

# CPC COOPERATIVE PATENT CLASSIFICATION

## H ELECTRICITY

(NOTE omitted)

## H01 ELECTRIC ELEMENTS

(NOTES omitted)

**H01L SEMICONDUCTOR DEVICES NOT COVERED BY CLASS [H10](#)** (use of semiconductor devices for measuring [G01](#); resistors in general [H01C](#); magnets, inductors or transformers [H01F](#); capacitors in general [H01G](#); electrolytic devices [H01G 9/00](#); batteries or accumulators [H01M](#); waveguides, resonators or lines of the waveguide type [H01P](#); line connectors or current collectors [H01R](#); stimulated-emission devices [H01S](#); electromechanical resonators [H03H](#); loudspeakers, microphones, gramophone pick-ups or like acoustic electromechanical transducers [H04R](#); electric light sources in general [H05B](#); printed circuits, hybrid circuits, casings or constructional details of electrical apparatus, manufacture of assemblages of electrical components [H05K](#); use of semiconductor devices in circuits having a particular application, see the subclass for the application)

### NOTES

1. This subclass is residual to class [H10](#).
2. This subclass covers:
  - a. semiconductor devices for rectifying, amplifying, oscillating or switching; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
  - b. semiconductor devices sensitive to radiation; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
  - c. semiconductor devices for light emission; their constructional details or arrangements; their assemblies or integrated devices; their manufacture or treatment;
  - d. processes or apparatus for the manufacture or treatment of semiconductor or solid-state devices where the type of device is not listed under bullets a to c, above, or not essential;
  - e. constructional details or arrangements of semiconductor or solid-state devices not covered by class [H10](#) and not specific to types of devices listed under bullets a to c, above;
  - f. packaging or assembling of semiconductor or solid-state devices covered by this subclass or by class [H10](#).
3. In this subclass, the following terms or expressions are used with the meaning indicated:
  - "wafer" means a slice of semiconductor or crystalline substrate material, which can be modified by impurity diffusion (doping), ion implantation or epitaxy, and whose active surface can be processed into arrays of discrete components or integrated circuits;
  - "solid state body" means the body of material within which, or at the surface of which, the physical effects characteristic of the device occur;
  - "electrode" is a region in or on the body of the device (other than the solid state body itself), which exerts an electrical influence on the solid state body, irrespective of whether or not an external electrical connection is made thereto. An electrode may include several portions and the term includes metallic regions which exert influence on the solid state body through an insulating region (e.g. capacitive coupling) and inductive coupling arrangements to the body. The dielectric region in a capacitive arrangement is regarded as part of the electrode. In arrangements including several portions, only those portions which exert an influence on the solid state body by virtue of their shape, size, or disposition or the material of which they are formed are considered to be part of the electrode. The other portions are considered to be "arrangements for conducting electric current to or from the solid state body" or "interconnections between solid state components formed in or on a common substrate", i.e. leads;
  - "device" means an electric circuit element; where an electric circuit element is one of a plurality of elements formed in or on a common substrate; it is referred to as a "component";
  - "complete device" is a device in its fully assembled state which may or may not require further treatment, e.g. electroforming, before it is ready for use but which does not require the addition of further structural units;
  - "parts" includes all structural units which are included in a complete device;
  - "container" is an enclosure forming part of the complete device and is essentially a solid construction in which the body of the device is placed, or which is formed around the body without forming an intimate layer thereon. An enclosure which consists of one or more layers formed on the body and in intimate contact therewith is referred to as an "encapsulation";
  - "integrated circuit" is a device where all components, e.g. diodes or resistors, are built up on a common substrate and form the device including interconnections between the components;
  - "assembly" of a device is the building up of the device from its constructional units; the term covers the provision of fillings in containers.

## H01L

### H01L

(continued)

4. In this subclass, both the process or apparatus for the manufacture or treatment of a device and the device itself are classified, whenever both of these are described sufficiently to be of interest.
5. Attention is drawn to Note (3) after the title of section C, which Note indicates to which version of the Periodic Table of chemical elements the CPC refers. In this subclass, the system used is the 8 group system, indicated by Roman numerals in the Periodic Table thereunder.

#### WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:

<a href="#">H01L 21/203</a>	covered by	<a href="#">H01L 21/02631</a>
<a href="#">H01L 21/205</a>	covered by	<a href="#">H01L 21/0262</a>
<a href="#">H01L 21/208</a>	covered by	<a href="#">H01L 21/02623</a>
<a href="#">H01L 21/301</a>	covered by	<a href="#">H01L 21/30</a>
<a href="#">H01L 21/36</a> - <a href="#">H01L 21/368</a>	covered by	<a href="#">H01L 21/02107</a>
<a href="#">H01L 21/58</a>	covered by	<a href="#">H01L 24/80</a>
<a href="#">H01L 21/66</a>	covered by	<a href="#">H01L 22/00</a>
<a href="#">H01L 21/98</a>	covered by	<a href="#">H01L 25/50</a>
2. {In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.}
3. Due to the ongoing developments in class [H10](#) and related subclasses, the information displayed in notes, references and definitions of this subclass may not be entirely accurate. For each specific subject matter referred to in this subclass, users are invited to consult the relevant place in class [H10](#) and to consider the class [H10](#) information as correct, in case of conflict.

<b>21/00</b>	<b>Processes or apparatus adapted for the manufacture or treatment of semiconductor or solid state devices or of parts thereof</b>	21/02041 . . . {Cleaning}
		21/02043 . . . {Cleaning before device manufacture, i.e. Begin-Of-Line process}
		21/02046 . . . . {Dry cleaning only ( <a href="#">H01L 21/02085</a> takes precedence)}
		21/02049 . . . . . {with gaseous HF}
		21/02052 . . . . . {Wet cleaning only ( <a href="#">H01L 21/02085</a> takes precedence)}
		21/02054 . . . . . {combining dry and wet cleaning steps ( <a href="#">H01L 21/02085</a> takes precedence)}
		21/02057 . . . . {Cleaning during device manufacture}
		21/0206 . . . . . {during, before or after processing of insulating layers}
21/02	. . . . . Manufacture or treatment of semiconductor devices or of parts thereof	21/02063 . . . . . {the processing being the formation of vias or contact holes}
21/02002	. . . . . {Preparing wafers}	21/02065 . . . . . {the processing being a planarization of insulating layers}
		21/02068 . . . . . {during, before or after processing of conductive layers, e.g. polysilicon or amorphous silicon layers}
		21/02071 . . . . . {the processing being a delineation, e.g. RIE, of conductive layers}
		21/02074 . . . . . {the processing being a planarization of conductive layers}
		21/02076 . . . . {Cleaning after the substrates have been singulated}
		21/02079 . . . . {Cleaning for reclaiming}
		21/02082 . . . . {product to be cleaned}
21/02005	. . . . . {Preparing bulk and homogeneous wafers}	21/02085 . . . . . {Cleaning of diamond}
21/02008	. . . . . {Multistep processes}	21/02087 . . . . . {Cleaning of wafer edges}
21/0201	. . . . . {Specific process step}	21/0209 . . . . . {Cleaning of wafer backside}
21/02013	. . . . . {Grinding, lapping}	21/02093 . . . . . {Cleaning of porous materials}
21/02016	. . . . . {Backside treatment}	21/02096 . . . . {only mechanical cleaning}
21/02019	. . . . . {Chemical etching}	21/02098 . . . . {only involving lasers, e.g. laser ablation}
21/02021	. . . . . {Edge treatment, chamfering}	21/02101 . . . . {only involving supercritical fluids}
21/02024	. . . . . {Mirror polishing}	21/02104 . . . . {Forming layers (deposition in general <a href="#">C23C</a> ; crystal growth in general <a href="#">C30B</a> )}
21/02027	. . . . . {Setting crystal orientation}	21/02107 . . . . {Forming insulating materials on a substrate}
21/0203	. . . . . {Making porous regions on the surface}	
21/02032	. . . . . {by reclaiming or re-processing}	
21/02035	. . . . . {Shaping}	

21/02109 . . . . .	{ characterised by the type of layer, e.g. type of material, porous/non-porous, pre-cursors, mixtures or laminates }	21/02164 . . . . .	{ the material being a silicon oxide, e.g. SiO <sub>2</sub> }
21/02112 . . . . .	{ characterised by the material of the layer }		<b>NOTE</b>
	<b>NOTE</b>		The formation of silicon oxide layers is classified in this group regardless of the precursor or of the process of formation; in case of explicit statements on doping, on rest-groups, or on material components see <a href="#">H01L 21/02126</a> and subgroups; deposition of silicon oxide from organic precursors without further statements on film composition is classified here and in <a href="#">H01L 21/02205</a> and subgroups
	Layers comprising sublayers, i.e. multi-layers, are additionally classified in <a href="#">H01L 21/022</a> ; porous layers are additionally classified in <a href="#">H01L 21/02203</a>		
21/02115 . . . . .	{ the material being carbon, e.g. alpha-C, diamond or hydrogen doped carbon }	21/02167 . . . . .	{ the material being a silicon carbide not containing oxygen, e.g. SiC, SiC:H or silicon carbonitrides ( <a href="#">H01L 21/02126</a> and <a href="#">H01L 21/0214</a> take precedence) }
21/02118 . . . . .	{ carbon based polymeric organic or inorganic material, e.g. polyimides, poly cyclobutene or PVC (polymers per se <a href="#">C08G</a> , photoresist per se <a href="#">G03F</a> ) }	21/0217 . . . . .	{ the material being a silicon nitride not containing oxygen, e.g. SixNy or SixByNz ( <a href="#">H01L 21/02126</a> and <a href="#">H01L 21/0214</a> take precedence) }
21/0212 . . . . .	{ the material being fluoro carbon compounds, e.g.(CF <sub>x</sub> ) <sub>n</sub> , (CH <sub>x</sub> F <sub>y</sub> ) <sub>n</sub> or polytetrafluoroethylene }	21/02172 . . . . .	{ the material containing at least one metal element, e.g. metal oxides, metal nitrides, metal oxynitrides or metal carbides (materials containing silicon <a href="#">H01L 21/02123</a> ; metal silicates <a href="#">H01L 21/02142</a> ) }
21/02123 . . . . .	{ the material containing silicon }	21/02175 . . . . .	{ characterised by the metal ( <a href="#">H01L 21/02197</a> takes precedence) }
21/02126 . . . . .	{ the material containing Si, O, and at least one of H, N, C, F, or other non-metal elements, e.g. SiOC, SiOC:H or SiONC }	21/02178 . . . . .	{ the material containing aluminium, e.g. Al <sub>2</sub> O <sub>3</sub> }
21/02129 . . . . .	{ the material being boron or phosphorus doped silicon oxides, e.g. BPSG, BSG or PSG }	21/02181 . . . . .	{ the material containing hafnium, e.g. HfO <sub>2</sub> }
	<b>NOTE</b>	21/02183 . . . . .	{ the material containing tantalum, e.g. Ta <sub>2</sub> O <sub>5</sub> }
	Halogen, e.g. fluorine, containing BPSG, PSG, BSG, and the like, are additionally classified in <a href="#">H01L 21/02131</a>	21/02186 . . . . .	{ the material containing titanium, e.g. TiO <sub>2</sub> }
21/02131 . . . . .	{ the material being halogen doped silicon oxides, e.g. FSG }	21/02189 . . . . .	{ the material containing zirconium, e.g. ZrO <sub>2</sub> }
21/02134 . . . . .	{ the material comprising hydrogen silsesquioxane, e.g. HSQ }	21/02192 . . . . .	{ the material containing at least one rare earth metal element, e.g. oxides of lanthanides, scandium or yttrium }
21/02137 . . . . .	{ the material comprising alkyl silsesquioxane, e.g. MSQ }	21/02194 . . . . .	{ the material containing more than one metal element }
21/0214 . . . . .	{ the material being a silicon oxynitride, e.g. SiON or SiON:H }	21/02197 . . . . .	{ the material having a perovskite structure, e.g. BaTiO <sub>3</sub> }
21/02142 . . . . .	{ the material containing silicon and at least one metal element, e.g. metal silicate based insulators or metal silicon oxynitrides }	21/022 . . . . .	{ the layer being a laminate, i.e. composed of sublayers, e.g. stacks of alternating high-k metal oxides (adhesion layers or buffer layers <a href="#">H01L 21/02304</a> , <a href="#">H01L 21/02362</a> ) }
21/02145 . . . . .	{ the material containing aluminium, e.g. AlSiO <sub>x</sub> }	21/02203 . . . . .	{ the layer being porous }
21/02148 . . . . .	{ the material containing hafnium, e.g. HfSiO <sub>x</sub> or HfSiON }	21/02205 . . . . .	{ the layer being characterised by the precursor material for deposition }
21/0215 . . . . .	{ the material containing tantalum, e.g. TaSiO <sub>x</sub> }	21/02208 . . . . .	{ the precursor containing a compound comprising Si }
21/02153 . . . . .	{ the material containing titanium, e.g. TiSiO <sub>x</sub> }	21/02211 . . . . .	{ the compound being a silane, e.g. disilane, methylsilane or chlorosilane }
21/02156 . . . . .	{ the material containing at least one rare earth element, e.g. silicate of lanthanides, scandium or yttrium }		
21/02159 . . . . .	{ the material containing zirconium, e.g. ZrSiO <sub>x</sub> }		
21/02161 . . . . .	{ the material containing more than one metal element }		

- 21/02214 . . . . . {the compound comprising silicon and oxygen}
- NOTE**  
This group does not cover mixtures of a silane and oxygen
- 21/02216 . . . . . {the compound being a molecule comprising at least one silicon-oxygen bond and the compound having hydrogen or an organic group attached to the silicon or oxygen, e.g. a siloxane}
- 21/02219 . . . . . {the compound comprising silicon and nitrogen}
- NOTE**  
This group does not cover mixtures of silane and nitrogen
- 21/02222 . . . . . {the compound being a silazane}
- 21/02225 . . . . . {characterised by the process for the formation of the insulating layer}
- 21/02227 . . . . . {formation by a process other than a deposition process}
- NOTE**  
Subject matter classified in the range of [H01L 21/0223](#) - [H01L 21/02249](#) is additionally classified in [H01L 21/02249](#), [H01L 21/02255](#) and [H01L 21/02252](#), depending on the type of reaction
- 21/0223 . . . . . {formation by oxidation, e.g. oxidation of the substrate}
- 21/02233 . . . . . {of the semiconductor substrate or a semiconductor layer}
- 21/02236 . . . . . {group IV semiconductor}
- 21/02238 . . . . . {silicon in uncombined form, i.e. pure silicon}
- 21/02241 . . . . . {III-V semiconductor}
- 21/02244 . . . . . {of a metallic layer}
- 21/02247 . . . . . {formation by nitridation, e.g. nitridation of the substrate}
- 21/02249 . . . . . {formation by combined oxidation and nitridation performed simultaneously}
- 21/02252 . . . . . {formation by plasma treatment, e.g. plasma oxidation of the substrate (after treatment of an insulating film by plasma [H01L 21/3105](#) and subgroups)}
- 21/02255 . . . . . {formation by thermal treatment ([H01L 21/02252](#) takes precedence; after treatment of an insulating film [H01L 21/3105](#) and subgroups)}
- 21/02258 . . . . . {formation by anodic treatment, e.g. anodic oxidation}
- 21/0226 . . . . . {formation by a deposition process ([per se C23C](#))}
- 21/02263 . . . . . {deposition from the gas or vapour phase}
- NOTE**  
This group and subgroups also cover deposition methods in which the gas or vapour is produced by physical means, e.g. ablation from targets or heating of source material
- 21/02266 . . . . . {deposition by physical ablation of a target, e.g. sputtering, reactive sputtering, physical vapour deposition or pulsed laser deposition}
- 21/02269 . . . . . {deposition by thermal evaporation ([H01L 21/02293](#) takes precedence)}
- NOTE**  
Subject matter relating to molecular beam epitaxy is classified in this group
- 21/02271 . . . . . {deposition by decomposition or reaction of gaseous or vapour phase compounds, i.e. chemical vapour deposition ([H01L 21/02266](#) takes precedence)}
- 21/02274 . . . . . {in the presence of a plasma [PECVD]}
- 21/02277 . . . . . {the reactions being activated by other means than plasma or thermal, e.g. photo-CVD}
- 21/0228 . . . . . {deposition by cyclic CVD, e.g. ALD, ALE, pulsed CVD}
- NOTE**  
Subject matter relating to cyclic plasma CVD is additionally classified in [H01L 21/02274](#)
- 21/02282 . . . . . {liquid deposition, e.g. spin-coating, sol-gel techniques, spray coating}
- 21/02285 . . . . . {Langmuir-Blodgett techniques}
- 21/02288 . . . . . {printing, e.g. ink-jet printing ([per se B41J](#))}
- 21/0229 . . . . . {liquid atomic layer deposition}
- 21/02293 . . . . . {formation of epitaxial layers by a deposition process ([epitaxial growth per se C30B](#))}
- NOTE**  
Formation of non-epitaxial layers by MBE, ALE, etc. is not covered by this group; for MBE see [H01L 21/02269](#); for ALE see [H01L 21/0228](#)
- 21/02296 . . . . . {characterised by the treatment performed before or after the formation of the layer ([H01L 21/02227](#) and subgroups take precedence)}
- NOTE**  
This group and subgroups only cover processes which are directly linked to the layer formation; routine anneals, i.e. thermal treatment without further features like a special atmosphere, presence of a plasma, thermally induced chemical reactions, change of phase (crystal structure) etc. are not classified here; for cleaning see [H01L 21/02041](#) and subgroups; for etching processes see [H01L 21/311](#) and subgroups; for planarization processes

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H01L 21/02296

(continued)

see [H01L 21/31051](#) and subgroups; for processes to repair etch damage see [H01L 21/3105](#) and subgroups

21/02299 . . . . . {pre-treatment}

**NOTE**

This group and subgroups cover treatments to improve adhesion or change the surface termination; for etching see [H01L 21/306](#) and subgroups and [H01L 21/311](#) and subgroups

21/02301 . . . . . {in-situ cleaning}

**NOTE**

Subject matter relating to the cleaning processes for semiconductor devices in general is covered by [H01L 21/02041](#) and subgroups

21/02304 . . . . . {formation of intermediate layers, e.g. buffer layers, layers to improve adhesion, lattice match or diffusion barriers}

21/02307 . . . . . {treatment by exposure to a liquid}

21/0231 . . . . . {treatment by exposure to electromagnetic radiation, e.g. UV light}

21/02312 . . . . . {treatment by exposure to a gas or vapour}

21/02315 . . . . . {treatment by exposure to a plasma}

21/02318 . . . . . {post-treatment}

**NOTE**

This group only covers processes that are part of the layer formation; treatments which are performed after completion of the insulating layer are covered by [H01L 21/3105](#) and subgroups

21/02321 . . . . . {introduction of substances into an already existing insulating layer ([H01L 21/02227](#) and subgroups take precedence)}

**NOTE**

processes like the introduction of phosphorus into silicon oxide by diffusion, or doping of an already existing insulating layer are covered by this group and subgroups; for the method of introduction, see [H01L 21/02337](#), [H01L 21/02343](#), [H01L 21/02345](#) and subgroups

21/02323 . . . . . {introduction of oxygen}

21/02326 . . . . . {into a nitride layer, e.g. changing SiN to SiON}

21/02329 . . . . . {introduction of nitrogen}

21/02332 . . . . . {into an oxide layer, e.g. changing SiO to SiON}

21/02334 . . . . . {in-situ cleaning after layer formation, e.g. removing process residues}

**NOTE**

Subject matter relating to the cleaning processes for semiconductor devices in general is covered by [H01L 21/02041](#) and subgroups

21/02337 . . . . . {treatment by exposure to a gas or vapour}

21/0234 . . . . . {treatment by exposure to a plasma}

21/02343 . . . . . {treatment by exposure to a liquid}

21/02345 . . . . . {treatment by exposure to radiation, e.g. visible light}

21/02348 . . . . . {treatment by exposure to UV light}

21/02351 . . . . . {treatment by exposure to corpuscular radiation, e.g. exposure to electrons, alpha-particles, protons or ions}

21/02354 . . . . . {using a coherent radiation, e.g. a laser}

21/02356 . . . . . {treatment to change the morphology of the insulating layer, e.g. transformation of an amorphous layer into a crystalline layer}

21/02359 . . . . . {treatment to change the surface groups of the insulating layer}

21/02362 . . . . . {formation of intermediate layers, e.g. capping layers or diffusion barriers}

21/02365 . . . . . {Forming inorganic semiconducting materials on a substrate}

21/02367 . . . . . {Substrates}

21/0237 . . . . . {Materials}

21/02373 . . . . . {Group 14 semiconducting materials}

21/02376 . . . . . {Carbon, e.g. diamond-like carbon}

21/02378 . . . . . {Silicon carbide}

21/02381 . . . . . {Silicon, silicon germanium, germanium}

21/02384 . . . . . {including tin}

21/02387 . . . . . {Group 13/15 materials}

21/02389 . . . . . {Nitrides}

21/02392 . . . . . {Phosphides}

21/02395 . . . . . {Arsenides}

21/02398 . . . . . {Antimonides}

21/024 . . . . . {Group 12/16 materials}

21/02403 . . . . . {Oxides}

21/02406 . . . . . {Sulfides}

21/02409 . . . . . {Selenides}

21/02411 . . . . . {Tellurides}

21/02414 . . . . . {Oxide semiconducting materials not being Group 12/16 materials, e.g. ternary compounds}

21/02417 . . . . . {Chalcogenide semiconducting materials not being oxides, e.g. ternary compounds}

21/0242 . . . . . {Crystalline insulating materials}

21/02422 . . . . . {Non-crystalline insulating materials, e.g. glass, polymers}

21/02425 . . . . . {Conductive materials, e.g. metallic silicides}

21/02428 . . . . . {Structure}

21/0243 . . . . . {Surface structure}

21/02433 . . . . . {Crystal orientation}

- 21/02436 . . . . . {Intermediate layers between substrates and deposited layers}
- 21/02439 . . . . . {Materials}
- 21/02441 . . . . . {Group 14 semiconducting materials}
- 21/02444 . . . . . {Carbon, e.g. diamond-like carbon}
- 21/02447 . . . . . {Silicon carbide}
- 21/0245 . . . . . {Silicon, silicon germanium, germanium}
- 21/02452 . . . . . {including tin}
- 21/02455 . . . . . {Group 13/15 materials}
- 21/02458 . . . . . {Nitrides}
- 21/02461 . . . . . {Phosphides}
- 21/02463 . . . . . {Arsenides}
- 21/02466 . . . . . {Antimonides}
- 21/02469 . . . . . {Group 12/16 materials}
- 21/02472 . . . . . {Oxides}
- 21/02474 . . . . . {Sulfides}
- 21/02477 . . . . . {Selenides}
- 21/0248 . . . . . {Tellurides}
- 21/02483 . . . . . {Oxide semiconducting materials not being Group 12/16 materials, e.g. ternary compounds}
- 21/02485 . . . . . {Other chalcogenide semiconducting materials not being oxides, e.g. ternary compounds}
- 21/02488 . . . . . {Insulating materials}
- 21/02491 . . . . . {Conductive materials}
- 21/02494 . . . . . {Structure}
- 21/02496 . . . . . {Layer structure}
- 21/02499 . . . . . {Monolayers}
- 21/02502 . . . . . {consisting of two layers}
- 21/02505 . . . . . {consisting of more than two layers}
- 21/02507 . . . . . {Alternating layers, e.g. superlattice}
- 21/0251 . . . . . {Graded layers}
- 21/02513 . . . . . {Microstructure}
- 21/02516 . . . . . {Crystal orientation}
- 21/02518 . . . . . {Deposited layers}
- 21/02521 . . . . . {Materials}
- 21/02524 . . . . . {Group 14 semiconducting materials}
- 21/02527 . . . . . {Carbon, e.g. diamond-like carbon}
- 21/02529 . . . . . {Silicon carbide}
- 21/02532 . . . . . {Silicon, silicon germanium, germanium}
- 21/02535 . . . . . {including tin}
- 21/02538 . . . . . {Group 13/15 materials}
- 21/0254 . . . . . {Nitrides}
- 21/02543 . . . . . {Phosphides}
- 21/02546 . . . . . {Arsenides}
- 21/02549 . . . . . {Antimonides}
- 21/02551 . . . . . {Group 12/16 materials}
- 21/02554 . . . . . {Oxides}
- 21/02557 . . . . . {Sulfides}
- 21/0256 . . . . . {Selenides}
- 21/02562 . . . . . {Tellurides}
- 21/02565 . . . . . {Oxide semiconducting materials not being Group 12/16 materials, e.g. ternary compounds}
- 21/02568 . . . . . {Chalcogenide semiconducting materials not being oxides, e.g. ternary compounds}
- 21/0257 . . . . . {Doping during depositing}
- 21/02573 . . . . . {Conductivity type}
- 21/02576 . . . . . {N-type}
- 21/02579 . . . . . {P-type}
- 21/02581 . . . . . {Transition metal or rare earth elements}
- 21/02584 . . . . . {Delta-doping}
- 21/02587 . . . . . {Structure}
- 21/0259 . . . . . {Microstructure}
- 21/02592 . . . . . {amorphous}
- 21/02595 . . . . . {polycrystalline}
- 21/02598 . . . . . {monocrystalline}
- 21/02601 . . . . . {Nanoparticles ([fullerenes H10K 85/211](#))}
- 21/02603 . . . . . {Nanowires}
- 21/02606 . . . . . {Nanotubes ([carbon nanotubes H10K 85/211](#))}
- 21/02609 . . . . . {Crystal orientation}
- 21/02612 . . . . . {Formation types}
- 21/02614 . . . . . {Transformation of metal, e.g. oxidation, nitridation}
- 21/02617 . . . . . {Deposition types}
- 21/0262 . . . . . {Reduction or decomposition of gaseous compounds, e.g. CVD}
- 21/02623 . . . . . {Liquid deposition}
- 21/02625 . . . . . {using melted materials}
- 21/02628 . . . . . {using solutions}
- 21/02631 . . . . . {Physical deposition at reduced pressure, e.g. MBE, sputtering, evaporation}
- 21/02634 . . . . . {Homoepitaxy}
- 21/02636 . . . . . {Selective deposition, e.g. simultaneous growth of mono- and non-monocrystalline semiconductor materials}
- 21/02639 . . . . . {Preparation of substrate for selective deposition}
- 21/02642 . . . . . {Mask materials other than SiO<sub>2</sub> or SiN}
- 21/02645 . . . . . {Seed materials}
- 21/02647 . . . . . {Lateral overgrowth}
- 21/0265 . . . . . {Pendeoepitaxy}
- 21/02653 . . . . . {Vapour-liquid-solid growth}
- 21/02656 . . . . . {Special treatments}
- 21/02658 . . . . . {Pretreatments ([cleaning in general H01L 21/02041](#))}
- 21/02661 . . . . . {In-situ cleaning}
- 21/02664 . . . . . {Aftertreatments ([planarisation in general H01L 21/304](#))}
- 21/02667 . . . . . {Crystallisation or recrystallisation of non-monocrystalline semiconductor materials, e.g. regrowth}
- 21/02669 . . . . . {using crystallisation inhibiting elements}
- 21/02672 . . . . . {using crystallisation enhancing elements}
- 21/02675 . . . . . {using laser beams}
- 21/02678 . . . . . {Beam shaping, e.g. using a mask}
- 21/0268 . . . . . {Shape of mask}
- 21/02683 . . . . . {Continuous wave laser beam}
- 21/02686 . . . . . {Pulsed laser beam}
- 21/02689 . . . . . {using particle beams}
- 21/02691 . . . . . {Scanning of a beam}

- 21/02694 . . . . . {Controlling the interface between substrate and epitaxial layer, e.g. by ion implantation followed by annealing}
- 21/02697 . . . {Forming conducting materials on a substrate}
- 21/027 . . Making masks on semiconductor bodies for further photolithographic processing not provided for in group [H01L 21/18](#) or [H01L 21/34](#) {(photographic masks or originals [per se G03F 1/00](#); registration or positioning of photographic masks or originals [G03F 9/00](#); photographic cameras [G03B](#); control of position [G05D 3/00](#))}
- 21/0271 . . . {comprising organic layers}
- 21/0272 . . . . {for lift-off processes}
- 21/0273 . . . . {characterised by the treatment of photoresist layers}
- 21/0274 . . . . . {Photolithographic processes}
- 21/0275 . . . . . {using lasers}
- 21/0276 . . . . . {using an anti-reflective coating (anti-reflective coating for lithography in general [G03F 7/09](#))}
- 21/0277 . . . . . {Electrolithographic processes}
- 21/0278 . . . . . {Röntgenlithographic or X-ray lithographic processes}
- 21/0279 . . . . . {Ionlithographic processes}
- 21/033 . . . comprising inorganic layers
- 21/0331 . . . . {for lift-off processes}
- 21/0332 . . . . {characterised by their composition, e.g. multilayer masks, materials}
- 21/0334 . . . . {characterised by their size, orientation, disposition, behaviour, shape, in horizontal or vertical plane}
- 21/0335 . . . . . {characterised by their behaviour during the process, e.g. soluble masks, redeposited masks}
- 21/0337 . . . . . {characterised by the process involved to create the mask, e.g. lift-off masks, sidewalls, or to modify the mask, e.g. pre-treatment, post-treatment}
- 21/0338 . . . . . {Process specially adapted to improve the resolution of the mask}
- 21/04 . . the devices having potential barriers, e.g. a PN junction, depletion layer or carrier concentration layer
- 21/0405 . . . {the devices having semiconductor bodies comprising semiconducting carbon, e.g. diamond, diamond-like carbon}
- NOTE**  
This group covers passivation
- 21/041 . . . . {Making n- or p-doped regions}
- 21/0415 . . . . . {using ion implantation}
- 21/042 . . . . {Changing their shape, e.g. forming recesses (etching of the semiconductor body [H01L 21/302](#))}
- 21/0425 . . . . {Making electrodes}
- 21/043 . . . . . {Ohmic electrodes}
- 21/0435 . . . . . {Schottky electrodes}
- 21/044 . . . . . {Conductor-insulator-semiconductor electrodes}
- 21/0445 . . . {the devices having semiconductor bodies comprising crystalline silicon carbide}
- 21/045 . . . . {passivating silicon carbide surfaces}
- 21/0455 . . . . {Making n or p doped regions or layers, e.g. using diffusion}
- 21/046 . . . . . {using ion implantation}
- NOTE**  
Processes where ion implantation of boron and subsequent annealing does not produce a p-doped region are classified elsewhere, e.g. [H01L 21/0445](#)
- 21/0465 . . . . . {using masks}
- 21/047 . . . . . {characterised by the angle between the ion beam and the crystal planes or the main crystal surface}
- 21/0475 . . . . {Changing the shape of the semiconductor body, e.g. forming recesses, (etching of the semiconductor body [H01L 21/302](#))}
- 21/048 . . . . {Making electrodes}
- 21/0485 . . . . . {Ohmic electrodes}
- 21/049 . . . . . {Conductor-insulator-semiconductor electrodes, e.g. MIS contacts}
- 21/0495 . . . . . {Schottky electrodes}
- 21/18 . . . the devices having semiconductor bodies comprising elements of Group IV of the Periodic Table or  $A_{III}B_V$  compounds with or without impurities, e.g. doping materials {([H01L 21/041](#) - [H01L 21/0425](#), [H01L 21/045](#) - [H01L 21/048](#) take precedence)}
- NOTE**  
This group covers also processes and apparatus which, by using the appropriate technology, are clearly suitable for manufacture or treatment of devices whose bodies comprise elements of Group IV of the Periodic Table or  $A_{III}B_V$  compounds, even if the material used is not explicitly specified.
- 21/182 . . . . {Intermixing or interdiffusion or disordering of III-V heterostructures, e.g. IILD}
- 21/185 . . . . {Joining of semiconductor bodies for junction formation}
- 21/187 . . . . . {by direct bonding}
- 21/20 . . . . Deposition of semiconductor materials on a substrate, e.g. epitaxial growth {solid phase epitaxy}
- 21/2003 . . . . . {characterised by the substrate}
- 21/2007 . . . . . {Bonding of semiconductor wafers to insulating substrates or to semiconducting substrates using an intermediate insulating layer ([H01L 21/2011](#) takes precedence; bonding of semiconductor wafers to semiconductor wafers for junction formation [H01L 21/187](#))}
- 21/2011 . . . . . {the substrate being of crystalline insulating material, e.g. sapphire}
- 21/2015 . . . . . {the substrate being of crystalline semiconductor material, e.g. lattice adaptation, heteroepitaxy}

- 21/22 . . . . Diffusion of impurity materials, e.g. doping materials, electrode materials, into or out of a semiconductor body, or between semiconductor regions; {Interactions between two or more impurities; Redistribution of impurities}
- 21/2205 . . . . {from the substrate during epitaxy, e.g. autodoping; Preventing or using autodoping}
- 21/221 . . . . {of killers}
- 21/2215 . . . . {in  $A_{III}B_V$  compounds}
- 21/222 . . . . {Lithium-drift}
- 21/2225 . . . . {Diffusion sources}
- 21/223 . . . . using diffusion into or out of a solid from or into a gaseous phase {[\(H01L 21/221 - H01L 21/222 take precedence; diffusion through an applied layer H01L 21/225\)](#)}
- 21/2233 . . . . {Diffusion into or out of  $A_{III}B_V$  compounds}
- 21/2236 . . . . {from or into a plasma phase}
- 21/225 . . . . using diffusion into or out of a solid from or into a solid phase, e.g. a doped oxide layer {[\(H01L 21/221 - H01L 21/222 take precedence\)](#)}
- 21/2251 . . . . {Diffusion into or out of group IV semiconductors}
- NOTE**  
 {In groups [H01L 21/2254 - H01L 21/2257](#) one should consider the main compositional parts of the applied layer just before the diffusion step}
- 21/2252 . . . . {using predeposition of impurities into the semiconductor surface, e.g. from a gaseous phase}
- 21/2253 . . . . {by ion implantation}
- 21/2254 . . . . {from or through or into an applied layer, e.g. photoresist, nitrides}
- 21/2255 . . . . {the applied layer comprising oxides only, e.g.  $P_2O_5$ , PSG,  $H_3BO_3$ , doped oxides}
- 21/2256 . . . . {through the applied layer}
- 21/2257 . . . . {the applied layer being silicon or silicide or SIPOS, e.g. polysilicon, porous silicon}
- 21/2258 . . . . {Diffusion into or out of  $A_{III}B_V$  compounds}
- 21/228 . . . . using diffusion into or out of a solid from or into a liquid phase, e.g. alloy diffusion processes {[\(H01L 21/221 - H01L 21/222 take precedence\)](#)}
- 21/24 . . . . Alloying of impurity materials, e.g. doping materials, electrode materials, with a semiconductor body {[\(H01L 21/182 takes precedence\)](#)}
- 21/242 . . . . {Alloying of doping materials with  $A_{III}B_V$  compounds}
- 21/244 . . . . {Alloying of electrode materials}
- 21/246 . . . . {with  $A_{III}B_V$  compounds}
- 21/248 . . . . {Apparatus specially adapted for the alloying}
- 21/26 . . . . Bombardment with radiation {[\(H01L 21/3105 takes precedence\)](#)}
- 21/2605 . . . . {using natural radiation, e.g. alpha, beta or gamma radiation}
- 21/261 . . . . to produce a nuclear reaction transmuted chemical elements
- 21/263 . . . . with high-energy radiation ([H01L 21/261 takes precedence](#))
- 21/2633 . . . . {for etching, e.g. sputteretching}
- 21/2636 . . . . {for heating, e.g. electron beam heating}
- 21/265 . . . . producing ion implantation
- 21/26506 . . . . {in group IV semiconductors}
- 21/26513 . . . . {of electrically active species}
- 21/2652 . . . . {Through-implantation}
- 21/26526 . . . . {Recoil-implantation}
- 21/26533 . . . . {of electrically inactive species in silicon to make buried insulating layers}
- 21/2654 . . . . {in  $A_{III}B_V$  compounds}
- 21/26546 . . . . {of electrically active species}
- 21/26553 . . . . {Through-implantation}
- 21/2656 . . . . {characterised by the implantation of both electrically active and inactive species in the same semiconductor region to be doped}
- 21/26566 . . . . {of a cluster, e.g. using a gas cluster ion beam}
- 2021/26573 . . . . {in diamond}
- 21/2658 . . . . {of a molecular ion, e.g. decaborane}
- 21/26586 . . . . {characterised by the angle between the ion beam and the crystal planes or the main crystal surface}
- 21/26593 . . . . {at a temperature lower than room temperature}
- 21/266 . . . . using masks {[\(H01L 21/26586 takes precedence\)](#)}
- 21/268 . . . . using electromagnetic radiation, e.g. laser radiation
- 21/2683 . . . . {using X-ray lasers}
- 21/2686 . . . . {using incoherent radiation}
- 21/28 . . . . Manufacture of electrodes on semiconductor bodies using processes or apparatus not provided for in groups [H01L 21/20 - H01L 21/268](#)
- 21/28008 . . . . {Making conductor-insulator-semiconductor electrodes}
- 21/28017 . . . . {the insulator being formed after the semiconductor body, the semiconductor being silicon}
- NOTE**  
 This group covers deposition of the insulators, including epitaxial insulators, and the conductors within the same process or chamber
- 21/28026 . . . . {characterised by the conductor ([H01L 21/28176 takes precedence](#))}
- NOTE**  
 When the final conductor comprises a superconductor, subject matter is not classified according to the subgroups [H01L 21/28035 - H01L 21/28097](#).

**H01L**

H01L 21/28026  
(continued)

	Instead, it is classified in <a href="#">H01L 21/28026</a>	21/28123 . . . . . {Lithography-related aspects, e.g. sub-lithography lengths; Isolation-related aspects, e.g. to solve problems arising at the crossing with the side of the device isolation; Planarisation aspects}
21/28035 . . . . .	{the final conductor layer next to the insulator being silicon, e.g. polysilicon, with or without impurities ( <a href="#">H01L 21/28105 takes precedence</a> )}	21/28132 . . . . . {conducting part of electrode is defined by a sidewall spacer or a similar technique, e.g. oxidation under mask, plating}
	<b>NOTE</b> A very thin, e.g. silicon, adhesion or seed layer is not considered as the one next to the insulator	21/28141 . . . . . {insulating part of the electrode is defined by a sidewall spacer, e.g. dummy spacer, or a similar technique, e.g. oxidation under mask, plating}
21/28044 . . . . .	{the conductor comprising at least another non-silicon conductive layer}	21/2815 . . . . . {part or whole of the electrode is a sidewall spacer or made by a similar technique, e.g. transformation under mask, plating}
21/28052 . . . . .	{the conductor comprising a silicide layer formed by the silicidation reaction of silicon with a metal layer ( <a href="#">formed by metal ion implantation H01L 21/28044</a> )}	21/28158 . . . . . {Making the insulator}
		21/28167 . . . . . {on single crystalline silicon, e.g. using a liquid, i.e. chemical oxidation}
21/28061 . . . . .	{the conductor comprising a metal or metal silicide formed by deposition, e.g. sputter deposition, i.e. without a silicidation reaction ( <a href="#">H01L 21/28052 takes precedence</a> )}	21/28176 . . . . . {with a treatment, e.g. annealing, after the formation of the definitive gate conductor}
	<b>NOTE</b> To assess the coverage of groups <a href="#">H01L 21/28052</a> and <a href="#">H01L 21/28061</a> , barrier layers, e.g. TaSiN, are not considered	21/28185 . . . . . {with a treatment, e.g. annealing, after the formation of the gate insulator and before the formation of the definitive gate conductor}
		21/28194 . . . . . {by deposition, e.g. evaporation, ALD, CVD, sputtering, laser deposition ( <a href="#">H01L 21/28202 takes precedence</a> )}
21/2807 . . . . .	{the final conductor layer next to the insulator being Si or Ge or C and their alloys except Si}	21/28202 . . . . . {in a nitrogen-containing ambient, e.g. nitride deposition, growth, oxynitridation, NH <sub>3</sub> nitridation, N <sub>2</sub> O oxidation, thermal nitridation, RTN, plasma nitridation, RPN}
21/28079 . . . . .	{the final conductor layer next to the insulator being a single metal, e.g. Ta, W, Mo, Al}	21/28211 . . . . . {in a gaseous ambient using an oxygen or a water vapour, e.g. RTO, possibly through a layer ( <a href="#">H01L 21/28194 and H01L 21/28202 take precedence</a> )}
21/28088 . . . . .	{the final conductor layer next to the insulator being a composite, e.g. TiN}	
21/28097 . . . . .	{the final conductor layer next to the insulator being a metallic silicide}	<b>NOTE</b> thin oxidation layers used as a barrier layer or as a buffer layer, e.g. before the formation of a high-k insulator, are classified here only if important <u>per se</u>
21/28105 . . . . .	{the final conductor next to the insulator having a lateral composition or doping variation, or being formed laterally by more than one deposition step}	
21/28114 . . . . .	{characterised by the sectional shape, e.g. T, inverted-T}	21/2822 . . . . . {with substrate doping, e.g. N, Ge, C implantation, before formation of the insulator}
	<b>NOTE</b> Documents are also classified in groups <a href="#">H01L 21/28035 - H01L 21/2810</a> when the composition is also relevant	21/28229 . . . . . {by deposition of a layer, e.g. metal, metal compound or polysilicon, followed by transformation thereof into an insulating layer}
		21/28238 . . . . . {with sacrificial oxide}

- 21/28247 . . . . . {passivation or protection of the electrode, e.g. using re-oxidation}
- 21/28255 . . . . . {the insulator being formed after the semiconductor body, the semiconductor belonging to Group IV and not being elemental silicon, e.g. Ge, SiGe, SiGeC}
- 21/28264 . . . . . {the insulator being formed after the semiconductor body, the semiconductor being a III-V compound}
- 21/283 . . . . . Deposition of conductive or insulating materials for electrodes {conducting electric current}
- 21/285 . . . . . from a gas or vapour, e.g. condensation
- 21/28506 . . . . . {of conductive layers}
- 21/28512 . . . . . {on semiconductor bodies comprising elements of Group IV of the Periodic Table}
- 21/28518 . . . . . {the conductive layers comprising silicides [\(H01L 21/28537 takes precedence\)](#)}
- 21/28525 . . . . . {the conductive layers comprising semiconducting material [\(H01L 21/28518, H01L 21/28537 take precedence\)](#)}
- 21/28531 . . . . . {Making of side-wall contacts}
- 21/28537 . . . . . {Deposition of Schottky electrodes}
- 21/2855 . . . . . {by physical means, e.g. sputtering, evaporation [\(H01L 21/28518 - H01L 21/28537 and H01L 21/28568 take precedence\)](#)}
- 21/28556 . . . . . {by chemical means, e.g. CVD, LPCVD, PECVD, laser CVD [\(H01L 21/28518 - H01L 21/28537 and H01L 21/28568 take precedence\)](#)}
- 21/28562 . . . . . {Selective deposition}
- 21/28568 . . . . . {the conductive layers comprising transition metals [\(H01L 21/28518 takes precedence\)](#)}
- 21/28575 . . . . . {on semiconductor bodies comprising  $A_{III}B_V$  compounds}
- 21/28581 . . . . . {Deposition of Schottky electrodes}
- 21/28587 . . . . . {characterised by the sectional shape, e.g. T, inverted T}
- 21/28593 . . . . . {asymmetrical sectional shape}
- 21/288 . . . . . from a liquid, e.g. electrolytic deposition
- 21/2885 . . . . . {using an external electrical current, i.e. electro-deposition}
- 21/30 . . . . . Treatment of semiconductor bodies using processes or apparatus not provided for in groups [H01L 21/20 - H01L 21/26 \(manufacture of electrodes thereon H01L 21/28\)](#)
- 21/3003 . . . . . {Hydrogenation or deuterisation, e.g. using atomic hydrogen from a plasma}
- 21/3006 . . . . . {of  $A_{III}B_V$  compounds}
- 21/302 . . . . . to change their surface-physical characteristics or shape, e.g. etching, polishing, cutting
- 21/304 . . . . . Mechanical treatment, e.g. grinding, polishing, cutting [{\(H01L 21/30625 takes precedence\)}](#)}
- 21/3043 . . . . . {Making grooves, e.g. cutting}
- 21/3046 . . . . . {using blasting, e.g. sand-blasting [\(H01L 21/2633 takes precedence\)](#)}
- 21/306 . . . . . Chemical or electrical treatment, e.g. electrolytic etching [\(to form insulating layers H01L 21/31\)](#)
- 21/30604 . . . . . {Chemical etching}
- 21/30608 . . . . . {Anisotropic liquid etching [\(H01L 21/3063 takes precedence\)](#)}
- 21/30612 . . . . . {Etching of  $A_{III}B_V$  compounds}
- 21/30617 . . . . . {Anisotropic liquid etching}
- 21/30621 . . . . . {Vapour phase etching}
- 21/30625 . . . . . {With simultaneous mechanical treatment, e.g. mechanico-chemical polishing}
- 21/3063 . . . . . Electrolytic etching
- 21/30635 . . . . . {of  $A_{III}B_V$  compounds}
- 21/3065 . . . . . Plasma etching; Reactive-ion etching
- 21/30655 . . . . . {comprising alternated and repeated etching and passivation steps, e.g. Bosch process}
- 21/308 . . . . . using masks [\(H01L 21/3063, H01L 21/3065 take precedence\)](#)
- 21/3081 . . . . . {characterised by their composition, e.g. multilayer masks, materials}
- 21/3083 . . . . . {characterised by their size, orientation, disposition, behaviour, shape, in horizontal or vertical plane}
- 21/3085 . . . . . {characterised by their behaviour during the process, e.g. soluble masks, redeposited masks}
- 21/3086 . . . . . {characterised by the process involved to create the mask, e.g. lift-off masks, sidewalls, or to modify the mask, e.g. pre-treatment, post-treatment}
- 21/3088 . . . . . {Process specially adapted to improve the resolution of the mask}
- 21/31 . . . . . to form insulating layers thereon, e.g. for masking or by using photolithographic techniques [\(encapsulating layers H01L 21/56\)](#); After treatment of these layers; Selection of materials for these layers
- 21/3105 . . . . . After-treatment
- 21/31051 . . . . . {Planarisation of the insulating layers [\(H01L 21/31058 takes precedence\)](#)}
- 21/31053 . . . . . {involving a dielectric removal step}
- 21/31055 . . . . . {the removal being a chemical etching step, e.g. dry etching [\(etching per se H01L 21/311\)](#)}

- 21/31056 . . . . . {the removal being a selective chemical etching step, e.g. selective dry etching through a mask}
- 21/31058 . . . . . {of organic layers}
- 21/311 . . . . . Etching the insulating layers {by chemical or physical means ([H01L 21/31058](#) takes precedence)}
- 21/31105 . . . . . {Etching inorganic layers}
- 21/31111 . . . . . {by chemical means}
- 21/31116 . . . . . {by dry-etching}
- 21/31122 . . . . . {of layers not containing Si, e.g. PZT, Al<sub>2</sub>O<sub>3</sub>}
- 21/31127 . . . . . {Etching organic layers}
- 21/31133 . . . . . {by chemical means}
- 21/31138 . . . . . {by dry-etching}
- 21/31144 . . . . . {using masks}
- 21/3115 . . . . . Doping the insulating layers
- 21/31155 . . . . . {by ion implantation}
- 21/312 . . . . . Organic layers, e.g. photoresist (*Frozen*)  
([H01L 21/3105](#), [H01L 21/32](#) take precedence; {photoresists *per se* [G03C](#)})

**WARNING**

Groups [H01L 21/312](#) – [H01L 21/3128](#) are no longer used for the classification of documents as of May 1, 2011. The content of these groups is being reclassified into groups [H01L 21/02107](#) – [H01L 21/02326](#).

Groups [H01L 21/02107](#) – [H01L 21/02326](#) should be considered in order to perform a complete search.

- 21/3121 . . . . . {Layers comprising organo-silicon compounds} (*Frozen*)
- 21/3122 . . . . . {layers comprising polysiloxane compounds} (*Frozen*)
- 21/3124 . . . . . {layers comprising hydrogen silsesquioxane} (*Frozen*)
- 21/3125 . . . . . {layers comprising silazane compounds} (*Frozen*)
- 21/3127 . . . . . {Layers comprising fluoro (hydro)carbon compounds, e.g. polytetrafluoroethylene} (*Frozen*)
- 21/3128 . . . . . {by Langmuir-Blodgett techniques} (*Frozen*)
- 21/314 . . . . . Inorganic layers ([H01L 21/3105](#), [H01L 21/32](#) take precedence) (*Frozen*)

**WARNING**

Groups [H01L 21/314](#) – [H01L 21/3185](#) are no longer used for the classification of documents as of May 1, 2011. The content of these group is being reclassified into group [H01L 21/02107](#) – [H01L 21/02326](#).

Groups [H01L 21/02107](#) – [H01L 21/02326](#) should be considered in order to perform a complete search.

- 21/3141 . . . . . {Deposition using atomic layer deposition techniques [ALD]} (*Frozen*)
- 21/3142 . . . . . {of nano-laminates, e.g. alternating layers of Al<sub>2</sub>O<sub>3</sub>-HfO<sub>2</sub>} (*Frozen*)
- 21/3143 . . . . . {composed of alternated layers or of mixtures of nitrides and oxides or of oxinitrides, e.g. formation of oxinitride by oxidation of nitride layers} (*Frozen*)
- 21/3144 . . . . . {on silicon} (*Frozen*)
- 21/3145 . . . . . {formed by deposition from a gas or vapour} (*Frozen*)
- 21/3146 . . . . . {Carbon layers, e.g. diamond-like layers} (*Frozen*)
- 21/3147 . . . . . {Epitaxial deposition of insulating materials} (*Frozen*)
- 21/3148 . . . . . {Silicon Carbide layers} (*Frozen*)
- 2021/3149 . . . . . {Langmuir-Blodgett techniques} (*Frozen*)
- 21/316 . . . . . composed of oxides or glassy oxides or oxide based glass (*Frozen*)

**WARNING**

Group [H01L 21/316](#) is no longer used for the classification of documents as of May 1, 2011. The content of this group is being reclassified into groups [H01L 21/02107](#) – [H01L 21/02326](#).

Groups [H01L 21/02107](#) – [H01L 21/02326](#) should be considered in order to perform a complete search.

- 21/31604 . . . . . {Deposition from a gas or vapour ([H01L 21/31691](#), [H01L 21/31695](#) take precedence)} (*Frozen*)
- 21/31608 . . . . . {Deposition of SiO<sub>2</sub> ([H01L 21/31625](#), [H01L 21/31629](#) and [H01L 21/31633](#) take precedence)} (*Frozen*)
- 21/31612 . . . . . {on a silicon body} (*Frozen*)
- 21/31616 . . . . . {Deposition of Al<sub>2</sub>O<sub>3</sub>} (*Frozen*)
- 21/3162 . . . . . {on a silicon body} (*Frozen*)
- 21/31625 . . . . . {Deposition of boron or phosphorus doped silicon oxide, e.g. BSG, PSG, BPSG} (*Frozen*)
- 21/31629 . . . . . {Deposition of halogen doped silicon oxide, e.g. fluorine doped silicon oxide} (*Frozen*)
- 21/31633 . . . . . {Deposition of carbon doped silicon oxide, e.g. SiOC} (*Frozen*)
- 21/31637 . . . . . {Deposition of Tantalum oxides, e.g. Ta<sub>2</sub>O<sub>5</sub>} (*Frozen*)
- 21/31641 . . . . . {Deposition of Zirconium oxides, e.g. ZrO<sub>2</sub>} (*Frozen*)
- 21/31645 . . . . . {Deposition of Hafnium oxides, e.g. HfO<sub>2</sub>} (*Frozen*)

21/3165 . . . . .	{formed by oxidation (Frozen) <a href="#">(H01L 21/31691, H01L 21/31695 take precedence)</a> }	21/3211 . . . . .	{Nitridation of silicon-containing layers}
21/31654 . . . . .	{of semiconductor materials, e.g. the body itself}	21/32115 . . . . .	{Planarisation}
21/31658 . . . . .	{by thermal oxidation, e.g. of SiGe}	21/3212 . . . . .	{by chemical mechanical polishing [CMP]}
21/31662 . . . . .	{of silicon in uncombined form}	21/32125 . . . . .	{by simultaneously passing an electrical current, i.e. electrochemical mechanical polishing, e.g. ECMP}
21/31666 . . . . .	{of AIII BV compounds}	21/3213 . . . . .	Physical or chemical etching of the layers, e.g. to produce a patterned layer from a pre-deposited extensive layer
21/3167 . . . . .	{of anodic oxidation}	21/32131 . . . . .	{by physical means only}
21/31675 . . . . .	{of silicon}	21/32132 . . . . .	{of silicon-containing layers}
21/31679 . . . . .	{of AIII BV compounds}	21/32133 . . . . .	{by chemical means only}
21/31683 . . . . .	{of metallic layers, e.g. Al deposited on the body, e.g. formation of multi-layer insulating structures}	21/32134 . . . . .	{by liquid etching only}
21/31687 . . . . .	{by anodic oxidation}	21/32135 . . . . .	{by vapour etching only}
21/31691 . . . . .	{with perovskite structure}	21/32136 . . . . .	{using plasmas}
21/31695 . . . . .	{Deposition of porous oxides or porous glassy oxides or oxide based porous glass}	21/32137 . . . . .	{of silicon-containing layers}
21/318 . . . . .	composed of nitrides	21/32138 . . . . .	{pre- or post-treatments, e.g. anti-corrosion processes}
	<b>WARNING</b>	21/32139 . . . . .	{using masks}
	Group <a href="#">H01L 21/318</a> is no longer used for the classification of documents as of May 1, 2011. The content of this group is being reclassified into groups <a href="#">H01L 21/02107</a> – <a href="#">H01L 21/02326</a> .	21/3215 . . . . .	Doping the layers
	Groups <a href="#">H01L 21/02107</a> – <a href="#">H01L 21/02326</a> should be considered in order to perform a complete search.	21/32155 . . . . .	{Doping polycrystalline - or amorphous silicon layers}
21/3185 . . . . .	{of siliconnitrides}	21/322 . . . . .	to modify their internal properties, e.g. to produce internal imperfections
(Frozen)		21/3221 . . . . .	{of silicon bodies, e.g. for gettering}
21/32 . . . . .	using masks	21/3223 . . . . .	{using cavities formed by hydrogen or noble gas ion implantation}
21/3205 . . . . .	Deposition of non-insulating-, e.g. conductive- or resistive-, layers on insulating layers; After-treatment of these layers ( <a href="#">manufacture of electrodes H01L 21/28</a> )	21/3225 . . . . .	{Thermally inducing defects using oxygen present in the silicon body for intrinsic gettering ( <a href="#">H01L 21/3226 takes precedence</a> )}
21/32051 . . . . .	{Deposition of metallic or metal-silicide layers}		<b>NOTE</b>
21/32053 . . . . .	{of metal-silicide layers}		Gettering using both extrinsic and intrinsic gettering techniques is classified in both <a href="#">H01L 21/3221</a> and <a href="#">H01L 21/3225</a>
21/32055 . . . . .	{Deposition of semiconductive layers, e.g. poly - or amorphous silicon layers}	21/3226 . . . . .	{of silicon on insulator}
21/32056 . . . . .	{Deposition of conductive or semi-conductive organic layers ( <a href="#">H01L 21/32058 takes precedence</a> )}	21/3228 . . . . .	{of A <sub>III</sub> B <sub>V</sub> compounds, e.g. to make them semi-insulating}
21/32058 . . . . .	{Deposition of superconductive layers}	21/324 . . . . .	Thermal treatment for modifying the properties of semiconductor bodies, e.g. annealing, sintering ( <a href="#">H01L 21/20 - H01L 21/288 and H01L 21/302 - H01L 21/322 take precedence</a> )
21/321 . . . . .	After treatment	21/3242 . . . . .	{for the formation of PN junctions without addition of impurities ( <a href="#">H01L 21/22 takes precedence</a> )}
21/32105 . . . . .	{Oxidation of silicon-containing layers}	21/3245 . . . . .	{of A <sub>III</sub> B <sub>V</sub> compounds}

- 21/3247 . . . . . {for altering the shape, e.g. smoothing the surface}
- WARNING**
- Group [H01L 21/3247](#) is incomplete pending reclassification of documents from group [H01L 21/324](#).
- Groups [H01L 21/324](#) and [H01L 21/3247](#) should be considered in order to perform a complete search.
- 21/326 . . . . . Application of electric currents or fields, e.g. for electroforming ([H01L 21/20](#) - [H01L 21/288](#) and [H01L 21/302](#) - [H01L 21/324](#) take precedence)
- 21/34 . . . the devices having semiconductor bodies not provided for in groups [H01L 21/18](#), [H10D 48/04](#) and [H10D 48/07](#), with or without impurities, e.g. doping materials
- 21/38 . . . . . Diffusion of impurity materials, e.g. doping materials, electrode materials, into or out of a semiconductor body, or between semiconductor regions
- 21/383 . . . . . using diffusion into or out of a solid from or into a gaseous phase
- 21/385 . . . . . using diffusion into or out of a solid from or into a solid phase, e.g. a doped oxide layer
- 21/388 . . . . . using diffusion into or out of a solid from or into a liquid phase, e.g. alloy diffusion processes
- 21/40 . . . . . Alloying of impurity materials, e.g. doping materials, electrode materials, with a semiconductor body
- 21/42 . . . . . Bombardment with radiation
- 21/423 . . . . . with high-energy radiation
- 21/425 . . . . . producing ion implantation
- 21/426 . . . . . using masks
- 21/428 . . . . . using electromagnetic radiation, e.g. laser radiation
- 21/44 . . . . . Manufacture of electrodes on semiconductor bodies using processes or apparatus not provided for in groups [H01L 21/38](#) - [H01L 21/428](#)
- 21/441 . . . . . Deposition of conductive or insulating materials for electrodes
- 21/443 . . . . . from a gas or vapour, e.g. condensation
- 21/445 . . . . . from a liquid, e.g. electrolytic deposition
- 21/447 . . . . . involving the application of pressure, e.g. thermo-compression bonding
- 21/449 . . . . . involving the application of mechanical vibrations, e.g. ultrasonic vibrations
- 21/46 . . . . . Treatment of semiconductor bodies using processes or apparatus not provided for in groups [H01L 21/428](#) (manufacture of electrodes thereon [H01L 21/44](#))
- 21/461 . . . . . to change their surface-physical characteristics or shape, e.g. etching, polishing, cutting
- 21/463 . . . . . Mechanical treatment, e.g. grinding, ultrasonic treatment
- 21/465 . . . . . Chemical or electrical treatment, e.g. electrolytic etching (to form insulating layers [H01L 21/469](#))
- 21/467 . . . . . using masks
- 21/469 . . . . . to form insulating layers thereon, e.g. for masking or by using photolithographic techniques (encapsulating layers [H01L 21/56](#)); After-treatment of these layers
- 21/47 . . . . . Organic layers, e.g. photoresist ([H01L 21/475](#), [H01L 21/4757](#) take precedence)
- 21/471 . . . . . Inorganic layers ([H01L 21/475](#), [H01L 21/4757](#) take precedence)
- 21/473 . . . . . composed of oxides or glassy oxides or oxide based glass
- 21/475 . . . . . using masks
- 21/4757 . . . . . After-treatment
- 21/47573 . . . . . {Etching the layer}
- 21/47576 . . . . . {Doping the layer}
- 21/4763 . . . . . Deposition of non-insulating, e.g. conductive -, resistive -, layers on insulating layers; After-treatment of these layers (manufacture of electrodes [H01L 21/28](#), ([H01L 21/44](#)))
- 21/47635 . . . . . {After-treatment of these layers}
- 21/477 . . . . . Thermal treatment for modifying the properties of semiconductor bodies, e.g. annealing, sintering ([H01L 21/38](#) - [H01L 21/449](#) and [H01L 21/461](#) - [H01L 21/475](#) take precedence)
- 21/479 . . . . . Application of electric currents or fields, e.g. for electroforming ([H01L 21/38](#) - [H01L 21/449](#) and [H01L 21/461](#) - [H01L 21/475](#) take precedence)
- 21/48 . . . . . Manufacture or treatment of parts, e.g. containers, prior to assembly of the devices, using processes not provided for in a single one of the groups [H01L 21/18](#) - [H01L 21/326](#) or [H10D 48/04](#) - [H10D 48/07](#)
- NOTE**
- In this group, the expression "treatment" covers also the removal of leads from parts
- 21/4803 . . . . . {Insulating or insulated parts, e.g. mountings, containers, diamond heatsinks ([H01L 21/4846](#) takes precedence; printed circuit boards [H05K 1/00](#))}
- 21/4807 . . . . . {Ceramic parts}
- 21/481 . . . . . {Insulating layers on insulating parts, with or without metallisation}
- 21/4814 . . . . . {Conductive parts}
- 21/4817 . . . . . {for containers, e.g. caps ([H01L 21/4871](#) takes precedence)}
- 21/4821 . . . . . {Flat leads, e.g. lead frames with or without insulating supports}
- 21/4825 . . . . . {Connection or disconnection of other leads to or from flat leads, e.g. wires, bumps, other flat leads}
- 21/4828 . . . . . {Etching (etching for cleaning without patterning [H01L 21/4835](#))}

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- 21/4832 . . . . . {Etching a temporary substrate after encapsulation process to form leads}
  - 21/4835 . . . . . {Cleaning, e.g. removing of solder}
  - 21/4839 . . . . . {Assembly of a flat lead with an insulating support, e.g. for TAB}
  - 21/4842 . . . . . {Mechanical treatment, e.g. punching, cutting, deforming, cold welding}
  - 21/4846 . . . . . {Leads on or in insulating or insulated substrates, e.g. metallisation [\(H01L 21/4821 takes precedence; metallisation of ceramics in general C04B 41/51; printed circuits H05K 3/00\)](#)}
  - 21/485 . . . . . {Adaptation of interconnections, e.g. engineering charges, repair techniques}
  - 21/4853 . . . . . {Connection or disconnection of other leads to or from a metallisation, e.g. pins, wires, bumps}
  - 21/4857 . . . . . {Multilayer substrates [\(multilayer metallisation on monolayer substrate H01L 21/4846\)](#)}
  - 21/486 . . . . . {Via connections through the substrate with or without pins}
  - 21/4864 . . . . . {Cleaning, e.g. removing of solder}
  - 21/4867 . . . . . {Applying pastes or inks, e.g. screen printing [\(H01L 21/486 takes precedence\)](#)}
  - 21/4871 . . . . . {Bases, plates or heatsinks}
  - 21/4875 . . . . . {Connection or disconnection of other leads to or from bases or plates}
  - 21/4878 . . . . . {Mechanical treatment, e.g. deforming}
  - 21/4882 . . . . . {Assembly of heatsink parts}
  - 21/4885 . . . . . {Wire-like parts or pins [\(wire ball formation B23K 20/00; methods related to connecting semiconductor or other solid state bodies H01L 24/00\)](#)}
  - 21/4889 . . . . . {Connection or disconnection of other leads to or from wire-like parts, e.g. wires}
  - 21/4892 . . . . . {Cleaning}
  - 21/4896 . . . . . {Mechanical treatment, e.g. cutting, bending}
  - 21/50 . . . . . Assembly of semiconductor devices using processes or apparatus not provided for in a single one of the groups [H01L 21/18 - H01L 21/326](#) or [H10D 48/04 - H10D 48/07](#) {e.g. sealing of a cap to a base of a container}
- NOTE**
- Arrangements for connecting or disconnecting semiconductor or other solid state bodies, or methods related thereto, other than those arrangements or methods covered by the following subgroups, are covered by [H01L 24/00](#)
- 21/52 . . . . . Mounting semiconductor bodies in containers
  - 21/54 . . . . . Providing fillings in containers, e.g. gas fillings
  - 21/56 . . . . . Encapsulations, e.g. encapsulation layers, coatings
  - 21/561 . . . . . {Batch processing}
  - 21/563 . . . . . {Encapsulation of active face of flip-chip device, e.g. underfilling or underencapsulation of flip-chip, encapsulation preform on chip or mounting substrate}
  - 21/565 . . . . . {Moulds}
  - 21/566 . . . . . {Release layers for moulds, e.g. release layers, layers against residue during moulding}
  - 21/568 . . . . . {Temporary substrate used as encapsulation process aid [\(H01L 21/4832 and H01L 21/566 take precedence\)](#)}
  - 21/60 . . . . . Attaching {or detaching} leads or other conductive members, to be used for carrying current to or from the device in operation
  - 2021/60007 . . . . . {involving a soldering or an alloying process}
  - 2021/60015 . . . . . {using plate connectors, e.g. layer, film}
  - 2021/60022 . . . . . {using bump connectors, e.g. for flip chip mounting}
  - 2021/6003 . . . . . {Apparatus therefor}
  - 2021/60037 . . . . . {Right-up bonding}
  - 2021/60045 . . . . . {Pre-treatment step of the bump connectors prior to bonding}
  - 2021/60052 . . . . . {Oxide removing step, e.g. flux, rosin}
  - 2021/6006 . . . . . {with temporary supporting member not part of an apparatus, e.g. removable coating, film or substrate}
  - 2021/60067 . . . . . {Aligning the bump connectors with the mounting substrate}
  - 2021/60075 . . . . . {involving active alignment, i.e. by apparatus steering, e.g. using alignment marks, sensors}
  - 2021/60082 . . . . . {involving passive alignment, e.g. using surface energy, chemical reactions, thermal equilibrium}
  - 2021/6009 . . . . . {involving guiding structures, e.g. structures that are left at least partly in the bonded product, spacers}
  - 2021/60097 . . . . . {Applying energy, e.g. for the soldering or alloying process}
  - 2021/60105 . . . . . {using electromagnetic radiation}
  - 2021/60112 . . . . . {Coherent radiation, i.e. laser beam}
  - 2021/6012 . . . . . {Incoherent radiation, e.g. polychromatic heating lamp}
  - 2021/60127 . . . . . {Induction heating, i.e. eddy currents}
  - 2021/60135 . . . . . {using convection, e.g. reflow oven}
  - 2021/60142 . . . . . {with a graded temperature profile}
  - 2021/6015 . . . . . {using conduction, e.g. chuck heater, thermocompression}
  - 2021/60157 . . . . . {with a graded temperature profile}
  - 2021/60165 . . . . . {using an electron beam}
  - 2021/60172 . . . . . {using static pressure}
  - 2021/6018 . . . . . {Unidirectional static pressure}
  - 2021/60187 . . . . . {Isostatic pressure, e.g. degassing using vacuum or pressurised liquid}

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- 2021/60195 . . . . . {using dynamic pressure, e.g. ultrasonic or thermosonic bonding}
- 2021/60202 . . . . . {using a protective atmosphere, e.g. with forming or shielding gas}
- 2021/6021 . . . . . {using an autocatalytic reaction}
- 2021/60217 . . . . . {Detaching bump connectors, e.g. after testing}
- 2021/60225 . . . . . {Arrangement of bump connectors prior to mounting}
- 2021/60232 . . . . . {wherein the bump connectors are disposed only on the semiconductor chip}
- 2021/6024 . . . . . {wherein the bump connectors are disposed only on the mounting substrate}
- 2021/60247 . . . . . {wherein the bump connectors are disposed on both the semiconductor chip and the mounting substrate, e.g. bump to bump}
- 2021/60255 . . . . . {wherein the bump connectors are provided as prepeg, e.g. are provided in an insulating plate member}
- 2021/60262 . . . . . {Lateral distribution of bump connectors prior to mounting}
- 2021/6027 . . . . . {Mounting on semiconductor conductive members}
- 2021/60277 . . . . . {involving the use of conductive adhesives}
- 2021/60285 . . . . . {involving the use of mechanical auxiliary parts without the use of an alloying or soldering process, e.g. pressure contacts}
- 2021/60292 . . . . . {involving the use of an electron or laser beam}
- 21/603 . . . . . involving the application of pressure, e.g. thermo-compression bonding ([H01L 21/607](#) takes precedence)
- 21/607 . . . . . involving the application of mechanical vibrations, e.g. ultrasonic vibrations
- 21/62 . . . . . the devices having no potential barriers
- 21/64 . . . . . Manufacture or treatment of solid state devices other than semiconductor devices, or of parts thereof, not peculiar to a single device provided for in subclasses [H10E](#), [H10H](#), [H10K](#) or [H10N](#)
- 21/67 . . . . . Apparatus specially adapted for handling semiconductor or electric solid state devices during manufacture or treatment thereof; Apparatus specially adapted for handling wafers during manufacture or treatment of semiconductor or electric solid state devices or components {; Apparatus not specifically provided for elsewhere (processes per se [H01L 21/30](#), [H01L 21/46](#), [H01L 23/00](#); simple temporary support means, e.g. using adhesives, electric or magnetic means [H01L 21/68](#), [H01L 21/302](#); apparatus for manufacturing arrangements for connecting or disconnecting semiconductor or solid-state bodies and for methods related thereto [H01L 24/74](#);)}
- 21/67005 . . . . . {Apparatus not specifically provided for elsewhere (processes per se [H01L 21/30](#), [H01L 21/46](#), [H01L 23/00](#); simple temporary support means, e.g. using adhesives, electric or magnetic means [H01L 21/68](#), [H01L 21/302](#))}
- 21/67011 . . . . . {Apparatus for manufacture or treatment (processes [H01L 21/30](#), [H01L 21/46](#); for production or after-treatment of single crystals or homogeneous polycrystalline material [C30B 35/00](#))}
- 21/67017 . . . . . {Apparatus for fluid treatment ([H01L 21/67126](#), [H01L 21/6715](#) take precedence)}
- 21/67023 . . . . . {for general liquid treatment, e.g. etching followed by cleaning}
- 21/67028 . . . . . {for cleaning followed by drying, rinsing, stripping, blasting or the like}
- 21/67034 . . . . . {for drying}
- 21/6704 . . . . . {for wet cleaning or washing}
- 21/67046 . . . . . {using mainly scrubbing means, e.g. brushes}
- 21/67051 . . . . . {using mainly spraying means, e.g. nozzles}
- 21/67057 . . . . . {with the semiconductor substrates being dipped in baths or vessels}
- 21/67063 . . . . . {for etching}
- 21/67069 . . . . . {for drying etching}
- 21/67075 . . . . . {for wet etching}
- 21/6708 . . . . . {using mainly spraying means, e.g. nozzles}
- 21/67086 . . . . . {with the semiconductor substrates being dipped in baths or vessels}
- 21/67092 . . . . . {Apparatus for mechanical treatment (or grinding or cutting, see the relevant groups in subclasses [B24B](#) or [B28D](#))}
- 21/67098 . . . . . {Apparatus for thermal treatment}
- 21/67103 . . . . . {mainly by conduction}
- 21/67109 . . . . . {mainly by convection}
- 21/67115 . . . . . {mainly by radiation}
- 21/67121 . . . . . {Apparatus for making assemblies not otherwise provided for, e.g. package constructions}
- 21/67126 . . . . . {Apparatus for sealing, encapsulating, glassing, decapsulating or the like (processes [H01L 23/02](#), [H01L 23/28](#))}
- 21/67132 . . . . . {Apparatus for placing on an insulating substrate, e.g. tape}
- 21/67138 . . . . . {Apparatus for wiring semiconductor or solid state device}
- 21/67144 . . . . . {Apparatus for mounting on conductive members, e.g. leadframes or conductors on insulating substrates}
- 21/6715 . . . . . {Apparatus for applying a liquid, a resin, an ink or the like ([H01L 21/67126](#) takes precedence)}
- 21/67155 . . . . . {Apparatus for manufacturing or treating in a plurality of work-stations}
- 21/67161 . . . . . {characterized by the layout of the process chambers}
- 21/67167 . . . . . {surrounding a central transfer chamber}
- 21/67173 . . . . . {in-line arrangement}
- 21/67178 . . . . . {vertical arrangement}

**NOTE**

In this subgroup the term substrate designates a semiconductor or electric solid state device or component, or a wafer

- 21/67184 . . . . . {characterized by the presence of more than one transfer chamber}
- 21/6719 . . . . . {characterized by the construction of the processing chambers, e.g. modular processing chambers}
- 21/67196 . . . . . {characterized by the construction of the transfer chamber}
- 21/67201 . . . . . {characterized by the construction of the load-lock chamber}
- 21/67207 . . . . . {comprising a chamber adapted to a particular process}
- 21/67213 . . . . . {comprising at least one ion or electron beam chamber (coating by ion implantation [C23C](#); ion or electron beam tubes [H01J 37/00](#))}
- 21/67219 . . . . . {comprising at least one polishing chamber (polishing apparatuses [B24B](#))}
- 21/67225 . . . . . {comprising at least one lithography chamber (lithographic apparatuses [G03F 7/00](#))}
- 21/6723 . . . . . {comprising at least one plating chamber (electroless plating apparatuses [C23C](#), electroplating apparatuses [C25D](#))}
- 21/67236 . . . . . {the substrates being processed being not semiconductor wafers, e.g. leadframes or chips}
- 21/67242 . . . . . {Apparatus for monitoring, sorting or marking (testing or measuring during manufacture [H01L 22/00](#), marks per se [H01L 23/544](#); testing individual semiconductor devices [G01R 31/26](#))}
- 21/67248 . . . . . {Temperature monitoring}
- 21/67253 . . . . . {Process monitoring, e.g. flow or thickness monitoring}
- 21/67259 . . . . . {Position monitoring, e.g. misposition detection or presence detection}
- 21/67265 . . . . . {of substrates stored in a container, a magazine, a carrier, a boat or the like}
- 21/67271 . . . . . {Sorting devices}
- 21/67276 . . . . . {Production flow monitoring, e.g. for increasing throughput (program-control systems per se [G05B 19/00](#), e.g. total factory control [G05B 19/418](#))}
- 21/67282 . . . . . {Marking devices}
- 21/67288 . . . . . {Monitoring of warpage, curvature, damage, defects or the like}
- 21/67294 . . . . . {using identification means, e.g. labels on substrates or labels on containers}
- 21/673 . . . . . using specially adapted carriers {or holders; Fixing the workpieces on such carriers or holders (holders for supporting a complete device in operation [H01L 23/32](#))}
- 21/67303 . . . . . {Vertical boat type carrier whereby the substrates are horizontally supported, e.g. comprising rod-shaped elements}
- 21/67306 . . . . . {characterized by a material, a roughness, a coating or the like}
- 21/67309 . . . . . {characterized by the substrate support}
- 21/67313 . . . . . {Horizontal boat type carrier whereby the substrates are vertically supported, e.g. comprising rod-shaped elements}
- 21/67316 . . . . . {characterized by a material, a roughness, a coating or the like}
- 21/6732 . . . . . {Vertical carrier comprising wall type elements whereby the substrates are horizontally supported, e.g. comprising sidewalls}
- 21/67323 . . . . . {characterized by a material, a roughness, a coating or the like}
- 21/67326 . . . . . {Horizontal carrier comprising wall type elements whereby the substrates are vertically supported, e.g. comprising sidewalls}
- 21/6733 . . . . . {characterized by a material, a roughness, a coating or the like}
- 21/67333 . . . . . {Trays for chips ([magazine for components H05K 13/0084](#))}
- 21/67336 . . . . . {characterized by a material, a roughness, a coating or the like}
- 21/6734 . . . . . {specially adapted for supporting large square shaped substrates (containers and packaging elements for glass sheets [B65D 85/48](#), transporting of glass products during their manufacture [C03B 35/00](#))}
- 21/67343 . . . . . {characterized by a material, a roughness, a coating or the like}
- 21/67346 . . . . . {characterized by being specially adapted for supporting a single substrate or by comprising a stack of such individual supports}
- 21/6735 . . . . . {Closed carriers}
- 21/67353 . . . . . {specially adapted for a single substrate}
- 21/67356 . . . . . {specially adapted for containing chips, dies or ICs}
- 21/67359 . . . . . {specially adapted for containing masks, reticles or pellicles}
- 21/67363 . . . . . {specially adapted for containing substrates other than wafers ([H01L 21/67356](#), [H01L 21/67359](#) take precedence)}
- 21/67366 . . . . . {characterised by materials, roughness, coatings or the like (materials relating to an injection moulding process [B29C 45/00](#); chemical composition of materials [C08L 51/00](#))}
- 21/67369 . . . . . {characterised by shock absorbing elements, e.g. retainers or cushions}
- 21/67373 . . . . . {characterised by locking systems}
- 21/67376 . . . . . {characterised by sealing arrangements}
- 21/67379 . . . . . {characterised by coupling elements, kinematic members, handles or elements to be externally gripped}
- 21/67383 . . . . . {characterised by substrate supports}
- 21/67386 . . . . . {characterised by the construction of the closed carrier}
- 21/67389 . . . . . {characterised by atmosphere control}
- 21/67393 . . . . . {characterised by the presence of atmosphere modifying elements inside or attached to the closed carrier!}
- 21/67396 . . . . . {characterised by the presence of antistatic elements}
- 21/677 . . . . . for conveying, e.g. between different workstations
- 21/67703 . . . . . {between different workstations}
- 21/67706 . . . . . {Mechanical details, e.g. roller, belt ([H01L 21/67709](#) takes precedence)}
- 21/67709 . . . . . {using magnetic elements}
- 21/67712 . . . . . {the substrate being handled substantially vertically}
- 21/67715 . . . . . {Changing the direction of the conveying path}

- 21/67718 . . . . {Changing orientation of the substrate, e.g. from a horizontal position to a vertical position}
- 21/67721 . . . . {the substrates to be conveyed not being semiconductor wafers or large planar substrates, e.g. chips, lead frames ([H01L 21/6773](#) takes precedence)}
- 21/67724 . . . . {by means of a cart or a vehicle}
- 21/67727 . . . . {using a general scheme of a conveying path within a factory}
- 21/6773 . . . . {Conveying cassettes, containers or carriers}
- 21/67733 . . . . {Overhead conveying}
- 21/67736 . . . . {Loading to or unloading from a conveyor}
- 21/67739 . . . {into and out of processing chamber}
- 21/67742 . . . . {Mechanical parts of transfer devices ([robots in general in B25J](#))}
- 21/67745 . . . . {characterized by movements or sequence of movements of transfer devices}
- 21/67748 . . . . {horizontal transfer of a single workpiece}
- 21/67751 . . . . {vertical transfer of a single workpiece}
- 21/67754 . . . . {horizontal transfer of a batch of workpieces}
- 21/67757 . . . . {vertical transfer of a batch of workpieces}
- 21/6776 . . . . {Continuous loading and unloading into and out of a processing chamber, e.g. transporting belts within processing chambers}
- 21/67763 . . . {the wafers being stored in a carrier, involving loading and unloading ([H01L 21/6779](#) takes precedence)}
- 21/67766 . . . . {Mechanical parts of transfer devices ([robots in general in B25J](#))}
- 21/67769 . . . . {Storage means}
- 21/67772 . . . . {involving removal of lid, door, cover}
- 21/67775 . . . . {Docking arrangements}
- 21/67778 . . . . {involving loading and unloading of wafers}
- 21/67781 . . . . {Batch transfer of wafers}
- 21/67784 . . . {using air tracks}
- 21/67787 . . . . {with angular orientation of the workpieces}
- 21/6779 . . . . {the workpieces being stored in a carrier, involving loading and unloading}
- 21/67793 . . . {with orientating and positioning by means of a vibratory bowl or track}
- 21/67796 . . . {with angular orientation of workpieces ([H01L 21/67787](#) and [H01L 21/67793](#) take precedence)}
- 21/68 . . for positioning, orientation or alignment
- 21/681 . . . {using optical controlling means}
- 21/682 . . . {Mask-wafer alignment (in general [G03F 7/70](#), [G03F 9/70](#))}
- 21/683 . . for supporting or gripping (for conveying [H01L 21/677](#), for positioning, orientation or alignment [H01L 21/68](#))
- 21/6831 . . . {using electrostatic chucks}
- 21/6833 . . . . {Details of electrostatic chucks}
- 21/6835 . . . {using temporarily an auxiliary support}
- NOTE**
- [H01L 21/6835](#), details of the apparatus are to be further indexed using the indexing codes chosen from [H01L 2221/68304](#) and subgroups
- 21/6836 . . . . {Wafer tapes, e.g. grinding or dicing support tapes ([adhesive tapes in general C09J 7/20](#))}
- 21/6838 . . . {with gripping and holding devices using a vacuum; Bernoulli devices}
- 21/687 . . . using mechanical means, e.g. chucks, clamps or pinches ({[using electrostatic chucks H01L 21/6831](#))}
- 21/68707 . . . . {the wafers being placed on a robot blade, or gripped by a gripper for conveyance}
- 21/68714 . . . . {the wafers being placed on a susceptor, stage or support}
- 21/68721 . . . . {characterised by edge clamping, e.g. clamping ring}
- 21/68728 . . . . {characterised by a plurality of separate clamping members, e.g. clamping fingers}
- 21/68735 . . . . {characterised by edge profile or support profile}
- 21/68742 . . . . {characterised by a lifting arrangement, e.g. lift pins}
- 21/6875 . . . . {characterised by a plurality of individual support members, e.g. support posts or protrusions}
- 21/68757 . . . . {characterised by a coating or a hardness or a material}
- 21/68764 . . . . {characterised by a movable susceptor, stage or support, others than those only rotating on their own vertical axis, e.g. susceptors on a rotating carousel}
- 21/68771 . . . . {characterised by supporting more than one semiconductor substrate}
- 21/68778 . . . . {characterised by supporting substrates others than wafers, e.g. chips}
- 21/68785 . . . . {characterised by the mechanical construction of the susceptor, stage or support}
- 21/68792 . . . . {characterised by the construction of the shaft}
- 21/70 . . Manufacture or treatment of devices consisting of a plurality of solid state components formed in or on a common substrate or of parts thereof; Manufacture of integrated circuit devices or of parts thereof ({[multistep manufacturing processes of assemblies consisting of a plurality of individual semiconductor or other solid state devices H01L 25/00](#); } [manufacture of assemblies consisting of preformed electrical components H05K 3/00](#), [H05K 13/00](#))
- 21/702 . . {of thick- or thin-film circuits or parts thereof}
- 21/705 . . . {of thick-film circuits or parts thereof}
- 21/707 . . . {of thin-film circuits or parts thereof}
- 21/71 . . Manufacture of specific parts of devices defined in group [H01L 21/70](#) ({[H01L 21/0405](#), [H01L 21/0445](#)}, [H01L 21/28](#), [H01L 21/44](#), [H01L 21/48](#) take precedence)
- 21/74 . . . Making of {localized} buried regions, e.g. buried collector layers, internal connections {substrate contacts}
- 21/743 . . . . {Making of internal connections, substrate contacts}
- 21/746 . . . . {for AIII-BV integrated circuits}
- 21/76 . . . Making of isolation regions between components
- 21/7602 . . . . {between components manufactured in an active substrate comprising SiC compounds}

- 21/7605 . . . . {between components manufactured in an active substrate comprising AIII BV compounds}
- 21/7607 . . . . {between components manufactured in an active substrate comprising A<sub>II</sub>B<sub>VI</sub> compounds}
- 21/761 . . . . PN junctions
- 21/762 . . . . Dielectric regions {, e.g. EPIC dielectric isolation, LOCOS; Trench refilling techniques, SOI technology, use of channel stoppers}
- 21/76202 . . . . {using a local oxidation of silicon, e.g. LOCOS, SWAMI, SILO ([H01L 21/76235](#) takes precedence; together with vertical isolation, e.g. LOCOS in a SOI substrate, [H01L 21/76264](#))}
- 21/76205 . . . . {in a region being recessed from the surface, e.g. in a recess, groove, tub or trench region}
- 21/76208 . . . . {using auxiliary pillars in the recessed region, e.g. to form LOCOS over extended areas}
- 21/7621 . . . . {the recessed region having a shape other than rectangular, e.g. rounded or oblique shape ([H01L 21/76208](#) takes precedence)}
- 21/76213 . . . . {introducing electrical inactive or active impurities in the local oxidation region, e.g. to alter LOCOS oxide growth characteristics or for additional isolation purpose}
- 21/76216 . . . . {introducing electrical active impurities in the local oxidation region for the sole purpose of creating channel stoppers}
- 21/76218 . . . . {introducing both types of electrical active impurities in the local oxidation region for the sole purpose of creating channel stoppers, e.g. for isolation of complementary doped regions}
- 21/76221 . . . . {with a plurality of successive local oxidation steps}
- 21/76224 . . . . {using trench refilling with dielectric materials ([trench filling with polycrystalline silicon \[H01L 21/763\]\(#\); together with vertical isolation, e.g. trench refilling in a SOI substrate \[H01L 21/76264\]\(#\)](#))}
- 21/76227 . . . . {the dielectric materials being obtained by full chemical transformation of non-dielectric materials, such as polycrystalline silicon, metals}
- 21/76229 . . . . {Concurrent filling of a plurality of trenches having a different trench shape or dimension, e.g. rectangular and V-shaped trenches, wide and narrow trenches, shallow and deep trenches}
- 21/76232 . . . . {of trenches having a shape other than rectangular or V-shape, e.g. rounded corners, oblique or rounded trench walls ([H01L 21/76229](#) takes precedence)}
- 21/76235 . . . . {trench shape altered by a local oxidation of silicon process step, e.g. trench corner rounding by LOCOS}
- 21/76237 . . . . {introducing impurities in trench side or bottom walls, e.g. for forming channel stoppers or alter isolation behavior}
- 21/7624 . . . . {using semiconductor on insulator [SOI] technology}
- 21/76243 . . . . {using silicon implanted buried insulating layers, e.g. oxide layers, i.e. SIMOX techniques}
- 21/76245 . . . . {using full isolation by porous oxide silicon, i.e. FIPOS techniques}
- 21/76248 . . . . {using lateral overgrowth techniques, i.e. ELO techniques}
- 21/76251 . . . . {using bonding techniques}
- 21/76254 . . . . {with separation/delamination along an ion implanted layer, e.g. Smart-cut, Unibond}
- 21/76256 . . . . {using silicon etch back techniques, e.g. BESOI, ELTRAN}
- 21/76259 . . . . {with separation/delamination along a porous layer}
- 21/76262 . . . . {using selective deposition of single crystal silicon, i.e. SEG techniques}
- 21/76264 . . . . {SOI together with lateral isolation, e.g. using local oxidation of silicon, or dielectric or polycrystalline material refilled trench or air gap isolation regions, e.g. completely isolated semiconductor islands}
- 21/76267 . . . . {Vertical isolation by silicon implanted buried insulating layers, e.g. oxide layers, i.e. SIMOX techniques}
- 21/7627 . . . . {Vertical isolation by full isolation by porous oxide silicon, i.e. FIPOS techniques}
- 21/76272 . . . . {Vertical isolation by lateral overgrowth techniques, i.e. ELO techniques}
- 21/76275 . . . . {Vertical isolation by bonding techniques}
- 21/76278 . . . . {Vertical isolation by selective deposition of single crystal silicon, i.e. SEG techniques}
- 21/76281 . . . . {Lateral isolation by selective oxidation of silicon}
- 21/76283 . . . . {Lateral isolation by refilling of trenches with dielectric material}
- 21/76286 . . . . {Lateral isolation by refilling of trenches with polycrystalline material}
- 21/76289 . . . . {Lateral isolation by air gap}
- 21/76291 . . . . {Lateral isolation by field effect}
- 21/76294 . . . . {using selective deposition of single crystal silicon, i.e. SEG techniques}
- 21/76297 . . . . {Dielectric isolation using EPIC techniques, i.e. epitaxial passivated integrated circuit}
- 21/763 . . . . Polycrystalline semiconductor regions ([H01L 21/76264](#) takes precedence)}
- 21/764 . . . . Air gaps ([H01L 21/76264](#) takes precedence)}
- 21/765 . . . . by field effect ([H01L 21/76264](#) takes precedence)}

- 21/768 . . . Applying interconnections to be used for carrying current between separate components within a device {comprising conductors and dielectrics}
- NOTE**  
Groups  
[H01L 21/768](#) - [H01L 21/76898](#) cover multi-step processes for manufacturing interconnections. Information peculiar to single-step processes should also be classified in the corresponding group, e.g.
  - cleaning [H01L 21/02041](#)
  - etching [H01L 21/311](#), [H01L 21/3213](#)
  - masking [H01L 21/027](#), [H01L 21/033](#), [H01L 21/31144](#), [H01L 21/32139](#)
  - planarizing [H01L 21/3105](#), [H01L 21/321](#)
- 21/76801 . . . . {characterised by the formation and the after-treatment of the dielectrics, e.g. smoothing}
- 21/76802 . . . . . {by forming openings in dielectrics}
- 21/76804 . . . . . {by forming tapered via holes}
- 21/76805 . . . . . {the opening being a via or contact hole penetrating the underlying conductor}
- 21/76807 . . . . . {for dual damascene structures}
- 21/76808 . . . . . {involving intermediate temporary filling with material}
- 21/7681 . . . . . {involving one or more buried masks}
- 21/76811 . . . . . {involving multiple stacked pre-patterned masks}
- 21/76813 . . . . . {involving a partial via etch}
- 21/76814 . . . . . {post-treatment or after-treatment, e.g. cleaning or removal of oxides on underlying conductors}
- 21/76816 . . . . . {Aspects relating to the layout of the pattern or to the size of vias or trenches ([layout of the interconnections per se H01L 23/528](#); [CAD of ICs G06F 30/00](#))}
- 21/76817 . . . . . {using printing or stamping techniques}
- 21/76819 . . . . . {Smoothing of the dielectric ([planarisation of insulating materials per se H01L 21/31051](#))}
- 21/7682 . . . . . {the dielectric comprising air gaps}
- 21/76822 . . . . . {Modification of the material of dielectric layers, e.g. grading, after-treatment to improve the stability of the layers, to increase their density etc.}
- 21/76823 . . . . . {transforming an insulating layer into a conductive layer}
- 21/76825 . . . . . {by exposing the layer to particle radiation, e.g. ion implantation, irradiation with UV light or electrons etc. ([plasma treatment H01L 21/76826](#))}
- 21/76826 . . . . . {by contacting the layer with gases, liquids or plasmas}
- 21/76828 . . . . . {thermal treatment}
- 21/76829 . . . . . {characterised by the formation of thin functional dielectric layers, e.g. dielectric etch-stop, barrier, capping or liner layers}
- 21/76831 . . . . . {in via holes or trenches, e.g. non-conductive sidewall liners}
- 21/76832 . . . . . {Multiple layers}
- 21/76834 . . . . . {formation of thin insulating films on the sidewalls or on top of conductors ([H01L 21/76831](#) takes precedence)}
- 21/76835 . . . . . {Combinations of two or more different dielectric layers having a low dielectric constant ([H01L 21/76832](#) takes precedence)}
- 21/76837 . . . . . {Filling up the space between adjacent conductive structures; Gap-filling properties of dielectrics}
- 21/76838 . . . . . {characterised by the formation and the after-treatment of the conductors ([etching for patterning the conductors H01L 21/3213](#))}
- NOTE**  
When the interconnect is also used as the conductor part of a conductor insulator semiconductor electrode (gate level interconnections), documents are classified in the relevant electrode manufacture groups, e.g. [H01L 21/28026](#)
- 21/7684 . . . . . {Smoothing; Planarisation}
- 21/76841 . . . . . {Barrier, adhesion or liner layers}
- 21/76843 . . . . . {formed in openings in a dielectric}
- 21/76844 . . . . . {Bottomless liners}
- 21/76846 . . . . . {Layer combinations}
- 21/76847 . . . . . {the layer being positioned within the main fill metal}
- 21/76849 . . . . . {the layer being positioned on top of the main fill metal}
- 21/7685 . . . . . {the layer covering a conductive structure ([H01L 21/76849](#) takes precedence)}
- 21/76852 . . . . . {the layer also covering the sidewalls of the conductive structure}
- 21/76853 . . . . . {characterized by particular after-treatment steps}
- 21/76855 . . . . . {After-treatment introducing at least one additional element into the layer}
- 21/76856 . . . . . {by treatment in plasmas or gaseous environments, e.g. nitriding a refractory metal liner}
- 21/76858 . . . . . {by diffusing alloying elements}
- 21/76859 . . . . . {by ion implantation}
- 21/76861 . . . . . {Post-treatment or after-treatment not introducing additional chemical elements into the layer}
- 21/76862 . . . . . {Bombardment with particles, e.g. treatment in noble gas plasmas; UV irradiation}
- 21/76864 . . . . . {Thermal treatment}
- 21/76865 . . . . . {Selective removal of parts of the layer ([H01L 21/76844](#) takes precedence)}
- 21/76867 . . . . . {characterized by methods of formation other than PVD, CVD or deposition from a liquids ([PVD H01L 21/2855](#); [CVD H01L 21/28556](#); [deposition from liquids H01L 21/288](#))}
- 21/76868 . . . . . {Forming or treating discontinuous thin films, e.g. repair, enhancement or reinforcement of discontinuous thin films}

21/7687	. . . . . {Thin films associated with contacts of capacitors}	22/10	. {Measuring as part of the manufacturing process ( <a href="#">burn-in G01R 31/2855</a> )}
21/76871	. . . . . {Layers specifically deposited to enhance or enable the nucleation of further layers, i.e. seed layers}	22/12	. . {for structural parameters, e.g. thickness, line width, refractive index, temperature, warp, bond strength, defects, optical inspection, electrical measurement of structural dimensions, metallurgic measurement of diffusions ( <a href="#">electrical measurement of diffusions H01L 22/14</a> )}
21/76873	. . . . . {for electroplating}	22/14	. . {for electrical parameters, e.g. resistance, deep-levels, CV, diffusions by electrical means}
21/76874	. . . . . {for electroless plating}	22/20	. {Sequence of activities consisting of a plurality of measurements, corrections, marking or sorting steps}
21/76876	. . . . . {for deposition from the gas phase, e.g. CVD}	22/22	. . {Connection or disconnection of sub-entities or redundant parts of a device in response to a measurement ( <a href="#">testing and repair of stores after manufacture including at wafer scale G11C 29/00</a> ; <a href="#">fuses per se H01L 23/525</a> )}
21/76877	. . . . . {Filling of holes, grooves or trenches, e.g. vias, with conductive material}	22/24	. . {Optical enhancement of defects or not directly visible states, e.g. selective electrolytic deposition, bubbles in liquids, light emission, colour change ( <a href="#">voltage contrast G01R 31/311</a> )}
21/76879	. . . . . {by selective deposition of conductive material in the vias, e.g. selective C.V.D. on semiconductor material, plating ( <a href="#">plating on semiconductors in general H01L 21/288</a> )}	22/26	. . {Acting in response to an ongoing measurement without interruption of processing, e.g. endpoint detection, in-situ thickness measurement ( <a href="#">endpoint detection arrangements in CMP apparatus B24B 37/013</a> , <a href="#">in discharge apparatus H01J 37/32</a> )}
21/7688	. . . . . {by deposition over sacrificial masking layer, e.g. lift-off ( <a href="#">lift-off per se H01L 21/0272</a> )}	22/30	. {Structural arrangements specially adapted for testing or measuring during manufacture or treatment, or specially adapted for reliability measurements}
21/76882	. . . . . {Reflowing or applying of pressure to better fill the contact hole}	22/32	. . {Additional lead-in metallisation on a device or substrate, e.g. additional pads or pad portions, lines in the scribe line, sacrificed conductors ( <a href="#">arrangements for conducting electric current to or from the solid state body in operation H01L 23/48</a> )}
21/76883	. . . . . {Post-treatment or after-treatment of the conductive material}	22/34	. . {Circuits for electrically characterising or monitoring manufacturing processes, e. g. whole test die, wafers filled with test structures, on-board-devices incorporated on each die, process control monitors or pad structures thereof, devices in scribe line ( <a href="#">switching, multiplexing, gating devices G01R 19/25</a> ; <a href="#">process control with lithography, e.g. dose control, G03F 7/20</a> ; <a href="#">structures for alignment control by optical means G03F 7/70633</a> )}
21/76885	. . . . . {By forming conductive members before deposition of protective insulating material, e.g. pillars, studs}		
21/76886	. . . . . {Modifying permanently or temporarily the pattern or the conductivity of conductive members, e.g. formation of alloys, reduction of contact resistances}		
21/76888	. . . . . {By rendering at least a portion of the conductor non conductive, e.g. oxidation}		
21/76889	. . . . . {by forming silicides of refractory metals}		
21/76891	. . . . . {by using superconducting materials}		
21/76892	. . . . . {modifying the pattern}		
21/76894	. . . . . {using a laser, e.g. laser cutting, laser direct writing, laser repair}		
21/76895	. . . . . {Local interconnects; Local pads, as exemplified by patent document EP0896365}		
21/76897	. . . . . {Formation of self-aligned vias or contact plugs, i.e. involving a lithographically uncritical step}		
21/76898	. . . . . {formed through a semiconductor substrate}		
21/77	. . Manufacture or treatment of devices consisting of a plurality of solid state components or integrated circuits formed in, or on, a common substrate ( <a href="#">manufacture or treatment of electronic memory devices H10B</a> )	23/00	<b>Details of semiconductor or other solid state devices</b> ( <a href="#">H01L 25/00</a> takes precedence {; structural arrangements for testing or measuring during manufacture or treatment, or for reliability measurements <a href="#">H01L 22/00</a> ; arrangements for connecting or disconnecting semiconductor or solid-state bodies, or methods related thereto <a href="#">H01L 24/00</a> ; <a href="#">finger print sensors G06V 40/12</a> )}
21/78	. . . with subsequent division of the substrate into plural individual devices ( <a href="#">cutting to change the surface-physical characteristics or shape of semiconductor bodies H01L 21/304</a> )		
21/7806	. . . . . {involving the separation of the active layers from a substrate}		
21/7813	. . . . . {leaving a reusable substrate, e.g. epitaxial lift off}		
<b>22/00</b>	<b>{Testing or measuring during manufacture or treatment; Reliability measurements, i.e. testing of parts without further processing to modify the parts as such; Structural arrangements therefor}</b>		

**NOTE**

This group **does not cover**:

- details of semiconductor bodies or of electrodes of devices provided for in subclass [H10D](#), which details are covered by that group;
- details peculiar to devices provided for in a single subclass of subclasses [H10F](#), [H10H](#),

## H01L

H01L 23/00

(continued)

- [H10K](#) or [H10N](#), which details are covered by those places.
- 23/02 . Containers; Seals ([H01L 23/12](#), [H01L 23/34](#), [H01L 23/48](#), [H01L 23/552](#), [H01L 23/66](#)) take precedence; {for memories [G11C](#)}
- 23/04 . . characterised by the shape {of the container or parts, e.g. caps, walls}
- 23/041 . . . {the container being a hollow construction having no base used as a mounting for the semiconductor body}
- 23/043 . . . the container being a hollow construction and having a conductive base as a mounting as well as a lead for the semiconductor body
- 23/045 . . . . the other leads having an insulating passage through the base
- 23/047 . . . . the other leads being parallel to the base
- 23/049 . . . . the other leads being perpendicular to the base
- 23/051 . . . . another lead being formed by a cover plate parallel to the base plate, e.g. sandwich type
- 23/053 . . . the container being a hollow construction and having an insulating {or insulated} base as a mounting for the semiconductor body
- 23/055 . . . . the leads having a passage through the base {[H01L 23/057](#) takes precedence}
- 23/057 . . . . the leads being parallel to the base
- 23/06 . . characterised by the material of the container or its electrical properties
- 23/08 . . . the material being an electrical insulator, e.g. glass
- 23/10 . . characterised by the material or arrangement of seals between parts, e.g. between cap and base of the container or between leads and walls of the container
- 23/12 . Mountings, e.g. non-detachable insulating substrates
- 23/13 . . characterised by the shape
- 23/14 . . characterised by the material or its electrical properties {[printed circuit boards H05K 1/00](#)}
- 23/142 . . . {Metallic substrates having insulating layers}
- 23/145 . . . {Organic substrates, e.g. plastic}
- 23/147 . . . {Semiconductor insulating substrates (semiconductor conductive substrates [H01L 23/4926](#))}
- 23/15 . . . Ceramic or glass substrates {[H01L 23/142](#), [H01L 23/145](#), [H01L 23/147](#) take precedence}
- 23/16 . Fillings or auxiliary members in containers {or encapsulations}, e.g. centering rings ([H01L 23/42](#), [H01L 23/552](#) take precedence)
- 23/18 . . Fillings characterised by the material, its physical or chemical properties, or its arrangement within the complete device
- NOTE**
- Group [H01L 23/26](#) takes precedence over groups [H01L 23/20](#) - [H01L 23/24](#)
- 23/20 . . . gaseous at the normal operating temperature of the device
- 23/22 . . . liquid at the normal operating temperature of the device
- 23/24 . . . solid or gel at the normal operating temperature of the device {[H01L 23/3135](#) takes precedence}
- 23/26 . . . including materials for absorbing or reacting with moisture or other undesired substances {, e.g. getters}
- 23/28 . Encapsulations, e.g. encapsulating layers, coatings, {e.g. for protection} ([H01L 23/552](#) takes precedence; {insulating layers for contacts or interconnections [H01L 23/5329](#)})
- 23/29 . . characterised by the material {, e.g. carbon (interlayer dielectrics [H01L 23/5329](#))}
- 23/291 . . . {Oxides or nitrides or carbides, e.g. ceramics, glass}
- 23/293 . . . . {Organic, e.g. plastic}
- 23/295 . . . . {containing a filler ([H01L 23/296](#) takes precedence)}
- 23/296 . . . . {Organo-silicon compounds}
- 23/298 . . . {Semiconductor material, e.g. amorphous silicon}
- 23/31 . . characterised by the arrangement {or shape}
- 23/3107 . . . {the device being completely enclosed}
- 23/3114 . . . . {the device being a chip scale package, e.g. CSP}
- 23/3121 . . . . {a substrate forming part of the encapsulation}
- 23/3128 . . . . . {the substrate having spherical bumps for external connection}
- 23/3135 . . . . {Double encapsulation or coating and encapsulation}
- 23/3142 . . . . {Sealing arrangements between parts, e.g. adhesion promoters}
- 23/315 . . . . {the encapsulation having a cavity}
- 23/3157 . . . {Partial encapsulation or coating (mask layer used as insulation layer [H01L 21/31](#))}
- 23/3164 . . . . {the coating being a foil}
- 23/3171 . . . . {the coating being directly applied to the semiconductor body, e.g. passivation layer ([H01L 23/3178](#) takes precedence)}
- 23/3178 . . . . {Coating or filling in grooves made in the semiconductor body}
- 23/3185 . . . . {the coating covering also the sidewalls of the semiconductor body}
- 23/3192 . . . . {Multilayer coating}
- 23/32 . Holders for supporting the complete device in operation, i.e. detachable fixtures ([H01L 23/40](#) takes precedence)
- 23/34 . Arrangements for cooling, heating, ventilating or temperature compensation {; Temperature sensing arrangements (thermal treatment apparatus [H01L 21/00](#))}
- 23/345 . . {Arrangements for heating (thermal treatment apparatus [H01L 21/00](#))}
- 23/36 . . Selection of materials, or shaping, to facilitate cooling or heating, e.g. heatsinks {([H01L 23/28](#), [H01L 23/40](#), [H01L 23/42](#), [H01L 23/44](#), [H01L 23/46](#) take precedence; heating [H01L 23/345](#))}
- 23/367 . . . Cooling facilitated by shape of device {([H01L 23/38](#), [H01L 23/40](#), [H01L 23/42](#), [H01L 23/44](#), [H01L 23/46](#) take precedence)}
- 23/3672 . . . . {Foil-like cooling fins or heat sinks (being part of lead-frames [H01L 23/49568](#))}
- 23/3675 . . . . {characterised by the shape of the housing}
- 23/3677 . . . . {Wire-like or pin-like cooling fins or heat sinks}

- 23/373 . . . Cooling facilitated by selection of materials for the device {or materials for thermal expansion adaptation, e.g. carbon}
- 23/3731 . . . . {Ceramic materials or glass ([H01L 23/3732](#), [H01L 23/3733](#), [H01L 23/3735](#), [H01L 23/3737](#), [H01L 23/3738](#) take precedence)}
- 23/3732 . . . . {Diamonds}
- 23/3733 . . . . {having a heterogeneous or anisotropic structure, e.g. powder or fibres in a matrix, wire mesh, porous structures ([H01L 23/3732](#), [H01L 23/3737](#) take precedence)}
- 23/3735 . . . . {Laminates or multilayers, e.g. direct bond copper ceramic substrates}
- 23/3736 . . . . {Metallic materials ([H01L 23/3732](#), [H01L 23/3733](#), [H01L 23/3735](#), [H01L 23/3737](#), [H01L 23/3738](#) take precedence)}
- 23/3737 . . . . {Organic materials with or without a thermoconductive filler}
- 23/3738 . . . . {Semiconductor materials}
- 23/38 . . Cooling arrangements using the Peltier effect
- 23/40 . . Mountings or securing means for detachable cooling or heating arrangements {(heating [H01L 23/345](#)); fixed by friction, plugs or springs}
- 23/4006 . . . {with bolts or screws}
- 23/4012 . . . . {for stacked arrangements of a plurality of semiconductor devices ([assemblies per se H01L 25/00](#))}
- 2023/4018 . . . . {characterised by the type of device to be heated or cooled}
- 2023/4025 . . . . . {Base discrete devices, e.g. presspack, disc-type transistors}
- 2023/4031 . . . . . {Packaged discrete devices, e.g. to-3 housings, diodes}
- 2023/4037 . . . . . {characterised by thermal path or place of attachment of heatsink}
- 2023/4043 . . . . . {heatsink to have chip}
- 2023/405 . . . . . {heatsink to package}
- 2023/4056 . . . . . {heatsink to additional heatsink}
- 2023/4062 . . . . . {heatsink to or through board or cabinet}
- 2023/4068 . . . . . {Heatconductors between device and heatsink, e.g. compliant heat-spreaders, heat-conducting bands}
- 2023/4075 . . . . . {Mechanical elements}
- 2023/4081 . . . . . {Compliant clamping elements not primarily serving heat-conduction}
- 2023/4087 . . . . . {Mounting accessories, interposers, clamping or screwing parts}
- 23/4093 . . . {Snap-on arrangements, e.g. clips}
- 23/42 . . Fillings or auxiliary members in containers {or encapsulations} selected or arranged to facilitate heating or cooling
- 23/427 . . . Cooling by change of state, e.g. use of heat pipes {(by liquefied gas [H01L 23/445](#))}
- 23/4275 . . . . {by melting or evaporation of solids}
- 23/433 . . . Auxiliary members {in containers} characterised by their shape, e.g. pistons
- 23/4332 . . . . {Bellows}
- 23/4334 . . . . {Auxiliary members in encapsulations ([H01L 23/49568](#) takes precedence)}
- 23/4336 . . . . {in combination with jet impingement}
- 23/4338 . . . . {Pistons, e.g. spring-loaded members}
- 23/44 . . the complete device being wholly immersed in a fluid other than air {([H01L 23/427](#) takes precedence)}
- 23/445 . . . . {the fluid being a liquefied gas, e.g. in a cryogenic vessel}
- 23/46 . . involving the transfer of heat by flowing fluids ([H01L 23/42](#), [H01L 23/44](#) take precedence)
- 23/467 . . . by flowing gases, e.g. air {([H01L 23/473](#) takes precedence)}
- 23/473 . . . by flowing liquids {([H01L 23/4332](#), [H01L 23/4338](#) take precedence)}
- 23/4735 . . . . {Jet impingement ([H01L 23/4336](#) takes precedence)}
- 23/48 . Arrangements for conducting electric current to or from the solid state body in operation, e.g. leads, terminal arrangements {; Selection of materials therefor}
- NOTE**
- Arrangements for connecting or disconnecting semiconductor or other solid state bodies, or methods related thereto, other than those arrangements or methods covered by the following subgroups, are covered by [H01L 24/00](#)
- 23/481 . . {Internal lead connections, e.g. via connections, feedthrough structures}
- 23/482 . . consisting of lead-in layers inseparably applied to the semiconductor body {(electrodes)}
- 23/4821 . . . {Bridge structure with air gap}
- 23/4822 . . . {Beam leads}
- 23/4824 . . . {Pads with extended contours, e.g. grid structure, branch structure, finger structure}
- 23/4825 . . . {for devices consisting of semiconductor layers on insulating or semi-insulating substrates, e.g. silicon on sapphire devices, i.e. SOS}
- 23/4827 . . . {Materials}
- 23/4828 . . . . {Conductive organic material or pastes, e.g. conductive adhesives, inks}
- 23/485 . . . consisting of layered constructions comprising conductive layers and insulating layers, e.g. planar contacts {([H01L 23/4821](#), [H01L 23/4822](#), [H01L 23/4824](#), [H01L 23/4825](#) take precedence; materials [H01L 23/532](#), bond pads [H01L 24/02](#), bump connectors [H01L 24/10](#))}
- 23/4855 . . . . {Overhang structure}
- 23/488 . . consisting of soldered {or bonded} constructions {(bump connectors [H01L 24/01](#))}
- 23/49 . . . wire-like {arrangements or pins or rods (using optical fibres [H01L 23/48](#); pins attached to insulating substrates [H01L 23/49811](#))}
- 23/492 . . . Bases or plates {or solder therefor}
- 23/4922 . . . . {having a heterogeneous or anisotropic structure}
- 23/4924 . . . . {characterised by the materials}
- 23/4926 . . . . . {the materials containing semiconductor material}
- 23/4928 . . . . . {the materials containing carbon}
- 23/495 . . . Lead-frames {or other flat leads ([H01L 23/498](#) takes precedence; lead frame interconnections between components [H01L 23/52](#))}
- 23/49503 . . . . {characterised by the die pad}

- 23/49506 . . . . . {an insulative substrate being used as a diepad, e.g. ceramic, plastic ([H01L 23/49531](#) takes precedence)}
- 23/4951 . . . . . {Chip-on-leads or leads-on-chip techniques, i.e. inner lead fingers being used as die pad}
- 23/49513 . . . . . {having bonding material between chip and die pad}
- 23/49517 . . . . . {Additional leads}
- 23/4952 . . . . . {the additional leads being a bump or a wire}
- 23/49524 . . . . . {the additional leads being a tape carrier or flat leads}
- 23/49527 . . . . . {the additional leads being a multilayer}
- 23/49531 . . . . . {the additional leads being a wiring board}
- 23/49534 . . . . . {Multi-layer}
- 23/49537 . . . . . {Plurality of lead frames mounted in one device}
- 23/49541 . . . . . {Geometry of the lead-frame}
- 23/49544 . . . . . {Deformation absorbing parts in the lead frame plane, e.g. meanderline shape ([H01L 23/49562](#) takes precedence)}
- 23/49548 . . . . . {Cross section geometry ([H01L 23/49562](#) takes precedence)}
- 23/49551 . . . . . {characterised by bent parts}
- 23/49555 . . . . . {the bent parts being the outer leads}
- 23/49558 . . . . . {Insulating layers on lead frames, e.g. bridging members}
- 23/49562 . . . . . {for individual devices of subclass [H10D](#)}
- 23/49565 . . . . . {Side rails of the lead frame, e.g. with perforations, sprocket holes}
- 23/49568 . . . . . {specifically adapted to facilitate heat dissipation}
- 23/49572 . . . . . {consisting of thin flexible metallic tape with or without a film carrier ([H01L 23/49503](#) - [H01L 23/49568](#) and [H01L 23/49575](#) - [H01L 23/49579](#) take precedence)}
- 23/49575 . . . . . {Assemblies of semiconductor devices on lead frames}
- 23/49579 . . . . . {characterised by the materials of the lead frames or layers thereon}
- 23/49582 . . . . . {Metallic layers on lead frames}
- 23/49586 . . . . . {Insulating layers on lead frames}
- 23/49589 . . . . . {Capacitor integral with or on the leadframe}
- 23/49593 . . . . . {Battery in combination with a leadframe}
- 23/49596 . . . . . {Oscillators in combination with lead-frames}
- 23/498 . . . . . Leads, {i.e. metallisations or lead-frames} on insulating substrates, {e.g. chip carriers (shape of the substrate [H01L 23/13](#))}
- 23/49805 . . . . . {the leads being also applied on the sidewalls or the bottom of the substrate, e.g. leadless packages for surface mounting}
- 23/49811 . . . . . {Additional leads joined to the metallisation on the insulating substrate, e.g. pins, bumps, wires, flat leads ([H01L 23/49827](#) takes precedence)}
- 23/49816 . . . . . {Spherical bumps on the substrate for external connection, e.g. ball grid arrays [BGA]}
- 23/49822 . . . . . {Multilayer substrates (multilayer metallisation on monolayer substrate [H01L 23/498](#))}
- 23/49827 . . . . . {Via connections through the substrates, e.g. pins going through the substrate, coaxial cables ([H01L 23/49822](#), [H01L 23/49833](#), [H01L 23/4985](#), [H01L 23/49861](#) take precedence)}
- 23/49833 . . . . . {the chip support structure consisting of a plurality of insulating substrates}
- 23/49838 . . . . . {Geometry or layout}
- 23/49844 . . . . . {for individual devices of subclass [H10D](#)}
- 23/4985 . . . . . {Flexible insulating substrates ([H01L 23/49572](#) and [H01L 23/49855](#) take precedence)}
- 23/49855 . . . . . {for flat-cards, e.g. credit cards (cards [per se G06K 19/00](#))}
- 23/49861 . . . . . {Lead-frames fixed on or encapsulated in insulating substrates ([H01L 23/4985](#), [H01L 23/49805](#) take precedence)}
- 23/49866 . . . . . {characterised by the materials (materials of the substrates [H01L 23/14](#), of the lead-frames [H01L 23/49579](#))}
- 23/49872 . . . . . {the conductive materials containing semiconductor material}
- 23/49877 . . . . . {Carbon, e.g. fullerenes (superconducting fullerenes [H10N 60/853](#))}
- 23/49883 . . . . . {the conductive materials containing organic materials or pastes, e.g. for thick films (for printed circuits [H05K 1/092](#))}
- 23/49888 . . . . . {the conductive materials containing superconducting material}
- 23/49894 . . . . . {Materials of the insulating layers or coatings}
- 23/50 . . . . . for integrated circuit devices, {e.g. power bus, number of leads} ([H01L 23/482](#) - [H01L 23/498](#) take precedence)
- 23/52 . . . . . Arrangements for conducting electric current within the device in operation from one component to another {, i.e. interconnections, e.g. wires, lead frames (optical interconnections [G02B 6/00](#))}
- 23/522 . . . . . including external interconnections consisting of a multilayer structure of conductive and insulating layers inseparably formed on the semiconductor body
- 23/5221 . . . . . {Crossover interconnections}
- 23/5222 . . . . . {Capacitive arrangements or effects of, or between wiring layers (other capacitive arrangements [H01L 23/642](#))}
- 23/5223 . . . . . {Capacitor integral with wiring layers}
- 23/5225 . . . . . {Shielding layers formed together with wiring layers}
- 23/5226 . . . . . {Via connections in a multilevel interconnection structure}
- 23/5227 . . . . . {Inductive arrangements or effects of, or between, wiring layers (other inductive arrangements [H01L 23/645](#))}
- 23/5228 . . . . . {Resistive arrangements or effects of, or between, wiring layers (other resistive arrangements [H01L 23/647](#))}
- 23/525 . . . . . with adaptable interconnections
- 23/5252 . . . . . {comprising anti-fuses, i.e. connections having their state changed from non-conductive to conductive}
- 23/5254 . . . . . {the change of state resulting from the use of an external beam, e.g. laser beam or ion beam}

- 23/5256 . . . . {comprising fuses, i.e. connections having their state changed from conductive to non-conductive}
- 23/5258 . . . . . {the change of state resulting from the use of an external beam, e.g. laser beam or ion beam}
- 23/528 . . . . Layout of the interconnection structure
- 23/5283 . . . . . {Cross-sectional geometry}
- 23/5286 . . . . . {Arrangements of power or ground buses}
- 23/532 . . . . characterised by the materials
- 23/53204 . . . . . {Conductive materials}
- 23/53209 . . . . . {based on metals, e.g. alloys, metal silicides ([H01L 23/53285](#) takes precedence)}
- 23/53214 . . . . . {the principal metal being aluminium}
- 23/53219 . . . . . {Aluminium alloys}
- 23/53223 . . . . . {Additional layers associated with aluminium layers, e.g. adhesion, barrier, cladding layers}
- 23/53228 . . . . . {the principal metal being copper}
- 23/53233 . . . . . {Copper alloys}
- 23/53238 . . . . . {Additional layers associated with copper layers, e.g. adhesion, barrier, cladding layers}
- 23/53242 . . . . . {the principal metal being a noble metal, e.g. gold}
- 23/53247 . . . . . {Noble-metal alloys}
- 23/53252 . . . . . {Additional layers associated with noble-metal layers, e.g. adhesion, barrier, cladding layers}
- 23/53257 . . . . . {the principal metal being a refractory metal}
- 23/53261 . . . . . {Refractory-metal alloys}
- 23/53266 . . . . . {Additional layers associated with refractory-metal layers, e.g. adhesion, barrier, cladding layers}
- 23/53271 . . . . . {containing semiconductor material, e.g. polysilicon}
- 23/53276 . . . . . {containing carbon, e.g. fullerenes ([superconducting fullerenes H10N 60/853](#))}
- 23/5328 . . . . . {containing conductive organic materials or pastes, e.g. conductive adhesives, inks}
- 23/53285 . . . . . {containing superconducting materials}
- 23/5329 . . . . . {Insulating materials}
- 23/53295 . . . . . {Stacked insulating layers}
- 23/535 . . . including internal interconnections, e.g. cross-under constructions {([internal lead connections H01L 23/481](#))}
- 23/538 . . . the interconnection structure between a plurality of semiconductor chips being formed on, or in, insulating substrates {([H05K](#) takes precedence; [manufacture or treatment H01L 21/4846](#)); [mountings per se H01L 23/12](#); {[materials H01L 23/49866](#))}
- 23/5381 . . . {Crossover interconnections, e.g. bridge steppers}
- 23/5382 . . . {Adaptable interconnections, e.g. for engineering changes}
- 23/5383 . . . {Multilayer substrates ([H01L 23/5385](#) takes precedence; [multilayer metallisation on monolayer substrates H01L 23/538](#))}
- 23/5384 . . . {Conductive vias through the substrate with or without pins, e.g. buried coaxial conductors ([H01L 23/5383](#), [H01L 23/5385](#) take precedence; pins attached to insulating substrates [H01L 23/49811](#))}
- 23/5385 . . . {Assembly of a plurality of insulating substrates}
- 23/5386 . . . {Geometry or layout of the interconnection structure}
- 23/5387 . . . {Flexible insulating substrates ([H01L 23/5388](#) takes precedence)}
- 23/5388 . . . {for flat cards, e.g. credit cards ([cards per se G06K 19/00](#))}
- 23/5389 . . . {the chips being integrally enclosed by the interconnect and support structures}
- 23/544 . . . Marks applied to semiconductor devices {or parts}, e.g. registration marks, {alignment structures, wafer maps ([test patterns for characterising or monitoring manufacturing processes H01L 22/00](#))}
- NOTE**
- When classifying in group [H01L 23/544](#), details are to be further indexed by using the indexing codes chosen from [H01L 2223/544](#) and subgroups
- 23/552 . . . Protection against radiation, e.g. light {or electromagnetic waves}
- 23/556 . . . against alpha rays
- 23/562 . . . {Protection against mechanical damage ([H01L 23/02](#), [H01L 23/28](#) take precedence)}
- 23/564 . . . {Details not otherwise provided for, e.g. protection against moisture ([getters H01L 23/26](#))}
- 23/57 . . . {Protection from inspection, reverse engineering or tampering}
- 23/573 . . . {using passive means}
- 23/576 . . . {using active circuits}
- 23/58 . . . Structural electrical arrangements for semiconductor devices not otherwise provided for {, e.g. in combination with batteries ([H01L 23/49593](#), [H01L 23/49596](#) take precedence)}
- 23/585 . . . {comprising conductive layers or plates or strips or rods or rings ([H01L 23/60](#), [H01L 23/62](#), [H01L 23/64](#), [H01L 23/66](#) take precedence)}
- 23/60 . . . Protection against electrostatic charges or discharges, e.g. Faraday shields
- 23/62 . . . Protection against overvoltage, e.g. fuses, shunts
- 23/64 . . . Impedance arrangements
- 23/642 . . . {Capacitive arrangements ([H01L 23/49589](#), [H01L 23/645](#), [H01L 23/647](#), [H01L 23/66](#) take precedence; capacitive effects between wiring layers on the semiconductor body [H01L 23/5222](#))}
- 23/645 . . . {Inductive arrangements ([H01L 23/647](#), [H01L 23/66](#) take precedence)}
- 23/647 . . . {Resistive arrangements ([H01L 23/66](#), [H01L 23/62](#) take precedence)}
- 23/66 . . . High-frequency adaptations
- NOTE**
- When classifying in group [H01L 23/66](#), details are to be further indexed by using the indexing codes chosen from [H01L 2223/66](#) and subgroups

24/00	<b>{Arrangements for connecting or disconnecting semiconductor or solid-state bodies; Methods or apparatus related thereto}</b>	24/10	. . . {Bump connectors (bumps on insulating substrates, e.g. chip carriers, <a href="#">H01L 23/49816</a> ); Manufacturing methods related thereto}
	<b>NOTES</b>	24/11	. . . . {Manufacturing methods (for bumps on insulating substrates <a href="#">H01L 21/4853</a> )}
1.	This group <b>does not cover</b> :	24/12	. . . . {Structure, shape, material or disposition of the bump connectors prior to the connecting process}
	• details of semiconductor bodies or of electrodes of devices provided for in subclass <a href="#">H10D</a> , which details are covered by that group;	24/13	. . . . . {of an individual bump connector}
	• details peculiar to devices provided for in a single subclass of subclasses <a href="#">H10E</a> , <a href="#">H10H</a> , <a href="#">H10K</a> or <a href="#">H10N</a> , which details are covered by those places.	24/14	. . . . . {of a plurality of bump connectors}
	• printed circuits, which are covered by groups <a href="#">H05K 1/00</a> - <a href="#">H05K 1/189</a> ;	24/15	. . . . {Structure, shape, material or disposition of the bump connectors after the connecting process}
	• apparatus or manufacturing processes for printed circuits, which are covered by groups <a href="#">H05K 3/00</a> - <a href="#">H05K 3/4685</a> ;	24/16	. . . . . {of an individual bump connector}
	• manufacture or treatment of parts, which are covered by group <a href="#">H01L 21/48</a> and subgroups except <a href="#">H01L 21/4885</a> - <a href="#">H01L 21/4896</a> ;	24/17	. . . . . {of a plurality of bump connectors}
	• assemblies of semiconductor devices, which are covered by groups <a href="#">H01L 21/50</a> - <a href="#">H01L 21/568</a> ;	24/18	. . . {High density interconnect [HDI] connectors; Manufacturing methods related thereto ( <a href="#">interconnection structure between a plurality of semiconductor chips H01L 23/5389</a> )}
	• applying interconnections to be used for carrying current between separate components within a device, which is covered by group <a href="#">H01L 21/768</a> and subgroups;	24/19	. . . . {Manufacturing methods of high density interconnect preforms}
	• containers or seals, which are covered by groups <a href="#">H01L 23/02</a> - <a href="#">H01L 23/10</a> ;	24/20	. . . . {Structure, shape, material or disposition of high density interconnect preforms}
	• mountings, which are covered by groups <a href="#">H01L 23/12</a> - <a href="#">H01L 23/15</a> and subgroups;	24/23	. . . . {Structure, shape, material or disposition of the high density interconnect connectors after the connecting process}
	• arrangements for cooling, heating, ventilating or temperature compensation, which are covered by groups <a href="#">H01L 23/34</a> - <a href="#">H01L 23/4735</a> ;	24/24	. . . . . {of an individual high density interconnect connector}
	• arrangements for conducting electric current, which are covered by groups <a href="#">H01L 23/48</a> - <a href="#">H01L 23/50</a> , and by groups <a href="#">H01L 23/52</a> - <a href="#">H01L 23/5389</a> ;	24/25	. . . . . {of a plurality of high density interconnect connectors}
	• structural electrical arrangements, which are covered by groups <a href="#">H01L 23/58</a> - <a href="#">H01L 23/66</a> ;	24/26	. . . {Layer connectors, e.g. plate connectors, solder or adhesive layers; Manufacturing methods related thereto}
	• assemblies of semiconductor or other solid state devices, which are covered by groups <a href="#">H01L 25/00</a> - <a href="#">H01L 25/18</a> .	24/27	. . . . {Manufacturing methods}
2.	In this group the following indexing codes are used : <a href="#">H01L 24/00</a> , <a href="#">H01L 2224/00</a> , <a href="#">H01L 2924/00</a> , and subgroups thereof	24/28	. . . . {Structure, shape, material or disposition of the layer connectors prior to the connecting process}
24/01	. {Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chip-to-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto}	24/29	. . . . . {of an individual layer connector}
24/02	. . {Bonding areas (on insulating substrates, e.g. chip carriers, <a href="#">H01L 23/49816</a> , <a href="#">H01L 23/49838</a> , <a href="#">H01L 23/5389</a> ); Manufacturing methods related thereto}	24/30	. . . . . {of a plurality of layer connectors}
24/03	. . . . {Manufacturing methods}	24/31	. . . . {Structure, shape, material or disposition of the layer connectors after the connecting process}
24/04	. . . . {Structure, shape, material or disposition of the bonding areas prior to the connecting process}	24/32	. . . . . {of an individual layer connector}
24/05	. . . . . {of an individual bonding area}	24/33	. . . . . {of a plurality of layer connectors}
24/06	. . . . . {of a plurality of bonding areas}	24/34	. . . {Strap connectors, e.g. copper straps for grounding power devices; Manufacturing methods related thereto}
24/07	. . . . {Structure, shape, material or disposition of the bonding areas after the connecting process}	24/35	. . . . {Manufacturing methods}
24/08	. . . . . {of an individual bonding area}	24/36	. . . . {Structure, shape, material or disposition of the strap connectors prior to the connecting process}
24/09	. . . . . {of a plurality of bonding areas}	24/37	. . . . . {of an individual strap connector}
		24/38	. . . . . {of a plurality of strap connectors}
		24/39	. . . . {Structure, shape, material or disposition of the strap connectors after the connecting process}
		24/40	. . . . . {of an individual strap connector}
		24/41	. . . . . {of a plurality of strap connectors}
		24/42	. . . {Wire connectors; Manufacturing methods related thereto}
		24/43	. . . . {Manufacturing methods}
		24/44	. . . . {Structure, shape, material or disposition of the wire connectors prior to the connecting process}
		24/45	. . . . . {of an individual wire connector}
		24/46	. . . . . {of a plurality of wire connectors}

- 24/47 . . . {Structure, shape, material or disposition of the wire connectors after the connecting process}
  - 24/48 . . . . {of an individual wire connector}
  - 24/49 . . . . {of a plurality of wire connectors}
  - 24/50 . . {Tape automated bonding [TAB] connectors, i.e. film carriers; Manufacturing methods related thereto (thin flexible metallic tape with or without a film carrier [H01L 23/49572](#), flexible insulating substrates [H01L 23/4985](#), [H01L 23/5387](#))}
  - 24/63 . . {Connectors not provided for in any of the groups [H01L 24/10](#) - [H01L 24/50](#) and subgroups; Manufacturing methods related thereto}
  - 24/64 . . . {Manufacturing methods}
  - 24/65 . . . {Structure, shape, material or disposition of the connectors prior to the connecting process}
  - 24/66 . . . . {of an individual connector}
  - 24/67 . . . . {of a plurality of connectors}
  - 24/68 . . . {Structure, shape, material or disposition of the connectors after the connecting process}
  - 24/69 . . . . {of an individual connector}
  - 24/70 . . . . {of a plurality of connectors}
  - 24/71 . {Means for bonding not being attached to, or not being formed on, the surface to be connected (holders for supporting the complete device in operation [H01L 23/32](#))}
  - 24/72 . . {Detachable connecting means consisting of mechanical auxiliary parts connecting the device, e.g. pressure contacts using springs or clips}
  - 24/73 . {Means for bonding being of different types provided for in two or more of groups [H01L 24/10](#), [H01L 24/18](#), [H01L 24/26](#), [H01L 24/34](#), [H01L 24/42](#), [H01L 24/50](#), [H01L 24/63](#), [H01L 24/71](#)}
  - 24/74 . {Apparatus for manufacturing arrangements for connecting or disconnecting semiconductor or solid-state bodies}
  - 24/741 . . {Apparatus for manufacturing means for bonding, e.g. connectors}
  - 24/742 . . . {Apparatus for manufacturing bump connectors}
  - 24/743 . . . {Apparatus for manufacturing layer connectors}
  - 24/744 . . . {Apparatus for manufacturing strap connectors}
  - 24/745 . . . {Apparatus for manufacturing wire connectors}
  - 24/75 . . {Apparatus for connecting with bump connectors or layer connectors}
  - 24/76 . . {Apparatus for connecting with build-up interconnects}
  - 24/77 . . {Apparatus for connecting with strap connectors}
  - 24/78 . . {Apparatus for connecting with wire connectors}
  - 24/79 . . {Apparatus for Tape Automated Bonding [TAB]}
  - 24/799 . . {Apparatus for disconnecting}
  - 24/80 . {Methods for connecting semiconductor or other solid state bodies using means for bonding being attached to, or being formed on, the surface to be connected}
  - 24/81 . . {using a bump connector}
  - 24/82 . . {by forming build-up interconnects at chip-level, e.g. for high density interconnects [HDI] (interconnection structure between a plurality of semiconductor chips [H01L 23/5389](#))}
  - 24/83 . . {using a layer connector}
  - 24/84 . . {using a strap connector}
  - 24/85 . . {using a wire connector ([wire bonding in general B23K 20/004](#))}
  - 24/86 . . {using tape automated bonding [TAB]}
  - 24/89 . . {using at least one connector not provided for in any of the groups [H01L 24/81](#) - [H01L 24/86](#)}
  - 24/90 . {Methods for connecting semiconductor or solid state bodies using means for bonding not being attached to, or not being formed on, the body surface to be connected, e.g. pressure contacts using springs or clips}
  - 24/91 . {Methods for connecting semiconductor or solid state bodies including different methods provided for in two or more of groups [H01L 24/80](#) - [H01L 24/90](#)}
  - 24/92 . . {Specific sequence of method steps}
  - 24/93 . {Batch processes}
  - 24/94 . . {at wafer-level, i.e. with connecting carried out on a wafer comprising a plurality of undiced individual devices}
  - 24/95 . . {at chip-level, i.e. with connecting carried out on a plurality of singulated devices, i.e. on diced chips}
  - 24/96 . . . {the devices being encapsulated in a common layer, e.g. neo-wafer or pseudo-wafer, said common layer being separable into individual assemblies after connecting}
  - 24/97 . . . {the devices being connected to a common substrate, e.g. interposer, said common substrate being separable into individual assemblies after connecting}
  - 24/98 . {Methods for disconnecting semiconductor or solid-state bodies}
  - 25/00 **Assemblies consisting of a plurality of semiconductor or other solid state devices (devices consisting of a plurality of solid-state components formed in or on a common substrate [H10D 89/00](#); photovoltaic modules or arrays of photovoltaic cells [H10F 19/00](#))**
- NOTE**
- {Due to the ongoing developments in class [H10](#) and related subclasses, the information displayed in notes, references and definitions of this main group and indents may not be entirely accurate. For each specific subject matter referred to in this main group and indents, users are invited to consult the relevant place in class [H10](#) and to consider the class [H10](#) information as correct, in case of conflict}
- 25/03 . all the devices being of a type provided for in a single subclass of subclasses [H10B](#), [H10F](#), [H10H](#), [H10K](#) or [H10N](#), e.g. assemblies of rectifier diodes
  - 25/04 . . the devices not having separate containers
- WARNING**
- Group [H01L 25/04](#) is impacted by reclassification into groups [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).
- All groups listed in this Warning should be considered in order to perform a complete search.

**H01L**

- 25/041 . . . {the devices being of a type provided for in subclass [H10F](#)}
- 25/042 . . . . {the devices being arranged next to each other (solar cells [H10F 19/00](#))}
- 25/043 . . . . {Stacked arrangements of devices}
- 25/065 . . . the devices being of a type provided for in group [H10D 89/00](#)

**NOTE**

Group [H01L 25/0652](#) takes precedence over groups [H01L 25/0655](#) and [H01L 25/0657](#)

**WARNING**

Group [H01L 25/065](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 25/0652 . . . . {the devices being arranged next and on each other, i.e. mixed assemblies}

**WARNING**

Group [H01L 25/0652](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 25/0655 . . . . {the devices being arranged next to each other}

**WARNING**

Group [H01L 25/0655](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 25/0657 . . . . {Stacked arrangements of devices}

**WARNING**

Group [H01L 25/0657](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 25/07 . . . the devices being of a type provided for in group subclass [H10D](#)

**NOTE**

Group [H01L 25/071](#) takes precedence over groups [H01L 25/072](#) - [H01L 25/074](#)

- 25/071 . . . . {the devices being arranged next and on each other, i.e. mixed assemblies}
- 25/072 . . . . {the devices being arranged next to each other}
- 25/073 . . . . {Apertured devices mounted on one or more rods passed through the apertures}
- 25/074 . . . . {Stacked arrangements of non-apertured devices}
- 25/075 . . . the devices being of a type provided for in group [H10H 20/00](#)
- 25/0753 . . . . {the devices being arranged next to each other}
- 25/0756 . . . . {Stacked arrangements of devices}
- 25/10 . . the devices having separate containers
- 25/105 . . . {the devices being integrated devices of class [H10](#)}

**NOTE**

When classifying in group [H01L 25/105](#), details of the assemblies are to be further indexed by using the indexing codes chosen from [H01L 2225/1005](#) and subgroups

- 25/11 . . . the devices being of a type provided for in subclass [H10D](#)

**NOTE**

Group [H01L 25/112](#) takes precedence over groups [H01L 25/115](#) and [H01L 25/117](#)

- 25/112 . . . . {Mixed assemblies}
- 25/115 . . . . {the devices being arranged next to each other}
- 25/117 . . . . {Stacked arrangements of devices}
- 25/13 . . . the devices being of a type provided for in group [H10H 20/00](#)

- 25/16 . the devices being of types provided for in two or more different subclasses of [H10B](#), [H10D](#), [H10E](#), [H10H](#), [H10K](#) or [H10N](#), e.g. forming hybrid circuits

**WARNING**

Group [H01L 25/16](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 25/162 . . {the devices being mounted on two or more different substrates}

**WARNING**

Group [H01L 25/162](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 25/165 . . {Containers}

**WARNING**

Group [H01L 25/165](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 25/167 . . {comprising optoelectronic devices, e.g. LED, photodiodes}

**WARNING**

Group [H01L 25/167](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 25/18 . the devices being of the types provided for in two or more different main groups of the same subclass of [H10B](#), [H10D](#), [H10E](#), [H10H](#), [H10K](#) or [H10N](#)

**WARNING**

Group [H01L 25/18](#) is impacted by reclassification into groups [H10B 80/00](#), [H10K 19/00](#), [H10K 39/10](#), [H10K 39/12](#), [H10K 39/15](#), [H10K 39/18](#), [H10K 39/601](#), [H10K 39/621](#), [H10K 59/90](#), [H10K 59/95](#), [H10K 65/00](#), [H10N 19/00](#), [H10N 39/00](#), [H10N 59/00](#), [H10N 69/00](#), [H10N 79/00](#) and [H10N 89/00](#).

All groups listed in this Warning should be considered in order to perform a complete search.

- 25/50 . {Multistep manufacturing processes of assemblies consisting of devices, the devices being individual devices of subclass [H10D](#) or integrated devices of class [H10](#) ([H01L 21/50](#) takes precedence)}

- 2221/00 Processes or apparatus adapted for the manufacture or treatment of semiconductor or solid state devices or of parts thereof covered by [H01L 21/00](#)**
- 2221/10 . Applying interconnections to be used for carrying current between separate components within a device
  - 2221/1005 . . Formation and after-treatment of dielectrics
  - 2221/101 . . . Forming openings in dielectrics
  - 2221/1015 . . . . for dual damascene structures
  - 2221/1021 . . . . . Pre-forming the dual damascene structure in a resist layer
  - 2221/1026 . . . . . the via being formed by burying a sacrificial pillar in the dielectric and removing the pillar
  - 2221/1031 . . . . . Dual damascene by forming vias in the via-level dielectric prior to deposition of the trench-level dielectric
  - 2221/1036 . . . . . Dual damascene with different via-level and trench-level dielectrics
  - 2221/1042 . . . the dielectric comprising air gaps
  - 2221/1047 . . . . the air gaps being formed by pores in the dielectric
  - 2221/1052 . . . Formation of thin functional dielectric layers
  - 2221/1057 . . . . in via holes or trenches
  - 2221/1063 . . . . . Sacrificial or temporary thin dielectric films in openings in a dielectric
  - 2221/1068 . . Formation and after-treatment of conductors
  - 2221/1073 . . . Barrier, adhesion or liner layers
  - 2221/1078 . . . . Multiple stacked thin films not being formed in openings in dielectrics
  - 2221/1084 . . . . Layers specifically deposited to enhance or enable the nucleation of further layers, i.e. seed layers
  - 2221/1089 . . . . . Stacks of seed layers
  - 2221/1094 . . . Conducting structures comprising nanotubes or nanowires
  - 2221/67 . Apparatus for handling semiconductor or electric solid state devices during manufacture or treatment thereof; Apparatus for handling wafers during manufacture or treatment of semiconductor or electric solid state devices or components; Apparatus not specifically provided for elsewhere

## H01L

- 2221/683 . . for supporting or gripping
- 2221/68304 . . . using temporarily an auxiliary support
- 2221/68309 . . . . Auxiliary support including alignment aids
- 2221/68313 . . . . Auxiliary support including a cavity for storing a finished device, e.g. IC package, or a partly finished device, e.g. die, during manufacturing or mounting
- 2221/68318 . . . . Auxiliary support including means facilitating the separation of a device or wafer from the auxiliary support
- 2221/68322 . . . . . Auxiliary support including means facilitating the selective separation of some of a plurality of devices from the auxiliary support
- 2221/68327 . . . . used during dicing or grinding
- 2221/68331 . . . . . of passive members, e.g. die mounting substrate
- 2221/68336 . . . . . involving stretching of the auxiliary support post dicing
- 2221/6834 . . . . used to protect an active side of a device or wafer
- 2221/68345 . . . . used as a support during the manufacture of self supporting substrates
- 2221/6835 . . . . used as a support during build up manufacturing of active devices
- 2221/68354 . . . . used to support diced chips prior to mounting
- 2221/68359 . . . . used as a support during manufacture of interconnect decals or build up layers
- 2221/68363 . . . . used in a transfer process involving transfer directly from an origin substrate to a target substrate without use of an intermediate handle substrate
- 2221/68368 . . . . used in a transfer process involving at least two transfer steps, i.e. including an intermediate handle substrate
- 2221/68372 . . . . used to support a device or wafer when forming electrical connections thereto
- 2221/68377 . . . . with parts of the auxiliary support remaining in the finished device
- 2221/68381 . . . . Details of chemical or physical process used for separating the auxiliary support from a device or wafer
- 2221/68386 . . . . . Separation by peeling
- 2221/6839 . . . . . using peeling wedge or knife or bar
- 2221/68395 . . . . . using peeling wheel
- 2223/00** **Details relating to semiconductor or other solid state devices covered by the group [H01L 23/00](#)**
- 2223/544 . . Marks applied to semiconductor devices or parts
- 2223/54406 . . comprising alphanumeric information
- 2223/54413 . . comprising digital information, e.g. bar codes, data matrix
- 2223/5442 . . comprising non digital, non alphanumeric information, e.g. symbols
- 2223/54426 . . for alignment
- 2223/54433 . . containing identification or tracking information
- 2223/5444 . . . for electrical read out
- 2223/54446 . . . . Wireless electrical read out
- 2223/54453 . . for use prior to dicing
- 2223/5446 . . . Located in scribe lines
- 2223/54466 . . . Located in a dummy or reference die
- 2223/54473 . . for use after dicing
- 2223/5448 . . . Located on chip prior to dicing and remaining on chip after dicing
- 2223/54486 . . . . Located on package parts, e.g. encapsulation, leads, package substrate
- 2223/54493 . . . Peripheral marks on wafers, e.g. orientation flats, notches, lot number
- 2223/58 . . Structural electrical arrangements for semiconductor devices not otherwise provided for
- 2223/64 . . Impedance arrangements
- 2223/66 . . . High-frequency adaptations
- 2223/6605 . . . . High-frequency electrical connections
- 2223/6611 . . . . . Wire connections
- 2223/6616 . . . . . Vertical connections, e.g. vias
- 2223/6622 . . . . . Coaxial feed-throughs in active or passive substrates
- 2223/6627 . . . . . Waveguides, e.g. microstrip line, strip line, coplanar line
- 2223/6633 . . . . . Transition between different waveguide types
- 2223/6638 . . . . . Differential pair signal lines
- 2223/6644 . . . . . Packaging aspects of high-frequency amplifiers
- 2223/665 . . . . . Bias feed arrangements
- 2223/6655 . . . . . Matching arrangements, e.g. arrangement of inductive and capacitive components
- 2223/6661 . . . . . for passive devices
- 2223/6666 . . . . . for decoupling, e.g. bypass capacitors
- 2223/6672 . . . . . for integrated passive components, e.g. semiconductor device with passive components only
- 2223/6677 . . . . . for antenna, e.g. antenna included within housing of semiconductor device
- 2223/6683 . . . . . for monolithic microwave integrated circuit [MMIC]
- 2223/6688 . . . . . Mixed frequency adaptations, i.e. for operation at different frequencies
- 2223/6694 . . . . . Optical signal interface included within high-frequency semiconductor device housing
- 2224/00** **Indexing scheme for arrangements for connecting or disconnecting semiconductor or solid-state bodies and methods related thereto as covered by [H01L 24/00](#)**
- 2224/01 . . Means for bonding being attached to, or being formed on, the surface to be connected, e.g. chip-to-package, die-attach, "first-level" interconnects; Manufacturing methods related thereto
- 2224/02 . . Bonding areas; Manufacturing methods related thereto
- 2224/0212 . . . Auxiliary members for bonding areas, e.g. spacers
- 2224/02122 . . . . being formed on the semiconductor or solid-state body
- 2224/02123 . . . . . inside the bonding area
- 2224/02125 . . . . . Reinforcing structures
- 2224/02126 . . . . . Collar structures
- 2224/0213 . . . . . Alignment aids
- 2224/02135 . . . . . Flow barrier
- 2224/0214 . . . . . Structure of the auxiliary member
- 2224/02141 . . . . . Multilayer auxiliary member
- 2224/02145 . . . . . Shape of the auxiliary member
- 2224/0215 . . . . . Material of the auxiliary member
- 2224/02163 . . . . . on the bonding area
- 2224/02165 . . . . . Reinforcing structures
- 2224/02166 . . . . . Collar structures
- 2224/0217 . . . . . Alignment aids

- 2224/02175 . . . . . Flow barrier
- 2224/0218 . . . . . Structure of the auxiliary member
- 2224/02181 . . . . . Multilayer auxiliary member
- 2224/02185 . . . . . Shape of the auxiliary member
- 2224/0219 . . . . . Material of the auxiliary member
- 2224/022 . . . . . Protective coating, i.e. protective bond-through coating
- 2224/02205 . . . . . Structure of the protective coating
- 2224/02206 . . . . . Multilayer protective coating
- 2224/0221 . . . . . Shape of the protective coating
- 2224/02215 . . . . . Material of the protective coating
- 2224/02233 . . . . . not in direct contact with the bonding area
- 2224/02235 . . . . . Reinforcing structures
- 2224/0224 . . . . . Alignment aids
- 2224/02245 . . . . . Flow barrier
- 2224/0225 . . . . . Structure of the auxiliary member
- 2224/02251 . . . . . Multilayer auxiliary member
- 2224/02255 . . . . . Shape of the auxiliary member
- 2224/0226 . . . . . Material of the auxiliary member
- 2224/023 . . . . . Redistribution layers [RDL] for bonding areas
- 2224/0231 . . . . . Manufacturing methods of the redistribution layers
- 2224/02311 . . . . . Additive methods
- 2224/02313 . . . . . Subtractive methods
- 2224/02315 . . . . . Self-assembly processes
- 2224/02317 . . . . . by local deposition
- 2224/02319 . . . . . by using a preform
- 2224/02321 . . . . . Reworking
- 2224/0233 . . . . . Structure of the redistribution layers
- 2224/02331 . . . . . Multilayer structure
- 2224/02333 . . . . . being a bump
- 2224/02335 . . . . . Free-standing redistribution layers
- 2224/0235 . . . . . Shape of the redistribution layers
- 2224/02351 . . . . . comprising interlocking features
- 2224/0236 . . . . . Shape of the insulating layers therebetween
- 2224/0237 . . . . . Disposition of the redistribution layers
- 2224/02371 . . . . . connecting the bonding area on a surface of the semiconductor or solid-state body with another surface of the semiconductor or solid-state body
- 2224/02372 . . . . . connecting to a via connection in the semiconductor or solid-state body
- 2224/02373 . . . . . Layout of the redistribution layers
- 2224/02375 . . . . . Top view
- 2224/02377 . . . . . Fan-in arrangement
- 2224/02379 . . . . . Fan-out arrangement
- 2224/02381 . . . . . Side view
- 2224/0239 . . . . . Material of the redistribution layers
- 2224/024 . . . . . Material of the insulating layers therebetween
- 2224/03 . . . . . Manufacturing methods
- 2224/03001 . . . . . Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
- 2224/03002 . . . . . for supporting the semiconductor or solid-state body
- 2224/03003 . . . . . for holding or transferring a preform
- 2224/03005 . . . . . for aligning the bonding area, e.g. marks, spacers
- 2224/03009 . . . . . for protecting parts during manufacture
- 2224/03011 . . . . . Involving a permanent auxiliary member, i.e. a member which is left at least partly in the finished device, e.g. coating, dummy feature
- 2224/03013 . . . . . for holding or confining the bonding area, e.g. solder flow barrier
- 2224/03015 . . . . . for aligning the bonding area, e.g. marks, spacers
- 2224/03019 . . . . . for protecting parts during the process
- 2224/031 . . . . . Manufacture and pre-treatment of the bonding area preform
- 2224/0311 . . . . . Shaping
- 2224/0312 . . . . . Applying permanent coating
- 2224/033 . . . . . by local deposition of the material of the bonding area
- 2224/0331 . . . . . in liquid form
- 2224/03312 . . . . . Continuous flow, e.g. using a microsyringe, a pump, a nozzle or extrusion
- 2224/03318 . . . . . by dispensing droplets
- 2224/0332 . . . . . Screen printing, i.e. using a stencil
- 2224/0333 . . . . . in solid form
- 2224/03332 . . . . . using a powder
- 2224/03334 . . . . . using a preform
- 2224/034 . . . . . by blanket deposition of the material of the bonding area
- 2224/0341 . . . . . in liquid form
- 2224/03416 . . . . . Spin coating
- 2224/03418 . . . . . Spray coating
- 2224/0342 . . . . . Curtain coating
- 2224/03422 . . . . . by dipping, e.g. in a solder bath
- 2224/03424 . . . . . Immersion coating, e.g. in a solder bath
- 2224/03426 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
- 2224/03428 . . . . . Wave coating
- 2224/0343 . . . . . in solid form
- 2224/03436 . . . . . Lamination of a preform, e.g. foil, sheet or layer
- 2224/03438 . . . . . the preform being at least partly pre-patterned
- 2224/0344 . . . . . by transfer printing
- 2224/03442 . . . . . using a powder
- 2224/03444 . . . . . in gaseous form
- 2224/0345 . . . . . Physical vapour deposition [PVD], e.g. evaporation, or sputtering
- 2224/03452 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
- 2224/0346 . . . . . Plating
- 2224/03462 . . . . . Electroplating
- 2224/03464 . . . . . Electroless plating
- 2224/03466 . . . . . Conformal deposition, i.e. blanket deposition of a conformal layer on a patterned surface
- 2224/0347 . . . . . using a lift-off mask
- 2224/03472 . . . . . Profile of the lift-off mask
- 2224/03474 . . . . . Multilayer masks
- 2224/0348 . . . . . Permanent masks, i.e. masks left in the finished device, e.g. passivation layers
- 2224/035 . . . . . by chemical or physical modification of a pre-existing or pre-deposited material
- 2224/03502 . . . . . Pre-existing or pre-deposited material
- 2224/03505 . . . . . Sintering
- 2224/0351 . . . . . Anodisation

2224/03515	. . . . .	Curing and solidification, e.g. of a photosensitive material	2224/03901	. . . . .	with repetition of the same manufacturing step
2224/0352	. . . . .	Self-assembly, e.g. self-agglomeration of the material in a fluid	2224/03902	. . . . .	Multiple masking steps
2224/03522	. . . . .	Auxiliary means therefor, e.g. for self-assembly activation	2224/03903	. . . . .	using different masks
2224/03524	. . . . .	with special adaptation of the surface of the body to be connected or of an auxiliary substrate, e.g. surface shape specially adapted for the self-assembly process	2224/03906	. . . . .	with modification of the same mask
2224/0355	. . . . .	Selective modification	2224/0391	. . . . .	Forming a passivation layer after forming the bonding area
2224/03552	. . . . .	using a laser or a focussed ion beam [FIB]	2224/03912	. . . . .	the bump being used as a mask for patterning the bonding area
2224/03554	. . . . .	Stereolithography, i.e. solidification of a pattern defined by a laser trace in a photosensitive resin	2224/03914	. . . . .	the bonding area, e.g. under bump metallisation [UBM], being used as a mask for patterning other parts
2224/036	. . . . .	by patterning a pre-deposited material	2224/03916	. . . . .	a passivation layer being used as a mask for patterning the bonding area
2224/03602	. . . . .	Mechanical treatment, e.g. polishing, grinding	2224/0392	. . . . .	specifically adapted to include a probing step
2224/0361	. . . . .	Physical or chemical etching	2224/03921	. . . . .	by repairing the bonding area damaged by the probing step
2224/03612	. . . . .	by physical means only	2224/04	. . . . .	Structure, shape, material or disposition of the bonding areas prior to the connecting process
2224/03614	. . . . .	by chemical means only	2224/0401	. . . . .	Bonding areas specifically adapted for bump connectors, e.g. under bump metallisation [UBM]
2224/03616	. . . . .	Chemical mechanical polishing [CMP]	2224/04026	. . . . .	Bonding areas specifically adapted for layer connectors
2224/03618	. . . . .	with selective exposure, development and removal of a photosensitive material, e.g. of a photosensitive conductive resin	2224/04034	. . . . .	Bonding areas specifically adapted for strap connectors
2224/0362	. . . . .	Photolithography	2224/04042	. . . . .	Bonding areas specifically adapted for wire connectors, e.g. wirebond pads
2224/03622	. . . . .	using masks	2224/0405	. . . . .	Bonding areas specifically adapted for tape automated bonding [TAB] connectors
2224/0363	. . . . .	using a laser or a focused ion beam [FIB]	2224/04073	. . . . .	Bonding areas specifically adapted for connectors of different types
2224/03632	. . . . .	Ablation by means of a laser or focused ion beam [FIB]	2224/04105	. . . . .	Bonding areas formed on an encapsulation of the semiconductor or solid-state body, e.g. bonding areas on chip-scale packages
2224/037	. . . . .	involving monitoring, e.g. feedback loop	2224/05	. . . . .	of an individual bonding area
2224/038	. . . . .	Post-treatment of the bonding area	2224/05001	. . . . .	Internal layers
2224/0381	. . . . .	Cleaning, e.g. oxide removal step, desmearing	2224/05005	. . . . .	Structure
2224/0382	. . . . .	Applying permanent coating, e.g. in-situ coating	2224/05006	. . . . .	Dual damascene structure
2224/03821	. . . . .	Spray coating	2224/05007	. . . . .	comprising a core and a coating
2224/03822	. . . . .	by dipping, e.g. in a solder bath	2224/05008	. . . . .	Bonding area integrally formed with a redistribution layer on the semiconductor or solid-state body, e.g.
2224/03823	. . . . .	Immersion coating, e.g. in a solder bath	2224/05009	. . . . .	Bonding area integrally formed with a via connection of the semiconductor or solid-state body
2224/03824	. . . . .	Chemical solution deposition [CSD], i.e. using a liquid precursor	2224/0501	. . . . .	Shape
2224/03825	. . . . .	Plating, e.g. electroplating, electroless plating	2224/05011	. . . . .	comprising apertures or cavities
2224/03826	. . . . .	Physical vapour deposition [PVD], e.g. evaporation, or sputtering	2224/05012	. . . . .	in top view
2224/03827	. . . . .	Chemical vapour deposition [CVD], e.g. laser CVD	2224/05013	. . . . .	being rectangular
2224/03828	. . . . .	Applying flux	2224/05014	. . . . .	being square
2224/03829	. . . . .	Applying a precursor material	2224/05015	. . . . .	being circular or elliptic
2224/0383	. . . . .	Reworking, e.g. shaping	2224/05016	. . . . .	in side view
2224/03831	. . . . .	involving a chemical process, e.g. etching the bonding area	2224/05017	. . . . .	comprising protrusions or indentations
2224/0384	. . . . .	involving a mechanical process, e.g. planarising the bonding area	2224/05018	. . . . .	being a conformal layer on a patterned surface
2224/03845	. . . . .	Chemical mechanical polishing [CMP]	2224/05019	. . . . .	being a non conformal layer on a patterned surface
2224/03848	. . . . .	Thermal treatments, e.g. annealing, controlled cooling	2224/0502	. . . . .	Disposition
2224/03849	. . . . .	Reflowing	2224/05022	. . . . .	the internal layer being at least partially embedded in the surface
2224/039	. . . . .	Methods of manufacturing bonding areas involving a specific sequence of method steps			

2224/05023	. . . . .	the whole internal layer protruding from the surface	2224/05114	. . . . .	Thallium [Tl] as principal constituent
2224/05024	. . . . .	the internal layer being disposed on a redistribution layer on the semiconductor or solid-state body	2224/05116	. . . . .	Lead [Pb] as principal constituent
2224/05025	. . . . .	the internal layer being disposed on a via connection of the semiconductor or solid-state body	2224/05117	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05026	. . . . .	the internal layer being disposed in a recess of the surface	2224/05118	. . . . .	Zinc [Zn] as principal constituent
2224/05027	. . . . .	the internal layer extending out of an opening	2224/0512	. . . . .	Antimony [Sb] as principal constituent
2224/05073	. . . . .	Single internal layer	2224/05123	. . . . .	Magnesium [Mg] as principal constituent
2224/05075	. . . . .	Plural internal layers	2224/05124	. . . . .	Aluminium [Al] as principal constituent
2224/05076	. . . . .	being mutually engaged together, e.g. through inserts	2224/05138	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05078	. . . . .	being disposed next to each other, e.g. side-to-side arrangements	2224/05139	. . . . .	Silver [Ag] as principal constituent
2224/0508	. . . . .	being stacked	2224/05144	. . . . .	Gold [Au] as principal constituent
2224/05082	. . . . .	Two-layer arrangements	2224/05147	. . . . .	Copper [Cu] as principal constituent
2224/05083	. . . . .	Three-layer arrangements	2224/05149	. . . . .	Manganese [Mn] as principal constituent
2224/05084	. . . . .	Four-layer arrangements	2224/05155	. . . . .	Nickel [Ni] as principal constituent
2224/05085	. . . . .	with additional elements, e.g. vias arrays, interposed between the stacked layers	2224/05157	. . . . .	Cobalt [Co] as principal constituent
2224/05086	. . . . .	Structure of the additional element	2224/0516	. . . . .	Iron [Fe] as principal constituent
2224/05087	. . . . .	being a via with at least a lining layer	2224/05163	. . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/05088	. . . . .	Shape of the additional element	2224/05164	. . . . .	Palladium [Pd] as principal constituent
2224/05089	. . . . .	Disposition of the additional element	2224/05166	. . . . .	Titanium [Ti] as principal constituent
2224/0509	. . . . .	of a single via	2224/05169	. . . . .	Platinum [Pt] as principal constituent
2224/05091	. . . . .	at the center of the internal layers	2224/0517	. . . . .	Zirconium [Zr] as principal constituent
2224/05092	. . . . .	at the periphery of the internal layers	2224/05171	. . . . .	Chromium [Cr] as principal constituent
2224/05093	. . . . .	of a plurality of vias	2224/05172	. . . . .	Vanadium [V] as principal constituent
2224/05094	. . . . .	at the center of the internal layers	2224/05173	. . . . .	Rhodium [Rh] as principal constituent
2224/05095	. . . . .	at the periphery of the internal layers	2224/05176	. . . . .	Ruthenium [Ru] as principal constituent
2224/05096	. . . . .	Uniform arrangement, i.e. array	2224/05178	. . . . .	Iridium [Ir] as principal constituent
2224/05097	. . . . .	Random arrangement	2224/05179	. . . . .	Niobium [Nb] as principal constituent
2224/05098	. . . . .	Material of the additional element	2224/0518	. . . . .	Molybdenum [Mo] as principal constituent
2224/05099	. . . . .	Material	2224/05181	. . . . .	Tantalum [Ta] as principal constituent
2224/051	. . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05183	. . . . .	Rhenium [Re] as principal constituent
2224/05101	. . . . .	the principal constituent melting at a temperature of less than 400°C	2224/05184	. . . . .	Tungsten [W] as principal constituent
2224/05105	. . . . .	Gallium [Ga] as principal constituent	2224/05186	. . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05109	. . . . .	Indium [In] as principal constituent			
2224/05111	. . . . .	Tin [Sn] as principal constituent			
2224/05113	. . . . .	Bismuth [Bi] as principal constituent			

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2224/05187	. . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/05224	. . . . .	Aluminium [Al] as principal constituent
2224/05188	. . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/05238	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/0519	. . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/05239	. . . . .	Silver [Ag] as principal constituent
2224/05191	. . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/05244	. . . . .	Gold [Au] as principal constituent
2224/05193	. . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/051</a> - <a href="#">H01L 2224/05191</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/05247	. . . . .	Copper [Cu] as principal constituent
2224/05194	. . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/051</a> - <a href="#">H01L 2224/05191</a>	2224/05249	. . . . .	Manganese [Mn] as principal constituent
2224/05195	. . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/051</a> - <a href="#">H01L 2224/05191</a>	2224/05255	. . . . .	Nickel [Ni] as principal constituent
2224/05198	. . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/05257	. . . . .	Cobalt [Co] as principal constituent
2224/05199	. . . . .	Material of the matrix	2224/0526	. . . . .	Iron [Fe] as principal constituent
2224/052	. . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05263	. . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/05201	. . . . .	the principal constituent melting at a temperature of less than 400°C	2224/05264	. . . . .	Palladium [Pd] as principal constituent
2224/05205	. . . . .	Gallium [Ga] as principal constituent	2224/05266	. . . . .	Titanium [Ti] as principal constituent
2224/05209	. . . . .	Indium [In] as principal constituent	2224/05269	. . . . .	Platinum [Pt] as principal constituent
2224/05211	. . . . .	Tin [Sn] as principal constituent	2224/0527	. . . . .	Zirconium [Zr] as principal constituent
2224/05213	. . . . .	Bismuth [Bi] as principal constituent	2224/05271	. . . . .	Chromium [Cr] as principal constituent
2224/05214	. . . . .	Thallium [Tl] as principal constituent	2224/05272	. . . . .	Vanadium [V] as principal constituent
2224/05216	. . . . .	Lead [Pb] as principal constituent	2224/05273	. . . . .	Rhodium [Rh] as principal constituent
2224/05217	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/05276	. . . . .	Ruthenium [Ru] as principal constituent
2224/05218	. . . . .	Zinc [Zn] as principal constituent	2224/05278	. . . . .	Iridium [Ir] as principal constituent
2224/0522	. . . . .	Antimony [Sb] as principal constituent	2224/05279	. . . . .	Niobium [Nb] as principal constituent
2224/05223	. . . . .	Magnesium [Mg] as principal constituent	2224/0528	. . . . .	Molybdenum [Mo] as principal constituent
			2224/05281	. . . . .	Tantalum [Ta] as principal constituent
			2224/05283	. . . . .	Rhenium [Re] as principal constituent
			2224/05284	. . . . .	Tungsten [W] as principal constituent
			2224/05286	. . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
			2224/05287	. . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
			2224/05288	. . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides
			2224/0529	. . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy

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2224/05291	. . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/05349	. . . . .	Manganese [Mn] as principal constituent
2224/05293	. . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/052</a> - <a href="#">H01L 2224/05291</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/05355	. . . . .	Nickel [Ni] as principal constituent
2224/05294	. . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/052</a> - <a href="#">H01L 2224/05291</a>	2224/05357	. . . . .	Cobalt [Co] as principal constituent
2224/05295	. . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/052</a> - <a href="#">H01L 2224/05291</a>	2224/0536	. . . . .	Iron [Fe] as principal constituent
2224/05298	. . . . .	Fillers	2224/05363	. . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/05299	. . . . .	Base material	2224/05364	. . . . .	Palladium [Pd] as principal constituent
2224/053	. . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05366	. . . . .	Titanium [Ti] as principal constituent
2224/05301	. . . . .	the principal constituent melting at a temperature of less than 400°C	2224/05369	. . . . .	Platinum [Pt] as principal constituent
2224/05305	. . . . .	Gallium [Ga] as principal constituent	2224/0537	. . . . .	Zirconium [Zr] as principal constituent
2224/05309	. . . . .	Indium [In] as principal constituent	2224/05371	. . . . .	Chromium [Cr] as principal constituent
2224/05311	. . . . .	Tin [Sn] as principal constituent	2224/05372	. . . . .	Vanadium [V] as principal constituent
2224/05313	. . . . .	Bismuth [Bi] as principal constituent	2224/05373	. . . . .	Rhodium [Rh] as principal constituent
2224/05314	. . . . .	Thallium [Tl] as principal constituent	2224/05376	. . . . .	Ruthenium [Ru] as principal constituent
2224/05316	. . . . .	Lead [Pb] as principal constituent	2224/05378	. . . . .	Iridium [Ir] as principal constituent
2224/05317	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/05379	. . . . .	Niobium [Nb] as principal constituent
2224/05318	. . . . .	Zinc [Zn] as principal constituent	2224/0538	. . . . .	Molybdenum [Mo] as principal constituent
2224/0532	. . . . .	Antimony [Sb] as principal constituent	2224/05381	. . . . .	Tantalum [Ta] as principal constituent
2224/05323	. . . . .	Magnesium [Mg] as principal constituent	2224/05383	. . . . .	Rhenium [Re] as principal constituent
2224/05324	. . . . .	Aluminium [Al] as principal constituent	2224/05384	. . . . .	Tungsten [W] as principal constituent
2224/05338	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/05386	. . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05339	. . . . .	Silver [Ag] as principal constituent	2224/05387	. . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/05344	. . . . .	Gold [Au] as principal constituent	2224/05388	. . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/05347	. . . . .	Copper [Cu] as principal constituent	2224/0539	. . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
			2224/05391	. . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
			2224/05393	. . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/053</a> - <a href="#">H01L 2224/05391</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
			2224/05394	. . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/053</a> - <a href="#">H01L 2224/05391</a>

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2224/05395	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/053</a> - <a href="#">H01L 2224/05391</a>	2224/05463	the principal constituent melting at a temperature of greater than 1550°C
2224/05398	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/05464	Palladium [Pd] as principal constituent
2224/05399	Coating material	2224/05466	Titanium [Ti] as principal constituent
2224/054	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05469	Platinum [Pt] as principal constituent
2224/05401	the principal constituent melting at a temperature of less than 400°C	2224/0547	Zirconium [Zr] as principal constituent
2224/05405	Gallium [Ga] as principal constituent	2224/05471	Chromium [Cr] as principal constituent
2224/05409	Indium [In] as principal constituent	2224/05472	Vanadium [V] as principal constituent
2224/05411	Tin [Sn] as principal constituent	2224/05473	Rhodium [Rh] as principal constituent
2224/05413	Bismuth [Bi] as principal constituent	2224/05476	Ruthenium [Ru] as principal constituent
2224/05414	Thallium [Tl] as principal constituent	2224/05478	Iridium [Ir] as principal constituent
2224/05416	Lead [Pb] as principal constituent	2224/05479	Niobium [Nb] as principal constituent
2224/05417	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/0548	Molybdenum [Mo] as principal constituent
2224/05418	Zinc [Zn] as principal constituent	2224/05481	Tantalum [Ta] as principal constituent
2224/0542	Antimony [Sb] as principal constituent	2224/05483	Rhenium [Re] as principal constituent
2224/05423	Magnesium [Mg] as principal constituent	2224/05484	Tungsten [W] as principal constituent
2224/05424	Aluminium [Al] as principal constituent	2224/05486	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/05438	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/05487	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/05439	Silver [Ag] as principal constituent	2224/05488	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/05444	Gold [Au] as principal constituent	2224/0549	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/05447	Copper [Cu] as principal constituent	2224/05491	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/05449	Manganese [Mn] as principal constituent	2224/05493	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/054</a> - <a href="#">H01L 2224/05491</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/05455	Nickel [Ni] as principal constituent	2224/05494	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/054</a> - <a href="#">H01L 2224/05491</a>
2224/05457	Cobalt [Co] as principal constituent	2224/05495	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/054</a> - <a href="#">H01L 2224/05491</a>
2224/0546	Iron [Fe] as principal constituent		

2224/05498	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/05584	Four-layer coating
2224/05499	Shape or distribution of the fillers	2224/05599	Material
2224/0554	External layer	2224/056	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/05541	Structure	2224/05601	the principal constituent melting at a temperature of less than 400°C
2224/05546	Dual damascene structure	2224/05605	Gallium [Ga] as principal constituent
2224/05547	comprising a core and a coating	2224/05609	Indium [In] as principal constituent
2224/05548	Bonding area integrally formed with a redistribution layer on the semiconductor or solid-state body	2224/05611	Tin [Sn] as principal constituent
2224/0555	Shape	2224/05613	Bismuth [Bi] as principal constituent
2224/05551	comprising apertures or cavities	2224/05614	Thallium [Tl] as principal constituent
2224/05552	in top view	2224/05616	Lead [Pb] as principal constituent
2224/05553	being rectangular	2224/05617	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05554	being square	2224/05618	Zinc [Zn] as principal constituent
2224/05555	being circular or elliptic	2224/0562	Antimony [Sb] as principal constituent
2224/05556	in side view	2224/05623	Magnesium [Mg] as principal constituent
2224/05557	comprising protrusions or indentations	2224/05624	Aluminium [Al] as principal constituent
2224/05558	conformal layer on a patterned surface	2224/05638	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05559	non conformal layer on a patterned surface	2224/05639	Silver [Ag] as principal constituent
2224/0556	Disposition	2224/05644	Gold [Au] as principal constituent
2224/05561	On the entire surface of the internal layer	2224/05647	Copper [Cu] as principal constituent
2224/05562	On the entire exposed surface of the internal layer	2224/05649	Manganese [Mn] as principal constituent
2224/05563	Only on parts of the surface of the internal layer	2224/05655	Nickel [Ni] as principal constituent
2224/05564	Only on the bonding interface of the bonding area	2224/05657	Cobalt [Co] as principal constituent
2224/05565	Only outside the bonding interface of the bonding area	2224/0566	Iron [Fe] as principal constituent
2224/05566	Both on and outside the bonding interface of the bonding area	2224/05663	the principal constituent melting at a temperature of greater than 1550°C
2224/05567	the external layer being at least partially embedded in the surface	2224/05664	Palladium [Pd] as principal constituent
2224/05568	the whole external layer protruding from the surface	2224/05666	Titanium [Ti] as principal constituent
2224/05569	the external layer being disposed on a redistribution layer on the semiconductor or solid-state body	2224/05669	Platinum [Pt] as principal constituent
2224/0557	the external layer being disposed on a via connection of the semiconductor or solid-state body	2224/0567	Zirconium [Zr] as principal constituent
2224/05571	the external layer being disposed in a recess of the surface	2224/05671	Chromium [Cr] as principal constituent
2224/05572	the external layer extending out of an opening	2224/05672	Vanadium [V] as principal constituent
2224/05573	Single external layer	2224/05673	Rhodium [Rh] as principal constituent
2224/05575	Plural external layers		
2224/05576	being mutually engaged together, e.g. through inserts		
2224/05578	being disposed next to each other, e.g. side-to-side arrangements		
2224/0558	being stacked		
2224/05582	Two-layer coating		
2224/05583	Three-layer coating		

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2224/05676	Ruthenium [Ru] as principal constituent	2224/05713	Bismuth [Bi] as principal constituent
2224/05678	Iridium [Ir] as principal constituent	2224/05714	Thallium [Tl] as principal constituent
2224/05679	Niobium [Nb] as principal constituent	2224/05716	Lead [Pb] as principal constituent
2224/0568	Molybdenum [Mo] as principal constituent	2224/05717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/05681	Tantalum [Ta] as principal constituent	2224/05718	Zinc [Zn] as principal constituent
2224/05683	Rhenium [Re] as principal constituent	2224/0572	Antimony [Sb] as principal constituent
2224/05684	Tungsten [W] as principal constituent	2224/05723	Magnesium [Mg] as principal constituent
2224/05686	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/05724	Aluminium [Al] as principal constituent
2224/05687	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/05738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05688	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/05739	Silver [Ag] as principal constituent
2224/0569	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/05744	Gold [Au] as principal constituent
2224/05691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/05747	Copper [Cu] as principal constituent
2224/05693	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/056</a> - <a href="#">H01L 2224/05691</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/05749	Manganese [Mn] as principal constituent
2224/05694	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/056</a> - <a href="#">H01L 2224/05691</a>	2224/05755	Nickel [Ni] as principal constituent
2224/05695	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/056</a> - <a href="#">H01L 2224/05691</a>	2224/05757	Cobalt [Co] as principal constituent
2224/05698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/0576	Iron [Fe] as principal constituent
2224/05699	Material of the matrix	2224/05763	the principal constituent melting at a temperature of greater than 1550°C
2224/057	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05764	Palladium [Pd] as principal constituent
2224/05701	the principal constituent melting at a temperature of less than 400°C	2224/05766	Titanium [Ti] as principal constituent
2224/05705	Gallium [Ga] as principal constituent	2224/05769	Platinum [Pt] as principal constituent
2224/05709	Indium [In] as principal constituent	2224/0577	Zirconium [Zr] as principal constituent
2224/05711	Tin [Sn] as principal constituent	2224/05771	Chromium [Cr] as principal constituent
		2224/05772	Vanadium [V] as principal constituent
		2224/05773	Rhodium [Rh] as principal constituent
		2224/05776	Ruthenium [Ru] as principal constituent
		2224/05778	Iridium [Ir] as principal constituent
		2224/05779	Niobium [Nb] as principal constituent
		2224/0578	Molybdenum [Mo] as principal constituent
		2224/05781	Tantalum [Ta] as principal constituent

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2224/05783	Rhenium [Re] as principal constituent	2224/05823	Magnesium [Mg] as principal constituent
2224/05784	Tungsten [W] as principal constituent	2224/05824	Aluminium [Al] as principal constituent
2224/05786	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/05838	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05787	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/05839	Silver [Ag] as principal constituent
2224/05788	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/05844	Gold [Au] as principal constituent
2224/0579	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/05847	Copper [Cu] as principal constituent
2224/05791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/05849	Manganese [Mn] as principal constituent
2224/05793	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/057</a> - <a href="#">H01L 2224/05791</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/05855	Nickel [Ni] as principal constituent
2224/05794	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/057</a> - <a href="#">H01L 2224/05791</a>	2224/05857	Cobalt [Co] as principal constituent
2224/05795	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/057</a> - <a href="#">H01L 2224/05791</a>	2224/0586	Iron [Fe] as principal constituent
2224/05798	Fillers	2224/05863	the principal constituent melting at a temperature of greater than 1550°C
2224/05799	Base material	2224/05864	Palladium [Pd] as principal constituent
2224/058	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/05866	Titanium [Ti] as principal constituent
2224/05801	the principal constituent melting at a temperature of less than 400°C	2224/05869	Platinum [Pt] as principal constituent
2224/05805	Gallium [Ga] as principal constituent	2224/0587	Zirconium [Zr] as principal constituent
2224/05809	Indium [In] as principal constituent	2224/05871	Chromium [Cr] as principal constituent
2224/05811	Tin [Sn] as principal constituent	2224/05872	Vanadium [V] as principal constituent
2224/05813	Bismuth [Bi] as principal constituent	2224/05873	Rhodium [Rh] as principal constituent
2224/05814	Thallium [Tl] as principal constituent	2224/05876	Ruthenium [Ru] as principal constituent
2224/05816	Lead [Pb] as principal constituent	2224/05878	Iridium [Ir] as principal constituent
2224/05817	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/05879	Niobium [Nb] as principal constituent
2224/05818	Zinc [Zn] as principal constituent	2224/0588	Molybdenum [Mo] as principal constituent
2224/0582	Antimony [Sb] as principal constituent	2224/05881	Tantalum [Ta] as principal constituent
		2224/05883	Rhenium [Re] as principal constituent
		2224/05884	Tungsten [W] as principal constituent
		2224/05886	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/05887	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/05888	Glasses, e.g. amorphous oxides, nitrides or fluorides

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2224/0589	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/05938	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/05891	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/05939	Silver [Ag] as principal constituent
2224/05893	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/058</a> - <a href="#">H01L 2224/05891</a> e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/05944	Gold [Au] as principal constituent
2224/05894	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/058</a> - <a href="#">H01L 2224/05891</a>	2224/05947	Copper [Cu] as principal constituent
2224/05895	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/058</a> - <a href="#">H01L 2224/05891</a>	2224/05949	Manganese [Mn] as principal constituent
2224/05898	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/05955	Nickel [Ni] as principal constituent
2224/05899	Coating material	2224/05957	Cobalt [Co] as principal constituent
2224/059	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/0596	Iron [Fe] as principal constituent
2224/05901	the principal constituent melting at a temperature of less than 400°C	2224/05963	the principal constituent melting at a temperature of greater than 1550°C
2224/05905	Gallium [Ga] as principal constituent	2224/05964	Palladium [Pd] as principal constituent
2224/05909	Indium [In] as principal constituent	2224/05966	Titanium [Ti] as principal constituent
2224/05911	Tin [Sn] as principal constituent	2224/05969	Platinum [Pt] as principal constituent
2224/05913	Bismuth [Bi] as principal constituent	2224/0597	Zirconium [Zr] as principal constituent
2224/05914	Thallium [Tl] as principal constituent	2224/05971	Chromium [Cr] as principal constituent
2224/05916	Lead [Pb] as principal constituent	2224/05972	Vanadium [V] as principal constituent
2224/05917	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/05973	Rhodium [Rh] as principal constituent
2224/05918	Zinc [Zn] as principal constituent	2224/05976	Ruthenium [Ru] as principal constituent
2224/0592	Antimony [Sb] as principal constituent	2224/05978	Iridium [Ir] as principal constituent
2224/05923	Magnesium [Mg] as principal constituent	2224/05979	Niobium [Nb] as principal constituent
2224/05924	Aluminium [Al] as principal constituent	2224/0598	Molybdenum [Mo] as principal constituent
		2224/05981	Tantalum [Ta] as principal constituent
		2224/05983	Rhenium [Re] as principal constituent
		2224/05984	Tungsten [W] as principal constituent
		2224/05986	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/05987	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/05988	Glasses, e.g. amorphous oxides, nitrides or fluorides
		2224/0599	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
		2224/05991	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

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2224/05993	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/059</a> - <a href="#">H01L 2224/05991</a>	2224/06145	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
	e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/06146	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/05994	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/059</a> - <a href="#">H01L 2224/05991</a>	2224/06147	with specially adapted redistribution layers [RDL]
		2224/06148	being disposed in a single wiring level, i.e. planar layout
2224/05995	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/059</a> - <a href="#">H01L 2224/05991</a>	2224/06149	being disposed in different wiring levels, i.e. resurf layout
		2224/0615	Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/05998	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/06151	being uniform, i.e. having a uniform pitch across the array
		2224/06152	being non uniform, i.e. having a non uniform pitch across the array
2224/05999	Shape or distribution of the fillers	2224/06153	with a staggered arrangement, e.g. depopulated array
2224/06	of a plurality of bonding areas	2224/06154	covering only portions of the surface to be connected
2224/0601	Structure	2224/06155	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/0603	Bonding areas having different sizes, e.g. different heights or widths	2224/06156	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/0605	Shape	2224/06157	with specially adapted redistribution layers [RDL]
2224/06051	Bonding areas having different shapes	2224/06158	being disposed in a single wiring level, i.e. planar layout
2224/061	Disposition	2224/06159	being disposed in different wiring levels, i.e. resurf layout
2224/06102	the bonding areas being at different heights	2224/0616	Random array, i.e. array with no symmetry
2224/0612	Layout	2224/06163	with a staggered arrangement
2224/0613	Square or rectangular array	2224/06164	covering only portions of the surface to be connected
2224/06131	being uniform, i.e. having a uniform pitch across the array	2224/06165	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/06132	being non uniform, i.e. having a non uniform pitch across the array	2224/06166	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/06133	with a staggered arrangement, e.g. depopulated array	2224/06167	with specially adapted redistribution layers [RDL]
2224/06134	covering only portions of the surface to be connected	2224/06168	being disposed in a single wiring level, i.e. planar layout
2224/06135	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/06169	being disposed in different wiring levels, i.e. resurf layout
2224/06136	Covering only the central area of the surface to be connected, i.e. central arrangements	2224/06177	Combinations of arrays with different layouts
2224/06137	with specially adapted redistribution layers [RDL]	2224/06179	Corner adaptations, i.e. disposition of the bonding areas at the corners of the semiconductor or solid-state body
2224/06138	being disposed in a single wiring level, i.e. planar layout	2224/0618	being disposed on at least two different sides of the body, e.g. dual array
2224/06139	being disposed in different wiring levels, i.e. resurf layout	2224/06181	On opposite sides of the body
2224/0614	Circular array, i.e. array with radial symmetry	2224/06182	with specially adapted redistribution layers [RDL]
2224/06141	being uniform, i.e. having a uniform pitch across the array	2224/06183	On contiguous sides of the body
2224/06142	being non uniform, i.e. having a non uniform pitch across the array		
2224/06143	with a staggered arrangement, e.g. depopulated array		
2224/06144	covering only portions of the surface to be connected		

- 2224/06187 . . . . . with specially adapted redistribution layers [RDL]
- 2224/06188 . . . . . being disposed in a single wiring level, i.e. planar layout
- 2224/06189 . . . . . being disposed in different wiring levels, i.e. resurf layout
- 2224/065 . . . . . Material
- 2224/06505 . . . . . Bonding areas having different materials
- 2224/0651 . . . . . Function
- 2224/06515 . . . . . Bonding areas having different functions
- 2224/06517 . . . . . including bonding areas providing primarily mechanical bonding
- 2224/06519 . . . . . including bonding areas providing primarily thermal dissipation
- 2224/07 . . . . . Structure, shape, material or disposition of the bonding areas after the connecting process
- 2224/08 . . . . . of an individual bonding area
- 2224/0801 . . . . . Structure
- 2224/0805 . . . . . Shape
- 2224/08052 . . . . . in top view
- 2224/08053 . . . . . being non uniform along the bonding area
- 2224/08054 . . . . . being rectangular
- 2224/08055 . . . . . being square
- 2224/08056 . . . . . being circular or elliptic
- 2224/08057 . . . . . in side view
- 2224/08058 . . . . . being non uniform along the bonding area
- 2224/08059 . . . . . comprising protrusions or indentations
- 2224/0807 . . . . . of bonding interfaces, e.g. interlocking features
- 2224/081 . . . . . Disposition
- 2224/08111 . . . . . the bonding area being disposed in a recess of the surface of the body
- 2224/08112 . . . . . the bonding area being at least partially embedded in the surface of the body
- 2224/08113 . . . . . the whole bonding area protruding from the surface of the body
- 2224/0812 . . . . . the bonding area connecting directly to another bonding area, i.e. connectorless bonding, e.g. bumpless bonding
- 2224/08121 . . . . . the connected bonding areas being not aligned with respect to each other
- 2224/08123 . . . . . the bonding area connecting directly to at least two bonding areas
- 2224/08135 . . . . . the bonding area connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip
- 2224/08137 . . . . . the bodies being arranged next to each other, e.g. on a common substrate
- 2224/08145 . . . . . the bodies being stacked
- 2224/08146 . . . . . the bonding area connecting to a via connection in the body
- 2224/08147 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the body
- 2224/08148 . . . . . the bonding area connecting to a bonding area protruding from the surface of the body
- 2224/08151 . . . . . the bonding area connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
- 2224/08153 . . . . . the body and the item being arranged next to each other, e.g. on a common substrate
- 2224/08155 . . . . . the item being non-metallic, e.g. being an insulating substrate with or without metallisation
- 2224/0816 . . . . . the bonding area connecting to a pin of the item
- 2224/08163 . . . . . the bonding area connecting to a potential ring of the item
- 2224/08165 . . . . . the bonding area connecting to a via metallisation of the item
- 2224/08167 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the item
- 2224/08168 . . . . . the bonding area connecting to a bonding area protruding from the surface of the item
- 2224/08175 . . . . . the item being metallic
- 2224/08183 . . . . . the bonding area connecting to a potential ring of the item
- 2224/08187 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the item
- 2224/08188 . . . . . the bonding area connecting to a bonding area protruding from the surface of the item
- 2224/08195 . . . . . the item being a discrete passive component
- 2224/08197 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the item
- 2224/08198 . . . . . the bonding area connecting to a bonding area protruding from the surface of the item
- 2224/08221 . . . . . the body and the item being stacked
- 2224/08225 . . . . . the item being non-metallic, e.g. insulating substrate with or without metallisation
- 2224/0823 . . . . . the bonding area connecting to a pin of the item
- 2224/08233 . . . . . the bonding area connecting to a potential ring of the item
- 2224/08235 . . . . . the bonding area connecting to a via metallisation of the item
- 2224/08237 . . . . . the bonding area connecting to a bonding area disposed in a recess of the surface of the item
- 2224/08238 . . . . . the bonding area connecting to a bonding area protruding from the surface of the item
- 2224/08245 . . . . . the item being metallic
- 2224/08253 . . . . . the bonding area connecting to a potential ring of the item

2224/08257	. . . . .	the bonding area connecting to a bonding area disposed in a recess of the surface of the item	2224/09152	. . . . .	being non uniform, i.e. having a non uniform pitch across the array
2224/08258	. . . . .	the bonding area connecting to a bonding area protruding from the surface of the item	2224/09153	. . . . .	with a staggered arrangement, e.g. depopulated array
2224/08265	. . . . .	the item being a discrete passive component	2224/09154	. . . . .	covering only portions of the surface to be connected
2224/08267	. . . . .	the bonding area connecting to a bonding area disposed in a recess of the surface of the item	2224/09155	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/08268	. . . . .	the bonding area connecting to a bonding area protruding from the surface of the item	2224/09156	. . . . .	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/085	. . . . .	Material	2224/0916	. . . . .	Random array, i.e. array with no symmetry
2224/08501	. . . . .	at the bonding interface	2224/09163	. . . . .	with a staggered arrangement
2224/08502	. . . . .	comprising an eutectic alloy	2224/09164	. . . . .	covering only portions of the surface to be connected
2224/08503	. . . . .	comprising an intermetallic compound	2224/09165	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/08505	. . . . .	outside the bonding interface	2224/09177	. . . . .	Combinations of arrays with different layouts
2224/08506	. . . . .	comprising an eutectic alloy	2224/09179	. . . . .	Corner adaptations, i.e. disposition of the bonding areas at the corners of the semiconductor or solid-state body
2224/09	. . . . .	of a plurality of bonding areas	2224/0918	. . . . .	being disposed on at least two different sides of the body, e.g. dual array
2224/0901	. . . . .	Structure	2224/09181	. . . . .	On opposite sides of the body
2224/0903	. . . . .	Bonding areas having different sizes, e.g. different diameters, heights or widths	2224/09183	. . . . .	On contiguous sides of the body
2224/0905	. . . . .	Shape	2224/095	. . . . .	Material
2224/09051	. . . . .	Bonding areas having different shapes	2224/09505	. . . . .	Bonding areas having different materials
2224/09055	. . . . .	of their bonding interfaces	2224/0951	. . . . .	Function
2224/091	. . . . .	Disposition	2224/09515	. . . . .	Bonding areas having different functions
2224/09102	. . . . .	the bonding areas being at different heights	2224/09517	. . . . .	including bonding areas providing primarily mechanical support
2224/09103	. . . . .	on the semiconductor or solid-state body	2224/09519	. . . . .	including bonding areas providing primarily thermal dissipation
2224/09104	. . . . .	outside the semiconductor or solid-state body	2224/10	. . . . .	Bump connectors; Manufacturing methods related thereto
2224/0912	. . . . .	Layout	2224/1012	. . . . .	Auxiliary members for bump connectors, e.g. spacers
2224/0913	. . . . .	Square or rectangular array	2224/10122	. . . . .	being formed on the semiconductor or solid-state body to be connected
2224/09132	. . . . .	being non uniform, i.e. having a non uniform pitch across the array	2224/10125	. . . . .	Reinforcing structures
2224/09133	. . . . .	with a staggered arrangement, e.g. depopulated array	2224/10126	. . . . .	Bump collar
2224/09134	. . . . .	covering only portions of the surface to be connected	2224/10135	. . . . .	Alignment aids
2224/09135	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/10145	. . . . .	Flow barriers
2224/0914	. . . . .	Circular array, i.e. array with radial symmetry	2224/10152	. . . . .	being formed on an item to be connected not being a semiconductor or solid-state body
2224/09142	. . . . .	being non uniform, i.e. having a non uniform pitch across the array	2224/10155	. . . . .	Reinforcing structures
2224/09143	. . . . .	with a staggered arrangement	2224/10156	. . . . .	Bump collar
2224/09144	. . . . .	covering only portions of the surface to be connected	2224/10165	. . . . .	Alignment aids
2224/09145	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/10175	. . . . .	Flow barriers
2224/0915	. . . . .	Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry	2224/11	. . . . .	Manufacturing methods
2224/09151	. . . . .	being uniform, i.e. having a uniform pitch across the array	2224/11001	. . . . .	Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
			2224/11002	. . . . .	for supporting the semiconductor or solid-state body
			2224/11003	. . . . .	for holding or transferring the bump preform

- 2224/11005 . . . . . for aligning the bump connector, e.g. marks, spacers
- 2224/11009 . . . . . for protecting parts during manufacture
- 2224/11011 . . . . . Involving a permanent auxiliary member, i.e. a member which is left at least partly in the finished device, e.g. coating, dummy feature
- 2224/11013 . . . . . for holding or confining the bump connector, e.g. solder flow barrier
- 2224/11015 . . . . . for aligning the bump connector, e.g. marks, spacers
- 2224/11019 . . . . . for protecting parts during the process
- 2224/111 . . . . . Manufacture and pre-treatment of the bump connector preform
- 2224/1111 . . . . . Shaping
- 2224/1112 . . . . . Applying permanent coating
- 2224/113 . . . . . by local deposition of the material of the bump connector
- 2224/1131 . . . . . in liquid form
- 2224/11312 . . . . . Continuous flow, e.g. using a microsyringe, a pump, a nozzle or extrusion
- 2224/11318 . . . . . by dispensing droplets
- 2224/1132 . . . . . Screen printing, i.e. using a stencil
- 2224/1133 . . . . . in solid form
- 2224/11332 . . . . . using a powder
- 2224/11334 . . . . . using preformed bumps
- 2224/1134 . . . . . Stud bumping, i.e. using a wire-bonding apparatus
- 2224/114 . . . . . by blanket deposition of the material of the bump connector
- 2224/1141 . . . . . in liquid form
- 2224/11416 . . . . . Spin coating
- 2224/11418 . . . . . Spray coating
- 2224/1142 . . . . . Curtain coating
- 2224/11422 . . . . . by dipping, e.g. in a solder bath
- 2224/11424 . . . . . Immersion coating, e.g. in a solder bath
- 2224/11426 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
- 2224/11428 . . . . . Wave coating
- 2224/1143 . . . . . in solid form
- 2224/11436 . . . . . Lamination of a preform, e.g. foil, sheet or layer
- 2224/11438 . . . . . the preform being at least partly pre-patterned
- 2224/1144 . . . . . by transfer printing
- 2224/11442 . . . . . using a powder
- 2224/11444 . . . . . in gaseous form
- 2224/1145 . . . . . Physical vapour deposition [PVD], e.g. evaporation, or sputtering
- 2224/11452 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
- 2224/1146 . . . . . Plating
- 2224/11462 . . . . . Electroplating
- 2224/11464 . . . . . Electroless plating
- 2224/11466 . . . . . Conformal deposition, i.e. blanket deposition of a conformal layer on a patterned surface
- 2224/1147 . . . . . using a lift-off mask
- 2224/11472 . . . . . Profile of the lift-off mask
- 2224/11474 . . . . . Multilayer masks
- 2224/1148 . . . . . Permanent masks, i.e. masks left in the finished device, e.g. passivation layers
- 2224/115 . . . . . by chemical or physical modification of a pre-existing or pre-deposited material
- 2224/11502 . . . . . Pre-existing or pre-deposited material
- 2224/11505 . . . . . Sintering
- 2224/1151 . . . . . Anodisation
- 2224/11515 . . . . . Curing and solidification, e.g. of a photosensitive bump material
- 2224/1152 . . . . . Self-assembly, e.g. self-agglomeration of the bump material in a fluid
- 2224/11522 . . . . . Auxiliary means therefor, e.g. for self-assembly activation
- 2224/11524 . . . . . with special adaptation of the surface or of an auxiliary substrate, e.g. surface shape specially adapted for the self-assembly process
- 2224/11526 . . . . . involving the material of the bonding area, e.g. bonding pad or under bump metallisation [UBM]
- 2224/1155 . . . . . Selective modification
- 2224/11552 . . . . . using a laser or a focussed ion beam [FIB]
- 2224/11554 . . . . . Stereolithography, i.e. solidification of a pattern defined by a laser trace in a photosensitive resin
- 2224/116 . . . . . by patterning a pre-deposited material
- 2224/11602 . . . . . Mechanical treatment, e.g. polishing, grinding
- 2224/1161 . . . . . Physical or chemical etching
- 2224/11612 . . . . . by physical means only
- 2224/11614 . . . . . by chemical means only
- 2224/11616 . . . . . Chemical mechanical polishing [CMP]
- 2224/11618 . . . . . with selective exposure, development and removal of a photosensitive bump material, e.g. of a photosensitive conductive resin
- 2224/1162 . . . . . using masks
- 2224/11622 . . . . . Photolithography
- 2224/1163 . . . . . using a laser or a focused ion beam [FIB]
- 2224/11632 . . . . . Ablation by means of a laser or focused ion beam [FIB]
- 2224/117 . . . . . involving monitoring, e.g. feedback loop
- 2224/118 . . . . . Post-treatment of the bump connector
- 2224/1181 . . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/1182 . . . . . Applying permanent coating, e.g. in-situ coating
- 2224/11821 . . . . . Spray coating
- 2224/11822 . . . . . by dipping, e.g. in a solder bath
- 2224/11823 . . . . . Immersion coating, e.g. in a solder bath
- 2224/11824 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
- 2224/11825 . . . . . Plating, e.g. electroplating, electroless plating
- 2224/11826 . . . . . Physical vapour deposition [PVD], e.g. evaporation, or sputtering
- 2224/11827 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
- 2224/1183 . . . . . Reworking, e.g. shaping
- 2224/11831 . . . . . involving a chemical process, e.g. etching the bump connector
- 2224/1184 . . . . . involving a mechanical process, e.g. planarising the bump connector
- 2224/11845 . . . . . Chemical mechanical polishing [CMP]

2224/11848	. . . . . Thermal treatments, e.g. annealing, controlled cooling	2224/13023	. . . . . the whole bump connector protruding from the surface
2224/11849	. . . . . Reflowing	2224/13024	. . . . . the bump connector being disposed on a redistribution layer on the semiconductor or solid-state body
2224/119	. . . . . Methods of manufacturing bump connectors involving a specific sequence of method steps	2224/13025	. . . . . the bump connector being disposed on a via connection of the semiconductor or solid-state body
2224/11901	. . . . . with repetition of the same manufacturing step	2224/13026	. . . . . relative to the bonding area, e.g. bond pad, of the semiconductor or solid-state body
2224/11902	. . . . . Multiple masking steps	2224/13027	. . . . . the bump connector being offset with respect to the bonding area, e.g. bond pad
2224/11903	. . . . . using different masks	2224/13028	. . . . . the bump connector being disposed on at least two separate bonding areas, e.g. bond pads
2224/11906	. . . . . with modification of the same mask	2224/13075	. . . . . Plural core members
2224/1191	. . . . . Forming a passivation layer after forming the bump connector	2224/13076	. . . . . being mutually engaged together, e.g. through inserts
2224/11912	. . . . . the bump being used as a mask for patterning other parts	2224/13078	. . . . . being disposed next to each other, e.g. side-to-side arrangements
2224/11914	. . . . . the under bump metallisation [UBM] being used as a mask for patterning other parts	2224/1308	. . . . . being stacked
2224/11916	. . . . . a passivation layer being used as a mask for patterning other parts	2224/13082	. . . . . Two-layer arrangements
2224/12	. . . . . Structure, shape, material or disposition of the bump connectors prior to the connecting process	2224/13083	. . . . . Three-layer arrangements
2224/12105	. . . . . Bump connectors formed on an encapsulation of the semiconductor or solid-state body, e.g. bumps on chip-scale packages	2224/13084	. . . . . Four-layer arrangements
2224/13	. . . . . of an individual bump connector	2224/13099	. . . . . Material
2224/13001	. . . . . Core members of the bump connector	2224/131	. . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13005	. . . . . Structure	2224/13101	. . . . . the principal constituent melting at a temperature of less than 400°C
2224/13006	. . . . . Bump connector larger than the underlying bonding area, e.g. than the under bump metallisation [UBM]	2224/13105	. . . . . Gallium [Ga] as principal constituent
2224/13007	. . . . . Bump connector smaller than the underlying bonding area, e.g. than the under bump metallisation [UBM]	2224/13109	. . . . . Indium [In] as principal constituent
2224/13008	. . . . . Bump connector integrally formed with a redistribution layer on the semiconductor or solid-state body	2224/13111	. . . . . Tin [Sn] as principal constituent
2224/13009	. . . . . Bump connector integrally formed with a via connection of the semiconductor or solid-state body	2224/13113	. . . . . Bismuth [Bi] as principal constituent
2224/1301	. . . . . Shape	2224/13114	. . . . . Thallium [Tl] as principal constituent
2224/13011	. . . . . comprising apertures or cavities, e.g. hollow bump	2224/13116	. . . . . Lead [Pb] as principal constituent
2224/13012	. . . . . in top view	2224/13117	. . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13013	. . . . . being rectangular or square	2224/13118	. . . . . Zinc [Zn] as principal constituent
2224/13014	. . . . . being circular or elliptic	2224/1312	. . . . . Antimony [Sb] as principal constituent
2224/13015	. . . . . comprising protrusions or indentations	2224/13123	. . . . . Magnesium [Mg] as principal constituent
2224/13016	. . . . . in side view	2224/13124	. . . . . Aluminium [Al] as principal constituent
2224/13017	. . . . . being non uniform along the bump connector	2224/13138	. . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13018	. . . . . comprising protrusions or indentations	2224/13139	. . . . . Silver [Ag] as principal constituent
2224/13019	. . . . . at the bonding interface of the bump connector, i.e. on the surface of the bump connector	2224/13144	. . . . . Gold [Au] as principal constituent
2224/1302	. . . . . Disposition		
2224/13021	. . . . . the bump connector being disposed in a recess of the surface		
2224/13022	. . . . . the bump connector being at least partially embedded in the surface		

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2224/13147 . . . . .	Copper [Cu] as principal constituent	2224/13195 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/131</a> - <a href="#">H01L 2224/13191</a>
2224/13149 . . . . .	Manganese [Mn] as principal constituent	2224/13198 . . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/13155 . . . . .	Nickel [Ni] as principal constituent	2224/13199 . . . . .	Material of the matrix
2224/13157 . . . . .	Cobalt [Co] as principal constituent	2224/132 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/1316 . . . . .	Iron [Fe] as principal constituent	2224/13201 . . . . .	the principal constituent melting at a temperature of less than 400°C
2224/13163 . . . . .	the principal constituent melting at a temperature of greater than 1550°C	2224/13205 . . . . .	Gallium [Ga] as principal constituent
2224/13164 . . . . .	Palladium [Pd] as principal constituent	2224/13209 . . . . .	Indium [In] as principal constituent
2224/13166 . . . . .	Titanium [Ti] as principal constituent	2224/13211 . . . . .	Tin [Sn] as principal constituent
2224/13169 . . . . .	Platinum [Pt] as principal constituent	2224/13213 . . . . .	Bismuth [Bi] as principal constituent
2224/1317 . . . . .	Zirconium [Zr] as principal constituent	2224/13214 . . . . .	Thallium [Tl] as principal constituent
2224/13171 . . . . .	Chromium [Cr] as principal constituent	2224/13216 . . . . .	Lead [Pb] as principal constituent
2224/13172 . . . . .	Vanadium [V] as principal constituent	2224/13217 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13173 . . . . .	Rhodium [Rh] as principal constituent	2224/13218 . . . . .	Zinc [Zn] as principal constituent
2224/13176 . . . . .	Ruthenium [Ru] as principal constituent	2224/1322 . . . . .	Antimony [Sb] as principal constituent
2224/13178 . . . . .	Iridium [Ir] as principal constituent	2224/13223 . . . . .	Magnesium [Mg] as principal constituent
2224/13179 . . . . .	Niobium [Nb] as principal constituent	2224/13224 . . . . .	Aluminium [Al] as principal constituent
2224/1318 . . . . .	Molybdenum [Mo] as principal constituent	2224/13238 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13181 . . . . .	Tantalum [Ta] as principal constituent	2224/13239 . . . . .	Silver [Ag] as principal constituent
2224/13183 . . . . .	Rhenium [Re] as principal constituent	2224/13244 . . . . .	Gold [Au] as principal constituent
2224/13184 . . . . .	Tungsten [W] as principal constituent	2224/13247 . . . . .	Copper [Cu] as principal constituent
2224/13186 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13249 . . . . .	Manganese [Mn] as principal constituent
2224/13187 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13255 . . . . .	Nickel [Ni] as principal constituent
2224/13188 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13257 . . . . .	Cobalt [Co] as principal constituent
2224/1319 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/1326 . . . . .	Iron [Fe] as principal constituent
2224/13191 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene		
2224/13193 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/131</a> - <a href="#">H01L 2224/13191</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond		
2224/13194 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/131</a> - <a href="#">H01L 2224/13191</a>		

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2224/13263	the principal constituent melting at a temperature of greater than 1550°C	2224/133	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13264	Palladium [Pd] as principal constituent	2224/13301	the principal constituent melting at a temperature of less than 400°C
2224/13266	Titanium [Ti] as principal constituent	2224/13305	Gallium [Ga] as principal constituent
2224/13269	Platinum [Pt] as principal constituent	2224/13309	Indium [In] as principal constituent
2224/1327	Zirconium [Zr] as principal constituent	2224/13311	Tin [Sn] as principal constituent
2224/13271	Chromium [Cr] as principal constituent	2224/13313	Bismuth [Bi] as principal constituent
2224/13272	Vanadium [V] as principal constituent	2224/13314	Thallium [Tl] as principal constituent
2224/13273	Rhodium [Rh] as principal constituent	2224/13316	Lead [Pb] as principal constituent
2224/13276	Ruthenium [Ru] as principal constituent	2224/13317	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13278	Iridium [Ir] as principal constituent	2224/13318	Zinc [Zn] as principal constituent
2224/13279	Niobium [Nb] as principal constituent	2224/1332	Antimony [Sb] as principal constituent
2224/1328	Molybdenum [Mo] as principal constituent	2224/13323	Magnesium [Mg] as principal constituent
2224/13281	Tantalum [Ta] as principal constituent	2224/13324	Aluminium [Al] as principal constituent
2224/13283	Rhenium [Re] as principal constituent	2224/13338	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13284	Tungsten [W] as principal constituent	2224/13339	Silver [Ag] as principal constituent
2224/13286	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13344	Gold [Au] as principal constituent
2224/13287	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13347	Copper [Cu] as principal constituent
2224/13288	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13349	Manganese [Mn] as principal constituent
2224/1329	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13355	Nickel [Ni] as principal constituent
2224/13291	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13357	Cobalt [Co] as principal constituent
2224/13293	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/132</a> - <a href="#">H01L 2224/13291</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/1336	Iron [Fe] as principal constituent
2224/13294	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/132</a> - <a href="#">H01L 2224/13291</a>	2224/13363	the principal constituent melting at a temperature of greater than 1550°C
2224/13295	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/132</a> - <a href="#">H01L 2224/13291</a>	2224/13364	Palladium [Pd] as principal constituent
2224/13298	Fillers	2224/13366	Titanium [Ti] as principal constituent
2224/13299	Base material	2224/13369	Platinum [Pt] as principal constituent
		2224/1337	Zirconium [Zr] as principal constituent

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2224/13371	Chromium [Cr] as principal constituent	2224/13401	the principal constituent melting at a temperature of less than 400°C
2224/13372	Vanadium [V] as principal constituent	2224/13405	Gallium [Ga] as principal constituent
2224/13373	Rhodium [Rh] as principal constituent	2224/13409	Indium [In] as principal constituent
2224/13376	Ruthenium [Ru] as principal constituent	2224/13411	Tin [Sn] as principal constituent
2224/13378	Iridium [Ir] as principal constituent	2224/13413	Bismuth [Bi] as principal constituent
2224/13379	Niobium [Nb] as principal constituent	2224/13414	Thallium [Tl] as principal constituent
2224/1338	Molybdenum [Mo] as principal constituent	2224/13416	Lead [Pb] as principal constituent
2224/13381	Tantalum [Ta] as principal constituent	2224/13417	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13383	Rhenium [Re] as principal constituent	2224/13418	Zinc [Zn] as principal constituent
2224/13384	Tungsten [W] as principal constituent	2224/1342	Antimony [Sb] as principal constituent
2224/13386	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13423	Magnesium [Mg] as principal constituent
2224/13387	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13424	Aluminium [Al] as principal constituent
2224/13388	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13438	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/1339	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13439	Silver [Ag] as principal constituent
2224/13391	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13444	Gold [Au] as principal constituent
2224/13393	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/133</a> - <a href="#">H01L 2224/13391</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/13447	Copper [Cu] as principal constituent
2224/13394	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/133</a> - <a href="#">H01L 2224/13391</a>	2224/13449	Manganese [Mn] as principal constituent
2224/13395	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/133</a> - <a href="#">H01L 2224/13391</a>	2224/13455	Nickel [Ni] as principal constituent
2224/13398	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/13457	Cobalt [Co] as principal constituent
2224/13399	Coating material	2224/1346	Iron [Fe] as principal constituent
2224/134	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/13463	the principal constituent melting at a temperature of greater than 1550°C
		2224/13464	Palladium [Pd] as principal constituent
		2224/13466	Titanium [Ti] as principal constituent
		2224/13469	Platinum [Pt] as principal constituent
		2224/1347	Zirconium [Zr] as principal constituent
		2224/13471	Chromium [Cr] as principal constituent
		2224/13472	Vanadium [V] as principal constituent
		2224/13473	Rhodium [Rh] as principal constituent
		2224/13476	Ruthenium [Ru] as principal constituent

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2224/13478	. . . . .	Iridium [Ir] as principal constituent	2224/13563	. . . . .	Only on parts of the surface of the core, i.e. partial coating
2224/13479	. . . . .	Niobium [Nb] as principal constituent	2224/13564	. . . . .	Only on the bonding interface of the bump connector
2224/1348	. . . . .	Molybdenum [Mo] as principal constituent	2224/13565	. . . . .	Only outside the bonding interface of the bump connector
2224/13481	. . . . .	Tantalum [Ta] as principal constituent	2224/13566	. . . . .	Both on and outside the bonding interface of the bump connector
2224/13483	. . . . .	Rhenium [Re] as principal constituent	2224/1357	. . . . .	Single coating layer
2224/13484	. . . . .	Tungsten [W] as principal constituent	2224/13575	. . . . .	Plural coating layers
2224/13486	. . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13576	. . . . .	being mutually engaged together, e.g. through inserts
2224/13487	. . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13578	. . . . .	being disposed next to each other, e.g. side-to-side arrangements
2224/13488	. . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/1358	. . . . .	being stacked
2224/1349	. . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13582	. . . . .	Two-layer coating
2224/13491	. . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13583	. . . . .	Three-layer coating
2224/13493	. . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/134</a> - <a href="#">H01L 2224/13491</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/13584	. . . . .	Four-layer coating
2224/13494	. . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/134</a> - <a href="#">H01L 2224/13491</a>	2224/13599	. . . . .	Material
2224/13495	. . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/134</a> - <a href="#">H01L 2224/13491</a>	2224/136	. . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13498	. . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/13601	. . . . .	the principal constituent melting at a temperature of less than 400°C
2224/13499	. . . . .	Shape or distribution of the fillers	2224/13605	. . . . .	Gallium [Ga] as principal constituent
2224/1354	. . . . .	Coating	2224/13609	. . . . .	Indium [In] as principal constituent
2224/13541	. . . . .	Structure	2224/13611	. . . . .	Tin [Sn] as principal constituent
2224/1355	. . . . .	Shape	2224/13613	. . . . .	Bismuth [Bi] as principal constituent
2224/13551	. . . . .	being non uniform	2224/13614	. . . . .	Thallium [Tl] as principal constituent
2224/13552	. . . . .	comprising protrusions or indentations	2224/13616	. . . . .	Lead [Pb] as principal constituent
2224/13553	. . . . .	at the bonding interface of the bump connector, i.e. on the surface of the bump connector	2224/13617	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/1356	. . . . .	Disposition	2224/13618	. . . . .	Zinc [Zn] as principal constituent
2224/13561	. . . . .	On the entire surface of the core, i.e. integral coating	2224/1362	. . . . .	Antimony [Sb] as principal constituent
2224/13562	. . . . .	On the entire exposed surface of the core	2224/13623	. . . . .	Magnesium [Mg] as principal constituent
			2224/13624	. . . . .	Aluminium [Al] as principal constituent
			2224/13638	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
			2224/13639	. . . . .	Silver [Ag] as principal constituent
			2224/13644	. . . . .	Gold [Au] as principal constituent
			2224/13647	. . . . .	Copper [Cu] as principal constituent
			2224/13649	. . . . .	Manganese [Mn] as principal constituent
			2224/13655	. . . . .	Nickel [Ni] as principal constituent
			2224/13657	. . . . .	Cobalt [Co] as principal constituent
			2224/1366	. . . . .	Iron [Fe] as principal constituent

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2224/13663 . . . . .	the principal constituent melting at a temperature of greater than 1550°C	2224/13699 . . . . .	Material of the matrix
2224/13664 . . . . .	Palladium [Pd] as principal constituent	2224/137 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/13666 . . . . .	Titanium [Ti] as principal constituent	2224/13701 . . . . .	the principal constituent melting at a temperature of less than 400°C
2224/13669 . . . . .	Platinum [Pt] as principal constituent	2224/13705 . . . . .	Gallium [Ga] as principal constituent
2224/1367 . . . . .	Zirconium [Zr] as principal constituent	2224/13709 . . . . .	Indium [In] as principal constituent
2224/13671 . . . . .	Chromium [Cr] as principal constituent	2224/13711 . . . . .	Tin [Sn] as principal constituent
2224/13672 . . . . .	Vanadium [V] as principal constituent	2224/13713 . . . . .	Bismuth [Bi] as principal constituent
2224/13673 . . . . .	Rhodium [Rh] as principal constituent	2224/13714 . . . . .	Thallium [Tl] as principal constituent
2224/13676 . . . . .	Ruthenium [Ru] as principal constituent	2224/13716 . . . . .	Lead [Pb] as principal constituent
2224/13678 . . . . .	Iridium [Ir] as principal constituent	2224/13717 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13679 . . . . .	Niobium [Nb] as principal constituent	2224/13718 . . . . .	Zinc [Zn] as principal constituent
2224/1368 . . . . .	Molybdenum [Mo] as principal constituent	2224/1372 . . . . .	Antimony [Sb] as principal constituent
2224/13681 . . . . .	Tantalum [Ta] as principal constituent	2224/13723 . . . . .	Magnesium [Mg] as principal constituent
2224/13683 . . . . .	Rhenium [Re] as principal constituent	2224/13724 . . . . .	Aluminium [Al] as principal constituent
2224/13684 . . . . .	Tungsten [W] as principal constituent	2224/13738 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13686 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13739 . . . . .	Silver [Ag] as principal constituent
2224/13687 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13744 . . . . .	Gold [Au] as principal constituent
2224/13688 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13747 . . . . .	Copper [Cu] as principal constituent
2224/1369 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13749 . . . . .	Manganese [Mn] as principal constituent
2224/13691 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13755 . . . . .	Nickel [Ni] as principal constituent
2224/13693 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/136</a> - <a href="#">H01L 2224/13691</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/13757 . . . . .	Cobalt [Co] as principal constituent
2224/13694 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/136</a> - <a href="#">H01L 2224/13691</a>	2224/1376 . . . . .	Iron [Fe] as principal constituent
2224/13695 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/136</a> - <a href="#">H01L 2224/13691</a>	2224/13763 . . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/13698 . . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/13764 . . . . .	Palladium [Pd] as principal constituent
		2224/13766 . . . . .	Titanium [Ti] as principal constituent
		2224/13769 . . . . .	Platinum [Pt] as principal constituent
		2224/1377 . . . . .	Zirconium [Zr] as principal constituent

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2224/13771 . . . . .	Chromium [Cr] as principal constituent	2224/13811 . . . . .	Tin [Sn] as principal constituent
2224/13772 . . . . .	Vanadium [V] as principal constituent	2224/13813 . . . . .	Bismuth [Bi] as principal constituent
2224/13773 . . . . .	Rhodium [Rh] as principal constituent	2224/13814 . . . . .	Thallium [Tl] as principal constituent
2224/13776 . . . . .	Ruthenium [Ru] as principal constituent	2224/13816 . . . . .	Lead [Pb] as principal constituent
2224/13778 . . . . .	Iridium [Ir] as principal constituent	2224/13817 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13779 . . . . .	Niobium [Nb] as principal constituent	2224/13818 . . . . .	Zinc [Zn] as principal constituent
2224/1378 . . . . .	Molybdenum [Mo] as principal constituent	2224/1382 . . . . .	Antimony [Sb] as principal constituent
2224/13781 . . . . .	Tantalum [Ta] as principal constituent	2224/13823 . . . . .	Magnesium [Mg] as principal constituent
2224/13783 . . . . .	Rhenium [Re] as principal constituent	2224/13824 . . . . .	Aluminium [Al] as principal constituent
2224/13784 . . . . .	Tungsten [W] as principal constituent	2224/13838 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13786 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/13839 . . . . .	Silver [Ag] as principal constituent
2224/13787 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13844 . . . . .	Gold [Au] as principal constituent
2224/13788 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13847 . . . . .	Copper [Cu] as principal constituent
2224/1379 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13849 . . . . .	Manganese [Mn] as principal constituent
2224/13791 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13855 . . . . .	Nickel [Ni] as principal constituent
2224/13793 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/137</a> - <a href="#">H01L 2224/13791</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/13857 . . . . .	Cobalt [Co] as principal constituent
2224/13794 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/137</a> - <a href="#">H01L 2224/13791</a>	2224/1386 . . . . .	Iron [Fe] as principal constituent
2224/13795 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/137</a> - <a href="#">H01L 2224/13791</a>	2224/13863 . . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/13798 . . . . .	Fillers	2224/13864 . . . . .	Palladium [Pd] as principal constituent
2224/13799 . . . . .	Base material	2224/13866 . . . . .	Titanium [Ti] as principal constituent
2224/138 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/13869 . . . . .	Platinum [Pt] as principal constituent
2224/13801 . . . . .	the principal constituent melting at a temperature of less than 400°C	2224/1387 . . . . .	Zirconium [Zr] as principal constituent
2224/13805 . . . . .	Gallium [Ga] as principal constituent	2224/13871 . . . . .	Chromium [Cr] as principal constituent
2224/13809 . . . . .	Indium [In] as principal constituent	2224/13872 . . . . .	Vanadium [V] as principal constituent
		2224/13873 . . . . .	Rhodium [Rh] as principal constituent
		2224/13876 . . . . .	Ruthenium [Ru] as principal constituent
		2224/13878 . . . . .	Iridium [Ir] as principal constituent
		2224/13879 . . . . .	Niobium [Nb] as principal constituent
		2224/1388 . . . . .	Molybdenum [Mo] as principal constituent

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2224/13881	Tantalum [Ta] as principal constituent	2224/13916	Lead [Pb] as principal constituent
2224/13883	Rhenium [Re] as principal constituent	2224/13917	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/13884	Tungsten [W] as principal constituent	2224/13918	Zinc [Zn] as principal constituent
2224/13886	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/1392	Antimony [Sb] as principal constituent
2224/13887	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/13923	Magnesium [Mg] as principal constituent
2224/13888	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/13924	Aluminium [Al] as principal constituent
2224/1389	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/13938	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/13891	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/13939	Silver [Ag] as principal constituent
2224/13893	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/138</a> - <a href="#">H01L 2224/13891</a>	2224/13944	Gold [Au] as principal constituent
	e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/13947	Copper [Cu] as principal constituent
2224/13894	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/138</a> - <a href="#">H01L 2224/13891</a>	2224/13949	Manganese [Mn] as principal constituent
		2224/13955	Nickel [Ni] as principal constituent
2224/13895	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/138</a> - <a href="#">H01L 2224/13891</a>	2224/13957	Cobalt [Co] as principal constituent
		2224/1396	Iron [Fe] as principal constituent
2224/13898	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/13963	the principal constituent melting at a temperature of greater than 1550°C
2224/13899	Coating material	2224/13964	Palladium [Pd] as principal constituent
2224/139	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/13966	Titanium [Ti] as principal constituent
		2224/13969	Platinum [Pt] as principal constituent
2224/13901	the principal constituent melting at a temperature of less than 400°C	2224/1397	Zirconium [Zr] as principal constituent
		2224/13971	Chromium [Cr] as principal constituent
2224/13905	Gallium [Ga] as principal constituent	2224/13972	Vanadium [V] as principal constituent
2224/13909	Indium [In] as principal constituent	2224/13973	Rhodium [Rh] as principal constituent
2224/13911	Tin [Sn] as principal constituent	2224/13976	Ruthenium [Ru] as principal constituent
2224/13913	Bismuth [Bi] as principal constituent	2224/13978	Iridium [Ir] as principal constituent
2224/13914	Thallium [Tl] as principal constituent	2224/13979	Niobium [Nb] as principal constituent
		2224/1398	Molybdenum [Mo] as principal constituent
		2224/13981	Tantalum [Ta] as principal constituent
		2224/13983	Rhenium [Re] as principal constituent
		2224/13984	Tungsten [W] as principal constituent

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2224/13986	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/14136	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/13987	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/1414	Central array, i.e. array with radial symmetry
2224/13988	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/14141	being uniform, i.e. having a uniform pitch across the array
2224/1399	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/14142	being non uniform, i.e. having a non uniform pitch across the array
2224/13991	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/14143	with a staggered arrangement, e.g. depopulated array
2224/13993	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/139</a> - <a href="#">H01L 2224/13991</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/14144	covering only portions of the surface to be connected
2224/13994	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/139</a> - <a href="#">H01L 2224/13991</a>	2224/14145	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/13995	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/139</a> - <a href="#">H01L 2224/13991</a>	2224/14146	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/13998	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/1415	Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/13999	Shape or distribution of the fillers	2224/14151	being uniform, i.e. having a uniform pitch across the array
2224/14	of a plurality of bump connectors	2224/14152	being non uniform, i.e. having a non uniform pitch across the array
2224/1401	Structure	2224/14153	with a staggered arrangement, e.g. depopulated array
2224/1403	Bump connectors having different sizes, e.g. different diameters, heights or widths	2224/14154	covering only portions of the surface to be connected
2224/1405	Shape	2224/14155	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/14051	Bump connectors having different shapes	2224/14156	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/141	Disposition	2224/1416	Random layout, i.e. layout with no symmetry
2224/14104	relative to the bonding areas, e.g. bond pads, of the semiconductor or solid-state body	2224/14163	with a staggered arrangement
2224/1411	the bump connectors being bonded to at least one common bonding area	2224/14164	covering only portions of the surface to be connected
2224/1412	Layout	2224/14165	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/1413	Square or rectangular array	2224/14166	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/14131	being uniform, i.e. having a uniform pitch across the array	2224/14177	Combinations of arrays with different layouts
2224/14132	being non uniform, i.e. having a non uniform pitch across the array	2224/14179	Corner adaptations, i.e. disposition of the bump connectors at the corners of the semiconductor or solid-state body
2224/14133	with a staggered arrangement, e.g. depopulated array	2224/1418	being disposed on at least two different sides of the body, e.g. dual array
2224/14134	covering only portions of the surface to be connected	2224/14181	On opposite sides of the body
2224/14135	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/14183	On contiguous sides of the body
		2224/145	Material
		2224/14505	Bump connectors having different materials
		2224/1451	Function
		2224/14515	Bump connectors having different functions
		2224/14517	including bump connectors providing primarily mechanical bonding

2224/14519	. . . . .	including bump connectors providing primarily thermal dissipation	2224/16151	. . . . .	the bump connector connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/15	. . .	Structure, shape, material or disposition of the bump connectors after the connecting process	2224/16153	. . . . .	the body and the item being arranged next to each other, e.g. on a common substrate
2224/16	. . . . .	of an individual bump connector	2224/16155	. . . . .	the item being non-metallic, e.g. being an insulating substrate with or without metallisation
2224/1601	. . . . .	Structure	2224/16157	. . . . .	the bump connector connecting to a bond pad of the item
2224/16012	. . . . .	relative to the bonding area, e.g. bond pad	2224/1616	. . . . .	the bump connector connecting to a pin of the item
2224/16013	. . . . .	the bump connector being larger than the bonding area, e.g. bond pad	2224/16163	. . . . .	the bump connector connecting to a potential ring of the item
2224/16014	. . . . .	the bump connector being smaller than the bonding area, e.g. bond pad	2224/16165	. . . . .	the bump connector connecting to a via metallisation of the item
2224/1605	. . . . .	Shape	2224/16167	. . . . .	the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16052	. . . . .	in top view	2224/16168	. . . . .	the bump connector connecting to a bonding area protruding from the surface of the item
2224/16054	. . . . .	being rectangular or square	2224/16175	. . . . .	the item being metallic
2224/16055	. . . . .	being circular or elliptic	2224/16183	. . . . .	the bump connector connecting to a potential ring of the item
2224/16056	. . . . .	comprising protrusions or indentations	2224/16187	. . . . .	the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16057	. . . . .	in side view	2224/16188	. . . . .	the bump connector connecting to a bonding area protruding from the surface of the item
2224/16058	. . . . .	being non uniform along the bump connector	2224/16195	. . . . .	the item being a discrete passive component
2224/16059	. . . . .	comprising protrusions or indentations	2224/16197	. . . . .	the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/1607	. . . . .	of bonding interfaces, e.g. interlocking features	2224/16198	. . . . .	the bump connector connecting to a bonding area protruding from the surface of the item
2224/161	. . . . .	Disposition	2224/16221	. . . . .	the body and the item being stacked
2224/16104	. . . . .	relative to the bonding area, e.g. bond pad	2224/16225	. . . . .	the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/16105	. . . . .	the bump connector connecting bonding areas being not aligned with respect to each other	2224/16227	. . . . .	the bump connector connecting to a bond pad of the item
2224/16106	. . . . .	the bump connector connecting one bonding area to at least two respective bonding areas	2224/1623	. . . . .	the bump connector connecting to a pin of the item
2224/16108	. . . . .	the bump connector not being orthogonal to the surface	2224/16233	. . . . .	the bump connector connecting to a potential ring of the item
2224/16111	. . . . .	the bump connector being disposed in a recess of the surface	2224/16235	. . . . .	the bump connector connecting to a via metallisation of the item
2224/16112	. . . . .	the bump connector being at least partially embedded in the surface	2224/16237	. . . . .	the bump connector connecting to a bonding area disposed in a recess of the surface of the item
2224/16113	. . . . .	the whole bump connector protruding from the surface	2224/16238	. . . . .	the bump connector connecting to a bonding area protruding from the surface of the item
2224/1613	. . . . .	the bump connector connecting within a semiconductor or solid-state body, i.e. connecting two bonding areas on the same semiconductor or solid-state body	2224/1624	. . . . .	the bump connector connecting between the body and an opposite side of the item with respect to the body
2224/16135	. . . . .	the bump connector connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip	2224/16245	. . . . .	the item being metallic
2224/16137	. . . . .	the bodies being arranged next to each other, e.g. on a common substrate			
2224/16141	. . . . .	the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements			
2224/16145	. . . . .	the bodies being stacked			
2224/16146	. . . . .	the bump connector connecting to a via connection in the semiconductor or solid-state body			
2224/16147	. . . . .	the bump connector connecting to a bonding area disposed in a recess of the surface			
2224/16148	. . . . .	the bump connector connecting to a bonding area protruding from the surface			

2224/16253	. . . . .	the bump connector connecting to a potential ring of the item	2224/17143	. . . . .	with a staggered arrangement
2224/16257	. . . . .	the bump connector connecting to a bonding area disposed in a recess of the surface of the item	2224/17144	. . . . .	covering only portions of the surface to be connected
2224/16258	. . . . .	the bump connector connecting to a bonding area protruding from the surface of the item	2224/17145	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/1626	. . . . .	the bump connector connecting between the body and an opposite side of the item with respect to the body	2224/17146	. . . . .	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/16265	. . . . .	the item being a discrete passive component	2224/1715	. . . . .	Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
2224/16267	. . . . .	the bump connector connecting to a bonding area disposed in a recess of the surface of the item	2224/17151	. . . . .	being uniform, i.e. having a uniform pitch across the array
2224/16268	. . . . .	the bump connector connecting to a bonding area protruding from the surface of the item	2224/17152	. . . . .	being non uniform, i.e. having a non uniform pitch across the array
2224/165	. . . . .	Material	2224/17153	. . . . .	with a staggered arrangement, e.g. depopulated array
2224/16501	. . . . .	at the bonding interface	2224/17154	. . . . .	covering only portions of the surface to be connected
2224/16502	. . . . .	comprising an eutectic alloy	2224/17155	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/16503	. . . . .	comprising an intermetallic compound	2224/17156	. . . . .	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/16505	. . . . .	outside the bonding interface, e.g. in the bulk of the bump connector	2224/1716	. . . . .	Random layout, i.e. layout with no symmetry
2224/16506	. . . . .	comprising an eutectic alloy	2224/17163	. . . . .	with a staggered arrangement
2224/16507	. . . . .	comprising an intermetallic compound	2224/17164	. . . . .	covering only portions of the surface to be connected
2224/17	. . . . .	of a plurality of bump connectors	2224/17165	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/1701	. . . . .	Structure	2224/17166	. . . . .	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/1703	. . . . .	Bump connectors having different sizes, e.g. different diameters, heights or widths	2224/17177	. . . . .	Combinations of arrays with different layouts
2224/1705	. . . . .	Shape	2224/17179	. . . . .	Corner adaptations, i.e. disposition of the bump connectors at the corners of the semiconductor or solid-state body
2224/17051	. . . . .	Bump connectors having different shapes	2224/1718	. . . . .	being disposed on at least two different sides of the body, e.g. dual array
2224/17055	. . . . .	of their bonding interfaces	2224/17181	. . . . .	On opposite sides of the body
2224/171	. . . . .	Disposition	2224/17183	. . . . .	On contiguous sides of the body
2224/17104	. . . . .	relative to the bonding areas, e.g. bond pads	2224/175	. . . . .	Material
2224/17106	. . . . .	the bump connectors being bonded to at least one common bonding area	2224/17505	. . . . .	Bump connectors having different materials
2224/17107	. . . . .	the bump connectors connecting two common bonding areas	2224/1751	. . . . .	Function
2224/1712	. . . . .	Layout	2224/17515	. . . . .	Bump connectors having different functions
2224/1713	. . . . .	Square or rectangular array	2224/17517	. . . . .	including bump connectors providing primarily mechanical support
2224/17132	. . . . .	being non uniform, i.e. having a non uniform pitch across the array	2224/17519	. . . . .	including bump connectors providing primarily thermal dissipation
2224/17133	. . . . .	with a staggered arrangement, e.g. depopulated array	2224/18	. . . . .	High density interconnect [HDI] connectors; Manufacturing methods related thereto
2224/17134	. . . . .	covering only portions of the surface to be connected	2224/19	. . . . .	Manufacturing methods of high density interconnect preforms
2224/17135	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/20	. . . . .	Structure, shape, material or disposition of high density interconnect preforms
2224/17136	. . . . .	Covering only the central area of the surface to be connected, i.e. central arrangements	2224/21	. . . . .	of an individual HDI interconnect
2224/1714	. . . . .	Circular array, i.e. array with radial symmetry	2224/2101	. . . . .	Structure
2224/17142	. . . . .	being non uniform, i.e. having a non uniform pitch across the array			

2224/2105	. . . . .	Shape	2224/24175	. . . . .	the item being metallic
2224/211	. . . . .	Disposition	2224/24195	. . . . .	the item being a discrete passive component
2224/214	. . . . .	Connecting portions	2224/24221	. . . . .	the body and the item being stacked
2224/215	. . . . .	Material	2224/24225	. . . . .	the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/22	. . . . .	of a plurality of HDI interconnects	2224/24226	. . . . .	the HDI interconnect connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the item being planar
2224/2201	. . . . .	Structure	2224/24227	. . . . .	the HDI interconnect not connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the semiconductor or solid-state body being mounted in a cavity or on a protrusion of the item
2224/2205	. . . . .	Shape	2224/24245	. . . . .	the item being metallic
2224/221	. . . . .	Disposition	2224/24246	. . . . .	the HDI interconnect connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the item being planar
2224/224	. . . . .	Connecting portions	2224/24247	. . . . .	the HDI interconnect not connecting to the same level of the item at which the semiconductor or solid-state body is mounted, e.g. the semiconductor or solid-state body being mounted in a cavity or on a protrusion of the item
2224/225	. . . . .	Material	2224/24265	. . . . .	the item being a discrete passive component
2224/22505	. . . . .	HDI interconnects having different materials	2224/244	. . . . .	Connecting portions
2224/23	. . . . .	Structure, shape, material or disposition of the high density interconnect connectors after the connecting process	2224/245	. . . . .	Material
2224/24	. . . . .	of an individual high density interconnect connector	2224/2499	. . . . .	Auxiliary members for HDI interconnects, e.g. spacers, alignment aids
2224/2401	. . . . .	Structure	2224/24991	. . . . .	being formed on the semiconductor or solid-state body to be connected
2224/24011	. . . . .	Deposited, e.g. MCM-D type	2224/24992	. . . . .	Flow barrier
2224/2402	. . . . .	Laminated, e.g. MCM-L type	2224/24996	. . . . .	being formed on an item to be connected not being a semiconductor or solid-state body
2224/2405	. . . . .	Shape	2224/24997	. . . . .	Flow barrier
2224/24051	. . . . .	Conformal with the semiconductor or solid-state device	2224/24998	. . . . .	Reinforcing structures, e.g. ramp-like support
2224/241	. . . . .	Disposition	2224/25	. . . . .	of a plurality of high density interconnect connectors
2224/24101	. . . . .	Connecting bonding areas at the same height	2224/2501	. . . . .	Structure
2224/24105	. . . . .	Connecting bonding areas at different heights	2224/2505	. . . . .	Shape
2224/2413	. . . . .	Connecting within a semiconductor or solid-state body	2224/251	. . . . .	Disposition
2224/24135	. . . . .	Connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip	2224/25105	. . . . .	Connecting at different heights
2224/24137	. . . . .	the bodies being arranged next to each other, e.g. on a common substrate	2224/2511	. . . . .	the connectors being bonded to at least one common bonding area
2224/24141	. . . . .	the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements	2224/25111	. . . . .	the connectors connecting two common bonding areas
2224/24145	. . . . .	the bodies being stacked	2224/25112	. . . . .	the connectors connecting a common bonding area on the semiconductor or solid-state body to different bonding areas outside the body
2224/24146	. . . . .	the HDI interconnect connecting to the same level of the lower semiconductor or solid-state body at which the upper semiconductor or solid-state body is mounted			
2224/24147	. . . . .	the HDI interconnect not connecting to the same level of the lower semiconductor or solid-state body at which the upper semiconductor or solid-state body is mounted, e.g. the upper semiconductor or solid-state body being mounted in a cavity or on a protrusion of the lower semiconductor or solid-state body			
2224/24151	. . . . .	Connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive			
2224/24153	. . . . .	the body and the item being arranged next to each other, e.g. on a common substrate			
2224/24155	. . . . .	the item being non-metallic, e.g. insulating substrate with or without metallisation			

- 2224/25113 . . . . . the connectors connecting different bonding areas on the semiconductor or solid-state body to a common bonding area outside the body
- 2224/2512 . . . . . Layout
- 2224/25171 . . . . . Fan-out arrangements
- 2224/25174 . . . . . Stacked arrangements
- 2224/25175 . . . . . Parallel arrangements
- 2224/25177 . . . . . Combinations of a plurality of arrangements
- 2224/2518 . . . . . being disposed on at least two different sides of the body, e.g. dual array
- 2224/254 . . . . . Connecting portions
- 2224/2541 . . . . . the connecting portions being stacked
- 2224/2543 . . . . . the connecting portions being staggered
- 2224/255 . . . . . Material
- 2224/26 . . . . . Layer connectors, e.g. plate connectors, solder or adhesive layers; Manufacturing methods related thereto
- 2224/2612 . . . . . Auxiliary members for layer connectors, e.g. spacers
- 2224/26122 . . . . . being formed on the semiconductor or solid-state body to be connected
- 2224/26125 . . . . . Reinforcing structures
- 2224/26135 . . . . . Alignment aids
- 2224/26145 . . . . . Flow barriers
- 2224/26152 . . . . . being formed on an item to be connected not being a semiconductor or solid-state body
- 2224/26155 . . . . . Reinforcing structures
- 2224/26165 . . . . . Alignment aids
- 2224/26175 . . . . . Flow barriers
- 2224/27 . . . . . Manufacturing methods
- 2224/27001 . . . . . Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
- 2224/27002 . . . . . for supporting the semiconductor or solid-state body
- 2224/27003 . . . . . for holding or transferring the layer preform
- 2224/27005 . . . . . for aligning the layer connector, e.g. marks, spacers
- 2224/27009 . . . . . for protecting parts during manufacture
- 2224/27011 . . . . . Involving a permanent auxiliary member, i.e. a member which is left at least partly in the finished device, e.g. coating, dummy feature
- 2224/27013 . . . . . for holding or confining the layer connector, e.g. solder flow barrier
- 2224/27015 . . . . . for aligning the layer connector, e.g. marks, spacers
- 2224/27019 . . . . . for protecting parts during the process
- 2224/271 . . . . . Manufacture and pre-treatment of the layer connector preform
- 2224/2711 . . . . . Shaping
- 2224/2712 . . . . . Applying permanent coating
- 2224/273 . . . . . by local deposition of the material of the layer connector
- 2224/2731 . . . . . in liquid form
- 2224/27312 . . . . . Continuous flow, e.g. using a microsyringe, a pump, a nozzle or extrusion
- 2224/27318 . . . . . by dispensing droplets
- 2224/2732 . . . . . Screen printing, i.e. using a stencil
- 2224/2733 . . . . . in solid form
- 2224/27332 . . . . . using a powder
- 2224/27334 . . . . . using preformed layer
- 2224/274 . . . . . by blanket deposition of the material of the layer connector
- 2224/2741 . . . . . in liquid form
- 2224/27416 . . . . . Spin coating
- 2224/27418 . . . . . Spray coating
- 2224/2742 . . . . . Curtain coating
- 2224/27422 . . . . . by dipping, e.g. in a solder bath
- 2224/27424 . . . . . Immersion coating, e.g. in a solder bath
- 2224/27426 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
- 2224/27428 . . . . . Wave coating
- 2224/2743 . . . . . in solid form
- 2224/27436 . . . . . Lamination of a preform, e.g. foil, sheet or layer
- 2224/27438 . . . . . the preform being at least partly pre-patterned
- 2224/2744 . . . . . by transfer printing
- 2224/27442 . . . . . using a powder
- 2224/27444 . . . . . in gaseous form
- 2224/2745 . . . . . Physical vapour deposition [PVD], e.g. evaporation, or sputtering
- 2224/27452 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
- 2224/2746 . . . . . Plating
- 2224/27462 . . . . . Electroplating
- 2224/27464 . . . . . Electroless plating
- 2224/27466 . . . . . Conformal deposition, i.e. blanket deposition of a conformal layer on a patterned surface
- 2224/2747 . . . . . using a lift-off mask
- 2224/27472 . . . . . Profile of the lift-off mask
- 2224/27474 . . . . . Multilayer masks
- 2224/2748 . . . . . Permanent masks, i.e. masks left in the finished device, e.g. passivation layers
- 2224/275 . . . . . by chemical or physical modification of a pre-existing or pre-deposited material
- 2224/27502 . . . . . Pre-existing or pre-deposited material
- 2224/27505 . . . . . Sintering
- 2224/2751 . . . . . Anodisation
- 2224/27515 . . . . . Curing and solidification, e.g. of a photosensitive layer material
- 2224/2752 . . . . . Self-assembly, e.g. self-agglomeration of the layer material in a fluid
- 2224/27522 . . . . . Auxiliary means therefor, e.g. for self-assembly activation
- 2224/27524 . . . . . with special adaptation of the surface or of an auxiliary substrate, e.g. surface shape specially adapted for the self-assembly process
- 2224/27526 . . . . . involving the material of the bonding area, e.g. bonding pad
- 2224/2755 . . . . . Selective modification
- 2224/27552 . . . . . using a laser or a focussed ion beam [FIB]
- 2224/27554 . . . . . Stereolithography, i.e. solidification of a pattern defined by a laser trace in a photosensitive resin
- 2224/276 . . . . . by patterning a pre-deposited material
- 2224/27602 . . . . . Mechanical treatment, e.g. polishing, grinding

2224/2761	. . . . .	Physical or chemical etching	2224/29007	. . . . .	Layer connector smaller than the underlying bonding area
2224/27612	. . . . .	by physical means only	2224/29008	. . . . .	Layer connector integrally formed with a redistribution layer on the semiconductor or solid-state body
2224/27614	. . . . .	by chemical means only	2224/29009	. . . . .	Layer connector integrally formed with a via connection of the semiconductor or solid-state body
2224/27616	. . . . .	Chemical mechanical polishing [CMP]	2224/2901	. . . . .	Shape
2224/27618	. . . . .	with selective exposure, development and removal of a photosensitive layer material, e.g. of a photosensitive conductive resin	2224/29011	. . . . .	comprising apertures or cavities
2224/2762	. . . . .	using masks	2224/29012	. . . . .	in top view
2224/27622	. . . . .	Photolithography	2224/29013	. . . . .	being rectangular or square
2224/2763	. . . . .	using a laser or a focused ion beam [FIB]	2224/29014	. . . . .	being circular or elliptic
2224/27632	. . . . .	Ablation by means of a laser or focused ion beam [FIB]	2224/29015	. . . . .	comprising protrusions or indentations
2224/277	. . . . .	involving monitoring, e.g. feedback loop	2224/29016	. . . . .	in side view
2224/278	. . . . .	Post-treatment of the layer connector	2224/29017	. . . . .	being non uniform along the layer connector
2224/2781	. . . . .	Cleaning, e.g. oxide removal step, desmearing	2224/29018	. . . . .	comprising protrusions or indentations
2224/2782	. . . . .	Applying permanent coating, e.g. in-situ coating	2224/29019	. . . . .	at the bonding interface of the layer connector, i.e. on the surface of the layer connector
2224/27821	. . . . .	Spray coating	2224/2902	. . . . .	Disposition
2224/27822	. . . . .	by dipping, e.g. in a solder bath	2224/29021	. . . . .	the layer connector being disposed in a recess of the surface
2224/27823	. . . . .	Immersion coating, e.g. in a solder bath	2224/29022	. . . . .	the layer connector being at least partially embedded in the surface
2224/27824	. . . . .	Chemical solution deposition [CSD], i.e. using a liquid precursor	2224/29023	. . . . .	the whole layer connector protruding from the surface
2224/27825	. . . . .	Plating, e.g. electroplating, electroless plating	2224/29024	. . . . .	the layer connector being disposed on a redistribution layer on the semiconductor or solid-state body
2224/27826	. . . . .	Physical vapour deposition [PVD], e.g. evaporation, or sputtering	2224/29025	. . . . .	the layer connector being disposed on a via connection of the semiconductor or solid-state body
2224/27827	. . . . .	Chemical vapour deposition [CVD], e.g. laser CVD	2224/29026	. . . . .	relative to the bonding area, e.g. bond pad, of the semiconductor or solid-state body
2224/2783	. . . . .	Reworking, e.g. shaping	2224/29027	. . . . .	the layer connector being offset with respect to the bonding area, e.g. bond pad
2224/27831	. . . . .	involving a chemical process, e.g. etching the layer connector	2224/29028	. . . . .	the layer connector being disposed on at least two separate bonding areas, e.g. bond pads
2224/2784	. . . . .	involving a mechanical process, e.g. planarising the layer connector	2224/29034	. . . . .	the layer connector covering only portions of the surface to be connected
2224/27845	. . . . .	Chemical mechanical polishing [CMP]	2224/29035	. . . . .	covering only the peripheral area of the surface to be connected
2224/27848	. . . . .	Thermal treatments, e.g. annealing, controlled cooling	2224/29036	. . . . .	covering only the central area of the surface to be connected
2224/27849	. . . . .	Reflowing	2224/29075	. . . . .	Plural core members
2224/279	. . . . .	Methods of manufacturing layer connectors involving a specific sequence of method steps	2224/29076	. . . . .	being mutually engaged together, e.g. through inserts
2224/27901	. . . . .	with repetition of the same manufacturing step	2224/29078	. . . . .	being disposed next to each other, e.g. side-to-side arrangements
2224/27902	. . . . .	Multiple masking steps	2224/2908	. . . . .	being stacked
2224/27903	. . . . .	using different masks	2224/29082	. . . . .	Two-layer arrangements
2224/27906	. . . . .	with modification of the same mask	2224/29083	. . . . .	Three-layer arrangements
2224/2791	. . . . .	Forming a passivation layer after forming the layer connector	2224/29084	. . . . .	Four-layer arrangements
2224/27912	. . . . .	the layer being used as a mask for patterning other parts	2224/29099	. . . . .	Material
2224/27916	. . . . .	a passivation layer being used as a mask for patterning other parts			
2224/28	. . . . .	Structure, shape, material or disposition of the layer connectors prior to the connecting process			
2224/28105	. . . . .	Layer connectors formed on an encapsulation of the semiconductor or solid-state body, e.g. layer connectors on chip-scale packages			
2224/29	. . . . .	of an individual layer connector			
2224/29001	. . . . .	Core members of the layer connector			
2224/29005	. . . . .	Structure			
2224/29006	. . . . .	Layer connector larger than the underlying bonding area			

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2224/291	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/29178	Iridium [Ir] as principal constituent
2224/29101	the principal constituent melting at a temperature of less than 400°C	2224/29179	Niobium [Nb] as principal constituent
2224/29105	Gallium [Ga] as principal constituent	2224/2918	Molybdenum [Mo] as principal constituent
2224/29109	Indium [In] as principal constituent	2224/29181	Tantalum [Ta] as principal constituent
2224/29111	Tin [Sn] as principal constituent	2224/29183	Rhenium [Re] as principal constituent
2224/29113	Bismuth [Bi] as principal constituent	2224/29184	Tungsten [W] as principal constituent
2224/29114	Thallium [Tl] as principal constituent	2224/29186	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29116	Lead [Pb] as principal constituent	2224/29187	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/29117	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/29188	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/29118	Zinc [Zn] as principal constituent	2224/2919	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/2912	Antimony [Sb] as principal constituent	2224/29191	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29123	Magnesium [Mg] as principal constituent	2224/29193	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/291</a> - <a href="#">H01L 2224/29191</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29124	Aluminium [Al] as principal constituent	2224/29194	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/291</a> - <a href="#">H01L 2224/29191</a>
2224/29138	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/29195	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/291</a> - <a href="#">H01L 2224/29191</a>
2224/29139	Silver [Ag] as principal constituent	2224/29198	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29144	Gold [Au] as principal constituent	2224/29199	Material of the matrix
2224/29147	Copper [Cu] as principal constituent	2224/292	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29149	Manganese [Mn] as principal constituent	2224/29201	the principal constituent melting at a temperature of less than 400°C
2224/29155	Nickel [Ni] as principal constituent	2224/29205	Gallium [Ga] as principal constituent
2224/29157	Cobalt [Co] as principal constituent	2224/29209	Indium [In] as principal constituent
2224/2916	Iron [Fe] as principal constituent	2224/29211	Tin [Sn] as principal constituent
2224/29163	the principal constituent melting at a temperature of greater than 1550°C	2224/29213	Bismuth [Bi] as principal constituent
2224/29164	Palladium [Pd] as principal constituent		
2224/29166	Titanium [Ti] as principal constituent		
2224/29169	Platinum [Pt] as principal constituent		
2224/2917	Zirconium [Zr] as principal constituent		
2224/29171	Chromium [Cr] as principal constituent		
2224/29172	Vanadium [V] as principal constituent		
2224/29173	Rhodium [Rh] as principal constituent		
2224/29176	Ruthenium [Ru] as principal constituent		

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2224/29214	Thallium [Tl] as principal constituent	2224/29284	Tungsten [W] as principal constituent
2224/29216	Lead [Pb] as principal constituent	2224/29286	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29217	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/29287	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/29218	Zinc [Zn] as principal constituent	2224/29288	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/29222	Antimony [Sb] as principal constituent	2224/2929	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/29223	Magnesium [Mg] as principal constituent	2224/29291	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29224	Aluminium [Al] as principal constituent	2224/29293	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/292</a> - <a href="#">H01L 2224/29291</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29238	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/29294	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/292</a> - <a href="#">H01L 2224/29291</a>
2224/29239	Silver [Ag] as principal constituent	2224/29295	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/292</a> - <a href="#">H01L 2224/29291</a>
2224/29244	Gold [Au] as principal constituent	2224/29298	Fillers
2224/29247	Copper [Cu] as principal constituent	2224/29299	Base material
2224/29249	Manganese [Mn] as principal constituent	2224/293	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29255	Nickel [Ni] as principal constituent	2224/29301	the principal constituent melting at a temperature of less than 400°C
2224/29257	Cobalt [Co] as principal constituent	2224/29305	Gallium [Ga] as principal constituent
2224/2926	Iron [Fe] as principal constituent	2224/29309	Indium [In] as principal constituent
2224/29263	the principal constituent melting at a temperature of greater than 1550°C	2224/29311	Tin [Sn] as principal constituent
2224/29264	Palladium [Pd] as principal constituent	2224/29313	Bismuth [Bi] as principal constituent
2224/29266	Titanium [Ti] as principal constituent	2224/29314	Thallium [Tl] as principal constituent
2224/29269	Platinum [Pt] as principal constituent	2224/29316	Lead [Pb] as principal constituent
2224/2927	Zirconium [Zr] as principal constituent	2224/29317	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29271	Chromium [Cr] as principal constituent	2224/29318	Zinc [Zn] as principal constituent
2224/29272	Vanadium [V] as principal constituent	2224/2932	Antimony [Sb] as principal constituent
2224/29273	Rhodium [Rh] as principal constituent	2224/29323	Magnesium [Mg] as principal constituent
2224/29276	Ruthenium [Ru] as principal constituent		
2224/29278	Iridium [Ir] as principal constituent		
2224/29279	Niobium [Nb] as principal constituent		
2224/2928	Molybdenum [Mo] as principal constituent		
2224/29281	Tantalum [Ta] as principal constituent		
2224/29283	Rhenium [Re] as principal constituent		

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2224/29324	Aluminium [Al] as principal constituent	2224/29391	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29338	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/29393	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/293</a> - <a href="#">H01L 2224/29391</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29339	Silver [Ag] as principal constituent	2224/29394	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/293</a> - <a href="#">H01L 2224/29391</a>
2224/29344	Gold [Au] as principal constituent	2224/29395	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/293</a> - <a href="#">H01L 2224/29391</a>
2224/29347	Copper [Cu] as principal constituent	2224/29398	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29349	Manganese [Mn] as principal constituent	2224/29399	Coating material
2224/29355	Nickel [Ni] as principal constituent	2224/294	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29357	Cobalt [Co] as principal constituent	2224/29401	the principal constituent melting at a temperature of less than 400°C
2224/2936	Iron [Fe] as principal constituent	2224/29405	Gallium [Ga] as principal constituent
2224/29363	the principal constituent melting at a temperature of greater than 1550°C	2224/29409	Indium [In] as principal constituent
2224/29364	Palladium [Pd] as principal constituent	2224/29411	Tin [Sn] as principal constituent
2224/29366	Titanium [Ti] as principal constituent	2224/29413	Bismuth [Bi] as principal constituent
2224/29369	Platinum [Pt] as principal constituent	2224/29414	Thallium [Tl] as principal constituent
2224/2937	Zirconium [Zr] as principal constituent	2224/29416	Lead [Pb] as principal constituent
2224/29371	Chromium [Cr] as principal constituent	2224/29417	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29372	Vanadium [V] as principal constituent	2224/29418	Zinc [Zn] as principal constituent
2224/29373	Rhodium [Rh] as principal constituent	2224/2942	Antimony [Sb] as principal constituent
2224/29376	Ruthenium [Ru] as principal constituent	2224/29423	Magnesium [Mg] as principal constituent
2224/29378	Iridium [Ir] as principal constituent	2224/29424	Aluminium [Al] as principal constituent
2224/29379	Niobium [Nb] as principal constituent	2224/29438	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/2938	Molybdenum [Mo] as principal constituent		
2224/29381	Tantalum [Ta] as principal constituent		
2224/29383	Rhenium [Re] as principal constituent		
2224/29384	Tungsten [W] as principal constituent		
2224/29386	with a principal constituent of the material being a non metallic, non metalloid inorganic material		
2224/29387	Ceramics, e.g. crystalline carbides, nitrides or oxides		
2224/29388	Glasses, e.g. amorphous oxides, nitrides or fluorides		
2224/2939	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy		

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2224/29439	...	Silver [Ag] as principal constituent	2224/29493	...	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/294</a> - <a href="#">H01L 2224/29491</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29444	...	Gold [Au] as principal constituent	2224/29494	...	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/294</a> - <a href="#">H01L 2224/29491</a>
2224/29447	...	Copper [Cu] as principal constituent	2224/29495	...	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/294</a> - <a href="#">H01L 2224/29491</a>
2224/29449	...	Manganese [Mn] as principal constituent	2224/29498	...	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29455	...	Nickel [Ni] as principal constituent	2224/29499	...	Shape or distribution of the fillers
2224/29457	...	Cobalt [Co] as principal constituent	2224/2954	...	Coating
2224/2946	...	Iron [Fe] as principal constituent	2224/29541	...	Structure
2224/29463	...	the principal constituent melting at a temperature of greater than 1550°C	2224/2955	...	Shape
2224/29464	...	Palladium [Pd] as principal constituent	2224/29551	...	being non uniform
2224/29466	...	Titanium [Ti] as principal constituent	2224/29552	...	comprising protrusions or indentations
2224/29469	...	Platinum [Pt] as principal constituent	2224/29553	...	at the bonding interface of the layer connector, i.e. on the surface of the layer connector
2224/2947	...	Zirconium [Zr] as principal constituent	2224/2956	...	Disposition
2224/29471	...	Chromium [Cr] as principal constituent	2224/29561	...	On the entire surface of the core, i.e. integral coating
2224/29472	...	Vanadium [V] as principal constituent	2224/29562	...	On the entire exposed surface of the core
2224/29473	...	Rhodium [Rh] as principal constituent	2224/29563	...	Only on parts of the surface of the core, i.e. partial coating
2224/29476	...	Ruthenium [Ru] as principal constituent	2224/29564	...	Only on the bonding interface of the layer connector
2224/29478	...	Iridium [Ir] as principal constituent	2224/29565	...	Only outside the bonding interface of the layer connector
2224/29479	...	Niobium [Nb] as principal constituent	2224/29566	...	Both on and outside the bonding interface of the layer connector
2224/2948	...	Molybdenum [Mo] as principal constituent	2224/2957	...	Single coating layer
2224/29481	...	Tantalum [Ta] as principal constituent	2224/29575	...	Plural coating layers
2224/29483	...	Rhenium [Re] as principal constituent	2224/29576	...	being mutually engaged together, e.g. through inserts
2224/29484	...	Tungsten [W] as principal constituent	2224/29578	...	being disposed next to each other, e.g. side-to-side arrangements
2224/29486	...	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/2958	...	being stacked
2224/29487	...	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/29582	...	Two-layer coating
2224/29488	...	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/29583	...	Three-layer coating
2224/2949	...	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/29584	...	Four-layer coating
2224/29491	...	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/29599	...	Material
			2224/296	...	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
			2224/29601	...	the principal constituent melting at a temperature of less than 400°C

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2224/29605	. . . . .	Gallium [Ga] as principal constituent	2224/29683	. . . . .	Rhenium [Re] as principal constituent
2224/29609	. . . . .	Indium [In] as principal constituent	2224/29684	. . . . .	Tungsten [W] as principal constituent
2224/29611	. . . . .	Tin [Sn] as principal constituent	2224/29686	. . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/29613	. . . . .	Bismuth [Bi] as principal constituent	2224/29687	. . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/29614	. . . . .	Thallium [Tl] as principal constituent	2224/29688	. . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/29616	. . . . .	Lead [Pb] as principal constituent	2224/2969	. . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/29617	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/29691	. . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29618	. . . . .	Zinc [Zn] as principal constituent	2224/29693	. . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/296</a> - <a href="#">H01L 2224/29691</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/2962	. . . . .	Antimony [Sb] as principal constituent	2224/29694	. . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/296</a> - <a href="#">H01L 2224/29691</a>
2224/29623	. . . . .	Magnesium [Mg] as principal constituent	2224/29695	. . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/296</a> - <a href="#">H01L 2224/29691</a>
2224/29624	. . . . .	Aluminium [Al] as principal constituent	2224/29698	. . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29638	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/29699	. . . . .	Material of the matrix
2224/29639	. . . . .	Silver [Ag] as principal constituent	2224/297	. . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29644	. . . . .	Gold [Au] as principal constituent	2224/29701	. . . . .	the principal constituent melting at a temperature of less than 400°C
2224/29647	. . . . .	Copper [Cu] as principal constituent	2224/29705	. . . . .	Gallium [Ga] as principal constituent
2224/29649	. . . . .	Manganese [Mn] as principal constituent	2224/29709	. . . . .	Indium [In] as principal constituent
2224/29655	. . . . .	Nickel [Ni] as principal constituent	2224/29711	. . . . .	Tin [Sn] as principal constituent
2224/29657	. . . . .	Cobalt [Co] as principal constituent	2224/29713	. . . . .	Bismuth [Bi] as principal constituent
2224/2966	. . . . .	Iron [Fe] as principal constituent	2224/29714	. . . . .	Thallium [Tl] as principal constituent
2224/29663	. . . . .	the principal constituent melting at a temperature of greater than 1550°C	2224/29716	. . . . .	Lead [Pb] as principal constituent
2224/29664	. . . . .	Palladium [Pd] as principal constituent	2224/29717	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29666	. . . . .	Titanium [Ti] as principal constituent			
2224/29669	. . . . .	Platinum [Pt] as principal constituent			
2224/2967	. . . . .	Zirconium [Zr] as principal constituent			
2224/29671	. . . . .	Chromium [Cr] as principal constituent			
2224/29672	. . . . .	Vanadium [V] as principal constituent			
2224/29673	. . . . .	Rhodium [Rh] as principal constituent			
2224/29676	. . . . .	Ruthenium [Ru] as principal constituent			
2224/29678	. . . . .	Iridium [Ir] as principal constituent			
2224/29679	. . . . .	Niobium [Nb] as principal constituent			
2224/2968	. . . . .	Molybdenum [Mo] as principal constituent			
2224/29681	. . . . .	Tantalum [Ta] as principal constituent			

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2224/29718	. . . . .	Zinc [Zn] as principal constituent	2224/2979	. . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/2972	. . . . .	Antimony [Sb] as principal constituent	2224/29791	. . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/29723	. . . . .	Magnesium [Mg] as principal constituent	2224/29793	. . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/297</a> - <a href="#">H01L 2224/29791</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29724	. . . . .	Aluminium [Al] as principal constituent	2224/29794	. . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/297</a> - <a href="#">H01L 2224/29791</a>
2224/29738	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/29795	. . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/297</a> - <a href="#">H01L 2224/29791</a>
2224/29739	. . . . .	Silver [Ag] as principal constituent	2224/29798	. . . . .	Fillers
2224/29744	. . . . .	Gold [Au] as principal constituent	2224/29799	. . . . .	Base material
2224/29747	. . . . .	Copper [Cu] as principal constituent	2224/298	. . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29749	. . . . .	Manganese [Mn] as principal constituent	2224/29801	. . . . .	the principal constituent melting at a temperature of less than 400°C
2224/29755	. . . . .	Nickel [Ni] as principal constituent	2224/29805	. . . . .	Gallium [Ga] as principal constituent
2224/29757	. . . . .	Cobalt [Co] as principal constituent	2224/29809	. . . . .	Indium [In] as principal constituent
2224/2976	. . . . .	Iron [Fe] as principal constituent	2224/29811	. . . . .	Tin [Sn] as principal constituent
2224/29763	. . . . .	the principal constituent melting at a temperature of greater than 1550°C	2224/29813	. . . . .	Bismuth [Bi] as principal constituent
2224/29764	. . . . .	Palladium [Pd] as principal constituent	2224/29814	. . . . .	Thallium [Tl] as principal constituent
2224/29766	. . . . .	Titanium [Ti] as principal constituent	2224/29816	. . . . .	Lead [Pb] as principal constituent
2224/29769	. . . . .	Platinum [Pt] as principal constituent	2224/29817	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/2977	. . . . .	Zirconium [Zr] as principal constituent	2224/29818	. . . . .	Zinc [Zn] as principal constituent
2224/29771	. . . . .	Chromium [Cr] as principal constituent	2224/2982	. . . . .	Antimony [Sb] as principal constituent
2224/29772	. . . . .	Vanadium [V] as principal constituent	2224/29823	. . . . .	Magnesium [Mg] as principal constituent
2224/29773	. . . . .	Rhodium [Rh] as principal constituent	2224/29824	. . . . .	Aluminium [Al] as principal constituent
2224/29776	. . . . .	Ruthenium [Ru] as principal constituent	2224/29838	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29778	. . . . .	Iridium [Ir] as principal constituent	2224/29839	. . . . .	Silver [Ag] as principal constituent
2224/29779	. . . . .	Niobium [Nb] as principal constituent			
2224/2978	. . . . .	Molybdenum [Mo] as principal constituent			
2224/29781	. . . . .	Tantalum [Ta] as principal constituent			
2224/29783	. . . . .	Rhenium [Re] as principal constituent			
2224/29784	. . . . .	Tungsten [W] as principal constituent			
2224/29786	. . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material			
2224/29787	. . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides			
2224/29788	. . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides			

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2224/29844	Gold [Au] as principal constituent	2224/29893	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/298</a> - <a href="#">H01L 2224/29891</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/29847	Copper [Cu] as principal constituent	2224/29894	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/298</a> - <a href="#">H01L 2224/29891</a>
2224/29849	Manganese [Mn] as principal constituent	2224/29895	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/298</a> - <a href="#">H01L 2224/29891</a>
2224/29855	Nickel [Ni] as principal constituent	2224/29898	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29857	Cobalt [Co] as principal constituent	2224/29899	Coating material
2224/2986	Iron [Fe] as principal constituent	2224/299	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/29863	the principal constituent melting at a temperature of greater than 1550°C	2224/29901	the principal constituent melting at a temperature of less than 400°C
2224/29864	Palladium [Pd] as principal constituent	2224/29905	Gallium [Ga] as principal constituent
2224/29866	Titanium [Ti] as principal constituent	2224/29909	Indium [In] as principal constituent
2224/29869	Platinum [Pt] as principal constituent	2224/29911	Tin [Sn] as principal constituent
2224/2987	Zirconium [Zr] as principal constituent	2224/29913	Bismuth [Bi] as principal constituent
2224/29871	Chromium [Cr] as principal constituent	2224/29914	Thallium [Tl] as principal constituent
2224/29872	Vanadium [V] as principal constituent	2224/29916	Lead [Pb] as principal constituent
2224/29873	Rhodium [Rh] as principal constituent	2224/29917	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/29876	Ruthenium [Ru] as principal constituent	2224/29918	Zinc [Zn] as principal constituent
2224/29878	Iridium [Ir] as principal constituent	2224/2992	Antimony [Sb] as principal constituent
2224/29879	Niobium [Nb] as principal constituent	2224/29923	Magnesium [Mg] as principal constituent
2224/2988	Molybdenum [Mo] as principal constituent	2224/29924	Aluminium [Al] as principal constituent
2224/29881	Tantalum [Ta] as principal constituent	2224/29938	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/29883	Rhenium [Re] as principal constituent	2224/29939	Silver [Ag] as principal constituent
2224/29884	Tungsten [W] as principal constituent	2224/29944	Gold [Au] as principal constituent
2224/29886	with a principal constituent of the material being a non metallic, non metalloid inorganic material		
2224/29887	Ceramics, e.g. crystalline carbides, nitrides or oxides		
2224/29888	Glasses, e.g. amorphous oxides, nitrides or fluorides		
2224/2989	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy		
2224/29891	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene		

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2224/29947	...	Copper [Cu] as principal constituent	2224/29994	...	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/299</a> - <a href="#">H01L 2224/29991</a>
2224/29949	...	Manganese [Mn] as principal constituent	2224/29995	...	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/299</a> - <a href="#">H01L 2224/29991</a>
2224/29955	...	Nickel [Ni] as principal constituent	2224/29998	...	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/29957	...	Cobalt [Co] as principal constituent	2224/29999	...	Shape or distribution of the fillers
2224/2996	...	Iron [Fe] as principal constituent	2224/30	...	of a plurality of layer connectors
2224/29963	...	the principal constituent melting at a temperature of greater than 1550°C	2224/3001	...	Structure
2224/29964	...	Palladium [Pd] as principal constituent	2224/3003	...	Layer connectors having different sizes, e.g. different heights or widths
2224/29966	...	Titanium [Ti] as principal constituent	2224/3005	...	Shape
2224/29969	...	Platinum [Pt] as principal constituent	2224/30051	...	Layer connectors having different shapes
2224/2997	...	Zirconium [Zr] as principal constituent	2224/301	...	Disposition
2224/29971	...	Chromium [Cr] as principal constituent	2224/30104	...	relative to the bonding areas, e.g. bond pads, of the semiconductor or solid-state body
2224/29972	...	Vanadium [V] as principal constituent	2224/3011	...	the layer connectors being bonded to at least one common bonding area
2224/29973	...	Rhodium [Rh] as principal constituent	2224/3012	...	Layout
2224/29976	...	Ruthenium [Ru] as principal constituent	2224/3013	...	Square or rectangular array
2224/29978	...	Iridium [Ir] as principal constituent	2224/30131	...	being uniform, i.e. having a uniform pitch across the array
2224/29979	...	Niobium [Nb] as principal constituent	2224/30132	...	being non uniform, i.e. having a non uniform pitch across the array
2224/2998	...	Molybdenum [Mo] as principal constituent	2224/30133	...	with a staggered arrangement, e.g. depopulated array
2224/29981	...	Tantalum [Ta] as principal constituent	2224/30134	...	covering only portions of the surface to be connected
2224/29983	...	Rhenium [Re] as principal constituent	2224/30135	...	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/29984	...	Tungsten [W] as principal constituent	2224/30136	...	Covering only the central area of the surface to be connected, i.e. central arrangements
2224/29986	...	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/3014	...	Circular array, i.e. array with radial symmetry
2224/29987	...	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/30141	...	being uniform, i.e. having a uniform pitch across the array
2224/29988	...	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/30142	...	being non uniform, i.e. having a non uniform pitch across the array
2224/2999	...	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/30143	...	covering only portions of the surface to be connected
2224/29991	...	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/30145	...	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/29993	...	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/299</a> - <a href="#">H01L 2224/29991</a>	2224/30146	...	Covering only the central area of the surface to be connected, i.e. central arrangements
		e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/3015	...	Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
			2224/30151	...	being uniform, i.e. having a uniform pitch across the array

2224/30152	being non uniform, i.e. having a non uniform pitch across the array	2224/32059	comprising protrusions or indentations
2224/30153	with a staggered arrangement, e.g. depopulated array	2224/3207	of bonding interfaces, e.g. interlocking features
2224/30154	covering only portions of the surface to be connected	2224/321	Disposition
2224/30155	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/32104	relative to the bonding area, e.g. bond pad
2224/30156	Covering only the central area of the surface to be connected, i.e. central arrangements	2224/32105	the layer connector connecting bonding areas being not aligned with respect to each other
2224/3016	Random layout, i.e. layout with no symmetry	2224/32106	the layer connector connecting one bonding area to at least two respective bonding areas
2224/30163	with a staggered arrangement	2224/32111	the layer connector being disposed in a recess of the surface
2224/30164	covering only portions of the surface to be connected	2224/32112	the layer connector being at least partially embedded in the surface
2224/30165	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements	2224/32113	the whole layer connector protruding from the surface
2224/30166	Covering only the central area of the surface to be connected, i.e. central arrangements	2224/3213	the layer connector connecting within a semiconductor or solid-state body, i.e. connecting two bonding areas on the same semiconductor or solid-state body
2224/30177	Combinations of arrays with different layouts	2224/32135	the layer connector connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip
2224/30179	Corner adaptations, i.e. disposition of the layer connectors at the corners of the semiconductor or solid-state body	2224/32137	the bodies being arranged next to each other, e.g. on a common substrate
2224/3018	being disposed on at least two different sides of the body, e.g. dual array	2224/32141	the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements
2224/30181	On opposite sides of the body	2224/32145	the bodies being stacked
2224/30183	On contiguous sides of the body	2224/32146	the layer connector connecting to a via connection in the semiconductor or solid-state body
2224/305	Material	2224/32147	the layer connector connecting to a bonding area disposed in a recess of the surface
2224/30505	Layer connectors having different materials	2224/32148	the layer connector connecting to a bonding area protruding from the surface
2224/3051	Function	2224/32151	the layer connector connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/30515	Layer connectors having different functions	2224/32153	the body and the item being arranged next to each other, e.g. on a common substrate
2224/30517	including layer connectors providing primarily mechanical bonding	2224/32155	the item being non-metallic, e.g. being an insulating substrate with or without metallisation
2224/30519	including layer connectors providing primarily thermal dissipation	2224/32157	the layer connector connecting to a bond pad of the item
2224/31	Structure, shape, material or disposition of the layer connectors after the connecting process	2224/3216	the layer connector connecting to a pin of the item
2224/32	of an individual layer connector	2224/32163	the layer connector connecting to a potential ring of the item
2224/3201	Structure	2224/32165	the layer connector connecting to a via metallisation of the item
2224/32012	relative to the bonding area, e.g. bond pad	2224/32167	the layer connector connecting to a bonding area disposed in a recess of the surface of the item
2224/32013	the layer connector being larger than the bonding area, e.g. bond pad		
2224/32014	the layer connector being smaller than the bonding area, e.g. bond pad		
2224/3205	Shape		
2224/32052	in top view		
2224/32053	being non uniform along the layer connector		
2224/32054	being rectangular or square		
2224/32055	being circular or elliptic		
2224/32056	comprising protrusions or indentations		
2224/32057	in side view		
2224/32058	being non uniform along the layer connector		

2224/32168	. . . . .	the layer connector connecting to a bonding area protruding from the surface of the item	2224/32501	. . . . .	at the bonding interface
2224/32175	. . . . .	the item being metallic	2224/32502	. . . . .	comprising an eutectic alloy
2224/32183	. . . . .	the layer connector connecting to a potential ring of the item	2224/32503	. . . . .	comprising an intermetallic compound
2224/32187	. . . . .	the layer connector connecting to a bonding area disposed in a recess of the surface of the item	2224/32505	. . . . .	outside the bonding interface, e.g. in the bulk of the layer connector
2224/32188	. . . . .	the layer connector connecting to a bonding area protruding from the surface of the item	2224/32506	. . . . .	comprising an eutectic alloy
2224/32195	. . . . .	the item being a discrete passive component	2224/32507	. . . . .	comprising an intermetallic compound
2224/32197	. . . . .	the layer connector connecting to a bonding area disposed in a recess of the surface of the item	2224/33	. . . . .	of a plurality of layer connectors
2224/32198	. . . . .	the layer connector connecting to a bonding area protruding from the surface of the item	2224/3301	. . . . .	Structure
2224/32221	. . . . .	the body and the item being stacked	2224/3303	. . . . .	Layer connectors having different sizes, e.g. different heights or widths
2224/32225	. . . . .	the item being non-metallic, e.g. insulating substrate with or without metallisation	2224/3305	. . . . .	Shape
2224/32227	. . . . .	the layer connector connecting to a bond pad of the item	2224/33051	. . . . .	Layer connectors having different shapes
2224/3223	. . . . .	the layer connector connecting to a pin of the item	2224/33055	. . . . .	of their bonding interfaces
2224/32233	. . . . .	the layer connector connecting to a potential ring of the item	2224/331	. . . . .	Disposition
2224/32235	. . . . .	the layer connector connecting to a via metallisation of the item	2224/33104	. . . . .	relative to the bonding areas, e.g. bond pads
2224/32237	. . . . .	the layer connector connecting to a bonding area disposed in a recess of the surface of the item	2224/33106	. . . . .	the layer connectors being bonded to at least one common bonding area
2224/32238	. . . . .	the layer connector connecting to a bonding area protruding from the surface of the item	2224/33107	. . . . .	the layer connectors connecting two common bonding areas
2224/3224	. . . . .	the layer connector connecting between the body and an opposite side of the item with respect to the body	2224/3312	. . . . .	Layout
2224/32245	. . . . .	the item being metallic	2224/3313	. . . . .	Square or rectangular array
2224/32253	. . . . .	the layer connector connecting to a potential ring of the item	2224/33132	. . . . .	being non uniform, i.e. having a non uniform pitch across the array
2224/32257	. . . . .	the layer connector connecting to a bonding area disposed in a recess of the surface of the item	2224/33133	. . . . .	with a staggered arrangement, e.g. depopulated array
2224/32258	. . . . .	the layer connector connecting to a bonding area protruding from the surface of the item	2224/33134	. . . . .	covering only portions of the surface to be connected
2224/3226	. . . . .	the layer connector connecting between the body and an opposite side of the item with respect to the body	2224/33135	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
2224/32265	. . . . .	the item being a discrete passive component	2224/3314	. . . . .	Circular array, i.e. array with radial symmetry
2224/32267	. . . . .	the layer connector connecting to a bonding area disposed in a recess of the surface of the item	2224/33142	. . . . .	being non uniform, i.e. having a non uniform pitch across the array
2224/32268	. . . . .	the layer connector connecting to a bonding area protruding from the surface of the item	2224/33143	. . . . .	with a staggered arrangement
2224/325	. . . . .	Material	2224/33144	. . . . .	covering only portions of the surface to be connected
			2224/33145	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
			2224/3315	. . . . .	Mirror array, i.e. array having only a reflection symmetry, i.e. bilateral symmetry
			2224/33151	. . . . .	being uniform, i.e. having a uniform pitch across the array
			2224/33152	. . . . .	being non uniform, i.e. having a non uniform pitch across the array
			2224/33153	. . . . .	with a staggered arrangement, e.g. depopulated array
			2224/33154	. . . . .	covering only portions of the surface to be connected
			2224/33155	. . . . .	Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
			2224/33156	. . . . .	Covering only the central area of the surface to be connected, i.e. central arrangements
			2224/3316	. . . . .	Random layout, i.e. layout with no symmetry

- 2224/33163 . . . . . with a staggered arrangement
- 2224/33164 . . . . . covering only portions of the surface to be connected
- 2224/33165 . . . . . Covering only the peripheral area of the surface to be connected, i.e. peripheral arrangements
- 2224/33177 . . . . . Combinations of arrays with different layouts
- 2224/33179 . . . . . Corner adaptations, i.e. disposition of the layer connectors at the corners of the semiconductor or solid-state body
- 2224/3318 . . . . . being disposed on at least two different sides of the body, e.g. dual array
- 2224/33181 . . . . . On opposite sides of the body
- 2224/33183 . . . . . On contiguous sides of the body
- 2224/335 . . . . . Material
- 2224/33505 . . . . . Layer connectors having different materials
- 2224/3351 . . . . . Function
- 2224/33515 . . . . . Layer connectors having different functions
- 2224/33517 . . . . . including layer connectors providing primarily mechanical support
- 2224/33519 . . . . . including layer connectors providing primarily thermal dissipation
- 2224/34 . . . . . Strap connectors, e.g. copper straps for grounding power devices; Manufacturing methods related thereto
- 2224/35 . . . . . Manufacturing methods
- 2224/35001 . . . . . Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
- 2224/351 . . . . . Pre-treatment of the preform connector
- 2224/3512 . . . . . Applying permanent coating, e.g. in-situ coating
- 2224/35125 . . . . . Plating, e.g. electroplating, electroless plating
- 2224/352 . . . . . Mechanical processes
- 2224/3521 . . . . . Pulling
- 2224/355 . . . . . Modification of a pre-existing material
- 2224/3551 . . . . . Sintering
- 2224/3552 . . . . . Anodisation
- 2224/357 . . . . . Involving monitoring, e.g. feedback loop
- 2224/358 . . . . . Post-treatment of the connector
- 2224/3581 . . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/3582 . . . . . Applying permanent coating, e.g. in-situ coating
- 2224/35821 . . . . . Spray coating
- 2224/35822 . . . . . Dip coating
- 2224/35823 . . . . . Immersion coating, e.g. solder bath
- 2224/35824 . . . . . Chemical solution deposition [CSD], i.e. using a liquid precursor
- 2224/35825 . . . . . Plating, e.g. electroplating, electroless plating
- 2224/35826 . . . . . Physical vapour deposition [PVD], e.g. evaporation, sputtering
- 2224/35827 . . . . . Chemical vapour deposition [CVD], e.g. laser CVD
- 2224/3583 . . . . . Reworking
- 2224/35831 . . . . . with a chemical process, e.g. with etching of the connector
- 2224/35847 . . . . . with a mechanical process, e.g. with flattening of the connector
- 2224/35848 . . . . . Thermal treatments, e.g. annealing, controlled cooling
- 2224/35985 . . . . . Methods of manufacturing strap connectors involving a specific sequence of method steps
- 2224/35986 . . . . . with repetition of the same manufacturing step
- 2224/36 . . . . . Structure, shape, material or disposition of the strap connectors prior to the connecting process
- 2224/37 . . . . . of an individual strap connector
- 2224/37001 . . . . . Core members of the connector
- 2224/37005 . . . . . Structure
- 2224/3701 . . . . . Shape
- 2224/37011 . . . . . comprising apertures or cavities
- 2224/37012 . . . . . Cross-sectional shape
- 2224/37013 . . . . . being non uniform along the connector
- 2224/3702 . . . . . Disposition
- 2224/37025 . . . . . Plural core members
- 2224/37026 . . . . . being mutually engaged together, e.g. through inserts
- 2224/37028 . . . . . Side-to-side arrangements
- 2224/3703 . . . . . Stacked arrangements
- 2224/37032 . . . . . Two-layer arrangements
- 2224/37033 . . . . . Three-layer arrangements
- 2224/37034 . . . . . Four-layer arrangements
- 2224/37099 . . . . . Material
- 2224/371 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
- 2224/37101 . . . . . the principal constituent melting at a temperature of less than 400°C
- 2224/37105 . . . . . Gallium [Ga] as principal constituent
- 2224/37109 . . . . . Indium [In] as principal constituent
- 2224/37111 . . . . . Tin [Sn] as principal constituent
- 2224/37113 . . . . . Bismuth [Bi] as principal constituent
- 2224/37114 . . . . . Thallium [Tl] as principal constituent
- 2224/37116 . . . . . Lead [Pb] as principal constituent
- 2224/37117 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
- 2224/37118 . . . . . Zinc [Zn] as principal constituent
- 2224/3712 . . . . . Antimony [Sb] as principal constituent
- 2224/37123 . . . . . Magnesium [Mg] as principal constituent
- 2224/37124 . . . . . Aluminium [Al] as principal constituent
- 2224/37138 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
- 2224/37139 . . . . . Silver [Ag] as principal constituent

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2224/37144	Gold [Au] as principal constituent	2224/37194	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/371</a> - <a href="#">H01L 2224/37191</a>
2224/37147	Copper [Cu] as principal constituent	2224/37195	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/371</a> - <a href="#">H01L 2224/37191</a>
2224/37149	Manganese [Mn] as principal constituent	2224/37198	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/37155	Nickel [Ni] as principal constituent	2224/37199	Material of the matrix
2224/37157	Cobalt [Co] as principal constituent	2224/372	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/3716	Iron [Fe] as principal constituent	2224/37201	the principal constituent melting at a temperature of less than 400°C
2224/37163	the principal constituent melting at a temperature of greater than 1550°C	2224/37205	Gallium [Ga] as principal constituent
2224/37164	Palladium [Pd] as principal constituent	2224/37209	Indium [In] as principal constituent
2224/37166	Titanium [Ti] as principal constituent	2224/37211	Tin [Sn] as principal constituent
2224/37169	Platinum [Pt] as principal constituent	2224/37213	Bismuth [Bi] as principal constituent
2224/3717	Zirconium [Zr] as principal constituent	2224/37214	Thallium [Tl] as principal constituent
2224/37171	Chromium [Cr] as principal constituent	2224/37216	Lead [Pb] as principal constituent
2224/37172	Vanadium [V] as principal constituent	2224/37217	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37173	Rhodium [Rh] as principal constituent	2224/37218	Zinc [Zn] as principal constituent
2224/37176	Ruthenium [Ru] as principal constituent	2224/3722	Antimony [Sb] as principal constituent
2224/37178	Iridium [Ir] as principal constituent	2224/37223	Magnesium [Mg] as principal constituent
2224/37179	Niobium [Nb] as principal constituent	2224/37224	Aluminium [Al] as principal constituent
2224/3718	Molybdenum [Mo] as principal constituent	2224/37238	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37181	Tantalum [Ta] as principal constituent	2224/37239	Silver [Ag] as principal constituent
2224/37183	Rhenium [Re] as principal constituent	2224/37244	Gold [Au] as principal constituent
2224/37184	Tungsten [W] as principal constituent	2224/37247	Copper [Cu] as principal constituent
2224/37186	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37249	Manganese [Mn] as principal constituent
2224/37187	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37255	Nickel [Ni] as principal constituent
2224/37188	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37257	Cobalt [Co] as principal constituent
2224/3719	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy		
2224/37191	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene		
2224/37193	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/371</a> - <a href="#">H01L 2224/37191</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond		

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2224/3726	Iron [Fe] as principal constituent	2224/373	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/37263	the principal constituent melting at a temperature of greater than 1550°C	2224/37301	the principal constituent melting at a temperature of less than 400°C
2224/37264	Palladium [Pd] as principal constituent	2224/37305	Gallium [Ga] as principal constituent
2224/37266	Titanium [Ti] as principal constituent	2224/37309	Indium [In] as principal constituent
2224/37269	Platinum [Pt] as principal constituent	2224/37311	Tin [Sn] as principal constituent
2224/3727	Zirconium [Zr] as principal constituent	2224/37313	Bismuth [Bi] as principal constituent
2224/37271	Chromium [Cr] as principal constituent	2224/37314	Thallium [Tl] as principal constituent
2224/37272	Vanadium [V] as principal constituent	2224/37316	Lead [Pb] as principal constituent
2224/37273	Rhodium [Rh] as principal constituent	2224/37317	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37276	Ruthenium [Ru] as principal constituent	2224/37318	Zinc [Zn] as principal constituent
2224/37278	Iridium [Ir] as principal constituent	2224/3732	Antimony [Sb] as principal constituent
2224/37279	Niobium [Nb] as principal constituent	2224/37323	Magnesium [Mg] as principal constituent
2224/3728	Molybdenum [Mo] as principal constituent	2224/37324	Aluminium [Al] as principal constituent
2224/37281	Tantalum [Ta] as principal constituent	2224/37338	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37283	Rhenium [Re] as principal constituent	2224/37339	Silver [Ag] as principal constituent
2224/37284	Tungsten [W] as principal constituent	2224/37344	Gold [Au] as principal constituent
2224/37286	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37347	Copper [Cu] as principal constituent
2224/37287	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37349	Manganese [Mn] as principal constituent
2224/37288	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37355	Nickel [Ni] as principal constituent
2224/3729	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37357	Cobalt [Co] as principal constituent
2224/37291	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/3736	Iron [Fe] as principal constituent
2224/37293	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/372</a> - <a href="#">H01L 2224/37291</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/37363	the principal constituent melting at a temperature of greater than 1550°C
2224/37294	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/372</a> - <a href="#">H01L 2224/37291</a>	2224/37364	Palladium [Pd] as principal constituent
2224/37295	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/372</a> - <a href="#">H01L 2224/37291</a>	2224/37366	Titanium [Ti] as principal constituent
2224/37298	Fillers	2224/37369	Platinum [Pt] as principal constituent
2224/37299	Base material	2224/3737	Zirconium [Zr] as principal constituent

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2224/37371	Chromium [Cr] as principal constituent	2224/37401	the principal constituent melting at a temperature of less than 400°C
2224/37372	Vanadium [V] as principal constituent	2224/37405	Gallium [Ga] as principal constituent
2224/37373	Rhodium [Rh] as principal constituent	2224/37409	Indium [In] as principal constituent
2224/37376	Ruthenium [Ru] as principal constituent	2224/37411	Tin [Sn] as principal constituent
2224/37378	Iridium [Ir] as principal constituent	2224/37413	Bismuth [Bi] as principal constituent
2224/37379	Niobium [Nb] as principal constituent	2224/37414	Thallium [Tl] as principal constituent
2224/3738	Molybdenum [Mo] as principal constituent	2224/37416	Lead [Pb] as principal constituent
2224/37381	Tantalum [Ta] as principal constituent	2224/37417	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37383	Rhenium [Re] as principal constituent	2224/37418	Zinc [Zn] as principal constituent
2224/37384	Tungsten [W] as principal constituent	2224/3742	Antimony [Sb] as principal constituent
2224/37386	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37423	Magnesium [Mg] as principal constituent
2224/37387	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37424	Aluminium [Al] as principal constituent
2224/37388	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37438	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/3739	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37439	Silver [Ag] as principal constituent
2224/37391	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/37444	Gold [Au] as principal constituent
2224/37393	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/373</a> - <a href="#">H01L 2224/37391</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/37447	Copper [Cu] as principal constituent
2224/37394	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/373</a> - <a href="#">H01L 2224/37391</a>	2224/37449	Manganese [Mn] as principal constituent
2224/37395	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/373</a> - <a href="#">H01L 2224/37391</a>	2224/37455	Nickel [Ni] as principal constituent
2224/37398	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/37457	Cobalt [Co] as principal constituent
2224/37399	Coating material	2224/3746	Iron [Fe] as principal constituent
2224/374	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/37463	the principal constituent melting at a temperature of greater than 1550°C
		2224/37464	Palladium [Pd] as principal constituent
		2224/37466	Titanium [Ti] as principal constituent
		2224/37469	Platinum [Pt] as principal constituent
		2224/3747	Zirconium [Zr] as principal constituent
		2224/37471	Chromium [Cr] as principal constituent
		2224/37472	Vanadium [V] as principal constituent
		2224/37473	Rhodium [Rh] as principal constituent
		2224/37476	Ruthenium [Ru] as principal constituent

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2224/37478	. . . . .	Iridium [Ir] as principal constituent	2224/37599	. . . . .	Material
2224/37479	. . . . .	Niobium [Nb] as principal constituent	2224/376	. . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/3748	. . . . .	Molybdenum [Mo] as principal constituent	2224/37601	. . . . .	the principal constituent melting at a temperature of less than 400°C
2224/37481	. . . . .	Tantalum [Ta] as principal constituent	2224/37605	. . . . .	Gallium [Ga] as principal constituent
2224/37483	. . . . .	Rhenium [Re] as principal constituent	2224/37609	. . . . .	Indium [In] as principal constituent
2224/37484	. . . . .	Tungsten [W] as principal constituent	2224/37611	. . . . .	Tin [Sn] as principal constituent
2224/37486	. . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37613	. . . . .	Bismuth [Bi] as principal constituent
2224/37487	. . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37614	. . . . .	Thallium [Tl] as principal constituent
2224/37488	. . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37616	. . . . .	Lead [Pb] as principal constituent
2224/3749	. . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37617	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37491	. . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/37618	. . . . .	Zinc [Zn] as principal constituent
2224/37493	. . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/374</a> - <a href="#">H01L 2224/37491</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/3762	. . . . .	Antimony [Sb] as principal constituent
2224/37494	. . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/374</a> - <a href="#">H01L 2224/37491</a>	2224/37623	. . . . .	Magnesium [Mg] as principal constituent
2224/37495	. . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/374</a> - <a href="#">H01L 2224/37491</a>	2224/37624	. . . . .	Aluminium [Al] as principal constituent
2224/37498	. . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/37638	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37499	. . . . .	Shape or distribution of the fillers	2224/37639	. . . . .	Silver [Ag] as principal constituent
2224/3754	. . . . .	Coating	2224/37644	. . . . .	Gold [Au] as principal constituent
2224/37541	. . . . .	Structure	2224/37647	. . . . .	Copper [Cu] as principal constituent
2224/3755	. . . . .	Shape	2224/37649	. . . . .	Manganese [Mn] as principal constituent
2224/3756	. . . . .	Disposition, e.g. coating on a part of the core	2224/37655	. . . . .	Nickel [Ni] as principal constituent
2224/37565	. . . . .	Single coating layer	2224/37657	. . . . .	Cobalt [Co] as principal constituent
2224/3757	. . . . .	Plural coating layers	2224/3766	. . . . .	Iron [Fe] as principal constituent
2224/37572	. . . . .	Two-layer stack coating	2224/37663	. . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/37573	. . . . .	Three-layer stack coating	2224/37664	. . . . .	Palladium [Pd] as principal constituent
2224/37574	. . . . .	Four-layer stack coating	2224/37666	. . . . .	Titanium [Ti] as principal constituent
2224/37576	. . . . .	being mutually engaged together, e.g. through inserts	2224/37669	. . . . .	Platinum [Pt] as principal constituent
2224/37578	. . . . .	being disposed next to each other, e.g. side-to-side arrangements	2224/3767	. . . . .	Zirconium [Zr] as principal constituent
			2224/37671	. . . . .	Chromium [Cr] as principal constituent
			2224/37672	. . . . .	Vanadium [V] as principal constituent
			2224/37673	. . . . .	Rhodium [Rh] as principal constituent

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2224/37676 . . . . .	Ruthenium [Ru] as principal constituent	2224/37713 . . . . .	Bismuth [Bi] as principal constituent
2224/37678 . . . . .	Iridium [Ir] as principal constituent	2224/37714 . . . . .	Thallium [Tl] as principal constituent
2224/37679 . . . . .	Niobium [Nb] as principal constituent	2224/37716 . . . . .	Lead [Pb] as principal constituent
2224/3768 . . . . .	Molybdenum [Mo] as principal constituent	2224/37717 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/37681 . . . . .	Tantalum [Ta] as principal constituent	2224/37718 . . . . .	Zinc [Zn] as principal constituent
2224/37683 . . . . .	Rhenium [Re] as principal constituent	2224/3772 . . . . .	Antimony [Sb] as principal constituent
2224/37684 . . . . .	Tungsten [W] as principal constituent	2224/37723 . . . . .	Magnesium [Mg] as principal constituent
2224/37686 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37724 . . . . .	Aluminium [Al] as principal constituent
2224/37687 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37738 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37688 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37739 . . . . .	Silver [Ag] as principal constituent
2224/3769 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37744 . . . . .	Gold [Au] as principal constituent
2224/37691 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/37747 . . . . .	Copper [Cu] as principal constituent
2224/37693 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/376</a> - <a href="#">H01L 2224/37691</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/37749 . . . . .	Manganese [Mn] as principal constituent
2224/37694 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/376</a> - <a href="#">H01L 2224/37691</a>	2224/37755 . . . . .	Nickel [Ni] as principal constituent
2224/37695 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/376</a> - <a href="#">H01L 2224/37691</a>	2224/37757 . . . . .	Cobalt [Co] as principal constituent
2224/37698 . . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/3776 . . . . .	Iron [Fe] as principal constituent
2224/37699 . . . . .	Material of the matrix	2224/37763 . . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/377 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/37764 . . . . .	Palladium [Pd] as principal constituent
2224/37701 . . . . .	the principal constituent melting at a temperature of less than 400°C	2224/37766 . . . . .	Titanium [Ti] as principal constituent
2224/37705 . . . . .	Gallium [Ga] as principal constituent	2224/37769 . . . . .	Platinum [Pt] as principal constituent
2224/37709 . . . . .	Indium [In] as principal constituent	2224/3777 . . . . .	Zirconium [Zr] as principal constituent
2224/37711 . . . . .	Tin [Sn] as principal constituent	2224/37771 . . . . .	Chromium [Cr] as principal constituent
		2224/37772 . . . . .	Vanadium [V] as principal constituent
		2224/37773 . . . . .	Rhodium [Rh] as principal constituent
		2224/37776 . . . . .	Ruthenium [Ru] as principal constituent
		2224/37778 . . . . .	Iridium [Ir] as principal constituent
		2224/37779 . . . . .	Niobium [Nb] as principal constituent
		2224/3778 . . . . .	Molybdenum [Mo] as principal constituent
		2224/37781 . . . . .	Tantalum [Ta] as principal constituent

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2224/37783	Rhenium [Re] as principal constituent	2224/37823	Magnesium [Mg] as principal constituent
2224/37784	Tungsten [W] as principal constituent	2224/37824	Aluminium [Al] as principal constituent
2224/37786	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/37838	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37787	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/37839	Silver [Ag] as principal constituent
2224/37788	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/37844	Gold [Au] as principal constituent
2224/3779	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37847	Copper [Cu] as principal constituent
2224/37791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/37849	Manganese [Mn] as principal constituent
2224/37793	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/377</a> - <a href="#">H01L 2224/37791</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/37855	Nickel [Ni] as principal constituent
2224/37794	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/377</a> - <a href="#">H01L 2224/37791</a>	2224/37857	Cobalt [Co] as principal constituent
2224/37795	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/377</a> - <a href="#">H01L 2224/37791</a>	2224/3786	Iron [Fe] as principal constituent
2224/37798	Fillers	2224/37863	the principal constituent melting at a temperature of greater than 1550°C
2224/37799	Base material	2224/37864	Palladium [Pd] as principal constituent
2224/378	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/37866	Titanium [Ti] as principal constituent
2224/37801	the principal constituent melting at a temperature of less than 400°C	2224/37869	Platinum [Pt] as principal constituent
2224/37805	Gallium [Ga] as principal constituent	2224/3787	Zirconium [Zr] as principal constituent
2224/37809	Indium [In] as principal constituent	2224/37871	Chromium [Cr] as principal constituent
2224/37811	Tin [Sn] as principal constituent	2224/37872	Vanadium [V] as principal constituent
2224/37813	Bismuth [Bi] as principal constituent	2224/37873	Rhodium [Rh] as principal constituent
2224/37814	Thallium [Tl] as principal constituent	2224/37876	Ruthenium [Ru] as principal constituent
2224/37816	Lead [Pb] as principal constituent	2224/37878	Iridium [Ir] as principal constituent
2224/37817	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/37879	Niobium [Nb] as principal constituent
2224/37818	Zinc [Zn] as principal constituent	2224/3788	Molybdenum [Mo] as principal constituent
2224/3782	Antimony [Sb] as principal constituent	2224/37881	Tantalum [Ta] as principal constituent
		2224/37883	Rhenium [Re] as principal constituent
		2224/37884	Tungsten [W] as principal constituent
		2224/37886	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/37887	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/37888	Glasses, e.g. amorphous oxides, nitrides or fluorides

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2224/3789	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/37938	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/37891	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/37939	Silver [Ag] as principal constituent
2224/37893	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/378</a> - <a href="#">H01L 2224/37891</a> e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/37944	Gold [Au] as principal constituent
2224/37894	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/378</a> - <a href="#">H01L 2224/37891</a>	2224/37947	Copper [Cu] as principal constituent
2224/37895	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/378</a> - <a href="#">H01L 2224/37891</a>	2224/37949	Manganese [Mn] as principal constituent
2224/37898	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/37955	Nickel [Ni] as principal constituent
2224/37899	Coating material	2224/37957	Cobalt [Co] as principal constituent
2224/379	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/3796	Iron [Fe] as principal constituent
2224/37901	the principal constituent melting at a temperature of less than 400°C	2224/37963	the principal constituent melting at a temperature of greater than 1550°C
2224/37905	Gallium [Ga] as principal constituent	2224/37964	Palladium [Pd] as principal constituent
2224/37909	Indium [In] as principal constituent	2224/37966	Titanium [Ti] as principal constituent
2224/37911	Tin [Sn] as principal constituent	2224/37969	Platinum [Pt] as principal constituent
2224/37913	Bismuth [Bi] as principal constituent	2224/3797	Zirconium [Zr] as principal constituent
2224/37914	Thallium [Tl] as principal constituent	2224/37971	Chromium [Cr] as principal constituent
2224/37916	Lead [Pb] as principal constituent	2224/37972	Vanadium [V] as principal constituent
2224/37917	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/37973	Rhodium [Rh] as principal constituent
2224/37918	Zinc [Zn] as principal constituent	2224/37976	Ruthenium [Ru] as principal constituent
2224/3792	Antimony [Sb] as principal constituent	2224/37978	Iridium [Ir] as principal constituent
2224/37923	Magnesium [Mg] as principal constituent	2224/37979	Niobium [Nb] as principal constituent
2224/37924	Aluminium [Al] as principal constituent	2224/3798	Molybdenum [Mo] as principal constituent
		2224/37981	Tantalum [Ta] as principal constituent
		2224/37983	Rhenium [Re] as principal constituent
		2224/37984	Tungsten [W] as principal constituent
		2224/37986	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/37987	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/37988	Glasses, e.g. amorphous oxides, nitrides or fluorides
		2224/3799	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
		2224/37991	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

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2224/37993	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/379</a> - <a href="#">H01L 2224/37991</a>	2224/40145	the bodies being stacked
	e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/40147	with an intermediate bond, e.g. continuous strap daisy chain
2224/37994	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/379</a> - <a href="#">H01L 2224/37991</a>	2224/40151	Connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive
2224/37995	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/379</a> - <a href="#">H01L 2224/37991</a>	2224/40153	the body and the item being arranged next to each other, e.g. on a common substrate
2224/37998	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/40155	the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/37999	Shape or distribution of the fillers	2224/40157	Connecting the strap to a bond pad of the item
2224/38	of a plurality of strap connectors	2224/40158	the bond pad being disposed in a recess of the surface of the item
2224/39	Structure, shape, material or disposition of the strap connectors after the connecting process	2224/40159	the bond pad protruding from the surface of the item
2224/40	of an individual strap connector	2224/4016	Connecting the strap to a pin of the item
2224/4001	Structure	2224/40163	Connecting the strap to a potential ring of the item
2224/4005	Shape	2224/40165	Connecting the strap to a via metallisation of the item
2224/4007	of bonding interfaces, e.g. interlocking features	2224/40175	the item being metallic
2224/4009	Loop shape	2224/40177	Connecting the strap to a bond pad of the item
2224/40091	Arched	2224/40178	the bond pad being disposed in a recess of the surface of the item
2224/40095	Kinked	2224/40179	the bond pad protruding from the surface of the item
2224/401	Disposition	2224/40183	Connecting the strap to a potential ring of the item
2224/40101	Connecting bonding areas at the same height, e.g. horizontal bond	2224/40195	the item being a discrete passive component
2224/40105	Connecting bonding areas at different heights	2224/40221	the body and the item being stacked
2224/40106	the connector being orthogonal to a side surface of the semiconductor or solid-state body, e.g. parallel layout	2224/40225	the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/40108	the connector not being orthogonal to a side surface of the semiconductor or solid-state body, e.g. fanned-out connectors, radial layout	2224/40227	Connecting the strap to a bond pad of the item
2224/40111	the strap connector extending above another semiconductor or solid-state body	2224/40228	the bond pad being disposed in a recess of the surface of the item
2224/4013	Connecting within a semiconductor or solid-state body, i.e. fly strap, bridge strap	2224/40229	the bond pad protruding from the surface of the item
2224/40132	with an intermediate bond, e.g. continuous strap daisy chain	2224/4023	Connecting the strap to a pin of the item
2224/40135	Connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip	2224/40233	Connecting the strap to a potential ring of the item
2224/40137	the bodies being arranged next to each other, e.g. on a common substrate	2224/40235	Connecting the strap to a via metallisation of the item
2224/40139	with an intermediate bond, e.g. continuous strap daisy chain	2224/40237	Connecting the strap to a die pad of the item
2224/40141	the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements	2224/4024	Connecting between the body and an opposite side of the item with respect to the body
		2224/40245	the item being metallic
		2224/40247	Connecting the strap to a bond pad of the item

2224/40248	. . . . .	the bond pad being disposed in a recess of the surface of the item	2224/41052	. . . . .	Different loop heights
2224/40249	. . . . .	the bond pad protruding from the surface of the item	2224/411	. . . . .	Disposition
2224/40253	. . . . .	Connecting the strap to a potential ring of the item	2224/41105	. . . . .	Connecting at different heights
2224/40257	. . . . .	Connecting the strap to a die pad of the item	2224/41107	. . . . .	on the semiconductor or solid-state body being
2224/4026	. . . . .	Connecting between the body and an opposite side of the item with respect to the body	2224/41109	. . . . .	outside the semiconductor or solid-state body
2224/40265	. . . . .	the item being a discrete passive component	2224/4111	. . . . .	the connectors being bonded to at least one common bonding area, e.g. daisy chain
2224/404	. . . . .	Connecting portions	2224/41111	. . . . .	the connectors connecting two common bonding areas
2224/4046	. . . . .	with multiple bonds on the same bonding area	2224/41112	. . . . .	the connectors connecting a common bonding area on the semiconductor or solid-state body to different bonding areas outside the body, e.g. diverging straps
2224/40475	. . . . .	connected to auxiliary connecting means on the bonding areas	2224/41113	. . . . .	the connectors connecting different bonding areas on the semiconductor or solid-state body to a common bonding area outside the body, e.g. converging straps
2224/40477	. . . . .	being a pre-ball (i.e. a ball formed by capillary bonding)	2224/4112	. . . . .	Layout
2224/40479	. . . . .	on the semiconductor or solid-state body	2224/4117	. . . . .	Crossed straps
2224/4048	. . . . .	outside the semiconductor or solid-state body	2224/41171	. . . . .	Fan-out arrangements
2224/40484	. . . . .	being a plurality of pre-balls disposed side-to-side	2224/41173	. . . . .	Radial fan-out arrangements
2224/40486	. . . . .	on the semiconductor or solid-state body	2224/41174	. . . . .	Stacked arrangements
2224/40487	. . . . .	outside the semiconductor or solid-state body	2224/41175	. . . . .	Parallel arrangements
2224/40491	. . . . .	being an additional member attached to the bonding area through an adhesive or solder, e.g. buffer pad	2224/41176	. . . . .	Strap connectors having the same loop shape and height
2224/40496	. . . . .	not being interposed between the connector and the bonding area	2224/41177	. . . . .	Combinations of different arrangements
2224/40499	. . . . .	Material of the auxiliary connecting means	2224/41179	. . . . .	Corner adaptations, i.e. disposition of the strap connectors at the corners of the semiconductor or solid-state body
2224/405	. . . . .	Material	2224/4118	. . . . .	being disposed on at least two different sides of the body, e.g. dual array
2224/40505	. . . . .	at the bonding interface	2224/414	. . . . .	Connecting portions
2224/40506	. . . . .	comprising an eutectic alloy	2224/4141	. . . . .	the connecting portions being stacked
2224/40507	. . . . .	comprising an intermetallic compound	2224/41421	. . . . .	on the semiconductor or solid-state body
2224/4051	. . . . .	Morphology of the connecting portion, e.g. grain size distribution	2224/41422	. . . . .	outside the semiconductor or solid-state body
2224/4052	. . . . .	Bonding interface between the connecting portion and the bonding area	2224/4143	. . . . .	the connecting portions being staggered
2224/4099	. . . . .	Auxiliary members for strap connectors, e.g. flow-barriers, spacers	2224/415	. . . . .	Material
2224/40991	. . . . .	being formed on the semiconductor or solid-state body to be connected	2224/41505	. . . . .	Connectors having different materials
2224/40992	. . . . .	Reinforcing structures	2224/42	. . . . .	Wire connectors; Manufacturing methods related thereto
2224/40993	. . . . .	Alignment aids	2224/43	. . . . .	Manufacturing methods
2224/40996	. . . . .	being formed on an item to be connected not being a semiconductor or solid-state body	2224/43001	. . . . .	Involving a temporary auxiliary member not forming part of the manufacturing apparatus, e.g. removable or sacrificial coating, film or substrate
2224/40997	. . . . .	Reinforcing structures	2224/431	. . . . .	Pre-treatment of the preform connector
2224/40998	. . . . .	Alignment aids	2224/4312	. . . . .	Applying permanent coating, e.g. in-situ coating
2224/41	. . . . .	of a plurality of strap connectors	2224/43125	. . . . .	Plating, e.g. electroplating, electroless plating
2224/4101	. . . . .	Structure	2224/432	. . . . .	Mechanical processes
2224/4103	. . . . .	Connectors having different sizes	2224/4321	. . . . .	Pulling
2224/4105	. . . . .	Shape	2224/435	. . . . .	Modification of a pre-existing material
2224/41051	. . . . .	Connectors having different shapes	2224/4351	. . . . .	Sintering
			2224/4352	. . . . .	Anodisation

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2224/437	. . . . .	Involving monitoring, e.g. feedback loop	2224/45109	. . . . .	Indium (In) as principal constituent
2224/438	. . . . .	Post-treatment of the connector	2224/45111	. . . . .	Tin (Sn) as principal constituent
2224/4381	. . . . .	Cleaning, e.g. oxide removal step, desmearing	2224/45113	. . . . .	Bismuth (Bi) as principal constituent
2224/4382	. . . . .	Applying permanent coating, e.g. in-situ coating	2224/45114	. . . . .	Thallium (Tl) as principal constituent
2224/43821	. . . . .	Spray coating	2224/45116	. . . . .	Lead (Pb) as principal constituent
2224/43822	. . . . .	Dip coating	2224/45117	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/43823	. . . . .	Immersion coating, e.g. solder bath	2224/45118	. . . . .	Zinc (Zn) as principal constituent
2224/43824	. . . . .	Chemical solution deposition [CSD], i.e. using a liquid precursor	2224/4512	. . . . .	Antimony (Sb) as principal constituent
2224/43825	. . . . .	Plating, e.g. electroplating, electroless plating	2224/45123	. . . . .	Magnesium (Mg) as principal constituent
2224/43826	. . . . .	Physical vapour deposition [PVD], e.g. evaporation, sputtering	2224/45124	. . . . .	Aluminium (Al) as principal constituent
2224/43827	. . . . .	Chemical vapour deposition [CVD], e.g. laser CVD	2224/45138	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/4383	. . . . .	Reworking	2224/45139	. . . . .	Silver (Ag) as principal constituent
2224/43831	. . . . .	with a chemical process, e.g. with etching of the connector	2224/45144	. . . . .	Gold (Au) as principal constituent
2224/43847	. . . . .	with a mechanical process, e.g. with flattening of the connector	2224/45147	. . . . .	Copper (Cu) as principal constituent
2224/43848	. . . . .	Thermal treatments, e.g. annealing, controlled cooling	2224/45149	. . . . .	Manganese (Mn) as principal constituent
2224/43985	. . . . .	Methods of manufacturing wire connectors involving a specific sequence of method steps	2224/45155	. . . . .	Nickel (Ni) as principal constituent
2224/43986	. . . . .	with repetition of the same manufacturing step	2224/45157	. . . . .	Cobalt (Co) as principal constituent
2224/44	. . . . .	Structure, shape, material or disposition of the wire connectors prior to the connecting process	2224/4516	. . . . .	Iron (Fe) as principal constituent
2224/45	. . . . .	of an individual wire connector	2224/45163	. . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/45001	. . . . .	Core members of the connector	2224/45164	. . . . .	Palladium (Pd) as principal constituent
2224/45005	. . . . .	Structure	2224/45166	. . . . .	Titanium (Ti) as principal constituent
2224/4501	. . . . .	Shape	2224/45169	. . . . .	Platinum (Pt) as principal constituent
2224/45012	. . . . .	Cross-sectional shape	2224/4517	. . . . .	Zirconium (Zr) as principal constituent
2224/45013	. . . . .	being non uniform along the connector	2224/45171	. . . . .	Chromium (Cr) as principal constituent
2224/45014	. . . . .	Ribbon connectors, e.g. rectangular cross-section	2224/45172	. . . . .	Vanadium (V) as principal constituent
2224/45015	. . . . .	being circular	2224/45173	. . . . .	Rhodium (Rh) as principal constituent
2224/45016	. . . . .	being elliptic	2224/45176	. . . . .	Ruthenium (Ru) as principal constituent
2224/4502	. . . . .	Disposition	2224/45178	. . . . .	Iridium (Ir) as principal constituent
2224/45025	. . . . .	Plural core members	2224/45179	. . . . .	Niobium (Nb) as principal constituent
2224/45026	. . . . .	being mutually engaged together, e.g. through inserts	2224/4518	. . . . .	Molybdenum (Mo) as principal constituent
2224/45028	. . . . .	Side-to-side arrangements	2224/45181	. . . . .	Tantalum (Ta) as principal constituent
2224/4503	. . . . .	Stacked arrangements	2224/45183	. . . . .	Rhenium (Re) as principal constituent
2224/45032	. . . . .	Two-layer arrangements			
2224/45033	. . . . .	Three-layer arrangements			
2224/45034	. . . . .	Four-layer arrangements			
2224/45099	. . . . .	Material			
2224/451	. . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof			
2224/45101	. . . . .	the principal constituent melting at a temperature of less than 400°C			
2224/45105	. . . . .	Gallium (Ga) as principal constituent			

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2224/45184 . . . . .	Tungsten (W) as principal constituent	2224/4522 . . . . .	Antimony (Sb) as principal constituent
2224/45186 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/45223 . . . . .	Magnesium (Mg) as principal constituent
2224/45187 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/45224 . . . . .	Aluminium (Al) as principal constituent
2224/45188 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/45238 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/4519 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/45239 . . . . .	Silver (Ag) as principal constituent
2224/45191 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/45244 . . . . .	Gold (Au) as principal constituent
2224/45193 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/451</a> - <a href="#">H01L 2224/45191</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/45247 . . . . .	Copper (Cu) as principal constituent
2224/45194 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/451</a> - <a href="#">H01L 2224/45191</a>	2224/45249 . . . . .	Manganese (Mn) as principal constituent
2224/45195 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/451</a> - <a href="#">H01L 2224/45191</a>	2224/45255 . . . . .	Nickel (Ni) as principal constituent
2224/45198 . . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/45257 . . . . .	Cobalt (Co) as principal constituent
2224/45199 . . . . .	Material of the matrix	2224/4526 . . . . .	Iron (Fe) as principal constituent
2224/452 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45263 . . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/45201 . . . . .	the principal constituent melting at a temperature of less than 400°C	2224/45264 . . . . .	Palladium (Pd) as principal constituent
2224/45205 . . . . .	Gallium (Ga) as principal constituent	2224/45266 . . . . .	Titanium (Ti) as principal constituent
2224/45209 . . . . .	Indium (In) as principal constituent	2224/45269 . . . . .	Platinum (Pt) as principal constituent
2224/45211 . . . . .	Tin (Sn) as principal constituent	2224/4527 . . . . .	Zirconium (Zr) as principal constituent
2224/45213 . . . . .	Bismuth (Bi) as principal constituent	2224/45271 . . . . .	Chromium (Cr) as principal constituent
2224/45214 . . . . .	Thallium (Tl) as principal constituent	2224/45272 . . . . .	Vanadium (V) as principal constituent
2224/45216 . . . . .	Lead (Pb) as principal constituent	2224/45273 . . . . .	Rhodium (Rh) as principal constituent
2224/45217 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45276 . . . . .	Ruthenium (Ru) as principal constituent
2224/45218 . . . . .	Zinc (Zn) as principal constituent	2224/45278 . . . . .	Iridium (Ir) as principal constituent
		2224/45279 . . . . .	Niobium (Nb) as principal constituent
		2224/4528 . . . . .	Molybdenum (Mo) as principal constituent
		2224/45281 . . . . .	Tantalum (Ta) as principal constituent
		2224/45283 . . . . .	Rhenium (Re) as principal constituent
		2224/45284 . . . . .	Tungsten (W) as principal constituent
		2224/45286 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/45287 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/45288 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides

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2224/4529	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/45344	Gold (Au) as principal constituent
2224/45291	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/45347	Copper (Cu) as principal constituent
2224/45293	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/452</a> - <a href="#">H01L 2224/45291</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/45349	Manganese (Mn) as principal constituent
2224/45294	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/452</a> - <a href="#">H01L 2224/45291</a>	2224/45355	Nickel (Ni) as principal constituent
2224/45295	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/452</a> - <a href="#">H01L 2224/45291</a>	2224/45357	Cobalt (Co) as principal constituent
2224/45298	Fillers	2224/4536	Iron (Fe) as principal constituent
2224/45299	Base material	2224/45363	the principal constituent melting at a temperature of greater than 1550°C
2224/453	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45364	Palladium (Pd) as principal constituent
2224/45301	the principal constituent melting at a temperature of less than 400°C	2224/45366	Titanium (Ti) as principal constituent
2224/45305	Gallium (Ga) as principal constituent	2224/45369	Platinum (Pt) as principal constituent
2224/45309	Indium (In) as principal constituent	2224/4537	Zirconium (Zr) as principal constituent
2224/45311	Tin (Sn) as principal constituent	2224/45371	Chromium (Cr) as principal constituent
2224/45313	Bismuth (Bi) as principal constituent	2224/45372	Vanadium (V) as principal constituent
2224/45314	Thallium (Tl) as principal constituent	2224/45373	Rhodium (Rh) as principal constituent
2224/45316	Lead (Pb) as principal constituent	2224/45376	Ruthenium (Ru) as principal constituent
2224/45317	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45378	Iridium (Ir) as principal constituent
2224/45318	Zinc (Zn) as principal constituent	2224/45379	Niobium (Nb) as principal constituent
2224/4532	Antimony (Sb) as principal constituent	2224/4538	Molybdenum (Mo) as principal constituent
2224/45323	Magnesium (Mg) as principal constituent	2224/45381	Tantalum (Ta) as principal constituent
2224/45324	Aluminium (Al) as principal constituent	2224/45383	Rhenium (Re) as principal constituent
2224/45338	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/45384	Tungsten (W) as principal constituent
2224/45339	Silver (Ag) as principal constituent	2224/45386	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/45387	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/45388	Glasses, e.g. amorphous oxides, nitrides or fluorides
		2224/4539	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
		2224/45391	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

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2224/45393	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/453</a> - <a href="#">H01L 2224/45391</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/45447	Copper (Cu) as principal constituent
2224/45394	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/453</a> - <a href="#">H01L 2224/45391</a>	2224/45449	Manganese (Mn) as principal constituent
2224/45395	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/453</a> - <a href="#">H01L 2224/45391</a>	2224/45455	Nickel (Ni) as principal constituent
2224/45398	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/45457	Cobalt (Co) as principal constituent
2224/45399	Coating material	2224/4546	Iron (Fe) as principal constituent
2224/454	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45463	the principal constituent melting at a temperature of greater than 1550°C
2224/45401	the principal constituent melting at a temperature of less than 400°C	2224/45464	Palladium (Pd) as principal constituent
2224/45405	Gallium (Ga) as principal constituent	2224/45466	Titanium (Ti) as principal constituent
2224/45409	Indium (In) as principal constituent	2224/45469	Platinum (Pt) as principal constituent
2224/45411	Tin (Sn) as principal constituent	2224/4547	Zirconium (Zr) as principal constituent
2224/45413	Bismuth (Bi) as principal constituent	2224/45471	Chromium (Cr) as principal constituent
2224/45414	Thallium (Tl) as principal constituent	2224/45472	Vanadium (V) as principal constituent
2224/45416	Lead (Pb) as principal constituent	2224/45473	Rhodium (Rh) as principal constituent
2224/45417	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45476	Ruthenium (Ru) as principal constituent
2224/45418	Zinc (Zn) as principal constituent	2224/45478	Iridium (Ir) as principal constituent
2224/4542	Antimony (Sb) as principal constituent	2224/45479	Niobium (Nb) as principal constituent
2224/45423	Magnesium (Mg) as principal constituent	2224/4548	Molybdenum (Mo) as principal constituent
2224/45424	Aluminium (Al) as principal constituent	2224/45481	Tantalum (Ta) as principal constituent
2224/45438	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/45483	Rhenium (Re) as principal constituent
2224/45439	Silver (Ag) as principal constituent	2224/45484	Tungsten (W) as principal constituent
2224/45444	Gold (Au) as principal constituent	2224/45486	with a principal constituent of the material being a non metallic, non metalloid inorganic material
		2224/45487	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/45488	Glasses, e.g. amorphous oxides, nitrides or fluorides
		2224/4549	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
		2224/45491	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
		2224/45493	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/454</a> - <a href="#">H01L 2224/45491</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

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2224/45494 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/454</a> - <a href="#">H01L 2224/45491</a>	2224/45639 . . . . .	Silver (Ag) as principal constituent
2224/45495 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/454</a> - <a href="#">H01L 2224/45491</a>	2224/45644 . . . . .	Gold (Au) as principal constituent
2224/45498 . . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/45647 . . . . .	Copper (Cu) as principal constituent
2224/45499 . . . . .	Shape or distribution of the fillers	2224/45649 . . . . .	Manganese (Mn) as principal constituent
2224/4554 . . . . .	Coating	2224/45655 . . . . .	Nickel (Ni) as principal constituent
2224/45541 . . . . .	Structure	2224/45657 . . . . .	Cobalt (Co) as principal constituent
2224/4555 . . . . .	Shape	2224/4566 . . . . .	Iron (Fe) as principal constituent
2224/4556 . . . . .	Disposition, e.g. coating on a part of the core	2224/45663 . . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/45565 . . . . .	Single coating layer	2224/45664 . . . . .	Palladium (Pd) as principal constituent
2224/4557 . . . . .	Plural coating layers	2224/45666 . . . . .	Titanium (Ti) as principal constituent
2224/45572 . . . . .	Two-layer stack coating	2224/45669 . . . . .	Platinum (Pt) as principal constituent
2224/45573 . . . . .	Three-layer stack coating	2224/4567 . . . . .	Zirconium (Zr) as principal constituent
2224/45574 . . . . .	Four-layer stack coating	2224/45671 . . . . .	Chromium (Cr) as principal constituent
2224/45576 . . . . .	being mutually engaged together, e.g. through inserts	2224/45672 . . . . .	Vanadium (V) as principal constituent
2224/45578 . . . . .	being disposed next to each other, e.g. side-to-side arrangements	2224/45673 . . . . .	Rhodium (Rh) as principal constituent
2224/45599 . . . . .	Material	2224/45676 . . . . .	Ruthenium (Ru) as principal constituent
2224/456 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45678 . . . . .	Iridium (Ir) as principal constituent
2224/45601 . . . . .	the principal constituent melting at a temperature of less than 400°C	2224/45679 . . . . .	Niobium (Nb) as principal constituent
2224/45605 . . . . .	Gallium (Ga) as principal constituent	2224/4568 . . . . .	Molybdenum (Mo) as principal constituent
2224/45609 . . . . .	Indium (In) as principal constituent	2224/45681 . . . . .	Tantalum (Ta) as principal constituent
2224/45611 . . . . .	Tin (Sn) as principal constituent	2224/45683 . . . . .	Rhenium (Re) as principal constituent
2224/45613 . . . . .	Bismuth (Bi) as principal constituent	2224/45684 . . . . .	Tungsten (W) as principal constituent
2224/45614 . . . . .	Thallium (Tl) as principal constituent	2224/45686 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45616 . . . . .	Lead (Pb) as principal constituent	2224/45687 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/45617 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45688 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/45618 . . . . .	Zinc (Zn) as principal constituent	2224/4569 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/4562 . . . . .	Antimony (Sb) as principal constituent	2224/45691 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45623 . . . . .	Magnesium (Mg) as principal constituent	2224/45693 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/456</a> - <a href="#">H01L 2224/45691</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45624 . . . . .	Aluminium (Al) as principal constituent		
2224/45638 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C		

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2224/45694 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/456</a> - <a href="#">H01L 2224/45691</a>	2224/4576 . . . . .	Iron (Fe) as principal constituent
2224/45695 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/456</a> - <a href="#">H01L 2224/45691</a>	2224/45763 . . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/45698 . . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/45764 . . . . .	Palladium (Pd) as principal constituent
2224/45699 . . . . .	Material of the matrix	2224/45766 . . . . .	Titanium (Ti) as principal constituent
2224/457 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45769 . . . . .	Platinum (Pt) as principal constituent
2224/45701 . . . . .	the principal constituent melting at a temperature of less than 400°C	2224/4577 . . . . .	Zirconium (Zr) as principal constituent
2224/45705 . . . . .	Gallium (Ga) as principal constituent	2224/45771 . . . . .	Chromium (Cr) as principal constituent
2224/45709 . . . . .	Indium (In) as principal constituent	2224/45772 . . . . .	Vanadium (V) as principal constituent
2224/45711 . . . . .	Tin (Sn) as principal constituent	2224/45773 . . . . .	Rhodium (Rh) as principal constituent
2224/45713 . . . . .	Bismuth (Bi) as principal constituent	2224/45776 . . . . .	Ruthenium (Ru) as principal constituent
2224/45714 . . . . .	Thallium (Tl) as principal constituent	2224/45778 . . . . .	Iridium (Ir) as principal constituent
2224/45716 . . . . .	Lead (Pb) as principal constituent	2224/45779 . . . . .	Niobium (Nb) as principal constituent
2224/45717 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/4578 . . . . .	Molybdenum (Mo) as principal constituent
2224/45718 . . . . .	Zinc (Zn) as principal constituent	2224/45781 . . . . .	Tantalum (Ta) as principal constituent
2224/4572 . . . . .	Antimony (Sb) as principal constituent	2224/45783 . . . . .	Rhenium (Re) as principal constituent
2224/45723 . . . . .	Magnesium (Mg) as principal constituent	2224/45784 . . . . .	Tungsten (W) as principal constituent
2224/45724 . . . . .	Aluminium (Al) as principal constituent	2224/45786 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45738 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/45787 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/45739 . . . . .	Silver (Ag) as principal constituent	2224/45788 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/45744 . . . . .	Gold (Au) as principal constituent	2224/4579 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45747 . . . . .	Copper (Cu) as principal constituent	2224/45791 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45749 . . . . .	Manganese (Mn) as principal constituent	2224/45793 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/457</a> - <a href="#">H01L 2224/45791</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45755 . . . . .	Nickel (Ni) as principal constituent	2224/45794 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/457</a> - <a href="#">H01L 2224/45791</a>
2224/45757 . . . . .	Cobalt (Co) as principal constituent	2224/45795 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/457</a> - <a href="#">H01L 2224/45791</a>
		2224/45798 . . . . .	Fillers
		2224/45799 . . . . .	Base material

2224/458	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/45871	Chromium (Cr) as principal constituent
2224/45801	the principal constituent melting at a temperature of less than 400°C	2224/45872	Vanadium (V) as principal constituent
2224/45805	Gallium (Ga) as principal constituent	2224/45873	Rhodium (Rh) as principal constituent
2224/45809	Indium (In) as principal constituent	2224/45876	Ruthenium (Ru) as principal constituent
2224/45811	Tin (Sn) as principal constituent	2224/45878	Iridium (Ir) as principal constituent
2224/45813	Bismuth (Bi) as principal constituent	2224/45879	Niobium (Nb) as principal constituent
2224/45814	Thallium (Tl) as principal constituent	2224/4588	Molybdenum (Mo) as principal constituent
2224/45816	Lead (Pb) as principal constituent	2224/45881	Tantalum (Ta) as principal constituent
2224/45817	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45883	Rhenium (Re) as principal constituent
2224/45818	Zinc (Zn) as principal constituent	2224/45884	Tungsten (W) as principal constituent
2224/4582	Antimony (Sb) as principal constituent	2224/45886	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45823	Magnesium (Mg) as principal constituent	2224/45887	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/45824	Aluminium (Al) as principal constituent	2224/45888	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/45838	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/4589	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45839	Silver (Ag) as principal constituent	2224/45891	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45844	Gold (Au) as principal constituent	2224/45893	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/458</a> - <a href="#">H01L 2224/45891</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45847	Copper (Cu) as principal constituent	2224/45894	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/458</a> - <a href="#">H01L 2224/45891</a>
2224/45849	Manganese (Mn) as principal constituent	2224/45895	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/458</a> - <a href="#">H01L 2224/45891</a>
2224/45855	Nickel (Ni) as principal constituent	2224/45898	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/45857	Cobalt (Co) as principal constituent	2224/45899	Coating material
2224/4586	Iron (Fe) as principal constituent	2224/459	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/45863	the principal constituent melting at a temperature of greater than 1550°C		
2224/45864	Palladium (Pd) as principal constituent		
2224/45866	Titanium (Ti) as principal constituent		
2224/45869	Platinum (Pt) as principal constituent		
2224/4587	Zirconium (Zr) as principal constituent		

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2224/45901	. . . . .	the principal constituent melting at a temperature of less than 400°C	2224/45978	. . . . .	Iridium (Ir) as principal constituent
2224/45905	. . . . .	Gallium (Ga) as principal constituent	2224/45979	. . . . .	Niobium (Nb) as principal constituent
2224/45909	. . . . .	Indium (In) as principal constituent	2224/4598	. . . . .	Molybdenum (Mo) as principal constituent
2224/45911	. . . . .	Tin (Sn) as principal constituent	2224/45981	. . . . .	Tantalum (Ta) as principal constituent
2224/45913	. . . . .	Bismuth (Bi) as principal constituent	2224/45983	. . . . .	Rhenium (Re) as principal constituent
2224/45914	. . . . .	Thallium (Tl) as principal constituent	2224/45984	. . . . .	Tungsten (W) as principal constituent
2224/45916	. . . . .	Lead (Pb) as principal constituent	2224/45986	. . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/45917	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/45987	. . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/45918	. . . . .	Zinc (Zn) as principal constituent	2224/45988	. . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/4592	. . . . .	Antimony (Sb) as principal constituent	2224/4599	. . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/45923	. . . . .	Magnesium (Mg) as principal constituent	2224/45991	. . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/45924	. . . . .	Aluminium (Al) as principal constituent	2224/45993	. . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/459</a> - <a href="#">H01L 2224/45991</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/45938	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/45994	. . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/459</a> - <a href="#">H01L 2224/45991</a>
2224/45939	. . . . .	Silver (Ag) as principal constituent	2224/45995	. . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/459</a> - <a href="#">H01L 2224/45991</a>
2224/45944	. . . . .	Gold (Au) as principal constituent	2224/45998	. . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/45947	. . . . .	Copper (Cu) as principal constituent	2224/45999	. . . . .	Shape or distribution of the fillers
2224/45949	. . . . .	Manganese (Mn) as principal constituent	2224/46	. . . . .	of a plurality of wire connectors
2224/45955	. . . . .	Nickel (Ni) as principal constituent	2224/47	. . . . .	Structure, shape, material or disposition of the wire connectors after the connecting process
2224/45957	. . . . .	Cobalt (Co) as principal constituent	2224/48	. . . . .	of an individual wire connector
2224/4596	. . . . .	Iron (Fe) as principal constituent	2224/4801	. . . . .	Structure
2224/45963	. . . . .	the principal constituent melting at a temperature of greater than 1550°C	2224/48011	. . . . .	Length
2224/45964	. . . . .	Palladium (Pd) as principal constituent	2224/4805	. . . . .	Shape
2224/45966	. . . . .	Titanium (Ti) as principal constituent	2224/4807	. . . . .	of bonding interfaces, e.g. interlocking features
2224/45969	. . . . .	Platinum (Pt) as principal constituent	2224/4809	. . . . .	Loop shape
2224/4597	. . . . .	Zirconium (Zr) as principal constituent	2224/48091	. . . . .	Arched
2224/45971	. . . . .	Chromium (Cr) as principal constituent	2224/48092	. . . . .	Helix
2224/45972	. . . . .	Vanadium (V) as principal constituent	2224/48095	. . . . .	Kinked
2224/45973	. . . . .	Rhodium (Rh) as principal constituent			
2224/45976	. . . . .	Ruthenium (Ru) as principal constituent			

2224/48096	. . . . .	the kinked part being in proximity to the bonding area on the semiconductor or solid-state body	2224/48155	. . . . .	the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/48097	. . . . .	the kinked part being in proximity to the bonding area outside the semiconductor or solid-state body	2224/48157	. . . . .	connecting the wire to a bond pad of the item
2224/481	. . . . .	Disposition	2224/48158	. . . . .	the bond pad being disposed in a recess of the surface of the item
2224/48101	. . . . .	Connecting bonding areas at the same height, e.g. horizontal bond	2224/48159	. . . . .	the bond pad protruding from the surface of the item
2224/48105	. . . . .	Connecting bonding areas at different heights	2224/4816	. . . . .	connecting the wire to a pin of the item
2224/48106	. . . . .	the connector being orthogonal to a side surface of the semiconductor or solid-state body, e.g. parallel layout	2224/48163	. . . . .	connecting the wire to a potential ring of the item
2224/48108	. . . . .	the connector not being orthogonal to a side surface of the semiconductor or solid-state body, e.g. fanned-out connectors, radial layout	2224/48165	. . . . .	connecting the wire to a via metallisation of the item
2224/4811	. . . . .	Connecting to a bonding area of the semiconductor or solid-state body located at the far end of the body with respect to the bonding area outside the semiconductor or solid-state body	2224/48175	. . . . .	the item being metallic
2224/48111	. . . . .	the wire connector extending above another semiconductor or solid-state body	2224/48177	. . . . .	connecting the wire to a bond pad of the item
2224/4813	. . . . .	Connecting within a semiconductor or solid-state body, i.e. fly wire, bridge wire	2224/48178	. . . . .	the bond pad being disposed in a recess of the surface of the item
2224/48132	. . . . .	with an intermediate bond, e.g. continuous wire daisy chain	2224/48179	. . . . .	the bond pad protruding from the surface of the item
2224/48135	. . . . .	Connecting between different semiconductor or solid-state bodies, i.e. chip-to-chip	2224/48183	. . . . .	connecting the wire to a potential ring of the item
2224/48137	. . . . .	the bodies being arranged next to each other, e.g. on a common substrate	2224/48195	. . . . .	the item being a discrete passive component
2224/48138	. . . . .	the wire connector connecting to a bonding area disposed in a recess of the surface	2224/48221	. . . . .	the body and the item being stacked
2224/48139	. . . . .	with an intermediate bond, e.g. continuous wire daisy chain	2224/48225	. . . . .	the item being non-metallic, e.g. insulating substrate with or without metallisation
2224/4814	. . . . .	the wire connector connecting to a bonding area protruding from the surface	2224/48227	. . . . .	connecting the wire to a bond pad of the item
2224/48141	. . . . .	the bodies being arranged on opposite sides of a substrate, e.g. mirror arrangements	2224/48228	. . . . .	the bond pad being disposed in a recess of the surface of the item
2224/48145	. . . . .	the bodies being stacked	2224/48229	. . . . .	the bond pad protruding from the surface of the item
2224/48147	. . . . .	with an intermediate bond, e.g. continuous wire daisy chain	2224/4823	. . . . .	connecting the wire to a pin of the item
2224/48148	. . . . .	the wire connector connecting to a bonding area disposed in a recess of the surface	2224/48233	. . . . .	connecting the wire to a potential ring of the item
2224/48149	. . . . .	the wire connector connecting to a bonding area protruding from the surface	2224/48235	. . . . .	connecting the wire to a via metallisation of the item
2224/48151	. . . . .	Connecting between a semiconductor or solid-state body and an item not being a semiconductor or solid-state body, e.g. chip-to-substrate, chip-to-passive	2224/48237	. . . . .	connecting the wire to a die pad of the item
2224/48153	. . . . .	the body and the item being arranged next to each other, e.g. on a common substrate	2224/4824	. . . . .	Connecting between the body and an opposite side of the item with respect to the body
			2224/48245	. . . . .	the item being metallic
			2224/48247	. . . . .	connecting the wire to a bond pad of the item
			2224/48248	. . . . .	the bond pad being disposed in a recess of the surface of the item
			2224/48249	. . . . .	the bond pad protruding from the surface of the item
			2224/48253	. . . . .	connecting the wire to a potential ring of the item
			2224/48257	. . . . .	connecting the wire to a die pad of the item
			2224/4826	. . . . .	Connecting between the body and an opposite side of the item with respect to the body

2224/48265	. . . . .	the item being a discrete passive component	2224/4849	. . . . .	outside the semiconductor or solid-state body
2224/484	. . . . .	Connecting portions	2224/48491	. . . . .	being an additional member attached to the bonding area through an adhesive or solder, e.g. buffer pad
2224/4845	. . . . .	Details of ball bonds	2224/48496	. . . . .	not being interposed between the wire connector and the bonding area
2224/48451	. . . . .	Shape	2224/48499	. . . . .	Material of the auxiliary connecting means
2224/48453	. . . . .	of the interface with the bonding area	2224/485	. . . . .	Material
2224/48455	. . . . .	Details of wedge bonds	2224/48505	. . . . .	at the bonding interface
2224/48456	. . . . .	Shape	2224/48506	. . . . .	comprising an eutectic alloy
2224/48458	. . . . .	of the interface with the bonding area	2224/48507	. . . . .	comprising an intermetallic compound
2224/4846	. . . . .	with multiple bonds on the same bonding area	2224/4851	. . . . .	Morphology of the connecting portion, e.g. grain size distribution
2224/48463	. . . . .	the connecting portion on the bonding area of the semiconductor or solid-state body being a ball bond	2224/48511	. . . . .	Heat affected zone [HAZ]
2224/48464	. . . . .	the other connecting portion not on the bonding area also being a ball bond, i.e. ball-to-ball	2224/4852	. . . . .	Bonding interface between the connecting portion and the bonding area
2224/48465	. . . . .	the other connecting portion not on the bonding area being a wedge bond, i.e. ball-to-wedge, regular stitch	2224/48599	. . . . .	Principal constituent of the connecting portion of the wire connector being Gold (Au)
2224/4847	. . . . .	the connecting portion on the bonding area of the semiconductor or solid-state body being a wedge bond	2224/486	. . . . .	with a principal constituent of the bonding area being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/48471	. . . . .	the other connecting portion not on the bonding area being a ball bond, i.e. wedge-to-ball, reverse stitch	2224/48601	. . . . .	the principal constituent melting at a temperature of less than 400°C
2224/48472	. . . . .	the other connecting portion not on the bonding area also being a wedge bond, i.e. wedge-to-wedge	2224/48605	. . . . .	Gallium (Ga) as principal constituent
2224/48475	. . . . .	connected to auxiliary connecting means on the bonding areas, e.g. pre-ball, wedge-on-ball, ball-on-ball	2224/48609	. . . . .	Indium (In) as principal constituent
2224/48476	. . . . .	between the wire connector and the bonding area	2224/48611	. . . . .	Tin (Sn) as principal constituent
2224/48477	. . . . .	being a pre-ball (i.e. a ball formed by capillary bonding)	2224/48613	. . . . .	Bismuth (Bi) as principal constituent
2224/48478	. . . . .	the connecting portion being a wedge bond, i.e. wedge on pre-ball	2224/48614	. . . . .	Thallium (Tl) as principal constituent
2224/48479	. . . . .	on the semiconductor or solid-state body	2224/48616	. . . . .	Lead (Pb) as principal constituent
2224/4848	. . . . .	outside the semiconductor or solid-state body	2224/48617	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950 °C
2224/48481	. . . . .	the connecting portion being a ball bond, i.e. ball on pre-ball	2224/48618	. . . . .	Zinc (Zn) as principal constituent
2224/48482	. . . . .	on the semiconductor or solid-state body	2224/4862	. . . . .	Antimony (Sb) as principal constituent
2224/48483	. . . . .	outside the semiconductor or solid-state body	2224/48623	. . . . .	Magnesium (Mg) as principal constituent
2224/48484	. . . . .	being a plurality of pre-balls disposed side-to-side	2224/48624	. . . . .	Aluminium (Al) as principal constituent
2224/48485	. . . . .	the connecting portion being a wedge bond, i.e. wedge on pre-ball	2224/48638	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/48486	. . . . .	on the semiconductor or solid-state body	2224/48639	. . . . .	Silver (Ag) as principal constituent
2224/48487	. . . . .	outside the semiconductor or solid-state body			
2224/48488	. . . . .	the connecting portion being a ball bond, i.e. ball on pre-ball			
2224/48489	. . . . .	on the semiconductor or solid-state body			

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2224/48644 . . . . .	Gold (Au) as principal constituent	2224/48694 . . . . .	with a principal constituent of the bonding area being a liquid not provided for in groups <a href="#">H01L 2224/486</a> - <a href="#">H01L 2224/4869</a>
2224/48647 . . . . .	Copper (Cu) as principal constituent	2224/48698 . . . . .	with a principal constituent of the bonding area being a combination of two or more material regions, i.e. being a hybrid material, e.g. segmented structures, island patterns
2224/48649 . . . . .	Manganese (Mn) as principal constituent	2224/48699 . . . . .	Principal constituent of the connecting portion of the wire connector being Aluminium (Al)
2224/48655 . . . . .	Nickel (Ni) as principal constituent	2224/487 . . . . .	with a principal constituent of the bonding area being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/48657 . . . . .	Cobalt (Co) as principal constituent	2224/48701 . . . . .	the principal constituent melting at a temperature of less than 400°C
2224/4866 . . . . .	Iron (Fe) as principal constituent	2224/48705 . . . . .	Gallium (Ga) as principal constituent
2224/48663 . . . . .	the principal constituent melting at a temperature of greater than 1550°C	2224/48709 . . . . .	Indium (In) as principal constituent
2224/48664 . . . . .	Palladium (Pd) as principal constituent	2224/48711 . . . . .	Tin (Sn) as principal constituent
2224/48666 . . . . .	Titanium (Ti) as principal constituent	2224/48713 . . . . .	Bismuth (Bi) as principal constituent
2224/48669 . . . . .	Platinum (Pt) as principal constituent	2224/48714 . . . . .	Thallium (Tl) as principal constituent
2224/4867 . . . . .	Zirconium (Zr) as principal constituent	2224/48716 . . . . .	Lead (Pb) as principal constituent
2224/48671 . . . . .	Chromium (Cr) as principal constituent	2224/48717 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950 °C
2224/48672 . . . . .	Vanadium (V) as principal constituent	2224/48718 . . . . .	Zinc (Zn) as principal constituent
2224/48673 . . . . .	Rhodium (Rh) as principal constituent	2224/4872 . . . . .	Antimony (Sb) as principal constituent
2224/48678 . . . . .	Iridium (Ir) as principal constituent	2224/48723 . . . . .	Magnesium (Mg) as principal constituent
2224/48679 . . . . .	Niobium (Nb) as principal constituent	2224/48724 . . . . .	Aluminium (Al) as principal constituent
2224/4868 . . . . .	Molybdenum (Mo) as principal constituent	2224/48738 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/48681 . . . . .	Tantalum (Ta) as principal constituent	2224/48739 . . . . .	Silver (Ag) as principal constituent
2224/48683 . . . . .	Rhenium (Re) as principal constituent	2224/48744 . . . . .	Gold (Au) as principal constituent
2224/48684 . . . . .	Tungsten (W) as principal constituent	2224/48747 . . . . .	Copper (Cu) as principal constituent
2224/48686 . . . . .	with a principal constituent of the bonding area being a non metallic, non metalloid inorganic material	2224/48749 . . . . .	Manganese (Mn) as principal constituent
2224/48687 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/48755 . . . . .	Nickel (Ni) as principal constituent
2224/48688 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/48757 . . . . .	Cobalt (Co) as principal constituent
2224/4869 . . . . .	with a principal constituent of the bonding area being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/4876 . . . . .	Iron (Fe) as principal constituent
2224/48691 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene		
2224/48693 . . . . .	with a principal constituent of the bonding area being a solid not provided for in groups <a href="#">H01L 2224/486</a> - <a href="#">H01L 2224/4869</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond		

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2224/48763	the principal constituent melting at a temperature of greater than 1550°C	2224/488	with a principal constituent of the bonding area being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/48764	Palladium (Pd) as principal constituent	2224/48801	the principal constituent melting at a temperature of less than 400°C
2224/48766	Titanium (Ti) as principal constituent	2224/48805	Gallium (Ga) as principal constituent
2224/48769	Platinum (Pt) as principal constituent	2224/48809	Indium (In) as principal constituent
2224/4877	Zirconium (Zr) as principal constituent	2224/48811	Tin (Sn) as principal constituent
2224/48771	Chromium (Cr) as principal constituent	2224/48813	Bismuth (Bi) as principal constituent
2224/48772	Vanadium (V) as principal constituent	2224/48814	Thallium (Tl) as principal constituent
2224/48773	Rhodium (Rh) as principal constituent	2224/48816	Lead (Pb) as principal constituent
2224/48778	Iridium (Ir) as principal constituent	2224/48817	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950 °C
2224/48779	Niobium (Nb) as principal constituent	2224/48818	Zinc (Zn) as principal constituent
2224/4878	Molybdenum (Mo) as principal constituent	2224/4882	Antimony (Sb) as principal constituent
2224/48781	Tantalum (Ta) as principal constituent	2224/48823	Magnesium (Mg) as principal constituent
2224/48783	Rhenium (Re) as principal constituent	2224/48824	Aluminium (Al) as principal constituent
2224/48784	Tungsten (W) as principal constituent	2224/48838	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/48786	with a principal constituent of the bonding area being a non metallic, non metalloid inorganic material	2224/48839	Silver (Ag) as principal constituent
2224/48787	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/48844	Gold (Au) as principal constituent
2224/48788	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/48847	Copper (Cu) as principal constituent
2224/4879	with a principal constituent of the bonding area being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/48849	Manganese (Mn) as principal constituent
2224/48791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/48855	Nickel (Ni) as principal constituent
2224/48793	with a principal constituent of the bonding area being a solid not provided for in groups <a href="#">H01L 2224/487</a> - <a href="#">H01L 2224/4879</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/48857	Cobalt (Co) as principal constituent
2224/48794	with a principal constituent of the bonding area being a liquid not provided for in groups <a href="#">H01L 2224/487</a> - <a href="#">H01L 2224/4879</a>	2224/4886	Iron (Fe) as principal constituent
2224/48798	with a principal constituent of the bonding area being a combination of two or more material regions, i.e. being a hybrid material, e.g. segmented structures, island patterns	2224/48863	the principal constituent melting at a temperature of greater than 1550°C
2224/48799	Principal constituent of the connecting portion of the wire connector being Copper (Cu)	2224/48864	Palladium (Pd) as principal constituent
		2224/48866	Titanium (Ti) as principal constituent
		2224/48869	Platinum (Pt) as principal constituent
		2224/4887	Zirconium (Zr) as principal constituent
		2224/48871	Chromium (Cr) as principal constituent

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2224/48872	. . . . .	Vanadium (V) as principal constituent	2224/49051	. . . . .	Connectors having different shapes
2224/48873	. . . . .	Rhodium (Rh) as principal constituent	2224/49052	. . . . .	Different loop heights
2224/48878	. . . . .	Iridium (Ir) as principal constituent	2224/4909	. . . . .	Loop shape arrangement
2224/48879	. . . . .	Niobium (Nb) as principal constituent	2224/49095	. . . . .	parallel in plane
2224/4888	. . . . .	Molybdenum (Mo) as principal constituent	2224/49096	. . . . .	horizontal
2224/48881	. . . . .	Tantalum (Ta) as principal constituent	2224/49097	. . . . .	vertical
2224/48883	. . . . .	Rhenium (Re) as principal constituent	2224/491	. . . . .	Disposition
2224/48884	. . . . .	Tungsten (W) as principal constituent	2224/49105	. . . . .	Connecting at different heights
2224/48886	. . . . .	with a principal constituent of the bonding area being a non metallic, non metalloid inorganic material	2224/49107	. . . . .	on the semiconductor or solid-state body
2224/48887	. . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/49109	. . . . .	outside the semiconductor or solid-state body
2224/48888	. . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/4911	. . . . .	the connectors being bonded to at least one common bonding area, e.g. daisy chain
2224/4889	. . . . .	with a principal constituent of the bonding area being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/49111	. . . . .	the connectors connecting two common bonding areas, e.g. Litz or braid wires
2224/48891	. . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/49112	. . . . .	the connectors connecting a common bonding area on the semiconductor or solid-state body to different bonding areas outside the body, e.g. diverging wires
2224/48893	. . . . .	with a principal constituent of the bonding area being a solid not provided for in groups <a href="#">H01L 2224/488</a> - <a href="#">H01L 2224/4889</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/49113	. . . . .	the connectors connecting different bonding areas on the semiconductor or solid-state body to a common bonding area outside the body, e.g. converging wires
2224/48894	. . . . .	with a principal constituent of the bonding area being a liquid not provided for in groups <a href="#">H01L 2224/488</a> - <a href="#">H01L 2224/4889</a>	2224/4912	. . . . .	Layout
2224/48898	. . . . .	with a principal constituent of the bonding area being a combination of two or more material regions, i.e. being a hybrid material, e.g. segmented structures, island patterns	2224/4917	. . . . .	Crossed wires
2224/4899	. . . . .	Auxiliary members for wire connectors, e.g. flow-barriers, reinforcing structures, spacers, alignment aids	2224/49171	. . . . .	Fan-out arrangements
2224/48991	. . . . .	being formed on the semiconductor or solid-state body to be connected	2224/49173	. . . . .	Radial fan-out arrangements
2224/48992	. . . . .	Reinforcing structures	2224/49174	. . . . .	Stacked arrangements
2224/48993	. . . . .	Alignment aids	2224/49175	. . . . .	Parallel arrangements
2224/48996	. . . . .	being formed on an item to be connected not being a semiconductor or solid-state body	2224/49176	. . . . .	Wire connectors having the same loop shape and height
2224/48997	. . . . .	Reinforcing structures	2224/49177	. . . . .	Combinations of different arrangements
2224/48998	. . . . .	Alignment aids	2224/49179	. . . . .	Corner adaptations, i.e. disposition of the wire connectors at the corners of the semiconductor or solid-state body
2224/49	. . . . .	of a plurality of wire connectors	2224/4918	. . . . .	being disposed on at least two different sides of the body, e.g. dual array
2224/4901	. . . . .	Structure	2224/494	. . . . .	Connecting portions
2224/4903	. . . . .	Connectors having different sizes, e.g. different diameters	2224/4941	. . . . .	the connecting portions being stacked
2224/4905	. . . . .	Shape	2224/4942	. . . . .	Ball bonds
			2224/49421	. . . . .	on the semiconductor or solid-state body
			2224/49422	. . . . .	outside the semiconductor or solid-state body
			2224/49425	. . . . .	Wedge bonds
			2224/49426	. . . . .	on the semiconductor or solid-state body
			2224/49427	. . . . .	outside the semiconductor or solid-state body
			2224/49429	. . . . .	Wedge and ball bonds
			2224/4943	. . . . .	the connecting portions being staggered
			2224/49431	. . . . .	on the semiconductor or solid-state body
			2224/49433	. . . . .	outside the semiconductor or solid-state body

- 2224/4945 . . . . . Wire connectors having connecting portions of different types on the semiconductor or solid-state body, e.g. regular and reverse stitches
- 2224/495 . . . . . Material
- 2224/49505 . . . . . Connectors having different materials
- 2224/50 . . . . . Tape automated bonding [TAB] connectors, i.e. film carriers; Manufacturing methods related thereto
- 2224/63 . . . . . Connectors not provided for in any of the groups [H01L 2224/10](#) - [H01L 2224/50](#) and subgroups; Manufacturing methods related thereto
- 2224/64 . . . . . Manufacturing methods
- 2224/65 . . . . . Structure, shape, material or disposition of the connectors prior to the connecting process
- 2224/66 . . . . . of an individual connector
- 2224/67 . . . . . of a plurality of connectors
- 2224/68 . . . . . Structure, shape, material or disposition of the connectors after the connecting process
- 2224/69 . . . . . of an individual connector
- 2224/70 . . . . . of a plurality of connectors
- 2224/71 . . . . . Means for bonding not being attached to, or not being formed on, the surface to be connected
- 2224/72 . . . . . Detachable connecting means consisting of mechanical auxiliary parts connecting the device, e.g. pressure contacts using springs or clips
- 2224/73 . . . . . Means for bonding being of different types provided for in two or more of groups [H01L 2224/10](#), [H01L 2224/18](#), [H01L 2224/26](#), [H01L 2224/34](#), [H01L 2224/42](#), [H01L 2224/50](#), [H01L 2224/63](#), [H01L 2224/71](#)
- 2224/731 . . . . . Location prior to the connecting process
- 2224/73101 . . . . . on the same surface
- 2224/73103 . . . . . Bump and layer connectors
- 2224/73104 . . . . . the bump connector being embedded into the layer connector
- 2224/73151 . . . . . on different surfaces
- 2224/73153 . . . . . Bump and layer connectors
- 2224/732 . . . . . Location after the connecting process
- 2224/73201 . . . . . on the same surface
- 2224/73203 . . . . . Bump and layer connectors
- 2224/73204 . . . . . the bump connector being embedded into the layer connector
- 2224/73205 . . . . . Bump and strap connectors
- 2224/73207 . . . . . Bump and wire connectors
- 2224/73209 . . . . . Bump and HDI connectors
- 2224/73211 . . . . . Bump and TAB connectors
- 2224/73213 . . . . . Layer and strap connectors
- 2224/73215 . . . . . Layer and wire connectors
- 2224/73217 . . . . . Layer and HDI connectors
- 2224/73219 . . . . . Layer and TAB connectors
- 2224/73221 . . . . . Strap and wire connectors
- 2224/73223 . . . . . Strap and HDI connectors
- 2224/73225 . . . . . Strap and TAB connectors
- 2224/73227 . . . . . Wire and HDI connectors
- 2224/73229 . . . . . Wire and TAB connectors
- 2224/73231 . . . . . HDI and TAB connectors
- 2224/73251 . . . . . on different surfaces
- 2224/73253 . . . . . Bump and layer connectors
- 2224/73255 . . . . . Bump and strap connectors
- 2224/73257 . . . . . Bump and wire connectors
- 2224/73259 . . . . . Bump and HDI connectors
- 2224/73261 . . . . . Bump and TAB connectors
- 2224/73263 . . . . . Layer and strap connectors
- 2224/73265 . . . . . Layer and wire connectors
- 2224/73267 . . . . . Layer and HDI connectors
- 2224/73269 . . . . . Layer and TAB connectors
- 2224/73271 . . . . . Strap and wire connectors
- 2224/73273 . . . . . Strap and HDI connectors
- 2224/73275 . . . . . Strap and TAB connectors
- 2224/73277 . . . . . Wire and HDI connectors
- 2224/73279 . . . . . Wire and TAB connectors
- 2224/73281 . . . . . HDI and TAB connectors
- 2224/74 . . . . . Apparatus for manufacturing arrangements for connecting or disconnecting semiconductor or solid-state bodies and for methods related thereto
- 2224/741 . . . . . Apparatus for manufacturing means for bonding, e.g. connectors
- 2224/742 . . . . . Apparatus for manufacturing bump connectors
- 2224/743 . . . . . Apparatus for manufacturing layer connectors
- 2224/744 . . . . . Apparatus for manufacturing strap connectors
- 2224/745 . . . . . Apparatus for manufacturing wire connectors
- 2224/749 . . . . . Tools for reworking, e.g. for shaping
- 2224/75 . . . . . Apparatus for connecting with bump connectors or layer connectors
- 2224/75001 . . . . . Calibration means
- 2224/7501 . . . . . Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma
- 2224/751 . . . . . Means for controlling the bonding environment, e.g. valves, vacuum pumps
- 2224/75101 . . . . . Chamber
- 2224/75102 . . . . . Vacuum chamber
- 2224/7511 . . . . . High pressure chamber
- 2224/7515 . . . . . Means for applying permanent coating, e.g. in-situ coating
- 2224/75151 . . . . . Means for direct writing
- 2224/75152 . . . . . Syringe
- 2224/75153 . . . . . integrated into the bonding head
- 2224/75155 . . . . . Jetting means, e.g. ink jet
- 2224/75158 . . . . . including a laser
- 2224/75161 . . . . . Means for screen printing, e.g. roller, squeegee, screen stencil
- 2224/7517 . . . . . Means for applying a preform, e.g. laminator
- 2224/75171 . . . . . including a vacuum-bag
- 2224/7518 . . . . . Means for blanket deposition
- 2224/75181 . . . . . for spin coating, i.e. spin coater
- 2224/75182 . . . . . for curtain coating
- 2224/75183 . . . . . for immersion coating, i.e. bath
- 2224/75184 . . . . . for spray coating, i.e. nozzle
- 2224/75185 . . . . . Means for physical vapour deposition [PVD], e.g. evaporation, sputtering
- 2224/75186 . . . . . Means for sputtering, e.g. target
- 2224/75187 . . . . . Means for evaporation
- 2224/75188 . . . . . Means for chemical vapour deposition [CVD], e.g. for laser CVD
- 2224/75189 . . . . . Means for plating, e.g. for electroplating, electroless plating
- 2224/752 . . . . . Protection means against electrical discharge
- 2224/7525 . . . . . Means for applying energy, e.g. heating means
- 2224/75251 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/75252 . . . . . in the upper part of the bonding apparatus, e.g. in the bonding head
- 2224/75253 . . . . . adapted for localised heating

2224/7526	. . . .	Polychromatic heating lamp	2224/75501	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75261	. . . .	Laser	2224/75502	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75262	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/7555	. . . .	Mechanical means, e.g. for planarising, pressing, stamping
2224/75263	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head	2224/756	. . . .	Means for supplying the connector to be connected in the bonding apparatus
2224/75264	. . . .	by induction heating, i.e. coils	2224/75601	. . . .	Storing means
2224/75265	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75611	. . . .	Feeding means
2224/75266	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head	2224/75621	. . . .	Holding means
2224/75267	. . . .	Flame torch, e.g. hydrogen torch	2224/7565	. . . .	Means for transporting the components to be connected
2224/75268	. . . .	Discharge electrode	2224/75651	. . . .	Belt conveyor
2224/75269	. . . .	Shape of the discharge electrode	2224/75652	. . . .	Chain conveyor
2224/7527	. . . .	Material of the discharge electrode	2224/75653	. . . .	Vibrating conveyor
2224/75271	. . . .	Circuitry of the discharge electrode	2224/75654	. . . .	Pneumatic conveyor
2224/75272	. . . .	Oven	2224/75655	. . . .	in a fluid
2224/7528	. . . .	Resistance welding electrodes, i.e. for ohmic heating	2224/757	. . . .	Means for aligning
2224/75281	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75701	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75282	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head	2224/75702	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75283	. . . .	by infrared heating, e.g. infrared heating lamp	2224/75703	. . . .	Mechanical holding means
2224/753	. . . .	by means of pressure	2224/75704	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75301	. . . .	Bonding head	2224/75705	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75302	. . . .	Shape	2224/75723	. . . .	Electrostatic holding means
2224/75303	. . . .	of the pressing surface	2224/75724	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75304	. . . .	being curved	2224/75725	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75305	. . . .	comprising protrusions	2224/75733	. . . .	Magnetic holding means
2224/7531	. . . .	of other parts	2224/75734	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75312	. . . .	Material	2224/75735	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75313	. . . .	Removable bonding head	2224/75743	. . . .	Suction holding means
2224/75314	. . . .	Auxiliary members on the pressing surface	2224/75744	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/75315	. . . .	Elastomer inlay	2224/75745	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75316	. . . .	with retaining mechanisms	2224/75753	. . . .	Means for optical alignment, e.g. sensors
2224/75317	. . . .	Removable auxiliary member	2224/75754	. . . .	Guiding structures
2224/75318	. . . .	Shape of the auxiliary member	2224/75755	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/7532	. . . .	Material of the auxiliary member	2224/75756	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head
2224/75343	. . . .	by ultrasonic vibrations	2224/758	. . . .	Means for moving parts
2224/75344	. . . .	Eccentric cams	2224/75801	. . . .	Lower part of the bonding apparatus, e.g. XY table
2224/75345	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75802	. . . .	Rotational mechanism
2224/75346	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head	2224/75803	. . . .	Pivoting mechanism
2224/75347	. . . .	Piezoelectric transducers	2224/75804	. . . .	Translational mechanism
2224/75348	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75821	. . . .	Upper part of the bonding apparatus, i.e. bonding head
2224/75349	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head	2224/75822	. . . .	Rotational mechanism
2224/7535	. . . .	Stable and mobile yokes	2224/75823	. . . .	Pivoting mechanism
2224/75351	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75824	. . . .	Translational mechanism
2224/75352	. . . .	in the upper part of the bonding apparatus, e.g. in the bonding head	2224/75841	. . . .	of the bonding head
2224/75353	. . . .	Ultrasonic horns	2224/75842	. . . .	Rotational mechanism
2224/75354	. . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/75843	. . . .	Pivoting mechanism
2224/75355	. . . .	Design, e.g. of the wave guide			
2224/755	. . . .	Cooling means			

- 2224/759 . . . Means for monitoring the connection process
- 2224/75901 . . . . using a computer, e.g. fully- or semi-automatic bonding
- 2224/7592 . . . . Load or pressure adjusting means, e.g. sensors
- 2224/75925 . . . . Vibration adjusting means, e.g. sensors
- 2224/7595 . . . Means for forming additional members
- 2224/7598 . . . specially adapted for batch processes
- 2224/75981 . . . Apparatus chuck
- 2224/75982 . . . . Shape
- 2224/75983 . . . . . of the mounting surface
- 2224/75984 . . . . . of other portions
- 2224/75985 . . . . Material
- 2224/75986 . . . . Auxiliary members on the pressing surface
- 2224/75987 . . . . . Shape of the auxiliary member
- 2224/75988 . . . . . Material of the auxiliary member
- 2224/76 . . Apparatus for connecting with build-up interconnects
- 2224/76001 . . . Calibration means
- 2224/7601 . . . Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma
- 2224/761 . . . Means for controlling the bonding environment, e.g. valves, vacuum pumps
- 2224/76101 . . . . Chamber
- 2224/76102 . . . . . Vacuum chamber
- 2224/7611 . . . . . High pressure chamber
- 2224/7615 . . . Means for depositing
- 2224/76151 . . . . Means for direct writing
- 2224/76152 . . . . . Syringe
- 2224/76155 . . . . . Jetting means, e.g. ink jet
- 2224/76158 . . . . . including a laser
- 2224/76161 . . . . Means for screen printing, e.g. roller, squeegee, screen stencil
- 2224/7617 . . . . Means for applying a preform, e.g. laminator
- 2224/76171 . . . . . including a vacuum-bag
- 2224/7618 . . . . Means for blanket deposition
- 2224/76181 . . . . . for spin coating, i.e. spin coater
- 2224/76182 . . . . . for curtain coating
- 2224/76183 . . . . . for immersion coating, i.e. bath
- 2224/76184 . . . . . for spray coating, i.e. nozzle
- 2224/76185 . . . . . Means for physical vapour deposition [PVD]
- 2224/76186 . . . . . Means for sputtering, e.g. target
- 2224/76187 . . . . . Means for evaporation
- 2224/76188 . . . . . Means for chemical vapour deposition [CVD], e.g. for laser CVD
- 2224/76189 . . . . . Means for plating, e.g. for electroplating, electroless plating
- 2224/762 . . . Protection means against electrical discharge
- 2224/7625 . . . Means for applying energy, e.g. heating means
- 2224/76251 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76252 . . . . . in the upper part of the bonding apparatus
- 2224/76253 . . . . . adapted for localised heating
- 2224/7626 . . . . Polychromatic heating lamp
- 2224/76261 . . . . . Laser
- 2224/76262 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76263 . . . . . in the upper part of the bonding apparatus
- 2224/76264 . . . . . by induction heating, i.e. coils
- 2224/76265 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76266 . . . . . in the upper part of the bonding apparatus
- 2224/76267 . . . . . Flame torch, e.g. hydrogen torch
- 2224/76268 . . . . . Discharge electrode
- 2224/76269 . . . . . Shape of the discharge electrode
- 2224/7627 . . . . . Material of the discharge electrode
- 2224/76271 . . . . . Circuitry of the discharge electrode
- 2224/76272 . . . . . Oven
- 2224/7628 . . . . . Resistance welding electrodes, i.e. for ohmic heating
- 2224/76281 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76282 . . . . . in the upper part of the bonding apparatus
- 2224/76283 . . . . . by infrared heating, e.g. infrared heating lamp
- 2224/763 . . . . . by means of pressure
- 2224/76301 . . . . . Pressing head
- 2224/76302 . . . . . . Shape
- 2224/76303 . . . . . . . of the pressing surface
- 2224/76304 . . . . . . . . being curved
- 2224/76305 . . . . . . . . comprising protrusions
- 2224/7631 . . . . . . . of other parts
- 2224/76312 . . . . . . . Material
- 2224/76313 . . . . . . . Removable pressing head
- 2224/76314 . . . . . . . Auxiliary members on the pressing surface
- 2224/76315 . . . . . . . Elastomer inlay
- 2224/76316 . . . . . . . with retaining mechanisms
- 2224/76317 . . . . . . . Removable auxiliary member
- 2224/76318 . . . . . . . Shape of the auxiliary member
- 2224/7632 . . . . . . . Material of the auxiliary member
- 2224/76343 . . . . . . . by ultrasonic vibrations
- 2224/76344 . . . . . . . Eccentric cams
- 2224/76345 . . . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76346 . . . . . . . in the upper part of the bonding apparatus
- 2224/76347 . . . . . . . Piezoelectric transducers
- 2224/76348 . . . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76349 . . . . . . . in the upper part of the bonding apparatus
- 2224/7635 . . . . . . . Stable and mobile yokes
- 2224/76351 . . . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76352 . . . . . . . in the upper part of the bonding apparatus
- 2224/76353 . . . . . . . Ultrasonic horns
- 2224/76354 . . . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76355 . . . . . . . Design, e.g. of the wave guide
- 2224/765 . . . Cooling means
- 2224/76501 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76502 . . . . . in the upper part of the bonding apparatus
- 2224/7655 . . . Mechanical means, e.g. for planarising, pressing, stamping
- 2224/76552 . . . . . for drilling
- 2224/76554 . . . . . for abrasive blasting, e.g. sand blasting, wet blasting, hydro-blasting, dry ice blasting
- 2224/766 . . . Means for supplying the material of the interconnect

- 2224/76601 . . . . Storing means
- 2224/76611 . . . . Feeding means
- 2224/76621 . . . . Holding means
- 2224/7665 . . . Means for transporting the components to be connected
- 2224/76651 . . . . Belt conveyor
- 2224/76652 . . . . Chain conveyor
- 2224/76653 . . . . Vibrating conveyor
- 2224/76654 . . . . Pneumatic conveyor
- 2224/76655 . . . . in a fluid
- 2224/767 . . . Means for aligning
- 2224/76701 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76702 . . . . in the upper part of the bonding apparatus
- 2224/76703 . . . . Mechanical holding means
- 2224/76704 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76705 . . . . . in the upper part of the bonding apparatus
- 2224/76723 . . . . Electrostatic holding means
- 2224/76724 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76725 . . . . . in the upper part of the bonding apparatus
- 2224/76733 . . . . Magnetic holding means
- 2224/76734 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76735 . . . . . in the upper part of the bonding apparatus
- 2224/76743 . . . . Suction holding means
- 2224/76744 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76745 . . . . . in the upper part of the bonding apparatus
- 2224/76753 . . . . Means for optical alignment, e.g. sensors
- 2224/76754 . . . . Guiding structures
- 2224/76755 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/76756 . . . . . in the upper part of the bonding apparatus
- 2224/768 . . . Means for moving parts
- 2224/76801 . . . . Lower part of the bonding apparatus, e.g. XY table
- 2224/76802 . . . . . Rotational mechanism
- 2224/76803 . . . . . Pivoting mechanism
- 2224/76804 . . . . . Translational mechanism
- 2224/76821 . . . . Upper part of the bonding apparatus, i.e. bonding head
- 2224/76822 . . . . . Rotational mechanism
- 2224/76823 . . . . . Pivoting mechanism
- 2224/76824 . . . . . Translational mechanism
- 2224/76841 . . . . of the bonding head
- 2224/76842 . . . . . Rotational mechanism
- 2224/76843 . . . . . Pivoting mechanism
- 2224/769 . . . Means for monitoring the connection process
- 2224/76901 . . . . using a computer, e.g. fully- or semi-automatic bonding
- 2224/7692 . . . . Load or pressure adjusting means, e.g. sensors
- 2224/76925 . . . . Vibration adjusting means, e.g. sensors
- 2224/7695 . . . Means for forming additional members
- 2224/7698 . . . specially adapted for batch processes
- 2224/76981 . . . Apparatus chuck
- 2224/76982 . . . . Shape
- 2224/76983 . . . . . of the mounting surface
- 2224/76984 . . . . . of other portions
- 2224/76985 . . . . Material
- 2224/76986 . . . . Auxiliary members on the pressing surface
- 2224/76987 . . . . . Shape of the auxiliary member
- 2224/76988 . . . . . Material of the auxiliary member
- 2224/77 . . . Apparatus for connecting with strap connectors
- 2224/77001 . . . Calibration means
- 2224/7701 . . . Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma
- 2224/771 . . . Means for controlling the bonding environment, e.g. valves, vacuum pumps
- 2224/77101 . . . . Chamber
- 2224/77102 . . . . . Vacuum chamber
- 2224/7711 . . . . . High pressure chamber
- 2224/7715 . . . Means for applying permanent coating, e.g. in-situ coating
- 2224/77151 . . . . Means for direct writing
- 2224/77152 . . . . . Syringe
- 2224/77153 . . . . . integrated into the capillary or wedge
- 2224/77155 . . . . . Jetting means, e.g. ink jet
- 2224/77158 . . . . . including a laser
- 2224/77161 . . . . Means for screen printing, e.g. roller, squeegee, screen stencil
- 2224/7717 . . . . Means for applying a preform, e.g. laminator
- 2224/77171 . . . . . including a vacuum-bag
- 2224/7718 . . . . Means for blanket deposition
- 2224/77181 . . . . . for spin coating, i.e. spin coater
- 2224/77182 . . . . . for curtain coating
- 2224/77183 . . . . . for immersion coating, i.e. bath
- 2224/77184 . . . . . for spray coating, i.e. nozzle
- 2224/77185 . . . . . Means for physical vapour deposition [PVD], e.g. evaporation, sputtering
- 2224/77186 . . . . . Means for sputtering, e.g. target
- 2224/77187 . . . . . Means for evaporation
- 2224/77188 . . . . . Means for chemical vapour deposition [CVD], e.g. for laser CVD
- 2224/77189 . . . . . Means for plating, e.g. for electroplating, electroless plating
- 2224/772 . . . Protection means against electrical discharge
- 2224/7725 . . . Means for applying energy, e.g. heating means
- 2224/77251 . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77252 . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77253 . . . . adapted for localised heating
- 2224/7726 . . . . Polychromatic heating lamp
- 2224/77261 . . . . Laser
- 2224/77262 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77263 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77264 . . . . by induction heating, i.e. coils
- 2224/77265 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77266 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77267 . . . . Flame torch, e.g. hydrogen torch
- 2224/77268 . . . . Discharge electrode
- 2224/77269 . . . . . Shape of the discharge electrode
- 2224/7727 . . . . . Material of the discharge electrode
- 2224/77271 . . . . . Circuitry of the discharge electrode
- 2224/77272 . . . . Oven

- 2224/7728 . . . . Resistance welding electrodes, i.e. for ohmic heating
- 2224/77281 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77282 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77283 . . . . . by infrared heating, e.g. infrared heating lamp
- 2224/773 . . . . . by means of pressure
- 2224/77313 . . . . . Wedge
- 2224/77314 . . . . . Shape
- 2224/77315 . . . . . of the pressing surface, e.g. tip or head
- 2224/77316 . . . . . comprising protrusions
- 2224/77317 . . . . . of other portions
- 2224/77318 . . . . . inside the capillary
- 2224/77319 . . . . . outside the capillary
- 2224/7732 . . . . . Removable wedge
- 2224/77321 . . . . . Material
- 2224/77325 . . . . . Auxiliary members on the pressing surface
- 2224/77326 . . . . . Removable auxiliary member
- 2224/77327 . . . . . Shape of the auxiliary member
- 2224/77328 . . . . . Material of the auxiliary member
- 2224/77343 . . . . . by ultrasonic vibrations
- 2224/77344 . . . . . Eccentric cams
- 2224/77345 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77346 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77347 . . . . . Piezoelectric transducers
- 2224/77348 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77349 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/7735 . . . . . Stable and mobile yokes
- 2224/77351 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77352 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77353 . . . . . Ultrasonic horns
- 2224/77354 . . . . . in the lower part of the bonding apparatus, e.g. in the mounting chuck
- 2224/77355 . . . . . Design, e.g. of the wave guide
- 2224/775 . . . . Cooling means
- 2224/77501 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77502 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/7755 . . . . Mechanical means, e.g. for severing, pressing, stamping
- 2224/776 . . . . Means for supplying the connector to be connected in the bonding apparatus
- 2224/77601 . . . . Storing means
- 2224/77611 . . . . Feeding means
- 2224/77621 . . . . Holding means, e.g. wire clampers
- 2224/77631 . . . . Means for wire tension adjustments
- 2224/7765 . . . . Means for transporting the components to be connected
- 2224/77651 . . . . Belt conveyor
- 2224/77652 . . . . Chain conveyor
- 2224/77653 . . . . Vibrating conveyor
- 2224/77654 . . . . Pneumatic conveyor
- 2224/77655 . . . . . in a fluid
- 2224/777 . . . . Means for aligning
- 2224/77701 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77702 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77703 . . . . . Mechanical holding means
- 2224/77704 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77705 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77723 . . . . . Electrostatic holding means
- 2224/77724 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77725 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77733 . . . . . Magnetic holding means
- 2224/77734 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77735 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77743 . . . . . Suction holding means
- 2224/77744 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77745 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/77753 . . . . . Means for optical alignment, e.g. sensors
- 2224/77754 . . . . . Guiding structures
- 2224/77755 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/77756 . . . . . in the upper part of the bonding apparatus, e.g. in the wedge
- 2224/778 . . . . Means for moving parts
- 2224/77801 . . . . . Lower part of the bonding apparatus, e.g. XY table
- 2224/77802 . . . . . Rotational mechanism
- 2224/77803 . . . . . Pivoting mechanism
- 2224/77804 . . . . . Translational mechanism
- 2224/77821 . . . . . Upper part of the bonding apparatus, i.e. bonding head, e.g. capillary or wedge
- 2224/77822 . . . . . Rotational mechanism
- 2224/77823 . . . . . Pivoting mechanism
- 2224/77824 . . . . . Translational mechanism
- 2224/77841 . . . . . of the pressing portion, e.g. tip or head
- 2224/77842 . . . . . Rotational mechanism
- 2224/77843 . . . . . Pivoting mechanism
- 2224/779 . . . . Means for monitoring the connection process
- 2224/77901 . . . . . using a computer, e.g. fully- or semi-automatic bonding
- 2224/7792 . . . . . Load or pressure adjusting means, e.g. sensors
- 2224/77925 . . . . . Vibration adjusting means, e.g. sensors
- 2224/7795 . . . . Means for forming additional members
- 2224/7798 . . . . specially adapted for batch processes
- 2224/77981 . . . . Apparatus chuck
- 2224/77982 . . . . Shape
- 2224/77983 . . . . . of the mounting surface
- 2224/77984 . . . . . of other portions
- 2224/77985 . . . . . Material
- 2224/77986 . . . . . Auxiliary members on the pressing surface
- 2224/77987 . . . . . Shape of the auxiliary member
- 2224/77988 . . . . . Material of the auxiliary member
- 2224/78 . . . . Apparatus for connecting with wire connectors

2224/78001	. . .	Calibration means	2224/78316	. . . . .	comprising protrusions
2224/7801	. . .	Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma	2224/78317	. . . . .	of other portions
2224/781	. . .	Means for controlling the bonding environment, e.g. valves, vacuum pumps	2224/78318	. . . . .	inside the capillary
2224/78101	. . . .	Chamber	2224/78319	. . . . .	outside the capillary
2224/78102	. . . . .	Vacuum chamber	2224/7832	. . . . .	Removable wedge
2224/7811	. . . . .	High pressure chamber	2224/78321	. . . . .	Material
2224/7815	. . .	Means for applying permanent coating, e.g. in-situ coating	2224/78325	. . . . .	Auxiliary members on the pressing surface
2224/782	. . .	Protection means against electrical discharge	2224/78326	. . . . .	Removable auxiliary member
2224/7825	. . .	Means for applying energy, e.g. heating means	2224/78327	. . . . .	Shape of the auxiliary member
2224/78251	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/78328	. . . . .	Material of the auxiliary member
2224/78252	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/78343	. . . . .	by ultrasonic vibrations
2224/78253	. . . . .	adapted for localised heating	2224/78344	. . . . .	Eccentric cams
2224/7826	. . . . .	Polychromatic heating lamp	2224/78345	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78261	. . . . .	Laser	2224/78346	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78262	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/78347	. . . . .	Piezoelectric transducers
2224/78263	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/78348	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78264	. . . . .	by induction heating, i.e. coils	2224/78349	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78265	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/7835	. . . . .	Stable and mobile yokes
2224/78266	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/78351	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78267	. . . . .	Flame torch, e.g. hydrogen torch	2224/78352	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78268	. . . . .	Discharge electrode	2224/78353	. . . . .	Ultrasonic horns
2224/78269	. . . . .	Shape of the discharge electrode	2224/78354	. . . . .	in the lower part of the bonding apparatus, e.g. in the mounting chuck
2224/7827	. . . . .	Material of the discharge electrode	2224/78355	. . . . .	Design, e.g. of the wave guide
2224/78271	. . . . .	Circuitry of the discharge electrode	2224/785	. . . . .	Cooling means
2224/78272	. . . . .	Oven	2224/78501	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/7828	. . . . .	Resistance welding electrodes, i.e. for ohmic heating	2224/78502	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78281	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/7855	. . . . .	Mechanical means, e.g. for severing, pressing, stamping
2224/78282	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/786	. . . . .	Means for supplying the connector to be connected in the bonding apparatus
2224/78283	. . . . .	by infrared heating, e.g. infrared heating lamp	2224/78601	. . . . .	Storing means
2224/783	. . . . .	by means of pressure	2224/78611	. . . . .	Feeding means
2224/78301	. . . . .	Capillary	2224/78621	. . . . .	Holding means, e.g. wire clampers
2224/78302	. . . . .	Shape	2224/78631	. . . . .	Means for wire tension adjustments
2224/78303	. . . . .	of the pressing surface, e.g. tip or head	2224/7865	. . . . .	Means for transporting the components to be connected
2224/78304	. . . . .	comprising protrusions	2224/78651	. . . . .	Belt conveyor
2224/78305	. . . . .	of other portions	2224/78652	. . . . .	Chain conveyor
2224/78306	. . . . .	inside the capillary	2224/78653	. . . . .	Vibrating conveyor
2224/78307	. . . . .	outside the capillary	2224/78654	. . . . .	Pneumatic conveyor
2224/78308	. . . . .	Removable capillary	2224/78655	. . . . .	in a fluid
2224/78309	. . . . .	Material	2224/787	. . . . .	Means for aligning
2224/7831	. . . . .	Auxiliary members on the pressing surface	2224/78701	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78311	. . . . .	Removable auxiliary member	2224/78702	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge
2224/78312	. . . . .	Shape of the auxiliary member	2224/78703	. . . . .	Mechanical holding means
2224/78313	. . . . .	Wedge	2224/78704	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78314	. . . . .	Shape			
2224/78315	. . . . .	of the pressing surface, e.g. tip or head			

2224/78705	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/7911	. . . . .	High pressure chamber
2224/78723	. . . . .	Electrostatic holding means	2224/7915	. . . . .	Means for applying permanent coating
2224/78724	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79151	. . . . .	Means for direct writing
2224/78725	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/79152	. . . . .	Syringe
2224/78733	. . . . .	Magnetic holding means	2224/79153	. . . . .	integrated into the pressing head
2224/78734	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79155	. . . . .	Jetting means, e.g. ink jet
2224/78735	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/79158	. . . . .	including a laser
2224/78743	. . . . .	Suction holding means	2224/79161	. . . . .	Means for screen printing, e.g. roller, squeegee, screen stencil
2224/78744	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/7917	. . . . .	Means for applying a preform, e.g. laminator
2224/78745	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/79171	. . . . .	including a vacuum-bag
2224/78753	. . . . .	Means for optical alignment, e.g. sensors	2224/7918	. . . . .	Means for blanket deposition
2224/78754	. . . . .	Guiding structures	2224/79181	. . . . .	for spin coating, i.e. spin coater
2224/78755	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck	2224/79182	. . . . .	for curtain coating
2224/78756	. . . . .	in the upper part of the bonding apparatus, e.g. in the capillary or wedge	2224/79183	. . . . .	for immersion coating, i.e. bath
2224/788	. . . . .	Means for moving parts	2224/79184	. . . . .	for spray coating, i.e. nozzle
2224/78801	. . . . .	Lower part of the bonding apparatus, e.g. XY table	2224/79185	. . . . .	Means for physical vapour deposition [PVD], e.g. evaporation, sputtering
2224/78802	. . . . .	Rotational mechanism	2224/79186	. . . . .	Means for sputtering, e.g. target
2224/78803	. . . . .	Pivoting mechanism	2224/79187	. . . . .	Means for evaporation
2224/78804	. . . . .	Translational mechanism	2224/79188	. . . . .	Means for chemical vapour deposition [CVD], e.g. for laser CVD
2224/78821	. . . . .	Upper part of the bonding apparatus, i.e. bonding head, e.g. capillary or wedge	2224/79189	. . . . .	Means for plating, e.g. for electroplating, electroless plating
2224/78822	. . . . .	Rotational mechanism	2224/792	. . . . .	Protection means against electrical discharge
2224/78823	. . . . .	Pivoting mechanism	2224/7925	. . . . .	Means for applying energy, e.g. heating means
2224/78824	. . . . .	Translational mechanism	2224/79251	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/78841	. . . . .	of the pressing portion, e.g. tip or head	2224/79252	. . . . .	in the upper part of the bonding apparatus, e.g. in the pressing head
2224/78842	. . . . .	Rotational mechanism	2224/79253	. . . . .	adapted for localised heating
2224/78843	. . . . .	Pivoting mechanism	2224/7926	. . . . .	Polychromatic heating lamp
2224/789	. . . . .	Means for monitoring the connection process	2224/79261	. . . . .	Laser
2224/78901	. . . . .	using a computer, e.g. fully- or semi-automatic bonding	2224/79262	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/7892	. . . . .	Load or pressure adjusting means, e.g. sensors	2224/79263	. . . . .	in the upper part of the bonding apparatus, e.g. in the pressing head
2224/78925	. . . . .	Vibration adjusting means, e.g. sensors	2224/79264	. . . . .	by induction heating, i.e. coils
2224/7895	. . . . .	Means for forming additional members	2224/79265	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/7898	. . . . .	specially adapted for batch processes	2224/79266	. . . . .	in the upper part of the bonding apparatus, e.g. in the pressing head
2224/78981	. . . . .	Apparatus chuck	2224/79267	. . . . .	Flame torch, e.g. hydrogen torch
2224/78982	. . . . .	Shape	2224/79268	. . . . .	Discharge electrode
2224/78983	. . . . .	of the mounting surface	2224/79269	. . . . .	Shape of the discharge electrode
2224/78984	. . . . .	of other portions	2224/7927	. . . . .	Material of the discharge electrode
2224/78985	. . . . .	Material	2224/79271	. . . . .	Circuitry of the discharge electrode
2224/78986	. . . . .	Auxiliary members on the pressing surface	2224/79272	. . . . .	Oven
2224/78987	. . . . .	Shape of the auxiliary member	2224/7928	. . . . .	Resistance welding electrodes, i.e. for ohmic heating
2224/78988	. . . . .	Material of the auxiliary member	2224/79281	. . . . .	in the lower part of the bonding apparatus, e.g. in the apparatus chuck
2224/79	. . . . .	Apparatus for Tape Automated Bonding [TAB]	2224/79282	. . . . .	in the upper part of the bonding apparatus, e.g. in the pressing head
2224/79001	. . . . .	Calibration means	2224/79283	. . . . .	by infrared heating, e.g. infrared heating lamp
2224/7901	. . . . .	Means for cleaning, e.g. brushes, for hydro blasting, for ultrasonic cleaning, for dry ice blasting, using gas-flow, by etching, by applying flux or plasma	2224/793	. . . . .	by means of pressure
2224/791	. . . . .	Means for controlling the bonding environment, e.g. valves, vacuum pumps	2224/79301	. . . . .	Pressing head
2224/79101	. . . . .	Chamber	2224/79302	. . . . .	Shape
2224/79102	. . . . .	Vacuum chamber	2224/79303	. . . . .	of the pressing surface
			2224/79304	. . . . .	being curved
			2224/79305	. . . . .	comprising protrusions

- 2224/7931 . . . . . of other parts
- 2224/79312 . . . . . Material
- 2224/79313 . . . . . Removable pressing head
- 2224/79314 . . . . . Auxiliary members on the pressing surface
- 2224/79315 . . . . . Elastomer inlay
- 2224/79316 . . . . . with retaining mechanisms
- 2224/79317 . . . . . Removable auxiliary member
- 2224/79318 . . . . . Shape of the auxiliary member
- 2224/7932 . . . . . Material of the auxiliary member
- 2224/79343 . . . . . by ultrasonic vibrations
- 2224/79344 . . . . . Eccentric cams
- 2224/79345 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79346 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
- 2224/79347 . . . . . Piezoelectric transducers
- 2224/79348 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79349 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
- 2224/7935 . . . . . Stable and mobile yokes
- 2224/79351 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79352 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
- 2224/79353 . . . . . Ultrasonic horns
- 2224/79354 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79355 . . . . . Design, e.g. of the wave guide
- 2224/795 . . . . . Cooling means
- 2224/79501 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79502 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
- 2224/7955 . . . . . Mechanical means, e.g. for pressing, stamping
- 2224/796 . . . . . Means for supplying the connector to be connected in the bonding apparatus
- 2224/79601 . . . . . Storing means
- 2224/79611 . . . . . Feeding means
- 2224/79621 . . . . . Holding means
- 2224/7965 . . . . . Means for transporting the components to be connected
- 2224/79651 . . . . . Belt conveyor
- 2224/79652 . . . . . Chain conveyor
- 2224/79653 . . . . . Vibrating conveyor
- 2224/79654 . . . . . Pneumatic conveyor
- 2224/79655 . . . . . in a fluid
- 2224/797 . . . . . Means for aligning
- 2224/79701 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79702 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
- 2224/79703 . . . . . Mechanical holding means
- 2224/79704 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79705 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
- 2224/79723 . . . . . Electrostatic holding means
- 2224/79724 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79725 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
- 2224/79733 . . . . . Magnetic holding means
- 2224/79734 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79735 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
- 2224/79743 . . . . . Suction holding means
- 2224/79744 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79745 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
- 2224/79753 . . . . . Means for optical alignment, e.g. sensors
- 2224/79754 . . . . . Guiding structures
- 2224/79755 . . . . . in the lower part of the bonding apparatus, e.g. in the apparatus chuck
- 2224/79756 . . . . . in the upper part of the bonding apparatus, e.g. in the pressing head
- 2224/798 . . . . . Means for moving parts
- 2224/79801 . . . . . Lower part of the bonding apparatus, e.g. XY table
- 2224/79802 . . . . . Rotational mechanism
- 2224/79803 . . . . . Pivoting mechanism
- 2224/79804 . . . . . Translational mechanism
- 2224/79821 . . . . . Upper part of the bonding apparatus, i.e. pressing head
- 2224/79822 . . . . . Rotational mechanism
- 2224/79823 . . . . . Pivoting mechanism
- 2224/79824 . . . . . Translational mechanism
- 2224/79841 . . . . . of the pressing head
- 2224/79842 . . . . . Rotational mechanism
- 2224/79843 . . . . . Pivoting mechanism
- 2224/799 . . . . . Means for monitoring the connection process
- 2224/79901 . . . . . using a computer, e.g. fully- or semi-automatic bonding
- 2224/7992 . . . . . Load or pressure adjusting means, e.g. sensors
- 2224/79925 . . . . . Vibration adjusting means, e.g. sensors
- 2224/7995 . . . . . Means for forming additional members
- 2224/7998 . . . . . specially adapted for batch processes
- 2224/79981 . . . . . Apparatus chuck
- 2224/79982 . . . . . Shape
- 2224/79983 . . . . . of the mounting surface
- 2224/79984 . . . . . of other portions
- 2224/79985 . . . . . Material
- 2224/79986 . . . . . Auxiliary members on the pressing surface
- 2224/79987 . . . . . Shape of the auxiliary member
- 2224/79988 . . . . . Material of the auxiliary member
- 2224/7999 . . . . . for disconnecting
- 2224/80 . . . . . Methods for connecting semiconductor or other solid state bodies using means for bonding being attached to, or being formed on, the surface to be connected
- 2224/80001 . . . . . by connecting a bonding area directly to another bonding area, i.e. connectorless bonding, e.g. bumpless bonding
- 2224/80003 . . . . . involving a temporary auxiliary member not forming part of the bonding apparatus
- 2224/80004 . . . . . being a removable or sacrificial coating
- 2224/80006 . . . . . being a temporary or sacrificial substrate
- 2224/80007 . . . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for protecting the bonding area during or after the bonding process
- 2224/80009 . . . . . Pre-treatment of the bonding area

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- 2224/8001 . . . . . Cleaning the bonding area, e.g. oxide removal step, desmearing
- 2224/80011 . . . . . Chemical cleaning, e.g. etching, flux
- 2224/80012 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/80013 . . . . . Plasma cleaning
- 2224/80014 . . . . . Thermal cleaning, e.g. decomposition, sublimation
- 2224/80019 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8001](#) - [H01L 2224/80014](#)
- 2224/8002 . . . . . Applying permanent coating to the bonding area in the bonding apparatus, e.g. in-situ coating
- 2224/80024 . . . . . Applying flux to the bonding area in the bonding apparatus
- 2224/8003 . . . . . Reshaping the bonding area in the bonding apparatus, e.g. flattening the bonding area
- 2224/80031 . . . . . by chemical means, e.g. etching, anodisation
- 2224/80035 . . . . . by heating means
- 2224/80037 . . . . . using a polychromatic heating lamp
- 2224/80039 . . . . . using a laser
- 2224/80041 . . . . . Induction heating, i.e. eddy currents
- 2224/80047 . . . . . by mechanical means, e.g. severing, pressing, stamping
- 2224/80048 . . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/80051 . . . . . Forming additional members
- 2224/80052 . . . . . Detaching bonding areas, e.g. after testing
- 2224/80053 . . . . . Bonding environment
- 2224/80054 . . . . . Composition of the atmosphere
- 2224/80055 . . . . . being oxidating
- 2224/80065 . . . . . being reducing
- 2224/80075 . . . . . being inert
- 2224/80085 . . . . . being a liquid, e.g. for fluidic self-assembly
- 2224/8009 . . . . . Vacuum
- 2224/80091 . . . . . Under pressure
- 2224/80092 . . . . . Atmospheric pressure
- 2224/80093 . . . . . Transient conditions, e.g. gas-flow
- 2224/80095 . . . . . Temperature settings
- 2224/80096 . . . . . Transient conditions
- 2224/80097 . . . . . Heating
- 2224/80098 . . . . . Cooling
- 2224/80099 . . . . . Ambient temperature
- 2224/8011 . . . . . involving protection against electrical discharge, e.g. removing electrostatic charge
- 2224/8012 . . . . . Aligning
- 2224/80121 . . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
- 2224/80122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
- 2224/80123 . . . . . Shape or position of the body
- 2224/80125 . . . . . Bonding areas on the body
- 2224/80127 . . . . . Bonding areas outside the body
- 2224/80129 . . . . . Shape or position of the other item
- 2224/8013 . . . . . using marks formed on the semiconductor or solid-state body
- 2224/80132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
- 2224/80136 . . . . . involving guiding structures, e.g. spacers or supporting members
- 2224/80138 . . . . . the guiding structures being at least partially left in the finished device
- 2224/80139 . . . . . Guiding structures on the body
- 2224/8014 . . . . . Guiding structures outside the body
- 2224/80141 . . . . . Guiding structures both on and outside the body
- 2224/80143 . . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
- 2224/80148 . . . . . involving movement of a part of the bonding apparatus
- 2224/80149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
- 2224/8015 . . . . . Rotational movements
- 2224/8016 . . . . . Translational movements
- 2224/80169 . . . . . being the upper part of the bonding apparatus, i.e. bonding head
- 2224/8017 . . . . . Rotational movements
- 2224/8018 . . . . . Translational movements
- 2224/8019 . . . . . Arrangement of the bonding areas prior to mounting
- 2224/80194 . . . . . Lateral distribution of the bonding areas
- 2224/802 . . . . . Applying energy for connecting
- 2224/80201 . . . . . Compression bonding
- 2224/80203 . . . . . Thermocompression bonding, e.g. diffusion bonding, pressure joining, thermocompression welding or solid-state welding
- 2224/80204 . . . . . with a graded temperature profile
- 2224/80205 . . . . . Ultrasonic bonding
- 2224/80206 . . . . . Direction of oscillation
- 2224/80207 . . . . . Thermosonic bonding
- 2224/80209 . . . . . applying unidirectional static pressure
- 2224/80211 . . . . . applying isostatic pressure, e.g. degassing using vacuum or a pressurised liquid
- 2224/80213 . . . . . using a reflow oven
- 2224/80215 . . . . . with a graded temperature profile
- 2224/8022 . . . . . with energy being in the form of electromagnetic radiation
- 2224/80222 . . . . . Induction heating, i.e. eddy currents
- 2224/80224 . . . . . using a laser
- 2224/8023 . . . . . Polychromatic or infrared lamp heating
- 2224/80232 . . . . . using an autocatalytic reaction, e.g. exothermic brazing
- 2224/80234 . . . . . using means for applying energy being within the device, e.g. integrated heater
- 2224/80236 . . . . . using electro-static corona discharge
- 2224/80237 . . . . . using an electron beam
- 2224/80238 . . . . . using electric resistance welding, i.e. ohmic heating
- 2224/8034 . . . . . Bonding interfaces of the bonding area
- 2224/80345 . . . . . Shape, e.g. interlocking features
- 2224/80355 . . . . . having an external coating, e.g. protective bond-through coating
- 2224/80357 . . . . . being flush with the surface
- 2224/80359 . . . . . Material

2224/8036	. . . Bonding interfaces of the semiconductor or solid state body	2224/8048	. . . . . Molybdenum [Mo] as principal constituent
2224/80365	. . . . Shape, e.g. interlocking features	2224/80481	. . . . . Tantalum [Ta] as principal constituent
2224/80375	. . . . having an external coating, e.g. protective bond-through coating	2224/80483	. . . . . Rhenium [Re] as principal constituent
2224/80379	. . . . Material	2224/80484	. . . . . Tungsten [W] as principal constituent
2224/8038	. . . Bonding interfaces outside the semiconductor or solid-state body	2224/80486	. . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/80385	. . . . Shape, e.g. interlocking features	2224/80487	. . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/80395	. . . . having an external coating, e.g. protective bond-through coating	2224/80488	. . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/80399	. . . . Material	2224/8049	. . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/804	. . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/80491	. . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/80401	. . . . . the principal constituent melting at a temperature of less than 400°C	2224/80493	. . . . . with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/804</a> - <a href="#">H01L 2224/80491</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/80405	. . . . . Gallium [Ga] as principal constituent	2224/80494	. . . . . with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/804</a> - <a href="#">H01L 2224/80491</a>
2224/80409	. . . . . Indium [In] as principal constituent	2224/80495	. . . . . with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/804</a> - <a href="#">H01L 2224/80491</a>
2224/80411	. . . . . Tin [Sn] as principal constituent	2224/80498	. . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/80413	. . . . . Bismuth [Bi] as principal constituent	2224/80499	. . . . . Material of the matrix
2224/80414	. . . . . Thallium [Tl] as principal constituent	2224/805	. . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/80416	. . . . . Lead [Pb] as principal constituent	2224/80501	. . . . . the principal constituent melting at a temperature of less than 400°C
2224/80417	. . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/80505	. . . . . Gallium [Ga] as principal constituent
2224/80418	. . . . . Zinc [Zn] as principal constituent	2224/80509	. . . . . Indium [In] as principal constituent
2224/8042	. . . . . Antimony [Sb] as principal constituent	2224/80511	. . . . . Tin [Sn] as principal constituent
2224/80423	. . . . . Magnesium [Mg] as principal constituent	2224/80513	. . . . . Bismuth [Bi] as principal constituent
2224/80424	. . . . . Aluminium [Al] as principal constituent	2224/80514	. . . . . Thallium [Tl] as principal constituent
2224/80438	. . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/80516	. . . . . Lead [Pb] as principal constituent
2224/80439	. . . . . Silver [Ag] as principal constituent	2224/80517	. . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/80444	. . . . . Gold [Au] as principal constituent	2224/80518	. . . . . Zinc [Zn] as principal constituent
2224/80447	. . . . . Copper [Cu] as principal constituent	2224/8052	. . . . . Antimony [Sb] as principal constituent
2224/80449	. . . . . Manganese [Mn] as principal constituent	2224/80523	. . . . . Magnesium [Mg] as principal constituent
2224/80455	. . . . . Nickel [Ni] as principal constituent	2224/80524	. . . . . Aluminium [Al] as principal constituent
2224/80457	. . . . . Cobalt [Co] as principal constituent		
2224/8046	. . . . . Iron [Fe] as principal constituent		
2224/80463	. . . . . the principal constituent melting at a temperature of greater than 1550°C		
2224/80464	. . . . . Palladium [Pd] as principal constituent		
2224/80466	. . . . . Titanium [Ti] as principal constituent		
2224/80469	. . . . . Platinum [Pt] as principal constituent		
2224/8047	. . . . . Zirconium [Zr] as principal constituent		
2224/80471	. . . . . Chromium [Cr] as principal constituent		
2224/80472	. . . . . Vanadium [V] as principal constituent		
2224/80473	. . . . . Rhodium [Rh] as principal constituent		
2224/80476	. . . . . Ruthenium [Ru] as principal constituent		
2224/80478	. . . . . Iridium [Ir] as principal constituent		
2224/80479	. . . . . Niobium [Nb] as principal constituent		

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2224/80538 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/80593 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/805</a> - <a href="#">H01L 2224/80591</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/80539 . . . . .	Silver [Ag] as principal constituent	2224/80594 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/805</a> - <a href="#">H01L 2224/80591</a>
2224/80544 . . . . .	Gold [Au] as principal constituent	2224/80595 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/805</a> - <a href="#">H01L 2224/80591</a>
2224/80547 . . . . .	Copper [Cu] as principal constituent	2224/80598 . . . . .	Fillers
2224/80549 . . . . .	Manganese [Mn] as principal constituent	2224/80599 . . . . .	Base material
2224/80555 . . . . .	Nickel [Ni] as principal constituent	2224/806 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/80557 . . . . .	Cobalt [Co] as principal constituent	2224/80601 . . . . .	the principal constituent melting at a temperature of less than 400°C
2224/8056 . . . . .	Iron [Fe] as principal constituent	2224/80605 . . . . .	Gallium [Ga] as principal constituent
2224/80563 . . . . .	the principal constituent melting at a temperature of greater than 1550°C	2224/80609 . . . . .	Indium [In] as principal constituent
2224/80564 . . . . .	Palladium [Pd] as principal constituent	2224/80611 . . . . .	Tin [Sn] as principal constituent
2224/80566 . . . . .	Titanium [Ti] as principal constituent	2224/80613 . . . . .	Bismuth [Bi] as principal constituent
2224/80569 . . . . .	Platinum [Pt] as principal constituent	2224/80614 . . . . .	Thallium [Tl] as principal constituent
2224/8057 . . . . .	Zirconium [Zr] as principal constituent	2224/80616 . . . . .	Lead [Pb] as principal constituent
2224/80571 . . . . .	Chromium [Cr] as principal constituent	2224/80617 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/80572 . . . . .	Vanadium [V] as principal constituent	2224/80618 . . . . .	Zinc [Zn] as principal constituent
2224/80573 . . . . .	Rhodium [Rh] as principal constituent	2224/8062 . . . . .	Antimony [Sb] as principal constituent
2224/80576 . . . . .	Ruthenium [Ru] as principal constituent	2224/80623 . . . . .	Magnesium [Mg] as principal constituent
2224/80578 . . . . .	Iridium [Ir] as principal constituent	2224/80624 . . . . .	Aluminium [Al] as principal constituent
2224/80579 . . . . .	Niobium [Nb] as principal constituent	2224/80638 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/8058 . . . . .	Molybdenum [Mo] as principal constituent	2224/80639 . . . . .	Silver [Ag] as principal constituent
2224/80581 . . . . .	Tantalum [Ta] as principal constituent	2224/80644 . . . . .	Gold [Au] as principal constituent
2224/80583 . . . . .	Rhenium [Re] as principal constituent	2224/80647 . . . . .	Copper [Cu] as principal constituent
2224/80584 . . . . .	Tungsten [W] as principal constituent	2224/80649 . . . . .	Manganese [Mn] as principal constituent
2224/80586 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/80655 . . . . .	Nickel [Ni] as principal constituent
2224/80587 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/80657 . . . . .	Cobalt [Co] as principal constituent
2224/80588 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides		
2224/8059 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy		
2224/80591 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene		

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2224/8066	Iron [Fe] as principal constituent	2224/80698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/80663	the principal constituent melting at a temperature of greater than 1550°C	2224/80699	Coating material
2224/80664	Palladium [Pd] as principal constituent	2224/807	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/80666	Titanium [Ti] as principal constituent	2224/80701	the principal constituent melting at a temperature of less than 400°C
2224/80669	Platinum [Pt] as principal constituent	2224/80705	Gallium [Ga] as principal constituent
2224/8067	Zirconium [Zr] as principal constituent	2224/80709	Indium [In] as principal constituent
2224/80671	Chromium [Cr] as principal constituent	2224/80711	Tin [Sn] as principal constituent
2224/80672	Vanadium [V] as principal constituent	2224/80713	Bismuth [Bi] as principal constituent
2224/80673	Rhodium [Rh] as principal constituent	2224/80714	Thallium [Tl] as principal constituent
2224/80676	Ruthenium [Ru] as principal constituent	2224/80716	Lead [Pb] as principal constituent
2224/80678	Iridium [Ir] as principal constituent	2224/80717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/80679	Niobium [Nb] as principal constituent	2224/80718	Zinc [Zn] as principal constituent
2224/8068	Molybdenum [Mo] as principal constituent	2224/8072	Antimony [Sb] as principal constituent
2224/80681	Tantalum [Ta] as principal constituent	2224/80723	Magnesium [Mg] as principal constituent
2224/80683	Rhenium [Re] as principal constituent	2224/80724	Aluminium [Al] as principal constituent
2224/80684	Tungsten [W] as principal constituent	2224/80738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/80686	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/80739	Silver [Ag] as principal constituent
2224/80687	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/80744	Gold [Au] as principal constituent
2224/80688	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/80747	Copper [Cu] as principal constituent
2224/8069	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/80749	Manganese [Mn] as principal constituent
2224/80691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/80755	Nickel [Ni] as principal constituent
2224/80693	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/806</a> - <a href="#">H01L 2224/80691</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/80757	Cobalt [Co] as principal constituent
2224/80694	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/806</a> - <a href="#">H01L 2224/80691</a>	2224/8076	Iron [Fe] as principal constituent
2224/80695	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/806</a> - <a href="#">H01L 2224/80691</a>	2224/80763	the principal constituent melting at a temperature of greater than 1550°C
		2224/80764	Palladium [Pd] as principal constituent
		2224/80766	Titanium [Ti] as principal constituent

- 2224/80769 . . . . . Platinum [Pt] as principal constituent
- 2224/8077 . . . . . Zirconium [Zr] as principal constituent
- 2224/80771 . . . . . Chromium [Cr] as principal constituent
- 2224/80772 . . . . . Vanadium [V] as principal constituent
- 2224/80773 . . . . . Rhodium [Rh] as principal constituent
- 2224/80776 . . . . . Ruthenium [Ru] as principal constituent
- 2224/80778 . . . . . Iridium [Ir] as principal constituent
- 2224/80779 . . . . . Niobium [Nb] as principal constituent
- 2224/8078 . . . . . Molybdenum [Mo] as principal constituent
- 2224/80781 . . . . . Tantalum [Ta] as principal constituent
- 2224/80783 . . . . . Rhenium [Re] as principal constituent
- 2224/80784 . . . . . Tungsten [W] as principal constituent
- 2224/80786 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
- 2224/80787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
- 2224/80788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
- 2224/8079 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
- 2224/80791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
- 2224/80793 . . . . . with a principal constituent of the material being a solid not provided for in groups [H01L 2224/807](#) - [H01L 2224/80791](#), e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
- 2224/80794 . . . . . with a principal constituent of the material being a liquid not provided for in groups [H01L 2224/807](#) - [H01L 2224/80791](#)
- 2224/80795 . . . . . with a principal constituent of the material being a gas not provided for in groups [H01L 2224/807](#) - [H01L 2224/80791](#)
- 2224/80798 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
- 2224/80799 . . . . . Shape or distribution of the fillers
- 2224/808 . . . . . Bonding techniques
- 2224/80801 . . . . . Soldering or alloying
- 2224/80805 . . . . . involving forming a eutectic alloy at the bonding interface
- 2224/8081 . . . . . involving forming an intermetallic compound at the bonding interface
- 2224/80815 . . . . . Reflow soldering
- 2224/8082 . . . . . Diffusion bonding
- 2224/80825 . . . . . Solid-liquid interdiffusion
- 2224/8083 . . . . . Solid-solid interdiffusion
- 2224/8084 . . . . . Sintering
- 2224/8085 . . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
- 2224/80855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
- 2224/80856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
- 2224/80859 . . . . . Localised curing of parts of the bonding area
- 2224/80862 . . . . . Heat curing
- 2224/80865 . . . . . Microwave curing
- 2224/80868 . . . . . Infrared [IR] curing
- 2224/80871 . . . . . Visible light curing
- 2224/80874 . . . . . Ultraviolet [UV] curing
- 2224/80877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
- 2224/8088 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
- 2224/80885 . . . . . Combinations of two or more hardening methods provided for in at least two different groups from [H01L 2224/80855](#) - [H01L 2224/8088](#), e.g. for hybrid thermoplastic-thermosetting adhesives
- 2224/8089 . . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
- 2224/80893 . . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
- 2224/80894 . . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
- 2224/80895 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
- 2224/80896 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
- 2224/80897 . . . . . Mechanical interlocking, e.g. anchoring, hook and loop-type fastening or the like
- 2224/80898 . . . . . Press-fitting, i.e. pushing the parts together and fastening by friction, e.g. by compression of one part against the other
- 2224/80899 . . . . . using resilient parts in the bonding area
- 2224/809 . . . . . with the bonding area not providing any mechanical bonding
- 2224/80901 . . . . . Pressing a bonding area against another bonding area by means of a further bonding area or connector
- 2224/80902 . . . . . by means of a further bonding area
- 2224/80903 . . . . . by means of a bump or layer connector
- 2224/80904 . . . . . by means of an encapsulation layer or foil
- 2224/80905 . . . . . Combinations of bonding methods provided for in at least two different groups from [H01L 2224/808](#) - [H01L 2224/80904](#)

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- 2224/80906 . . . . Specific sequence of method steps
- 2224/80907 . . . . Intermediate bonding, i.e. intermediate bonding step for temporarily bonding the semiconductor or solid-state body, followed by at least a further bonding step
- 2224/80908 . . . . involving monitoring, e.g. feedback loop
- 2224/80909 . . . . Post-treatment of the bonding area
- 2224/8091 . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/80911 . . . . . Chemical cleaning, e.g. etching, flux
- 2224/80912 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/80913 . . . . . Plasma cleaning
- 2224/80914 . . . . . Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
- 2224/80919 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8091](#) - [H01L 2224/80914](#)
- 2224/8092 . . . . Applying permanent coating, e.g. protective coating
- 2224/8093 . . . . Reshaping
- 2224/80931 . . . . . by chemical means, e.g. etching
- 2224/80935 . . . . . by heating means, e.g. reflowing
- 2224/80937 . . . . . using a polychromatic heating lamp
- 2224/80939 . . . . . using a laser
- 2224/80941 . . . . . Induction heating, i.e. eddy currents
- 2224/80943 . . . . . using a flame torch, e.g. hydrogen torch
- 2224/80945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/80947 . . . . . by mechanical means, e.g. pull-and-cut, pressing, stamping
- 2224/80948 . . . . Thermal treatments, e.g. annealing, controlled cooling
- 2224/80951 . . . . Forming additional members, e.g. for reinforcing
- 2224/80986 . . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/81 . . . . using a bump connector
- 2224/81001 . . . . involving a temporary auxiliary member not forming part of the bonding apparatus
- 2224/81002 . . . . . being a removable or sacrificial coating
- 2224/81005 . . . . . being a temporary or sacrificial substrate
- 2224/81007 . . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the bump connector during or after the bonding process
- 2224/81009 . . . . Pre-treatment of the bump connector or the bonding area
- 2224/8101 . . . . . Cleaning the bump connector, e.g. oxide removal step, desmearing
- 2224/81011 . . . . . Chemical cleaning, e.g. etching, flux
- 2224/81012 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/81013 . . . . . Plasma cleaning
- 2224/81014 . . . . . Thermal cleaning, e.g. decomposition, sublimation
- 2224/81019 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8101](#) - [H01L 2224/81014](#)
- 2224/8102 . . . . . Applying permanent coating to the bump connector in the bonding apparatus, e.g. in-situ coating
- 2224/81022 . . . . . Cleaning the bonding area, e.g. oxide removal step, desmearing
- 2224/81024 . . . . . Applying flux to the bonding area
- 2224/81026 . . . . . Applying a precursor material to the bonding area
- 2224/8103 . . . . . Reshaping the bump connector in the bonding apparatus, e.g. flattening the bump connector
- 2224/81031 . . . . . by chemical means, e.g. etching, anodisation
- 2224/81035 . . . . . by heating means
- 2224/81037 . . . . . using a polychromatic heating lamp
- 2224/81039 . . . . . using a laser
- 2224/81041 . . . . . Induction heating, i.e. eddy currents
- 2224/81047 . . . . . by mechanical means, e.g. severing, pressing, stamping
- 2224/81048 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/81051 . . . . Forming additional members
- 2224/81052 . . . . Detaching bump connectors, e.g. after testing
- 2224/81053 . . . . Bonding environment
- 2224/81054 . . . . Composition of the atmosphere
- 2224/81055 . . . . . being oxidating
- 2224/81065 . . . . . being reducing
- 2224/81075 . . . . . being inert
- 2224/81085 . . . . being a liquid, e.g. for fluidic self-assembly
- 2224/8109 . . . . Vacuum
- 2224/81091 . . . . Under pressure
- 2224/81092 . . . . Atmospheric pressure
- 2224/81093 . . . . Transient conditions, e.g. gas-flow
- 2224/81095 . . . . Temperature settings
- 2224/81096 . . . . Transient conditions
- 2224/81097 . . . . . Heating
- 2224/81098 . . . . . Cooling
- 2224/81099 . . . . Ambient temperature
- 2224/811 . . . . the bump connector being supplied to the parts to be connected in the bonding apparatus
- 2224/81101 . . . . as prepreg comprising a bump connector, e.g. provided in an insulating plate member
- 2224/8111 . . . . involving protection against electrical discharge, e.g. removing electrostatic charge
- 2224/8112 . . . . Aligning
- 2224/81121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
- 2224/81122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
- 2224/81123 . . . . . Shape or position of the body
- 2224/81125 . . . . . Bonding areas on the body
- 2224/81127 . . . . . Bonding areas outside the body
- 2224/81129 . . . . . Shape or position of the other item
- 2224/8113 . . . . . using marks formed on the semiconductor or solid-state body
- 2224/81132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
- 2224/81136 . . . . involving guiding structures, e.g. spacers or supporting members
- 2224/81138 . . . . . the guiding structures being at least partially left in the finished device

2224/81139	. . . . .	Guiding structures on the body	2224/81355	. . . . .	having an external coating, e.g. protective bond-through coating
2224/8114	. . . . .	Guiding structures outside the body	2224/81359	. . . . .	Material
2224/81141	. . . . .	Guiding structures both on and outside the body	2224/8136	. . . . .	Bonding interfaces of the semiconductor or solid state body
2224/81143	. . . . .	Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium	2224/81365	. . . . .	Shape, e.g. interlocking features
2224/81148	. . . . .	involving movement of a part of the bonding apparatus	2224/81375	. . . . .	having an external coating, e.g. protective bond-through coating
2224/81149	. . . . .	being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table	2224/81379	. . . . .	Material
2224/8115	. . . . .	Rotational movements	2224/8138	. . . . .	Bonding interfaces outside the semiconductor or solid-state body
2224/8116	. . . . .	Translational movements	2224/81385	. . . . .	Shape, e.g. interlocking features
2224/81169	. . . . .	being the upper part of the bonding apparatus, i.e. bonding head	2224/81395	. . . . .	having an external coating, e.g. protective bond-through coating
2224/8117	. . . . .	Rotational movements	2224/81399	. . . . .	Material
2224/8118	. . . . .	Translational movements	2224/814	. . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/8119	. . . . .	Arrangement of the bump connectors prior to mounting	2224/81401	. . . . .	the principal constituent melting at a temperature of less than 400°C
2224/81191	. . . . .	wherein the bump connectors are disposed only on the semiconductor or solid-state body	2224/81405	. . . . .	Gallium [Ga] as principal constituent
2224/81192	. . . . .	wherein the bump connectors are disposed only on another item or body to be connected to the semiconductor or solid-state body	2224/81409	. . . . .	Indium [In] as principal constituent
2224/81193	. . . . .	wherein the bump connectors are disposed on both the semiconductor or solid-state body and another item or body to be connected to the semiconductor or solid-state body	2224/81411	. . . . .	Tin [Sn] as principal constituent
2224/81194	. . . . .	Lateral distribution of the bump connectors	2224/81413	. . . . .	Bismuth [Bi] as principal constituent
2224/812	. . . . .	Applying energy for connecting	2224/81414	. . . . .	Thallium [Tl] as principal constituent
2224/81201	. . . . .	Compression bonding	2224/81416	. . . . .	Lead [Pb] as principal constituent
2224/81203	. . . . .	Thermocompression bonding, e.g. diffusion bonding, pressure joining, thermocompression welding or solid-state welding	2224/81417	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/81204	. . . . .	with a graded temperature profile	2224/81418	. . . . .	Zinc [Zn] as principal constituent
2224/81205	. . . . .	Ultrasonic bonding	2224/8142	. . . . .	Antimony [Sb] as principal constituent
2224/81206	. . . . .	Direction of oscillation	2224/81423	. . . . .	Magnesium [Mg] as principal constituent
2224/81207	. . . . .	Thermosonic bonding	2224/81424	. . . . .	Aluminium [Al] as principal constituent
2224/81208	. . . . .	applying unidirectional static pressure	2224/81438	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/81209	. . . . .	applying isostatic pressure, e.g. degassing using vacuum or a pressurised liquid	2224/81439	. . . . .	Silver [Ag] as principal constituent
2224/8121	. . . . .	using a reflow oven	2224/81444	. . . . .	Gold [Au] as principal constituent
2224/81211	. . . . .	with a graded temperature profile	2224/81447	. . . . .	Copper [Cu] as principal constituent
2224/8122	. . . . .	with energy being in the form of electromagnetic radiation	2224/81449	. . . . .	Manganese [Mn] as principal constituent
2224/81222	. . . . .	Induction heating, i.e. eddy currents	2224/81455	. . . . .	Nickel [Ni] as principal constituent
2224/81224	. . . . .	using a laser	2224/81457	. . . . .	Cobalt [Co] as principal constituent
2224/8123	. . . . .	Polychromatic or infrared lamp heating	2224/8146	. . . . .	Iron [Fe] as principal constituent
2224/81232	. . . . .	using an autocatalytic reaction, e.g. exothermic brazing	2224/81463	. . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/81234	. . . . .	using means for applying energy being within the device, e.g. integrated heater	2224/81464	. . . . .	Palladium [Pd] as principal constituent
2224/81236	. . . . .	using electro-static corona discharge	2224/81466	. . . . .	Titanium [Ti] as principal constituent
2224/81237	. . . . .	using an electron beam	2224/81469	. . . . .	Platinum [Pt] as principal constituent
2224/81238	. . . . .	using electric resistance welding, i.e. ohmic heating	2224/8147	. . . . .	Zirconium [Zr] as principal constituent
2224/8134	. . . . .	Bonding interfaces of the bump connector	2224/81471	. . . . .	Chromium [Cr] as principal constituent
2224/81345	. . . . .	Shape, e.g. interlocking features	2224/81472	. . . . .	Vanadium [V] as principal constituent
			2224/81473	. . . . .	Rhodium [Rh] as principal constituent
			2224/81476	. . . . .	Ruthenium [Ru] as principal constituent

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2224/81478 . . . . .	Iridium [Ir] as principal constituent	2224/81524 . . . . .	Aluminium [Al] as principal constituent
2224/81479 . . . . .	Niobium [Nb] as principal constituent	2224/81538 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/8148 . . . . .	Molybdenum [Mo] as principal constituent	2224/81539 . . . . .	Silver [Ag] as principal constituent
2224/81481 . . . . .	Tantalum [Ta] as principal constituent	2224/81544 . . . . .	Gold [Au] as principal constituent
2224/81483 . . . . .	Rhenium [Re] as principal constituent	2224/81547 . . . . .	Copper [Cu] as principal constituent
2224/81484 . . . . .	Tungsten [W] as principal constituent	2224/81549 . . . . .	Manganese [Mn] as principal constituent
2224/81486 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/81555 . . . . .	Nickel [Ni] as principal constituent
2224/81487 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/81557 . . . . .	Cobalt [Co] as principal constituent
2224/81488 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/8156 . . . . .	Iron [Fe] as principal constituent
2224/8149 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/81563 . . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/81491 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/81564 . . . . .	Palladium [Pd] as principal constituent
2224/81493 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/814</a> - <a href="#">H01L 2224/81491</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/81566 . . . . .	Titanium [Ti] as principal constituent
2224/81494 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/814</a> - <a href="#">H01L 2224/81491</a>	2224/81569 . . . . .	Platinum [Pt] as principal constituent
2224/81495 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/814</a> - <a href="#">H01L 2224/81491</a>	2224/8157 . . . . .	Zirconium [Zr] as principal constituent
2224/81498 . . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/81571 . . . . .	Chromium [Cr] as principal constituent
2224/81499 . . . . .	Material of the matrix	2224/81572 . . . . .	Vanadium [V] as principal constituent
2224/815 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/81573 . . . . .	Rhodium [Rh] as principal constituent
2224/81501 . . . . .	the principal constituent melting at a temperature of less than 400°C	2224/81576 . . . . .	Ruthenium [Ru] as principal constituent
2224/81505 . . . . .	Gallium [Ga] as principal constituent	2224/81578 . . . . .	Iridium [Ir] as principal constituent
2224/81509 . . . . .	Indium [In] as principal constituent	2224/81579 . . . . .	Niobium [Nb] as principal constituent
2224/81511 . . . . .	Tin [Sn] as principal constituent	2224/8158 . . . . .	Molybdenum [Mo] as principal constituent
2224/81513 . . . . .	Bismuth [Bi] as principal constituent	2224/81581 . . . . .	Tantalum [Ta] as principal constituent
2224/81514 . . . . .	Thallium [Tl] as principal constituent	2224/81583 . . . . .	Rhenium [Re] as principal constituent
2224/81516 . . . . .	Lead [Pb] as principal constituent	2224/81584 . . . . .	Tungsten [W] as principal constituent
2224/81517 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/81586 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/81518 . . . . .	Zinc [Zn] as principal constituent	2224/81587 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/8152 . . . . .	Antimony [Sb] as principal constituent	2224/81588 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/81523 . . . . .	Magnesium [Mg] as principal constituent	2224/8159 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
		2224/81591 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene

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2224/81593 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/815</a> - <a href="#">H01L 2224/81591</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/81666 . . . . .	Iron [Fe] as principal constituent
2224/81594 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/815</a> - <a href="#">H01L 2224/81591</a>	2224/81663 . . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/81595 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/815</a> - <a href="#">H01L 2224/81591</a>	2224/81664 . . . . .	Palladium [Pd] as principal constituent
2224/81598 . . . . .	Fillers	2224/81666 . . . . .	Titanium [Ti] as principal constituent
2224/81599 . . . . .	Base material	2224/81669 . . . . .	Platinum [Pt] as principal constituent
2224/816 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/8167 . . . . .	Zirconium [Zr] as principal constituent
2224/81601 . . . . .	the principal constituent melting at a temperature of less than 400°C	2224/81671 . . . . .	Chromium [Cr] as principal constituent
2224/81605 . . . . .	Gallium [Ga] as principal constituent	2224/81672 . . . . .	Vanadium [V] as principal constituent
2224/81609 . . . . .	Indium [In] as principal constituent	2224/81673 . . . . .	Rhodium [Rh] as principal constituent
2224/81611 . . . . .	Tin [Sn] as principal constituent	2224/81676 . . . . .	Ruthenium [Ru] as principal constituent
2224/81613 . . . . .	Bismuth [Bi] as principal constituent	2224/81678 . . . . .	Iridium [Ir] as principal constituent
2224/81614 . . . . .	Thallium [Tl] as principal constituent	2224/81679 . . . . .	Niobium [Nb] as principal constituent
2224/81616 . . . . .	Lead [Pb] as principal constituent	2224/8168 . . . . .	Molybdenum [Mo] as principal constituent
2224/81617 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/81681 . . . . .	Tantalum [Ta] as principal constituent
2224/81618 . . . . .	Zinc [Zn] as principal constituent	2224/81683 . . . . .	Rhenium [Re] as principal constituent
2224/8162 . . . . .	Antimony [Sb] as principal constituent	2224/81684 . . . . .	Tungsten [W] as principal constituent
2224/81623 . . . . .	Magnesium [Mg] as principal constituent	2224/81686 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/81624 . . . . .	Aluminium [Al] as principal constituent	2224/81687 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/81638 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/81688 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/81639 . . . . .	Silver [Ag] as principal constituent	2224/8169 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/81644 . . . . .	Gold [Au] as principal constituent	2224/81691 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/81647 . . . . .	Copper [Cu] as principal constituent	2224/81693 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/816</a> - <a href="#">H01L 2224/81691</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/81649 . . . . .	Manganese [Mn] as principal constituent	2224/81694 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/816</a> - <a href="#">H01L 2224/81691</a>
2224/81655 . . . . .	Nickel [Ni] as principal constituent	2224/81695 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/816</a> - <a href="#">H01L 2224/81691</a>
2224/81657 . . . . .	Cobalt [Co] as principal constituent		

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2224/81698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/81769	Platinum [Pt] as principal constituent
2224/81699	Coating material	2224/81777	Zirconium [Zr] as principal constituent
2224/817	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/81771	Chromium [Cr] as principal constituent
2224/81701	the principal constituent melting at a temperature of less than 400°C	2224/81772	Vanadium [V] as principal constituent
2224/81705	Gallium [Ga] as principal constituent	2224/81773	Rhodium [Rh] as principal constituent
2224/81709	Indium [In] as principal constituent	2224/81776	Ruthenium [Ru] as principal constituent
2224/81711	Tin [Sn] as principal constituent	2224/81778	Iridium [Ir] as principal constituent
2224/81713	Bismuth [Bi] as principal constituent	2224/81779	Niobium [Nb] as principal constituent
2224/81714	Thallium [Tl] as principal constituent	2224/8178	Molybdenum [Mo] as principal constituent
2224/81716	Lead [Pb] as principal constituent	2224/81781	Tantalum [Ta] as principal constituent
2224/81717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/81783	Rhenium [Re] as principal constituent
2224/81718	Zinc [Zn] as principal constituent	2224/81784	Tungsten [W] as principal constituent
2224/8172	Antimony [Sb] as principal constituent	2224/81786	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/81723	Magnesium [Mg] as principal constituent	2224/81787	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/81724	Aluminium [Al] as principal constituent	2224/81788	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/81738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/8179	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/81739	Silver [Ag] as principal constituent	2224/81791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/81744	Gold [Au] as principal constituent	2224/81793	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/817</a> - <a href="#">H01L 2224/81791</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/81747	Copper [Cu] as principal constituent	2224/81794	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/817</a> - <a href="#">H01L 2224/81791</a>
2224/81749	Manganese [Mn] as principal constituent	2224/81795	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/817</a> - <a href="#">H01L 2224/81791</a>
2224/81755	Nickel [Ni] as principal constituent	2224/81798	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/81757	Cobalt [Co] as principal constituent	2224/81799	Shape or distribution of the fillers
2224/8176	Iron [Fe] as principal constituent	2224/818	Bonding techniques
2224/81763	the principal constituent melting at a temperature of greater than 1550°C	2224/81801	Soldering or alloying
2224/81764	Palladium [Pd] as principal constituent	2224/81805	involving forming a eutectic alloy at the bonding interface
2224/81766	Titanium [Ti] as principal constituent		

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- 2224/8181 . . . . . involving forming an intermetallic compound at the bonding interface
- 2224/81815 . . . . . Reflow soldering
- 2224/8182 . . . . . Diffusion bonding
- 2224/81825 . . . . . Solid-liquid interdiffusion
- 2224/8183 . . . . . Solid-solid interdiffusion
- 2224/8184 . . . . . Sintering
- 2224/8185 . . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
- 2224/81855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
- 2224/81856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
- 2224/81859 . . . . . Localised curing of parts of the bump connector
- 2224/81862 . . . . . Heat curing
- 2224/81865 . . . . . Microwave curing
- 2224/81868 . . . . . Infrared [IR] curing
- 2224/81871 . . . . . Visible light curing
- 2224/81874 . . . . . Ultraviolet [UV] curing
- 2224/81877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
- 2224/8188 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
- 2224/81885 . . . . . Combinations of two or more hardening methods provided for in at least two different groups from [H01L 2224/81855](#) - [H01L 2224/8188](#), e.g. for hybrid thermoplastic-thermosetting adhesives
- 2224/8189 . . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
- 2224/81893 . . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
- 2224/81894 . . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
- 2224/81895 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
- 2224/81896 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
- 2224/81897 . . . . . Mechanical interlocking, e.g. anchoring, hook and loop-type fastening or the like
- 2224/81898 . . . . . Press-fitting, i.e. pushing the parts together and fastening by friction, e.g. by compression of one part against the other
- 2224/81899 . . . . . using resilient parts in the bump connector or in the bonding area
- 2224/819 . . . . . with the bump connector not providing any mechanical bonding
- 2224/81901 . . . . . Pressing the bump connector against the bonding areas by means of another connector
- 2224/81902 . . . . . by means of another bump connector
- 2224/81903 . . . . . by means of a layer connector
- 2224/81904 . . . . . by means of an encapsulation layer or foil
- 2224/81905 . . . . . Combinations of bonding methods provided for in at least two different groups from [H01L 2224/818](#) - [H01L 2224/81904](#)
- 2224/81906 . . . . . Specific sequence of method steps
- 2224/81907 . . . . . Intermediate bonding, i.e. intermediate bonding step for temporarily bonding the semiconductor or solid-state body, followed by at least a further bonding step
- 2224/81908 . . . . . involving monitoring, e.g. feedback loop
- 2224/81909 . . . . . Post-treatment of the bump connector or bonding area
- 2224/8191 . . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/81911 . . . . . Chemical cleaning, e.g. etching, flux
- 2224/81912 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/81913 . . . . . Plasma cleaning
- 2224/81914 . . . . . Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
- 2224/81919 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8191](#) - [H01L 2224/81914](#)
- 2224/8192 . . . . . Applying permanent coating, e.g. protective coating
- 2224/8193 . . . . . Reshaping
- 2224/81931 . . . . . by chemical means, e.g. etching
- 2224/81935 . . . . . by heating means, e.g. reflowing
- 2224/81937 . . . . . using a polychromatic heating lamp
- 2224/81939 . . . . . using a laser
- 2224/81941 . . . . . Induction heating, i.e. eddy currents
- 2224/81943 . . . . . using a flame torch, e.g. hydrogen torch
- 2224/81945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/81947 . . . . . by mechanical means, e.g. "pull-and-cut", pressing, stamping
- 2224/81948 . . . . . Thermal treatments, e.g. annealing, controlled cooling
- 2224/81951 . . . . . Forming additional members, e.g. for reinforcing
- 2224/81986 . . . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/82 . . . . . by forming build-up interconnects at chip-level, e.g. for high density interconnects [HDI]
- 2224/82001 . . . . . involving a temporary auxiliary member not forming part of the bonding apparatus
- 2224/82002 . . . . . being a removable or sacrificial coating
- 2224/82005 . . . . . being a temporary or sacrificial substrate
- 2224/82007 . . . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting a build-up interconnect during or after the bonding process
- 2224/82009 . . . . . Pre-treatment of the connector or the bonding area
- 2224/8201 . . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/8203 . . . . . Reshaping, e.g. forming vias
- 2224/82031 . . . . . by chemical means, e.g. etching, anodisation
- 2224/82035 . . . . . by heating means
- 2224/82039 . . . . . using a laser
- 2224/82045 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/82047 . . . . . by mechanical means, e.g. severing, pressing, stamping

- 2224/82048 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/82051 . . . . Forming additional members
- 2224/82053 . . . . Bonding environment
- 2224/82054 . . . . Composition of the atmosphere
- 2224/82085 . . . . being a liquid, e.g. for fluidic self-assembly
- 2224/8209 . . . . Vacuum
- 2224/82091 . . . . Under pressure
- 2224/82095 . . . . Temperature settings
- 2224/82096 . . . . . Transient conditions
- 2224/82097 . . . . . Heating
- 2224/82098 . . . . . Cooling
- 2224/82099 . . . . . Ambient temperature
- 2224/821 . . . . Forming a build-up interconnect
- 2224/82101 . . . . by additive methods, e.g. direct writing
- 2224/82102 . . . . . using jetting, e.g. ink jet
- 2224/82103 . . . . . using laser direct writing
- 2224/82104 . . . . . using screen printing
- 2224/82105 . . . . . by using a preform
- 2224/82106 . . . . by subtractive methods
- 2224/82108 . . . . by self-assembly processes
- 2224/8211 . . . . involving protection against electrical discharge, e.g. removing electrostatic charge
- 2224/8212 . . . . Aligning
- 2224/82121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
- 2224/82122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
- 2224/8213 . . . . . using marks formed on the semiconductor or solid-state body
- 2224/82132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
- 2224/82136 . . . . involving guiding structures, e.g. spacers or supporting members
- 2224/82138 . . . . . the guiding structures being at least partially left in the finished device
- 2224/82143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
- 2224/82148 . . . . involving movement of a part of the bonding apparatus
- 2224/82149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
- 2224/8215 . . . . . Rotational movements
- 2224/8216 . . . . . Translational movements
- 2224/82169 . . . . . being the upper part of the bonding apparatus, e.g. nozzle
- 2224/8217 . . . . . Rotational movement
- 2224/8218 . . . . . Translational movements
- 2224/82181 . . . . . connecting first on the semiconductor or solid-state body, i.e. on-chip,
- 2224/82186 . . . . . connecting first outside the semiconductor or solid-state body, i.e. off-chip
- 2224/82191 . . . . . connecting first both on and outside the semiconductor or solid-state body
- 2224/822 . . . . Applying energy for connecting
- 2224/82201 . . . . Compression bonding
- 2224/82203 . . . . Thermocompression bonding
- 2224/82205 . . . . Ultrasonic bonding
- 2224/82207 . . . . . Thermosonic bonding
- 2224/8221 . . . . with energy being in the form of electromagnetic radiation
- 2224/82212 . . . . . Induction heating, i.e. eddy currents
- 2224/82214 . . . . . using a laser
- 2224/82223 . . . . . Polychromatic or infrared lamp heating
- 2224/82232 . . . . . using an autocatalytic reaction, e.g. exothermic brazing
- 2224/82234 . . . . using means for applying energy being within the device, e.g. integrated heater
- 2224/82236 . . . . using electro-static corona discharge
- 2224/82237 . . . . using electron beam
- 2224/82238 . . . . using electric resistance welding, i.e. ohmic heating
- 2224/8234 . . . . Bonding interfaces of the connector
- 2224/82345 . . . . Shape, e.g. interlocking features
- 2224/82355 . . . . having an external coating, e.g. protective bond-through coating
- 2224/82359 . . . . Material
- 2224/8236 . . . . Bonding interfaces of the semiconductor or solid state body
- 2224/82365 . . . . Shape, e.g. interlocking features
- 2224/82375 . . . . having an external coating, e.g. protective bond-through coating
- 2224/82379 . . . . Material
- 2224/8238 . . . . Bonding interfaces outside the semiconductor or solid-state body
- 2224/82385 . . . . Shape, e.g. interlocking features
- 2224/82395 . . . . having an external coating, e.g. protective bond-through coating
- 2224/82399 . . . . Material
- 2224/828 . . . . Bonding techniques
- 2224/82801 . . . . Soldering or alloying
- 2224/82805 . . . . . involving forming a eutectic alloy at the bonding interface
- 2224/8281 . . . . . involving forming an intermetallic compound at the bonding interface
- 2224/82815 . . . . . Reflow soldering
- 2224/8282 . . . . . Diffusion bonding
- 2224/82825 . . . . . Solid-liquid interdiffusion
- 2224/8283 . . . . . Solid-solid interdiffusion
- 2224/8284 . . . . Sintering
- 2224/8285 . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
- 2224/82855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
- 2224/82856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
- 2224/82859 . . . . . Localised curing of parts of the connector
- 2224/82862 . . . . . Heat curing
- 2224/82865 . . . . . Microwave curing
- 2224/82868 . . . . . Infrared [IR] curing
- 2224/82871 . . . . . Visible light curing
- 2224/82874 . . . . . Ultraviolet [UV] curing
- 2224/82877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
- 2224/8288 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives

- 2224/82885 . . . . Combinations of two or more hardening methods provided for in at least two different groups from [H01L 2224/82855](#) - [H01L 2224/82888](#), e.g. for hybrid thermoplastic-thermosetting adhesives
- 2224/82889 . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
- 2224/82893 . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
- 2224/82895 . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
- 2224/82896 . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
- 2224/82897 . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
- 2224/82899 . . . . Combinations of bonding methods provided for in at least two different groups from [H01L 2224/828](#) - [H01L 2224/82897](#)
- 2224/829 . . . involving monitoring, e.g. feedback loop
- 2224/82909 . . . Post-treatment of the connector or the bonding area
- 2224/8291 . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/8293 . . . . Reshaping
- 2224/82931 . . . . by chemical means, e.g. etching, anodisation
- 2224/82935 . . . . by heating means
- 2224/82939 . . . . using a laser
- 2224/82945 . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/82947 . . . . by mechanical means, e.g. severing, pressing, stamping
- 2224/82948 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/82951 . . . . Forming additional members
- 2224/82986 . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/83 . . using a layer connector
- 2224/83001 . . . involving a temporary auxiliary member not forming part of the bonding apparatus
- 2224/83002 . . . . being a removable or sacrificial coating
- 2224/83005 . . . . being a temporary or sacrificial substrate
- 2224/83007 . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the layer connector during or after the bonding process
- 2224/83009 . . . Pre-treatment of the layer connector or the bonding area
- 2224/8301 . . . . Cleaning the layer connector, e.g. oxide removal step, desmearing
- 2224/83011 . . . . Chemical cleaning, e.g. etching, flux
- 2224/83012 . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/83013 . . . . Plasma cleaning
- 2224/83014 . . . . Thermal cleaning, e.g. decomposition, sublimation
- 2224/83019 . . . . Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8301](#) - [H01L 2224/83014](#)
- 2224/8302 . . . . Applying permanent coating to the layer connector in the bonding apparatus, e.g. in-situ coating
- 2224/83022 . . . . Cleaning the bonding area, e.g. oxide removal step, desmearing
- 2224/83024 . . . . Applying flux to the bonding area
- 2224/83026 . . . . Applying a precursor material to the bonding area
- 2224/8303 . . . . Reshaping the layer connector in the bonding apparatus, e.g. flattening the layer connector
- 2224/83031 . . . . by chemical means, e.g. etching, anodisation
- 2224/83035 . . . . by heating means
- 2224/83037 . . . . using a polychromatic heating lamp
- 2224/83039 . . . . using a laser
- 2224/83041 . . . . Induction heating, i.e. eddy currents
- 2224/83047 . . . . by mechanical means, e.g. severing, pressing, stamping
- 2224/83048 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/83051 . . . . Forming additional members, e.g. dam structures
- 2224/83052 . . . Detaching layer connectors, e.g. after testing
- 2224/83053 . . . Bonding environment
- 2224/83054 . . . . Composition of the atmosphere
- 2224/83055 . . . . being oxidating
- 2224/83065 . . . . being reducing
- 2224/83075 . . . . being inert
- 2224/83085 . . . . being a liquid, e.g. for fluidic self-assembly
- 2224/8309 . . . . Vacuum
- 2224/83091 . . . . Under pressure
- 2224/83092 . . . . Atmospheric pressure
- 2224/83093 . . . . Transient conditions, e.g. gas-flow
- 2224/83095 . . . . Temperature settings
- 2224/83096 . . . . Transient conditions
- 2224/83097 . . . . Heating
- 2224/83098 . . . . Cooling
- 2224/83099 . . . . Ambient temperature
- 2224/831 . . . the layer connector being supplied to the parts to be connected in the bonding apparatus
- 2224/83101 . . . . as prepeg comprising a layer connector, e.g. provided in an insulating plate member
- 2224/83102 . . . . using surface energy, e.g. capillary forces
- 2224/83104 . . . . by applying pressure, e.g. by injection
- 2224/8311 . . . involving protection against electrical discharge, e.g. removing electrostatic charge
- 2224/8312 . . . Aligning
- 2224/83121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
- 2224/83122 . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
- 2224/83123 . . . . Shape or position of the body
- 2224/83125 . . . . Bonding areas on the body
- 2224/83127 . . . . Bonding areas outside the body
- 2224/83129 . . . . Shape or position of the other item
- 2224/8313 . . . . using marks formed on the semiconductor or solid-state body

- 2224/83132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
- 2224/83136 . . . . . involving guiding structures, e.g. spacers or supporting members
- 2224/83138 . . . . . the guiding structures being at least partially left in the finished device
- 2224/83139 . . . . . Guiding structures on the body
- 2224/8314 . . . . . Guiding structures outside the body
- 2224/83141 . . . . . Guiding structures both on and outside the body
- 2224/83143 . . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
- 2224/83148 . . . . . involving movement of a part of the bonding apparatus
- 2224/83149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
- 2224/8315 . . . . . Rotational movements
- 2224/8316 . . . . . Translational movements
- 2224/83169 . . . . . being the upper part of the bonding apparatus, i.e. bonding head
- 2224/8317 . . . . . Rotational movements
- 2224/8318 . . . . . Translational movements
- 2224/8319 . . . . . Arrangement of the layer connectors prior to mounting
- 2224/83191 . . . . . wherein the layer connectors are disposed only on the semiconductor or solid-state body
- 2224/83192 . . . . . wherein the layer connectors are disposed only on another item or body to be connected to the semiconductor or solid-state body
- 2224/83193 . . . . . wherein the layer connectors are disposed on both the semiconductor or solid-state body and another item or body to be connected to the semiconductor or solid-state body
- 2224/83194 . . . . . Lateral distribution of the layer connectors
- 2224/832 . . . . . Applying energy for connecting
- 2224/83201 . . . . . Compression bonding
- 2224/83203 . . . . . Thermocompression bonding, e.g. diffusion bonding, pressure joining, thermocompression welding or solid-state welding
- 2224/83204 . . . . . with a graded temperature profile
- 2224/83205 . . . . . Ultrasonic bonding
- 2224/83206 . . . . . Direction of oscillation
- 2224/83207 . . . . . Thermosonic bonding
- 2224/83208 . . . . . applying unidirectional static pressure
- 2224/83209 . . . . . applying isostatic pressure, e.g. degassing using vacuum or a pressurised liquid
- 2224/8321 . . . . . using a reflow oven
- 2224/83211 . . . . . with a graded temperature profile
- 2224/8322 . . . . . with energy being in the form of electromagnetic radiation
- 2224/83222 . . . . . Induction heating, i.e. eddy currents
- 2224/83224 . . . . . using a laser
- 2224/8323 . . . . . Polychromatic or infrared lamp heating
- 2224/83232 . . . . . using an autocatalytic reaction, e.g. exothermic brazing
- 2224/83234 . . . . . using means for applying energy being within the device, e.g. integrated heater
- 2224/83236 . . . . . using electro-static corona discharge
- 2224/83237 . . . . . using an electron beam
- 2224/83238 . . . . . using electric resistance welding, i.e. ohmic heating
- 2224/8334 . . . . . Bonding interfaces of the layer connector
- 2224/83345 . . . . . Shape, e.g. interlocking features
- 2224/83355 . . . . . having an external coating, e.g. protective bond-through coating
- 2224/83359 . . . . . Material
- 2224/8336 . . . . . Bonding interfaces of the semiconductor or solid state body
- 2224/83365 . . . . . Shape, e.g. interlocking features
- 2224/83375 . . . . . having an external coating, e.g. protective bond-through coating
- 2224/83379 . . . . . Material
- 2224/8338 . . . . . Bonding interfaces outside the semiconductor or solid-state body
- 2224/83385 . . . . . Shape, e.g. interlocking features
- 2224/83395 . . . . . having an external coating, e.g. protective bond-through coating
- 2224/83399 . . . . . Material
- 2224/834 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
- 2224/83401 . . . . . the principal constituent melting at a temperature of less than 400°C
- 2224/83405 . . . . . Gallium [Ga] as principal constituent
- 2224/83409 . . . . . Indium [In] as principal constituent
- 2224/83411 . . . . . Tin [Sn] as principal constituent
- 2224/83413 . . . . . Bismuth [Bi] as principal constituent
- 2224/83414 . . . . . Thallium [Tl] as principal constituent
- 2224/83416 . . . . . Lead [Pb] as principal constituent
- 2224/83417 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
- 2224/83418 . . . . . Zinc [Zn] as principal constituent
- 2224/8342 . . . . . Antimony [Sb] as principal constituent
- 2224/83423 . . . . . Magnesium [Mg] as principal constituent
- 2224/83424 . . . . . Aluminium [Al] as principal constituent
- 2224/83438 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
- 2224/83439 . . . . . Silver [Ag] as principal constituent
- 2224/83444 . . . . . Gold [Au] as principal constituent
- 2224/83447 . . . . . Copper [Cu] as principal constituent
- 2224/83449 . . . . . Manganese [Mn] as principal constituent
- 2224/83455 . . . . . Nickel [Ni] as principal constituent
- 2224/83457 . . . . . Cobalt [Co] as principal constituent
- 2224/8346 . . . . . Iron [Fe] as principal constituent
- 2224/83463 . . . . . the principal constituent melting at a temperature of greater than 1550°C
- 2224/83464 . . . . . Palladium [Pd] as principal constituent
- 2224/83466 . . . . . Titanium [Ti] as principal constituent
- 2224/83469 . . . . . Platinum [Pt] as principal constituent
- 2224/8347 . . . . . Zirconium [Zr] as principal constituent

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2224/83471 . . . . .	Chromium [Cr] as principal constituent	2224/83518 . . . . .	Zinc [Zn] as principal constituent
2224/83472 . . . . .	Vanadium [V] as principal constituent	2224/8352 . . . . .	Antimony [Sb] as principal constituent
2224/83473 . . . . .	Rhodium [Rh] as principal constituent	2224/83523 . . . . .	Magnesium [Mg] as principal constituent
2224/83476 . . . . .	Ruthenium [Ru] as principal constituent	2224/83524 . . . . .	Aluminium [Al] as principal constituent
2224/83478 . . . . .	Iridium [Ir] as principal constituent	2224/83538 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/83479 . . . . .	Niobium [Nb] as principal constituent	2224/83539 . . . . .	Silver [Ag] as principal constituent
2224/8348 . . . . .	Molybdenum [Mo] as principal constituent	2224/83544 . . . . .	Gold [Au] as principal constituent
2224/83481 . . . . .	Tantalum [Ta] as principal constituent	2224/83547 . . . . .	Copper [Cu] as principal constituent
2224/83483 . . . . .	Rhenium [Re] as principal constituent	2224/83549 . . . . .	Manganese [Mn] as principal constituent
2224/83484 . . . . .	Tungsten [W] as principal constituent	2224/83555 . . . . .	Nickel [Ni] as principal constituent
2224/83486 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/83557 . . . . .	Cobalt [Co] as principal constituent
2224/83487 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/8356 . . . . .	Iron [Fe] as principal constituent
2224/83488 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/83563 . . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/8349 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/83564 . . . . .	Palladium [Pd] as principal constituent
2224/83491 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/83566 . . . . .	Titanium [Ti] as principal constituent
2224/83493 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/834</a> - <a href="#">H01L 2224/83491</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/83569 . . . . .	Platinum [Pt] as principal constituent
2224/83494 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/834</a> - <a href="#">H01L 2224/83491</a>	2224/8357 . . . . .	Zirconium [Zr] as principal constituent
2224/83495 . . . . .	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/834</a> - <a href="#">H01L 2224/83491</a>	2224/83571 . . . . .	Chromium [Cr] as principal constituent
2224/83498 . . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/83572 . . . . .	Vanadium [V] as principal constituent
2224/83499 . . . . .	Material of the matrix	2224/83573 . . . . .	Rhodium [Rh] as principal constituent
2224/835 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/83576 . . . . .	Ruthenium [Ru] as principal constituent
2224/83501 . . . . .	the principal constituent melting at a temperature of less than 400°C	2224/83578 . . . . .	Iridium [Ir] as principal constituent
2224/83505 . . . . .	Gallium [Ga] as principal constituent	2224/83579 . . . . .	Niobium [Nb] as principal constituent
2224/83509 . . . . .	Indium [In] as principal constituent	2224/8358 . . . . .	Molybdenum [Mo] as principal constituent
2224/83511 . . . . .	Tin [Sn] as principal constituent	2224/83581 . . . . .	Tantalum [Ta] as principal constituent
2224/83513 . . . . .	Bismuth [Bi] as principal constituent	2224/83583 . . . . .	Rhenium [Re] as principal constituent
2224/83514 . . . . .	Thallium [Tl] as principal constituent	2224/83584 . . . . .	Tungsten [W] as principal constituent
2224/83516 . . . . .	Lead [Pb] as principal constituent	2224/83586 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/83517 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/83587 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
		2224/83588 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides

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2224/8359	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/83647	Copper [Cu] as principal constituent
2224/83591	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/83649	Manganese [Mn] as principal constituent
2224/83593	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/835</a> - <a href="#">H01L 2224/83591</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/83655	Nickel [Ni] as principal constituent
2224/83594	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/835</a> - <a href="#">H01L 2224/83591</a>	2224/83657	Cobalt [Co] as principal constituent
2224/83595	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/835</a> - <a href="#">H01L 2224/83591</a>	2224/8366	Iron [Fe] as principal constituent
2224/83598	Fillers	2224/83663	the principal constituent melting at a temperature of greater than 1550°C
2224/83599	Base material	2224/83664	Palladium [Pd] as principal constituent
2224/836	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/83666	Titanium [Ti] as principal constituent
2224/83601	the principal constituent melting at a temperature of less than 400°C	2224/83669	Platinum [Pt] as principal constituent
2224/83605	Gallium [Ga] as principal constituent	2224/8367	Zirconium [Zr] as principal constituent
2224/83609	Indium [In] as principal constituent	2224/83671	Chromium [Cr] as principal constituent
2224/83611	Tin [Sn] as principal constituent	2224/83672	Vanadium [V] as principal constituent
2224/83613	Bismuth [Bi] as principal constituent	2224/83673	Rhodium [Rh] as principal constituent
2224/83614	Thallium [Tl] as principal constituent	2224/83676	Ruthenium [Ru] as principal constituent
2224/83616	Lead [Pb] as principal constituent	2224/83678	Iridium [Ir] as principal constituent
2224/83617	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/83679	Niobium [Nb] as principal constituent
2224/83618	Zinc [Zn] as principal constituent	2224/8368	Molybdenum [Mo] as principal constituent
2224/8362	Antimony [Sb] as principal constituent	2224/83681	Tantalum [Ta] as principal constituent
2224/83623	Magnesium [Mg] as principal constituent	2224/83683	Rhenium [Re] as principal constituent
2224/83624	Aluminium [Al] as principal constituent	2224/83684	Tungsten [W] as principal constituent
2224/83638	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/83686	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/83639	Silver [Ag] as principal constituent	2224/83687	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/83644	Gold [Au] as principal constituent	2224/83688	Glasses, e.g. amorphous oxides, nitrides or fluorides
		2224/8369	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
		2224/83691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
		2224/83693	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/836</a> - <a href="#">H01L 2224/83691</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond

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2224/83694	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/836</a> - <a href="#">H01L 2224/83691</a>	2224/8376	Iron [Fe] as principal constituent
2224/83695	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/836</a> - <a href="#">H01L 2224/83691</a>	2224/83763	the principal constituent melting at a temperature of greater than 1550°C
2224/83698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/83764	Palladium [Pd] as principal constituent
2224/83699	Coating material	2224/83766	Titanium [Ti] as principal constituent
2224/837	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/83769	Platinum [Pt] as principal constituent
2224/83701	the principal constituent melting at a temperature of less than 400°C	2224/8377	Zirconium [Zr] as principal constituent
2224/83705	Gallium [Ga] as principal constituent	2224/83771	Chromium [Cr] as principal constituent
2224/83709	Indium [In] as principal constituent	2224/83772	Vanadium [V] as principal constituent
2224/83711	Tin [Sn] as principal constituent	2224/83773	Rhodium [Rh] as principal constituent
2224/83713	Bismuth [Bi] as principal constituent	2224/83776	Ruthenium [Ru] as principal constituent
2224/83714	Thallium [Tl] as principal constituent	2224/83778	Iridium [Ir] as principal constituent
2224/83716	Lead [Pb] as principal constituent	2224/83779	Niobium [Nb] as principal constituent
2224/83717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/8378	Molybdenum [Mo] as principal constituent
2224/83718	Zinc [Zn] as principal constituent	2224/83781	Tantalum [Ta] as principal constituent
2224/8372	Antimony [Sb] as principal constituent	2224/83783	Rhenium [Re] as principal constituent
2224/83723	Magnesium [Mg] as principal constituent	2224/83784	Tungsten [W] as principal constituent
2224/83724	Aluminium [Al] as principal constituent	2224/83786	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/83738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/83787	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/83739	Silver [Ag] as principal constituent	2224/83788	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/83744	Gold [Au] as principal constituent	2224/8379	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/83747	Copper [Cu] as principal constituent	2224/83791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/83749	Manganese [Mn] as principal constituent	2224/83793	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/837</a> - <a href="#">H01L 2224/83791</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/83755	Nickel [Ni] as principal constituent	2224/83794	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/837</a> - <a href="#">H01L 2224/83791</a>
2224/83757	Cobalt [Co] as principal constituent	2224/83795	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/837</a> - <a href="#">H01L 2224/83791</a>

- 2224/83798 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
- 2224/83799 . . . . . Shape or distribution of the fillers
- 2224/838 . . . . . Bonding techniques
- 2224/83801 . . . . . Soldering or alloying
- 2224/83805 . . . . . involving forming a eutectic alloy at the bonding interface
- 2224/8381 . . . . . involving forming an intermetallic compound at the bonding interface
- 2224/83815 . . . . . Reflow soldering
- 2224/8382 . . . . . Diffusion bonding
- 2224/83825 . . . . . Solid-liquid interdiffusion
- 2224/8383 . . . . . Solid-solid interdiffusion
- 2224/8384 . . . . . Sintering
- 2224/8385 . . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
- 2224/83851 . . . . . being an anisotropic conductive adhesive
- 2224/83855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
- 2224/83856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
- 2224/83859 . . . . . Localised curing of parts of the layer connector
- 2224/83862 . . . . . Heat curing
- 2224/83865 . . . . . Microwave curing
- 2224/83868 . . . . . Infrared [IR] curing
- 2224/83871 . . . . . Visible light curing
- 2224/83874 . . . . . Ultraviolet [UV] curing
- 2224/83877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
- 2224/8388 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
- 2224/83885 . . . . . Combinations of two or more hardening methods provided for in at least two different groups from [H01L 2224/83855](#) - [H01L 2224/8388](#), e.g. for hybrid thermoplastic-thermosetting adhesives
- 2224/83886 . . . . . Involving a self-assembly process, e.g. self-agglomeration of a material dispersed in a fluid
- 2224/83887 . . . . . Auxiliary means therefor, e.g. for self-assembly activation
- 2224/83888 . . . . . with special adaptation of the surface of the body to be connected, e.g. surface shape specially adapted for the self-assembly process
- 2224/83889 . . . . . involving the material of the bonding area, e.g. bonding pad
- 2224/8389 . . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
- 2224/83893 . . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
- 2224/83894 . . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
- 2224/83895 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
- 2224/83896 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
- 2224/83897 . . . . . Mechanical interlocking, e.g. anchoring, hook and loop-type fastening or the like
- 2224/83898 . . . . . Press-fitting, i.e. pushing the parts together and fastening by friction, e.g. by compression of one part against the other
- 2224/83899 . . . . . using resilient parts in the layer connector or in the bonding area
- 2224/839 . . . . . with the layer connector not providing any mechanical bonding
- 2224/83901 . . . . . Pressing the layer connector against the bonding areas by means of another connector
- 2224/83902 . . . . . by means of another layer connector
- 2224/83903 . . . . . by means of a bump connector
- 2224/83904 . . . . . by means of an encapsulation layer or foil
- 2224/83905 . . . . . Combinations of bonding methods provided for in at least two different groups from [H01L 2224/838](#) - [H01L 2224/83904](#)
- 2224/83906 . . . . . Specific sequence of method steps
- 2224/83907 . . . . . Intermediate bonding, i.e. intermediate bonding step for temporarily bonding the semiconductor or solid-state body, followed by at least a further bonding step
- 2224/83908 . . . . . involving monitoring, e.g. feedback loop
- 2224/83909 . . . . . Post-treatment of the layer connector or bonding area
- 2224/8391 . . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/83911 . . . . . Chemical cleaning, e.g. etching, flux
- 2224/83912 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/83913 . . . . . Plasma cleaning
- 2224/83914 . . . . . Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
- 2224/83919 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8391](#) - [H01L 2224/83914](#)
- 2224/8392 . . . . . Applying permanent coating, e.g. protective coating
- 2224/8393 . . . . . Reshaping
- 2224/83931 . . . . . by chemical means, e.g. etching
- 2224/83935 . . . . . by heating means, e.g. reflowing
- 2224/83937 . . . . . using a polychromatic heating lamp
- 2224/83939 . . . . . using a laser
- 2224/83941 . . . . . Induction heating, i.e. eddy currents
- 2224/83943 . . . . . using a flame torch, e.g. hydrogen torch
- 2224/83945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/83947 . . . . . by mechanical means, e.g. "pull-and-cut", pressing, stamping
- 2224/83948 . . . . . Thermal treatments, e.g. annealing, controlled cooling
- 2224/83951 . . . . . Forming additional members, e.g. for reinforcing, fillet sealant

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- 2224/83986 . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/84 . . . using a strap connector
- 2224/84001 . . . involving a temporary auxiliary member not forming part of the bonding apparatus
- 2224/84002 . . . . . being a removable or sacrificial coating
- 2224/84005 . . . . . being a temporary substrate
- 2224/84007 . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the strap connector during or after the bonding process
- 2224/84009 . . . Pre-treatment of the connector and/or the bonding area
- 2224/8401 . . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/84011 . . . . . Chemical cleaning, e.g. etching, flux
- 2224/84012 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/84013 . . . . . Plasma cleaning
- 2224/84014 . . . . . Thermal cleaning, e.g. decomposition, sublimation
- 2224/84019 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8401](#) - [H01L 2224/84014](#)
- 2224/8402 . . . . . Applying permanent coating, e.g. in-situ coating
- 2224/8403 . . . . . Reshaping
- 2224/84031 . . . . . by chemical means, e.g. etching, anodisation
- 2224/84035 . . . . . by heating means, e.g. "free-air-ball"
- 2224/84037 . . . . . using a polychromatic heating lamp
- 2224/84039 . . . . . using a laser
- 2224/84041 . . . . . Induction heating, i.e. eddy currents
- 2224/84043 . . . . . using a flame torch, e.g. hydrogen torch
- 2224/84045 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/84047 . . . . . by mechanical means, e.g. severing, pressing, stamping
- 2224/84048 . . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/84051 . . . . . Forming additional members
- 2224/84053 . . . Bonding environment
- 2224/84054 . . . Composition of the atmosphere
- 2224/84055 . . . . . being oxidating
- 2224/84065 . . . . . being reducing
- 2224/84075 . . . . . being inert
- 2224/84085 . . . . . being a liquid (e.g. for fluidic self-assembly)
- 2224/8409 . . . . . Vacuum
- 2224/84091 . . . . . Under pressure
- 2224/84092 . . . . . Atmospheric pressure
- 2224/84093 . . . . . Transient conditions, e.g. gas-flow
- 2224/84095 . . . . . Temperature settings
- 2224/84096 . . . . . Transient conditions
- 2224/84097 . . . . . Heating
- 2224/84098 . . . . . Cooling
- 2224/84099 . . . . . Ambient temperature
- 2224/841 . . . the connector being supplied to the parts to be connected in the bonding apparatus
- 2224/8411 . . . involving protection against electrical discharge, e.g. removing electrostatic charge
- 2224/8412 . . . Aligning
- 2224/84121 . . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
- 2224/84122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
- 2224/84123 . . . . . Shape or position of the body
- 2224/84125 . . . . . Bonding areas on the body
- 2224/84127 . . . . . Bonding areas outside the body
- 2224/84129 . . . . . Shape or position of the other item
- 2224/8413 . . . . . using marks formed on the semiconductor or solid-state body
- 2224/84132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
- 2224/84136 . . . . . involving guiding structures, e.g. spacers or supporting members
- 2224/84138 . . . . . the guiding structures being at least partially left in the finished device
- 2224/84143 . . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
- 2224/84148 . . . . . involving movement of a part of the bonding apparatus
- 2224/84149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
- 2224/8415 . . . . . Rotational movements
- 2224/8416 . . . . . Translational movements
- 2224/84169 . . . . . being the upper part of the bonding apparatus, i.e. bonding head,
- 2224/8417 . . . . . Rotational movements
- 2224/8418 . . . . . Translational movements
- 2224/84181 . . . . . connecting first on the semiconductor or solid-state body, i.e. on-chip, regular stitch
- 2224/84186 . . . . . connecting first outside the semiconductor or solid-state body, i.e. off-chip, reverse stitch
- 2224/84191 . . . . . connecting first both on and outside the semiconductor or solid-state body, i.e. regular and reverse stitches
- 2224/84196 . . . . . involving intermediate connecting steps before cutting the strap connector
- 2224/842 . . . Applying energy for connecting
- 2224/84201 . . . . . Compression bonding
- 2224/84203 . . . . . Thermocompression bonding
- 2224/84205 . . . . . Ultrasonic bonding
- 2224/84206 . . . . . Direction of oscillation
- 2224/84207 . . . . . Thermosonic bonding
- 2224/8421 . . . . . with energy being in the form of electromagnetic radiation
- 2224/84212 . . . . . Induction heating, i.e. eddy currents
- 2224/84214 . . . . . using a laser
- 2224/8423 . . . . . Polychromatic or infrared lamp heating
- 2224/84232 . . . . . using an autocatalytic reaction, e.g. exothermic brazing
- 2224/84234 . . . . . using means for applying energy being within the device, e.g. integrated heater
- 2224/84236 . . . . . using electro-static corona discharge
- 2224/84237 . . . . . using an electron beam
- 2224/84238 . . . . . using electric resistance welding, i.e. ohmic heating

2224/8434	. . . Bonding interfaces of the connector	2224/84476	. . . . . Ruthenium [Ru] as principal constituent
2224/84345	. . . . Shape, e.g. interlocking features	2224/84478	. . . . . Iridium [Ir] as principal constituent
2224/84355	. . . . having an external coating, e.g. protective bond-through coating	2224/84479	. . . . . Niobium [Nb] as principal constituent
2224/84359	. . . . Material	2224/8448	. . . . . Molybdenum [Mo] as principal constituent
2224/8436	. . . Bonding interfaces of the semiconductor or solid state body	2224/84481	. . . . . Tantalum [Ta] as principal constituent
2224/84365	. . . . Shape, e.g. interlocking features	2224/84483	. . . . . Rhenium [Re] as principal constituent
2224/84375	. . . . having an external coating, e.g. protective bond-through coating	2224/84484	. . . . . Tungsten [W] as principal constituent
2224/84379	. . . . Material	2224/84486	. . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/8438	. . . Bonding interfaces outside the semiconductor or solid-state body	2224/84487	. . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/84385	. . . . Shape, e.g. interlocking features	2224/84488	. . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/84395	. . . . having an external coating, e.g. protective bond-through coating	2224/8449	. . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/84399	. . . . Material	2224/84491	. . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/844	. . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof	2224/84493	. . . . . with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/844</a> - <a href="#">H01L 2224/84491</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/84401	. . . . . the principal constituent melting at a temperature of less than 400°C	2224/84494	. . . . . with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/844</a> - <a href="#">H01L 2224/84491</a>
2224/84405	. . . . . Gallium [Ga] as principal constituent	2224/84495	. . . . . with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/844</a> - <a href="#">H01L 2224/84491</a>
2224/84409	. . . . . Indium [In] as principal constituent	2224/84498	. . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/84411	. . . . . Tin [Sn] as principal constituent	2224/84499	. . . . . Material of the matrix
2224/84413	. . . . . Bismuth [Bi] as principal constituent	2224/845	. . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/84414	. . . . . Thallium [Tl] as principal constituent	2224/84501	. . . . . the principal constituent melting at a temperature of less than 400°C
2224/84416	. . . . . Lead [Pb] as principal constituent	2224/84505	. . . . . Gallium [Ga] as principal constituent
2224/84417	. . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/84509	. . . . . Indium [In] as principal constituent
2224/84418	. . . . . Zinc [Zn] as principal constituent	2224/84511	. . . . . Tin [Sn] as principal constituent
2224/8442	. . . . . Antimony [Sb] as principal constituent	2224/84513	. . . . . Bismuth [Bi] as principal constituent
2224/84423	. . . . . Magnesium [Mg] as principal constituent	2224/84514	. . . . . Thallium [Tl] as principal constituent
2224/84424	. . . . . Aluminium [Al] as principal constituent	2224/84516	. . . . . Lead [Pb] as principal constituent
2224/84438	. . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/84517	. . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/84439	. . . . . Silver [Ag] as principal constituent	2224/84518	. . . . . Zinc [Zn] as principal constituent
2224/84444	. . . . . Gold [Au] as principal constituent	2224/8452	. . . . . Antimony [Sb] as principal constituent
2224/84447	. . . . . Copper [Cu] as principal constituent		
2224/84449	. . . . . Manganese [Mn] as principal constituent		
2224/84455	. . . . . Nickel [Ni] as principal constituent		
2224/84457	. . . . . Cobalt [Co] as principal constituent		
2224/8446	. . . . . Iron [Fe] as principal constituent		
2224/84463	. . . . . the principal constituent melting at a temperature of greater than 1550°C		
2224/84464	. . . . . Palladium [Pd] as principal constituent		
2224/84466	. . . . . Titanium [Ti] as principal constituent		
2224/84469	. . . . . Platinum [Pt] as principal constituent		
2224/8447	. . . . . Zirconium [Zr] as principal constituent		
2224/84471	. . . . . Chromium [Cr] as principal constituent		
2224/84472	. . . . . Vanadium [V] as principal constituent		
2224/84473	. . . . . Rhodium [Rh] as principal constituent		

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2224/84523	.....	Magnesium [Mg] as principal constituent	2224/84591	.....	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/84524	.....	Aluminium [Al] as principal constituent	2224/84593	.....	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/845</a> - <a href="#">H01L 2224/84591</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/84538	.....	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/84594	.....	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/845</a> - <a href="#">H01L 2224/84591</a>
2224/84539	.....	Silver [Ag] as principal constituent	2224/84595	.....	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/845</a> - <a href="#">H01L 2224/84591</a>
2224/84544	.....	Gold [Au] as principal constituent	2224/84598	.....	Fillers
2224/84547	.....	Copper [Cu] as principal constituent	2224/84599	.....	Base material
2224/84549	.....	Manganese [Mn] as principal constituent	2224/846	.....	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/84555	.....	Nickel [Ni] as principal constituent	2224/84601	.....	the principal constituent melting at a temperature of less than 400°C
2224/84557	.....	Cobalt [Co] as principal constituent	2224/84605	.....	Gallium [Ga] as principal constituent
2224/8456	.....	Iron [Fe] as principal constituent	2224/84609	.....	Indium [In] as principal constituent
2224/84563	.....	the principal constituent melting at a temperature of greater than 1550°C	2224/84611	.....	Tin [Sn] as principal constituent
2224/84564	.....	Palladium [Pd] as principal constituent	2224/84613	.....	Bismuth [Bi] as principal constituent
2224/84566	.....	Titanium [Ti] as principal constituent	2224/84614	.....	Thallium [Tl] as principal constituent
2224/84569	.....	Platinum [Pt] as principal constituent	2224/84616	.....	Lead [Pb] as principal constituent
2224/8457	.....	Zirconium [Zr] as principal constituent	2224/84617	.....	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/84571	.....	Chromium [Cr] as principal constituent	2224/84618	.....	Zinc [Zn] as principal constituent
2224/84572	.....	Vanadium [V] as principal constituent	2224/8462	.....	Antimony [Sb] as principal constituent
2224/84573	.....	Rhodium [Rh] as principal constituent	2224/84623	.....	Magnesium [Mg] as principal constituent
2224/84576	.....	Ruthenium [Ru] as principal constituent	2224/84624	.....	Aluminium [Al] as principal constituent
2224/84578	.....	Iridium [Ir] as principal constituent	2224/84638	.....	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/84579	.....	Niobium [Nb] as principal constituent	2224/84639	.....	Silver [Ag] as principal constituent
2224/8458	.....	Molybdenum [Mo] as principal constituent	2224/84644	.....	Gold [Au] as principal constituent
2224/84581	.....	Tantalum [Ta] as principal constituent	2224/84647	.....	Copper [Cu] as principal constituent
2224/84583	.....	Rhenium [Re] as principal constituent	2224/84649	.....	Manganese [Mn] as principal constituent
2224/84584	.....	Tungsten [W] as principal constituent			
2224/84586	.....	with a principal constituent of the material being a non metallic, non metalloid inorganic material			
2224/84587	.....	Ceramics, e.g. crystalline carbides, nitrides or oxides			
2224/84588	.....	Glasses, e.g. amorphous oxides, nitrides or fluorides			
2224/8459	.....	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy			

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2224/84655	...	Nickel [Ni] as principal constituent	2224/84695	...	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/846</a> - <a href="#">H01L 2224/84691</a>
2224/84657	...	Cobalt [Co] as principal constituent	2224/84698	...	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/84666	...	Iron [Fe] as principal constituent	2224/84699	...	Coating material
2224/84663	...	the principal constituent melting at a temperature of greater than 1550°C	2224/847	...	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2224/84664	...	Palladium [Pd] as principal constituent	2224/84701	...	the principal constituent melting at a temperature of less than 400°C
2224/84666	...	Titanium [Ti] as principal constituent	2224/84705	...	Gallium [Ga] as principal constituent
2224/84669	...	Platinum [Pt] as principal constituent	2224/84709	...	Indium [In] as principal constituent
2224/8467	...	Zirconium [Zr] as principal constituent	2224/84711	...	Tin [Sn] as principal constituent
2224/84671	...	Chromium [Cr] as principal constituent	2224/84713	...	Bismuth [Bi] as principal constituent
2224/84672	...	Vanadium [V] as principal constituent	2224/84714	...	Thallium [Tl] as principal constituent
2224/84673	...	Rhodium [Rh] as principal constituent	2224/84716	...	Lead [Pb] as principal constituent
2224/84676	...	Ruthenium [Ru] as principal constituent	2224/84717	...	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/84678	...	Iridium [Ir] as principal constituent	2224/84718	...	Zinc [Zn] as principal constituent
2224/84679	...	Niobium [Nb] as principal constituent	2224/8472	...	Antimony [Sb] as principal constituent
2224/8468	...	Molybdenum [Mo] as principal constituent	2224/84723	...	Magnesium [Mg] as principal constituent
2224/84681	...	Tantalum [Ta] as principal constituent	2224/84724	...	Aluminium [Al] as principal constituent
2224/84683	...	Rhenium [Re] as principal constituent	2224/84738	...	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/84684	...	Tungsten [W] as principal constituent	2224/84739	...	Silver [Ag] as principal constituent
2224/84686	...	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/84744	...	Gold [Au] as principal constituent
2224/84687	...	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/84747	...	Copper [Cu] as principal constituent
2224/84688	...	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/84749	...	Manganese [Mn] as principal constituent
2224/8469	...	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/84755	...	Nickel [Ni] as principal constituent
2224/84691	...	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/84757	...	Cobalt [Co] as principal constituent
2224/84693	...	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/846</a> - <a href="#">H01L 2224/84691</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/8476	...	Iron [Fe] as principal constituent
2224/84694	...	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/846</a> - <a href="#">H01L 2224/84691</a>	2224/84763	...	the principal constituent melting at a temperature of greater than 1550°C

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2224/84764	...	Palladium [Pd] as principal constituent	2224/84801	...	Soldering or alloying
2224/84766	...	Titanium [Ti] as principal constituent	2224/84805	...	involving forming a eutectic alloy at the bonding interface
2224/84769	...	Platinum [Pt] as principal constituent	2224/8481	...	involving forming an intermetallic compound at the bonding interface
2224/8477	...	Zirconium [Zr] as principal constituent	2224/84815	...	Reflow soldering
2224/84771	...	Chromium [Cr] as principal constituent	2224/8482	...	Diffusion bonding
2224/84772	...	Vanadium [V] as principal constituent	2224/84825	...	Solid-liquid interdiffusion
2224/84773	...	Rhodium [Rh] as principal constituent	2224/8483	...	Solid-solid interdiffusion
2224/84776	...	Ruthenium [Ru] as principal constituent	2224/8484	...	Sintering
2224/84778	...	Iridium [Ir] as principal constituent	2224/8485	...	using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/84779	...	Niobium [Nb] as principal constituent	2224/84855	...	Hardening the adhesive by curing, i.e. thermosetting
2224/8478	...	Molybdenum [Mo] as principal constituent	2224/84856	...	Pre-cured adhesive, i.e. B-stage adhesive
2224/84781	...	Tantalum [Ta] as principal constituent	2224/84859	...	Localised curing of parts of the connector
2224/84783	...	Rhenium [Re] as principal constituent	2224/84862	...	Heat curing
2224/84784	...	Tungsten [W] as principal constituent	2224/84865	...	Microwave curing
2224/84786	...	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/84868	...	Infrared [IR] curing
2224/84787	...	Ceramics, e.g. crystalline carbides, nitrides or oxides	2224/84871	...	Visible light curing
2224/84788	...	Glasses, e.g. amorphous oxides, nitrides or fluorides	2224/84874	...	Ultraviolet [UV] curing
2224/8479	...	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy	2224/84877	...	Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/84791	...	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene	2224/8488	...	Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
2224/84793	...	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/847</a> - <a href="#">H01L 2224/84791</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond	2224/84885	...	Combinations of two or more hardening methods provided for in at least two different groups from <a href="#">H01L 2224/84855</a> - <a href="#">H01L 2224/8488</a> , e.g. for hybrid thermoplastic-thermosetting adhesives
2224/84794	...	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/847</a> - <a href="#">H01L 2224/84791</a>	2224/8489	...	using an inorganic non metallic glass type adhesive, e.g. solder glass
2224/84795	...	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/847</a> - <a href="#">H01L 2224/84791</a>	2224/84893	...	Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
2224/84798	...	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams	2224/84895	...	Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
2224/84799	...	Shape or distribution of the fillers	2224/84897	...	between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
2224/848	...	Bonding techniques	2224/84898	...	between electrically insulating surfaces, e.g. oxide or nitride layersg
			2224/84899	...	Combinations of bonding methods provided for in at least two different groups from <a href="#">H01L 2224/848</a> - <a href="#">H01L 2224/84898</a>
			2224/849	...	involving monitoring, e.g. feedback loop
			2224/84909	...	Post-treatment of the connector or bonding area
			2224/8491	...	Cleaning, e.g. oxide removal step, desmearing
			2224/84911	...	Chemical cleaning, e.g. etching, flux
			2224/84912	...	Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
			2224/84913	...	Plasma cleaning
			2224/84914	...	Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge

- 2224/84919 . . . . Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8491](#) - [H01L 2224/84914](#)
- 2224/8492 . . . . Applying permanent coating, e.g. protective coating
- 2224/8493 . . . . Reshaping, e.g. for severing the strap, modifying the loop shape
- 2224/84931 . . . . by chemical means, e.g. etching
- 2224/84935 . . . . by heating means, e.g. reflowing
- 2224/84937 . . . . using a polychromatic heating lamp
- 2224/84939 . . . . using a laser
- 2224/84941 . . . . Induction heating, i.e. eddy currents
- 2224/84943 . . . . using a flame torch, e.g. hydrogen torch
- 2224/84945 . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/84947 . . . . by mechanical means, e.g. pressing, stamping
- 2224/84948 . . . . Thermal treatments, e.g. annealing, controlled cooling
- 2224/84951 . . . . Forming additional members, e.g. for reinforcing
- 2224/84986 . . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/85 . . . . using a wire connector
- 2224/85001 . . . . involving a temporary auxiliary member not forming part of the bonding apparatus, e.g. removable or sacrificial coating, film or substrate
- 2224/85002 . . . . being a removable or sacrificial coating
- 2224/85005 . . . . being a temporary or sacrificial substrate
- 2224/85007 . . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the wire connector during or after the bonding process
- 2224/85009 . . . . Pre-treatment of the connector or the bonding area
- 2224/8501 . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/85011 . . . . Chemical cleaning, e.g. etching, flux
- 2224/85012 . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/85013 . . . . Plasma cleaning
- 2224/85014 . . . . Thermal cleaning, e.g. decomposition, sublimation
- 2224/85016 . . . . using a laser
- 2224/85017 . . . . Electron beam cleaning
- 2224/85019 . . . . Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8501](#) - [H01L 2224/85014](#)
- 2224/8502 . . . . Applying permanent coating, e.g. in-situ coating
- 2224/8503 . . . . Reshaping, e.g. forming the ball or the wedge of the wire connector
- 2224/85031 . . . . by chemical means, e.g. etching, anodisation
- 2224/85035 . . . . by heating means, e.g. "free-air-ball"
- 2224/85037 . . . . using a polychromatic heating lamp
- 2224/85039 . . . . using a laser
- 2224/85041 . . . . Induction heating, i.e. eddy currents
- 2224/85043 . . . . using a flame torch, e.g. hydrogen torch
- 2224/85045 . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/85047 . . . . by mechanical means, e.g. severing, pressing, stamping
- 2224/85048 . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/85051 . . . . Forming additional members, e.g. for "wedge-on-ball", "ball-on-wedge", "ball-on-ball" connections
- 2224/85053 . . . . Bonding environment
- 2224/85054 . . . . Composition of the atmosphere
- 2224/85055 . . . . being oxidating
- 2224/85065 . . . . being reducing
- 2224/85075 . . . . being inert
- 2224/85085 . . . . being a liquid, e.g. for fluidic self-assembly
- 2224/8509 . . . . Vacuum
- 2224/85091 . . . . Under pressure
- 2224/85092 . . . . Atmospheric pressure
- 2224/85093 . . . . Transient conditions, e.g. gas-flow
- 2224/85095 . . . . Temperature settings
- 2224/85096 . . . . Transient conditions
- 2224/85097 . . . . Heating
- 2224/85098 . . . . Cooling
- 2224/85099 . . . . Ambient temperature
- 2224/851 . . . . the connector being supplied to the parts to be connected in the bonding apparatus
- 2224/8511 . . . . involving protection against electrical discharge, e.g. removing electrostatic charge
- 2224/8512 . . . . Aligning
- 2224/85121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
- 2224/85122 . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
- 2224/85123 . . . . Shape or position of the body
- 2224/85125 . . . . Bonding areas on the body
- 2224/85127 . . . . Bonding areas outside the body
- 2224/85129 . . . . Shape or position of the other item
- 2224/8513 . . . . using marks formed on the semiconductor or solid-state body
- 2224/85132 . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
- 2224/85136 . . . . involving guiding structures, e.g. spacers or supporting members
- 2224/85138 . . . . the guiding structures being at least partially left in the finished device
- 2224/85143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
- 2224/85148 . . . . involving movement of a part of the bonding apparatus
- 2224/85149 . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
- 2224/8515 . . . . Rotational movements
- 2224/8516 . . . . Translational movements
- 2224/85169 . . . . being the upper part of the bonding apparatus, i.e. bonding head, e.g. capillary or wedge
- 2224/8517 . . . . Rotational movements
- 2224/8518 . . . . Translational movements

2224/85181 . . . . .	connecting first on the semiconductor or solid-state body, i.e. on-chip, regular stitch	2224/85417 . . . . .	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
2224/85186 . . . . .	connecting first outside the semiconductor or solid-state body, i.e. off-chip, reverse stitch	2224/85418 . . . . .	Zinc (Zn) as principal constituent
2224/85191 . . . . .	connecting first both on and outside the semiconductor or solid-state body, i.e. regular and reverse stitches	2224/8542 . . . . .	Antimony (Sb) as principal constituent
2224/85196 . . . . .	involving intermediate connecting steps before cutting the wire connector	2224/85423 . . . . .	Magnesium (Mg) as principal constituent
2224/852 . . . . .	Applying energy for connecting	2224/85424 . . . . .	Aluminium (Al) as principal constituent
2224/85201 . . . . .	Compression bonding	2224/85438 . . . . .	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
2224/85203 . . . . .	Thermocompression bonding	2224/85439 . . . . .	Silver (Ag) as principal constituent
2224/85205 . . . . .	Ultrasonic bonding	2224/85444 . . . . .	Gold (Au) as principal constituent
2224/85206 . . . . .	Direction of oscillation	2224/85447 . . . . .	Copper (Cu) as principal constituent
2224/85207 . . . . .	Thermosonic bonding	2224/85449 . . . . .	Manganese (Mn) as principal constituent
2224/8521 . . . . .	with energy being in the form of electromagnetic radiation	2224/85455 . . . . .	Nickel (Ni) as principal constituent
2224/85212 . . . . .	Induction heating, i.e. eddy currents	2224/85457 . . . . .	Cobalt (Co) as principal constituent
2224/85214 . . . . .	using a laser	2224/8546 . . . . .	Iron (Fe) as principal constituent
2224/8523 . . . . .	Polychromatic or infrared lamp heating	2224/85463 . . . . .	the principal constituent melting at a temperature of greater than 1550°C
2224/85232 . . . . .	using an autocatalytic reaction, e.g. exothermic brazing	2224/85464 . . . . .	Palladium (Pd) as principal constituent
2224/85234 . . . . .	using means for applying energy being within the device, e.g. integrated heater	2224/85466 . . . . .	Titanium (Ti) as principal constituent
2224/85236 . . . . .	using electro-static corona discharge	2224/85469 . . . . .	Platinum (Pt) as principal constituent
2224/85237 . . . . .	using electron beam	2224/8547 . . . . .	Zirconium (Zr) as principal constituent
2224/85238 . . . . .	using electric resistance welding, i.e. ohmic heating	2224/85471 . . . . .	Chromium (Cr) as principal constituent
2224/8534 . . . . .	Bonding interfaces of the connector	2224/85472 . . . . .	Vanadium (V) as principal constituent
2224/85345 . . . . .	Shape, e.g. interlocking features	2224/85473 . . . . .	Rhodium (Rh) as principal constituent
2224/85355 . . . . .	having an external coating, e.g. protective bond-through coating	2224/85476 . . . . .	Ruthenium (Ru) as principal constituent
2224/85359 . . . . .	Material	2224/85478 . . . . .	Iridium (Ir) as principal constituent
2224/8536 . . . . .	Bonding interfaces of the semiconductor or solid state body	2224/85479 . . . . .	Niobium (Nb) as principal constituent
2224/85365 . . . . .	Shape, e.g. interlocking features	2224/8548 . . . . .	Molybdenum (Mo) as principal constituent
2224/85375 . . . . .	having an external coating, e.g. protective bond-through coating	2224/85481 . . . . .	Tantalum (Ta) as principal constituent
2224/85379 . . . . .	Material	2224/85483 . . . . .	Rhenium (Re) as principal constituent
2224/8538 . . . . .	Bonding interfaces outside the semiconductor or solid-state body	2224/85484 . . . . .	Tungsten (W) as principal constituent
2224/85385 . . . . .	Shape, e.g. interlocking features	2224/85486 . . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/85395 . . . . .	having an external coating, e.g. protective bond-through coating	2224/85487 . . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/85399 . . . . .	Material	2224/85488 . . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/854 . . . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof	2224/8549 . . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85401 . . . . .	the principal constituent melting at a temperature of less than 400°C	2224/85491 . . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85405 . . . . .	Gallium (Ga) as principal constituent	2224/85493 . . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/854</a> - <a href="#">H01L 2224/85491</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85409 . . . . .	Indium (In) as principal constituent	2224/85494 . . . . .	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/854</a> - <a href="#">H01L 2224/85491</a>
2224/85411 . . . . .	Tin (Sn) as principal constituent		
2224/85413 . . . . .	Bismuth (Bi) as principal constituent		
2224/85414 . . . . .	Thallium (Tl) as principal constituent		
2224/85416 . . . . .	Lead (Pb) as principal constituent		

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- 2224/85495 . . . . . with a principal constituent of the material being a gas not provided for in groups [H01L 2224/854](#) - [H01L 2224/85491](#)
- 2224/85498 . . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
- 2224/85499 . . . . . Material of the matrix
- 2224/855 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
- 2224/85501 . . . . . the principal constituent melting at a temperature of less than 400°C
- 2224/85505 . . . . . Gallium (Ga) as principal constituent
- 2224/85509 . . . . . Indium (In) as principal constituent
- 2224/85511 . . . . . Tin (Sn) as principal constituent
- 2224/85513 . . . . . Bismuth (Bi) as principal constituent
- 2224/85514 . . . . . Thallium (Tl) as principal constituent
- 2224/85516 . . . . . Lead (Pb) as principal constituent
- 2224/85517 . . . . . the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C
- 2224/85518 . . . . . Zinc (Zn) as principal constituent
- 2224/8552 . . . . . Antimony (Sb) as principal constituent
- 2224/85523 . . . . . Magnesium (Mg) as principal constituent
- 2224/85524 . . . . . Aluminium (Al) as principal constituent
- 2224/85538 . . . . . the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C
- 2224/85539 . . . . . Silver (Ag) as principal constituent
- 2224/85544 . . . . . Gold (Au) as principal constituent
- 2224/85547 . . . . . Copper (Cu) as principal constituent
- 2224/85549 . . . . . Manganese (Mn) as principal constituent
- 2224/85555 . . . . . Nickel (Ni) as principal constituent
- 2224/85557 . . . . . Cobalt (Co) as principal constituent
- 2224/8556 . . . . . Iron (Fe) as principal constituent
- 2224/85563 . . . . . the principal constituent melting at a temperature of greater than 1550°C
- 2224/85564 . . . . . Palladium (Pd) as principal constituent
- 2224/85566 . . . . . Titanium (Ti) as principal constituent
- 2224/85569 . . . . . Platinum (Pt) as principal constituent
- 2224/8557 . . . . . Zirconium (Zr) as principal constituent
- 2224/85571 . . . . . Chromium (Cr) as principal constituent
- 2224/85572 . . . . . Vanadium (V) as principal constituent
- 2224/85573 . . . . . Rhodium (Rh) as principal constituent
- 2224/85576 . . . . . Ruthenium (Ru) as principal constituent
- 2224/85578 . . . . . Iridium (Ir) as principal constituent
- 2224/85579 . . . . . Niobium (Nb) as principal constituent
- 2224/8558 . . . . . Molybdenum (Mo) as principal constituent
- 2224/85581 . . . . . Tantalum (Ta) as principal constituent
- 2224/85583 . . . . . Rhenium (Re) as principal constituent
- 2224/85584 . . . . . Tungsten (W) as principal constituent
- 2224/85586 . . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
- 2224/85587 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
- 2224/85588 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
- 2224/8559 . . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
- 2224/85591 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
- 2224/85593 . . . . . with a principal constituent of the material being a solid not provided for in groups [H01L 2224/855](#) - [H01L 2224/85591](#), e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
- 2224/85594 . . . . . with a principal constituent of the material being a liquid not provided for in groups [H01L 2224/855](#) - [H01L 2224/85591](#)
- 2224/85595 . . . . . with a principal constituent of the material being a gas not provided for in groups [H01L 2224/855](#) - [H01L 2224/85591](#)
- 2224/85598 . . . . . Fillers
- 2224/85599 . . . . . Base material
- 2224/856 . . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
- 2224/85601 . . . . . the principal constituent melting at a temperature of less than 400°C
- 2224/85605 . . . . . Gallium (Ga) as principal constituent
- 2224/85609 . . . . . Indium (In) as principal constituent

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2224/85611	Tin (Sn) as principal constituent	2224/85681	Tantalum (Ta) as principal constituent
2224/85613	Bismuth (Bi) as principal constituent	2224/85683	Rhenium (Re) as principal constituent
2224/85614	Thallium (Tl) as principal constituent	2224/85684	Tungsten (W) as principal constituent
2224/85616	Lead (Pb) as principal constituent	2224/85686	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2224/85617	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/85687	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/85618	Zinc (Zn) as principal constituent	2224/85688	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8562	Antimony (Sb) as principal constituent	2224/8569	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85623	Magnesium (Mg) as principal constituent	2224/85691	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85624	Aluminium (Al) as principal constituent	2224/85693	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/856</a> - <a href="#">H01L 2224/85691</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85638	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/85694	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/856</a> - <a href="#">H01L 2224/85691</a>
2224/85639	Silver (Ag) as principal constituent	2224/85695	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/856</a> - <a href="#">H01L 2224/85691</a>
2224/85644	Gold (Au) as principal constituent	2224/85698	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/85647	Copper (Cu) as principal constituent	2224/85699	Coating material
2224/85649	Manganese (Mn) as principal constituent	2224/857	with a principal constituent of the material being a metal or a metalloid, e.g. boron (B), silicon (Si), germanium (Ge), arsenic (As), antimony (Sb), tellurium (Te) and polonium (Po), and alloys thereof
2224/85655	Nickel (Ni) as principal constituent	2224/85701	the principal constituent melting at a temperature of less than 400°C
2224/85657	Cobalt (Co) as principal constituent	2224/85705	Gallium (Ga) as principal constituent
2224/8566	Iron (Fe) as principal constituent	2224/85709	Indium (In) as principal constituent
2224/85663	the principal constituent melting at a temperature of greater than 1550°C	2224/85711	Tin (Sn) as principal constituent
2224/85664	Palladium (Pd) as principal constituent	2224/85713	Bismuth (Bi) as principal constituent
2224/85666	Titanium (Ti) as principal constituent	2224/85714	Thallium (Tl) as principal constituent
2224/85669	Platinum (Pt) as principal constituent	2224/85716	Lead (Pb) as principal constituent
2224/8567	Zirconium (Zr) as principal constituent		
2224/85671	Chromium (Cr) as principal constituent		
2224/85672	Vanadium (V) as principal constituent		
2224/85673	Rhodium (Rh) as principal constituent		
2224/85676	Ruthenium (Ru) as principal constituent		
2224/85678	Iridium (Ir) as principal constituent		
2224/85679	Niobium (Nb) as principal constituent		
2224/8568	Molybdenum (Mo) as principal constituent		

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2224/85717	the principal constituent melting at a temperature of greater than or equal to 400°C and less than 950°C	2224/85787	Ceramics, e.g. crystalline carbides, nitrides or oxides
2224/85718	Zinc (Zn) as principal constituent	2224/85788	Glasses, e.g. amorphous oxides, nitrides or fluorides
2224/8572	Antimony (Sb) as principal constituent	2224/8579	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2224/85723	Magnesium (Mg) as principal constituent	2224/85791	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2224/85724	Aluminium (Al) as principal constituent	2224/85793	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2224/857</a> - <a href="#">H01L 2224/85791</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2224/85738	the principal constituent melting at a temperature of greater than or equal to 950°C and less than 1550°C	2224/85794	with a principal constituent of the material being a liquid not provided for in groups <a href="#">H01L 2224/857</a> - <a href="#">H01L 2224/85791</a>
2224/85739	Silver (Ag) as principal constituent	2224/85795	with a principal constituent of the material being a gas not provided for in groups <a href="#">H01L 2224/857</a> - <a href="#">H01L 2224/85791</a>
2224/85744	Gold (Au) as principal constituent	2224/85798	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2224/85747	Copper (Cu) as principal constituent	2224/85799	Shape or distribution of the fillers
2224/85749	Manganese (Mn) as principal constituent	2224/858	Bonding techniques
2224/85755	Nickel (Ni) as principal constituent	2224/85801	Soldering or alloying
2224/85757	Cobalt (Co) as principal constituent	2224/85805	involving forming a eutectic alloy at the bonding interface
2224/8576	Iron (Fe) as principal constituent	2224/8581	involving forming an intermetallic compound at the bonding interface
2224/85763	the principal constituent melting at a temperature of greater than 1550°C	2224/85815	Reflow soldering
2224/85764	Palladium (Pd) as principal constituent	2224/8582	Diffusion bonding
2224/85766	Titanium (Ti) as principal constituent	2224/85825	Solid-liquid interdiffusion
2224/85769	Platinum (Pt) as principal constituent	2224/8583	Solid-solid interdiffusion, e.g. "direct bonding"
2224/8577	Zirconium (Zr) as principal constituent	2224/8584	Sintering
2224/85771	Chromium (Cr) as principal constituent	2224/8585	using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
2224/85772	Vanadium (V) as principal constituent	2224/85855	Hardening the adhesive by curing, i.e. thermosetting
2224/85773	Rhodium (Rh) as principal constituent	2224/85856	Pre-cured adhesive, i.e. B-stage adhesive
2224/85776	Ruthenium (Ru) as principal constituent	2224/85859	Localised curing of parts of the connector
2224/85778	Iridium (Ir) as principal constituent	2224/85862	Heat curing
2224/85779	Niobium (Nb) as principal constituent	2224/85865	Microwave curing
2224/8578	Molybdenum (Mo) as principal constituent	2224/85868	Infrared [IR] curing
2224/85781	Tantalum (Ta) as principal constituent	2224/85871	Visible light curing
2224/85783	Rhenium (Re) as principal constituent	2224/85874	Ultraviolet [UV] curing
2224/85784	Tungsten (W) as principal constituent	2224/85877	Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
2224/85786	with a principal constituent of the material being a non metallic, non metalloid inorganic material	2224/8588	Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives

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- 2224/85885 . . . . Combinations of two or more hardening methods provided for in at least two different groups from [H01L 2224/85855](#) - [H01L 2224/85888](#), e.g. for hybrid thermoplastic-thermosetting adhesives
- 2224/85889 . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
- 2224/85893 . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
- 2224/85895 . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
- 2224/85897 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
- 2224/85898 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
- 2224/85899 . . . . Combinations of bonding methods provided for in at least two different groups from [H01L 2224/858](#) - [H01L 2224/85898](#)
- 2224/859 . . . involving monitoring, e.g. feedback loop
- 2224/85909 . . . Post-treatment of the connector or wire bonding area
- 2224/8591 . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/85911 . . . . . Chemical cleaning, e.g. etching, flux
- 2224/85912 . . . . . Mechanical cleaning, e.g. abrasion using hydro blasting, brushes, ultrasonic cleaning, dry ice blasting, gas-flow
- 2224/85913 . . . . . Plasma cleaning
- 2224/85914 . . . . . Thermal cleaning, e.g. using laser ablation or by electrostatic corona discharge
- 2224/85916 . . . . . using a laser
- 2224/85917 . . . . . Electron beam cleaning
- 2224/85919 . . . . . Combinations of two or more cleaning methods provided for in at least two different groups from [H01L 2224/8591](#) - [H01L 2224/85914](#)
- 2224/8592 . . . . Applying permanent coating, e.g. protective coating
- 2224/8593 . . . . Reshaping, e.g. for severing the wire, modifying the wedge or ball or the loop shape
- 2224/85931 . . . . . by chemical means, e.g. etching
- 2224/85935 . . . . . by heating means, e.g. reflowing
- 2224/85937 . . . . . using a polychromatic heating lamp
- 2224/85939 . . . . . using a laser
- 2224/85941 . . . . . Induction heating, i.e. eddy currents
- 2224/85943 . . . . . using a flame torch, e.g. hydrogen torch
- 2224/85945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/85947 . . . . . by mechanical means, e.g. "pull-and-cut", pressing, stamping
- 2224/85948 . . . . Thermal treatments, e.g. annealing, controlled cooling
- 2224/85951 . . . . Forming additional members, e.g. for reinforcing
- 2224/85986 . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/86 . . using tape automated bonding [TAB]
- 2224/86001 . . . involving a temporary auxiliary member not forming part of the bonding apparatus
- 2224/86002 . . . . being a removable or sacrificial coating
- 2224/86005 . . . . being a temporary or sacrificial substrate
- 2224/86007 . . . involving a permanent auxiliary member being left in the finished device, e.g. aids for holding or protecting the TAB connector during or after the bonding process
- 2224/86009 . . . Pre-treatment of the connector or the bonding area
- 2224/8601 . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/8603 . . . . Reshaping
- 2224/86031 . . . . . by chemical means, e.g. etching, anodisation
- 2224/86035 . . . . . by heating
- 2224/86039 . . . . . using a laser
- 2224/86045 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/86047 . . . . . by mechanical means, e.g. severing, pressing, stamping
- 2224/86048 . . . . Thermal treatment, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/86051 . . . . Forming additional members
- 2224/86053 . . . Bonding environment
- 2224/86054 . . . . Composition of the atmosphere
- 2224/86085 . . . . being a liquid, e.g. fluidic self-assembly
- 2224/8609 . . . . Vacuum
- 2224/86091 . . . . Under pressure
- 2224/86095 . . . . Temperature settings
- 2224/86096 . . . . . Transient conditions
- 2224/86097 . . . . . Heating
- 2224/86098 . . . . . Cooling
- 2224/86099 . . . . Ambient temperature
- 2224/861 . . . the connector being supplied to the parts to be connected in the bonding apparatus
- 2224/8611 . . . involving protection against electrical discharge, e.g. removing electrostatic charge
- 2224/8612 . . . Aligning
- 2224/86121 . . . . Active alignment, i.e. by apparatus steering, e.g. optical alignment using marks or sensors
- 2224/86122 . . . . . by detecting inherent features of, or outside, the semiconductor or solid-state body
- 2224/8613 . . . . . using marks formed on the semiconductor or solid-state body
- 2224/86132 . . . . . using marks formed outside the semiconductor or solid-state body, i.e. "off-chip"
- 2224/86136 . . . . involving guiding structures, e.g. spacers or supporting members
- 2224/86138 . . . . . the guiding structures being at least partially left in the finished device
- 2224/86143 . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
- 2224/86148 . . . . involving movement of a part of the bonding apparatus
- 2224/86149 . . . . . being the lower part of the bonding apparatus, i.e. holding means for the bodies to be connected, e.g. XY table
- 2224/8615 . . . . . Rotational movements
- 2224/8616 . . . . . Translational movements

- 2224/86169 . . . . . being the upper part of the bonding apparatus, e.g. nozzle
- 2224/8617 . . . . . Rotational movement
- 2224/8618 . . . . . Translational movements
- 2224/86181 . . . . . connecting first on the semiconductor or solid-state body, i.e. on-chip,
- 2224/86186 . . . . . connecting first outside the semiconductor or solid-state body, i.e. off-chip
- 2224/86191 . . . . . connecting first both on and outside the semiconductor or solid-state body
- 2224/862 . . . . . Applying energy for connecting
- 2224/86201 . . . . . Compression bonding
- 2224/86203 . . . . . Thermo-compression bonding
- 2224/86205 . . . . . Ultrasonic bonding
- 2224/86207 . . . . . Thermosonic bonding
- 2224/8621 . . . . . with energy being in the form of electromagnetic radiation
- 2224/86212 . . . . . Induction heating, i.e. eddy currents
- 2224/86214 . . . . . using a laser
- 2224/8623 . . . . . Polychromatic or infrared lamp heating
- 2224/86232 . . . . . using an autocatalytic reaction, e.g. exothermic brazing
- 2224/86234 . . . . . using means for applying energy being within the device, e.g. integrated heater
- 2224/86236 . . . . . using electro-static corona discharge
- 2224/86237 . . . . . using electron beam
- 2224/86238 . . . . . using electric resistance welding, i.e. ohmic heating
- 2224/8634 . . . . . Bonding interfaces of the connector
- 2224/86345 . . . . . Shape, e.g. interlocking features
- 2224/86355 . . . . . having an external coating, e.g. protective bond-through coating
- 2224/86359 . . . . . Material
- 2224/8636 . . . . . Bonding interfaces of the semiconductor or solid state body
- 2224/86365 . . . . . Shape, e.g. interlocking features
- 2224/86375 . . . . . having an external coating, e.g. protective bond-through coating
- 2224/86379 . . . . . Material
- 2224/8638 . . . . . Bonding interfaces outside the semiconductor or solid-state body
- 2224/86385 . . . . . Shape, e.g. interlocking features
- 2224/86395 . . . . . having an external coating, e.g. protective bond-through coating
- 2224/86399 . . . . . Material
- 2224/868 . . . . . Bonding techniques
- 2224/86801 . . . . . Soldering or alloying
- 2224/86805 . . . . . involving forming a eutectic alloy at the bonding interface
- 2224/8681 . . . . . involving forming an intermetallic compound at the bonding interface
- 2224/86815 . . . . . Reflow soldering
- 2224/8682 . . . . . Diffusion bonding
- 2224/86825 . . . . . Solid-liquid interdiffusion
- 2224/8683 . . . . . Solid-solid interdiffusion
- 2224/8684 . . . . . Sintering
- 2224/8685 . . . . . using a polymer adhesive, e.g. an adhesive based on silicone, epoxy, polyimide, polyester
- 2224/86855 . . . . . Hardening the adhesive by curing, i.e. thermosetting
- 2224/86856 . . . . . Pre-cured adhesive, i.e. B-stage adhesive
- 2224/86859 . . . . . Localised curing of parts of the connector
- 2224/86862 . . . . . Heat curing
- 2224/86865 . . . . . Microwave curing
- 2224/86868 . . . . . Infrared [IR] curing
- 2224/86871 . . . . . Visible light curing
- 2224/86874 . . . . . Ultraviolet [UV] curing
- 2224/86877 . . . . . Moisture curing, i.e. curing by exposing to humidity, e.g. for silicones and polyurethanes
- 2224/8688 . . . . . Hardening the adhesive by cooling, e.g. for thermoplastics or hot-melt adhesives
- 2224/86885 . . . . . Combinations of two or more hardening methods provided for in at least two different groups selected from [H01L 2224/86855](#) - [H01L 2224/8688](#), e.g. hybrid thermoplastic-thermosetting adhesives
- 2224/8689 . . . . . using an inorganic non metallic glass type adhesive, e.g. solder glass
- 2224/86893 . . . . . Anodic bonding, i.e. bonding by applying a voltage across the interface in order to induce ions migration leading to an irreversible chemical bond
- 2224/86895 . . . . . Direct bonding, i.e. joining surfaces by means of intermolecular attracting interactions at their interfaces, e.g. covalent bonds, van der Waals forces
- 2224/86896 . . . . . between electrically conductive surfaces, e.g. copper-copper direct bonding, surface activated bonding
- 2224/86897 . . . . . between electrically insulating surfaces, e.g. oxide or nitride layers
- 2224/86899 . . . . . Combinations of bonding methods provided for in at least two different groups from [H01L 2224/868](#) - [H01L 2224/86897](#)
- 2224/869 . . . . . involving monitoring, e.g. feedback loop
- 2224/86909 . . . . . Post-treatment of the connector or the bonding area
- 2224/8691 . . . . . Cleaning, e.g. oxide removal step, desmearing
- 2224/8693 . . . . . Reshaping
- 2224/86931 . . . . . by chemical means, e.g. etching, anodisation
- 2224/86935 . . . . . by heating means
- 2224/86939 . . . . . using a laser
- 2224/86945 . . . . . using a corona discharge, e.g. electronic flame off [EFO]
- 2224/86947 . . . . . by mechanical means, e.g. severing, pressing, stamping
- 2224/86948 . . . . . Thermal treatments, e.g. annealing, controlled pre-heating or pre-cooling
- 2224/86951 . . . . . Forming additional members
- 2224/86986 . . . . . Specific sequence of steps, e.g. repetition of manufacturing steps, time sequence
- 2224/89 . . . . . using at least one connector not provided for in any of the groups [H01L 2224/81](#) - [H01L 2224/86](#)
- 2224/90 . . . . . Methods for connecting semiconductor or solid state bodies using means for bonding not being attached to, or not being formed on, the body surface to be connected, e.g. pressure contacts using springs or clips

- 2224/91 . . . . . Methods for connecting semiconductor or solid state bodies including different methods provided for in two or more of groups [H01L 2224/80](#) - [H01L 2224/90](#)
- 2224/92 . . . . . Specific sequence of method steps
- 2224/9201 . . . . . Forming connectors during the connecting process, e.g. in-situ formation of bumps
- 2224/9202 . . . . . Forming additional connectors after the connecting process
- 2224/9205 . . . . . Intermediate bonding steps, i.e. partial connection of the semiconductor or solid-state body during the connecting process
- 2224/921 . . . . . Connecting a surface with connectors of different types
- 2224/9211 . . . . . Parallel connecting processes
- 2224/9212 . . . . . Sequential connecting processes
- 2224/92122 . . . . . the first connecting process involving a bump connector
- 2224/92124 . . . . . the second connecting process involving a build-up interconnect
- 2224/92125 . . . . . the second connecting process involving a layer connector
- 2224/92127 . . . . . the second connecting process involving a wire connector
- 2224/92132 . . . . . the first connecting process involving a build-up interconnect
- 2224/92133 . . . . . the second connecting process involving a bump connector
- 2224/92135 . . . . . the second connecting process involving a layer connector
- 2224/92136 . . . . . the second connecting process involving a strap connector
- 2224/92137 . . . . . the second connecting process involving a wire connector
- 2224/92138 . . . . . the second connecting process involving a TAB connector
- 2224/92142 . . . . . the first connecting process involving a layer connector
- 2224/92143 . . . . . the second connecting process involving a bump connector
- 2224/92144 . . . . . the second connecting process involving a build-up interconnect
- 2224/92147 . . . . . the second connecting process involving a wire connector
- 2224/92148 . . . . . the second connecting process involving a TAB connector
- 2224/92152 . . . . . the first connecting process involving a strap connector
- 2224/92153 . . . . . the second connecting process involving a bump connector
- 2224/92155 . . . . . the second connecting process involving a layer connector
- 2224/92157 . . . . . the second connecting process involving a wire connector
- 2224/92158 . . . . . the second connecting process involving a TAB connector
- 2224/92162 . . . . . the first connecting process involving a wire connector
- 2224/92163 . . . . . the second connecting process involving a bump connector
- 2224/92164 . . . . . the second connecting process involving a build-up interconnect
- 2224/92165 . . . . . the second connecting process involving a layer connector
- 2224/92166 . . . . . the second connecting process involving a strap connector
- 2224/92168 . . . . . the second connecting process involving a TAB connector
- 2224/92172 . . . . . the first connecting process involving a TAB connector
- 2224/92173 . . . . . the second connecting process involving a bump connector
- 2224/92174 . . . . . the second connecting process involving a build-up interconnect
- 2224/92175 . . . . . the second connecting process involving a layer connector
- 2224/92176 . . . . . the second connecting process involving a strap connector
- 2224/92177 . . . . . the second connecting process involving a wire connector
- 2224/922 . . . . . Connecting different surfaces of the semiconductor or solid-state body with connectors of different types
- 2224/9221 . . . . . Parallel connecting processes
- 2224/9222 . . . . . Sequential connecting processes
- 2224/92222 . . . . . the first connecting process involving a bump connector
- 2224/92224 . . . . . the second connecting process involving a build-up interconnect
- 2224/92225 . . . . . the second connecting process involving a layer connector
- 2224/92226 . . . . . the second connecting process involving a strap connector
- 2224/92227 . . . . . the second connecting process involving a wire connector
- 2224/92228 . . . . . the second connecting process involving a TAB connector
- 2224/92242 . . . . . the first connecting process involving a layer connector
- 2224/92244 . . . . . the second connecting process involving a build-up interconnect
- 2224/92246 . . . . . the second connecting process involving a strap connector
- 2224/92247 . . . . . the second connecting process involving a wire connector
- 2224/92248 . . . . . the second connecting process involving a TAB connector
- 2224/92252 . . . . . the first connecting process involving a strap connector
- 2224/92253 . . . . . the second connecting process involving a bump connector
- 2224/92255 . . . . . the second connecting process involving a layer connector
- 2224/93 . . . . . Batch processes
- 2224/94 . . . . . at wafer-level, i.e. with connecting carried out on a wafer comprising a plurality of undiced individual devices
- 2224/95 . . . . . at chip-level, i.e. with connecting carried out on a plurality of singulated devices, i.e. on diced chips
- 2224/95001 . . . . . involving a temporary auxiliary member not forming part of the bonding apparatus, e.g. removable or sacrificial coating, film or substrate
- 2224/95053 . . . . . Bonding environment
- 2224/95085 . . . . . being a liquid, e.g. for fluidic self-assembly
- 2224/95091 . . . . . Under pressure
- 2224/95092 . . . . . Atmospheric pressure, e.g. dry self-assembly

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- 2224/95093 . . . . . Transient conditions, e.g. assisted by a gas flow or a liquid flow
- 2224/951 . . . . . Supplying the plurality of semiconductor or solid-state bodies
- 2224/95101 . . . . . in a liquid medium
- 2224/95102 . . . . . being a colloidal droplet
- 2224/95111 . . . . . using a rack or rail
- 2224/95115 . . . . . using a roll-to-roll transfer technique
- 2224/9512 . . . . . Aligning the plurality of semiconductor or solid-state bodies
- 2224/95121 . . . . . Active alignment, i.e. by apparatus steering
- 2224/95122 . . . . . by applying vibration
- 2224/95123 . . . . . by applying a pressurised fluid flow, e.g. liquid or gas flow
- 2224/95133 . . . . . by applying an electromagnetic field
- 2224/95134 . . . . . Electrowetting, i.e. by changing the surface energy of a droplet
- 2224/95136 . . . . . involving guiding structures, e.g. shape matching, spacers or supporting members
- 2224/95143 . . . . . Passive alignment, i.e. self alignment, e.g. using surface energy, chemical reactions, thermal equilibrium
- 2224/95144 . . . . . Magnetic alignment, i.e. using permanent magnetic parts in the semiconductor or solid-state body
- 2224/95145 . . . . . Electrostatic alignment, i.e. polarity alignment with Coulomb charges
- 2224/95146 . . . . . by surface tension
- 2224/95147 . . . . . by molecular lock-key, e.g. by DNA
- 2224/95148 . . . . . involving movement of a part of the bonding apparatus
- 2224/96 . . . . . the devices being encapsulated in a common layer, e.g. neo-wafer or pseudo-wafer, said common layer being separable into individual assemblies after connecting
- 2224/97 . . . . . the devices being connected to a common substrate, e.g. interposer, said common substrate being separable into individual assemblies after connecting
- 2224/98 . . . . . Methods for disconnecting semiconductor or solid-state bodies
- 2225/00** **Details relating to assemblies covered by the group [H01L 25/00](#) but not provided for in its subgroups**
- 2225/03 . . . . . All the devices being of a type provided for in the same main group of the same subclass of class [H10](#), e.g. assemblies of rectifier diodes
- 2225/04 . . . . . the devices not having separate containers
- 2225/065 . . . . . All the devices being of a type provided for in the same main group of the same subclass of class [H10](#)
- 2225/06503 . . . . . Stacked arrangements of devices
- 2225/06506 . . . . . Wire or wire-like electrical connections between devices
- 2225/0651 . . . . . Wire or wire-like electrical connections from device to substrate
- 2225/06513 . . . . . Bump or bump-like direct electrical connections between devices, e.g. flip-chip connection, solder bumps
- 2225/06517 . . . . . Bump or bump-like direct electrical connections from device to substrate
- 2225/0652 . . . . . Bump or bump-like direct electrical connections from substrate to substrate
- 2225/06524 . . . . . Electrical connections formed on device or on substrate, e.g. a deposited or grown layer
- 2225/06527 . . . . . Special adaptation of electrical connections, e.g. rewiring, engineering changes, pressure contacts, layout
- 2225/06531 . . . . . Non-galvanic coupling, e.g. capacitive coupling
- 2225/06534 . . . . . Optical coupling
- 2225/06537 . . . . . Electromagnetic shielding
- 2225/06541 . . . . . Conductive via connections through the device, e.g. vertical interconnects, through silicon via [TSV]
- 2225/06544 . . . . . Design considerations for via connections, e.g. geometry or layout
- 2225/06548 . . . . . Conductive via connections through the substrate, container, or encapsulation
- 2225/06551 . . . . . Conductive connections on the side of the device
- 2225/06555 . . . . . Geometry of the stack, e.g. form of the devices, geometry to facilitate stacking
- 2225/06558 . . . . . the devices having passive surfaces facing each other, i.e. in a back-to-back arrangement
- 2225/06562 . . . . . at least one device in the stack being rotated or offset
- 2225/06565 . . . . . the devices having the same size and there being no auxiliary carrier between the devices
- 2225/06568 . . . . . the devices decreasing in size, e.g. pyramidal stack
- 2225/06572 . . . . . Auxiliary carrier between devices, the carrier having an electrical connection structure
- 2225/06575 . . . . . Auxiliary carrier between devices, the carrier having no electrical connection structure
- 2225/06579 . . . . . TAB carriers; beam leads
- 2225/06582 . . . . . Housing for the assembly, e.g. chip scale package [CSP]
- 2225/06586 . . . . . Housing with external bump or bump-like connectors
- 2225/06589 . . . . . Thermal management, e.g. cooling
- 2225/06593 . . . . . Mounting aids permanently on device; arrangements for alignment
- 2225/06596 . . . . . Structural arrangements for testing
- 2225/10 . . . . . the devices having separate containers
- 2225/1005 . . . . . the devices being integrated devices of class [H10](#)
- 2225/1011 . . . . . the containers being in a stacked arrangement
- 2225/1017 . . . . . the lowermost container comprising a device support
- 2225/1023 . . . . . the support being an insulating substrate
- 2225/1029 . . . . . the support being a lead frame
- 2225/1035 . . . . . the device being entirely enclosed by the support, e.g. high-density interconnect [HDI]
- 2225/1041 . . . . . Special adaptations for top connections of the lowermost container, e.g. redistribution layer, integral interposer
- 2225/1047 . . . . . Details of electrical connections between containers
- 2225/1052 . . . . . Wire or wire-like electrical connections

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- 2225/1058 . . . . . Bump or bump-like electrical connections, e.g. balls, pillars, posts
- 2225/1064 . . . . . Electrical connections provided on a side surface of one or more of the containers
- 2225/107 . . . . . Indirect electrical connections, e.g. via an interposer, a flexible substrate, using TAB
- 2225/1076 . . . . . Shape of the containers
- 2225/1082 . . . . . for improving alignment between containers, e.g. interlocking features
- 2225/1088 . . . . . Arrangements to limit the height of the assembly
- 2225/1094 . . . . . Thermal management, e.g. cooling
- 2924/00** **Indexing scheme for arrangements or methods for connecting or disconnecting semiconductor or solid-state bodies as covered by [H01L 24/00](#)**
- 2924/0001 . . Technical content checked by a classifier
- NOTE**  
Codes [H01L 2924/0001](#) - [H01L 2924/0002](#) are used to describe the status of reclassification; they do not relate to technical features as such
- 2924/00011 . . Not relevant to the scope of the group, the symbol of which is combined with the symbol of this group
- 2924/00012 . . Relevant to the scope of the group, the symbol of which is combined with the symbol of this group
- 2924/00013 . . Fully indexed content
- 2924/00014 . . the subject-matter covered by the group, the symbol of which is combined with the symbol of this group, being disclosed without further technical details
- 2924/00015 . . the subject-matter covered by the group, the symbol of which is combined with the symbol of this group, being disclosed as prior art
- 2924/0002 . . Not covered by any one of groups [H01L 24/00](#), [H01L 24/00](#) and [H01L 2224/00](#)
- 2924/01 . . Chemical elements
- 2924/01001 . . Hydrogen [H]
- 2924/01002 . . Helium [He]
- 2924/01003 . . Lithium [Li]
- 2924/01004 . . Beryllium [Be]
- 2924/01005 . . Boron [B]
- 2924/01006 . . Carbon [C]
- 2924/01007 . . Nitrogen [N]
- 2924/01008 . . Oxygen [O]
- 2924/01009 . . Fluorine [F]
- 2924/0101 . . Neon [Ne]
- 2924/01011 . . Sodium [Na]
- 2924/01012 . . Magnesium [Mg]
- 2924/01013 . . Aluminum [Al]
- 2924/01014 . . Silicon [Si]
- 2924/01015 . . Phosphorus [P]
- 2924/01016 . . Sulfur [S]
- 2924/01017 . . Chlorine [Cl]
- 2924/01018 . . Argon [Ar]
- 2924/01019 . . Potassium [K]
- 2924/0102 . . Calcium [Ca]
- 2924/01021 . . Scandium [Sc]
- 2924/01022 . . Titanium [Ti]
- 2924/01023 . . Vanadium [V]
- 2924/01024 . . Chromium [Cr]
- 2924/01025 . . Manganese [Mn]
- 2924/01026 . . Iron [Fe]
- 2924/01027 . . Cobalt [Co]
- 2924/01028 . . Nickel [Ni]
- 2924/01029 . . Copper [Cu]
- 2924/0103 . . Zinc [Zn]
- 2924/01031 . . Gallium [Ga]
- 2924/01032 . . Germanium [Ge]
- 2924/01033 . . Arsenic [As]
- 2924/01034 . . Selenium [Se]
- 2924/01035 . . Bromine [Br]
- 2924/01036 . . Krypton [Kr]
- 2924/01037 . . Rubidium [Rb]
- 2924/01038 . . Strontium [Sr]
- 2924/01039 . . Yttrium [Y]
- 2924/0104 . . Zirconium [Zr]
- 2924/01041 . . Niobium [Nb]
- 2924/01042 . . Molybdenum [Mo]
- 2924/01043 . . Technetium [Tc]
- 2924/01044 . . Ruthenium [Ru]
- 2924/01045 . . Rhodium [Rh]
- 2924/01046 . . Palladium [Pd]
- 2924/01047 . . Silver [Ag]
- 2924/01048 . . Cadmium [Cd]
- 2924/01049 . . Indium [In]
- 2924/0105 . . Tin [Sn]
- 2924/01051 . . Antimony [Sb]
- 2924/01052 . . Tellurium [Te]
- 2924/01053 . . Iodine [I]
- 2924/01054 . . Xenon [Xe]
- 2924/01055 . . Cesium [Cs]
- 2924/01056 . . Barium [Ba]
- 2924/01057 . . Lanthanum [La]
- 2924/01058 . . Cerium [Ce]
- 2924/01059 . . Praseodymium [Pr]
- 2924/0106 . . Neodymium [Nd]
- 2924/01061 . . Promethium [Pm]
- 2924/01062 . . Samarium [Sm]
- 2924/01063 . . Europium [Eu]
- 2924/01064 . . Gadolinium [Gd]
- 2924/01065 . . Terbium [Tb]
- 2924/01066 . . Dysprosium [Dy]
- 2924/01067 . . Holmium [Ho]
- 2924/01068 . . Erbium [Er]
- 2924/01069 . . Thulium [Tm]
- 2924/0107 . . Ytterbium [Yb]
- 2924/01071 . . Lutetium [Lu]
- 2924/01072 . . Hafnium [Hf]
- 2924/01073 . . Tantalum [Ta]
- 2924/01074 . . Tungsten [W]
- 2924/01075 . . Rhenium [Re]
- 2924/01076 . . Osmium [Os]
- 2924/01077 . . Iridium [Ir]
- 2924/01078 . . Platinum [Pt]
- 2924/01079 . . Gold [Au]
- 2924/0108 . . Mercury [Hg]
- 2924/01081 . . Thallium [Tl]
- 2924/01082 . . Lead [Pb]
- 2924/01083 . . Bismuth [Bi]
- 2924/01084 . . Polonium [Po]

2924/01085	. . Astatine [At]	2924/0421	. . . 1st Group
2924/01086	. . Radon [Rn]	2924/0422	. . . 2nd Group
2924/01087	. . Francium [Fr]	2924/0423	. . . 3rd Group
2924/01088	. . Radium [Ra]	2924/0424	. . . 4th Group
2924/01089	. . Actinium [Ac]	2924/0425	. . . 5th Group
2924/0109	. . Thorium [Th]	2924/0426	. . . 6th Group
2924/01091	. . Protactinium [Pa]	2924/0427	. . . 7th Group
2924/01092	. . Uranium [U]	2924/0428	. . . 8th Group
2924/01093	. . Neptunium [Np]	2924/0429	. . . 9th Group
2924/01094	. . Plutonium [Pu]	2924/044	. . . 10th Group
2924/011	. Groups of the periodic table	2924/0441	. . . 11th Group
2924/01101	. . Alkali metals	2924/0442	. . . 12th Group
2924/01102	. . Alkali earth metals	2924/0443	. . . 13th Group
2924/01103	. . Transition metals	2924/0444	. . . 14th Group
2924/01104	. . Refractory metals	2924/0445	. . . Lanthanides
2924/01105	. . Rare earth metals	2924/0446	. . . Actinides
2924/01106	. . . Lanthanides, i.e. Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu	2924/0449	. . being a combination of two or more materials provided in the groups <a href="#">H01L 2924/0421</a> - <a href="#">H01L 2924/0446</a>
2924/01107	. . . Actinides, i.e. Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr	2924/04491	. . having a monocrystalline microstructure
2924/01108	. . Noble metals	2924/04492	. . having a polycrystalline microstructure
2924/01109	. . Metalloids or Semi-metals	2924/04494	. . having an amorphous microstructure, i.e. glass
2924/0111	. . Chalcogens	2924/045	. Carbides composed of metals from groups of the periodic table
2924/01111	. . Halogens	2924/0451	. . . 1st Group
2924/01112	. . Noble gases	2924/0452	. . . 2nd Group
2924/012	. Semiconductor purity grades	2924/0453	. . . 3rd Group
2924/01201	. . 1N purity grades, i.e. 90%	2924/0454	. . . 4th Group
2924/01202	. . 2N purity grades, i.e. 99%	2924/04541	. . . TiC
2924/01203	. . 3N purity grades, i.e. 99.9%	2924/0455	. . . 5th Group
2924/01204	. . 4N purity grades, i.e. 99.99%	2924/0456	. . . 6th Group
2924/01205	. . 5N purity grades, i.e. 99.999%	2924/04563	. . . WC
2924/01206	. . 6N purity grades, i.e. 99.9999%	2924/0457	. . . 7th Group
2924/01207	. . 7N purity grades, i.e. 99.99999%	2924/0458	. . . 8th Group
2924/01208	. . 8N purity grades, i.e. 99.999999%	2924/0459	. . . 9th Group
2924/013	. Alloys	2924/046	. . . 10th Group
2924/0132	. . Binary Alloys	2924/0461	. . . 11th Group
2924/01321	. . . Isomorphous Alloys	2924/0462	. . . 12th Group
2924/01322	. . . Eutectic Alloys, i.e. obtained by a liquid transforming into two solid phases	2924/0463	. . . 13th Group
2924/01323	. . . Hypoeutectic alloys i.e. with compositions lying to the left of the eutectic point	2924/0464	. . . 14th Group
2924/01324	. . . Hypereutectic alloys i.e. with compositions lying to the right of the eutectic point	2924/04642	. . . SiC
2924/01325	. . . Peritectic Alloys, i.e. obtained by a liquid and a solid transforming into a new and different solid phase	2924/0465	. . . Lanthanides
2924/01326	. . . Monotectics, i.e. obtained by a liquid transforming into a solid and a new and different liquid phase	2924/0466	. . . Actinides
2924/01327	. . . Intermediate phases, i.e. intermetallics compounds	2924/0469	. . being a combination of two or more materials provided in the groups <a href="#">H01L 2924/0451</a> - <a href="#">H01L 2924/0466</a>
2924/0133	. . Ternary Alloys	2924/04691	. . having a monocrystalline microstructure
2924/0134	. . Quaternary Alloys	2924/04692	. . having a polycrystalline microstructure
2924/0135	. . Quinary Alloys	2924/04694	. . having an amorphous microstructure, i.e. glass
2924/014	. . Solder alloys	2924/047	. Silicides composed of metals from groups of the periodic table
2924/01402	. . Invar, i.e. single-phase alloy of around 36% nickel and 64% iron	2924/0471	. . . 1st Group
2924/01403	. . Kovar, i.e. FeNiCo alloys	2924/0472	. . . 2nd Group
2924/01404	. . Alloy 42, i.e. FeNi42	2924/0473	. . . 3rd Group
2924/01405	. . Inovco, i.e. Fe-33Ni-4.5Co	2924/0474	. . . 4th Group
2924/042	. Borides composed of metals from groups of the periodic table	2924/0475	. . . 5th Group
		2924/0476	. . . 6th Group
		2924/0477	. . . 7th Group
		2924/0478	. . . 8th Group
		2924/0479	. . . 9th Group
		2924/048	. . . 10th Group
		2924/0481	. . . 11th Group

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2924/0482	. . 12th Group	2924/05294	. . having an amorphous microstructure, i.e. glass
2924/0483	. . 13th Group	2924/053	. Oxides composed of metals from groups of the periodic table
2924/0484	. . 14th Group	2924/0531	. . 1st Group
2924/0485	. . Lanthanides	2924/0532	. . 2nd Group
2924/0486	. . Actinides	2924/0533	. . 3rd Group
2924/0489	. . being a combination of two or more materials provided in the groups <a href="#">H01L 2924/0471</a> - <a href="#">H01L 2924/0486</a>	2924/0534	. . 4th Group
2924/04891	. . having a monocrystalline microstructure	2924/05341	. . . TiO <sub>2</sub>
2924/04892	. . having a polycrystalline microstructure	2924/05342	. . . ZrO <sub>2</sub>
2924/04894	. . having an amorphous microstructure, i.e. glass	2924/0535	. . 5th Group
2924/049	. Nitrides composed of metals from groups of the periodic table	2924/0536	. . 6th Group
2924/0491	. . 1st Group	2924/0537	. . 7th Group
2924/0492	. . 2nd Group	2924/0538	. . 8th Group
2924/0493	. . 3rd Group	2924/05381	. . . FeOx
2924/0494	. . 4th Group	2924/0539	. . 9th Group
2924/04941	. . . TiN	2924/054	. . 10th Group
2924/0495	. . 5th Group	2924/0541	. . 11th Group
2924/04953	. . . TaN	2924/0542	. . 12th Group
2924/0496	. . 6th Group	2924/0543	. . 13th Group
2924/0497	. . 7th Group	2924/05432	. . . Al <sub>2</sub> O <sub>3</sub>
2924/0498	. . 8th Group	2924/0544	. . 14th Group
2924/0499	. . 9th Group	2924/05442	. . . SiO <sub>2</sub>
2924/05	. . 10th Group	2924/0545	. . Lanthanides
2924/0501	. . 11th Group	2924/0546	. . Actinides
2924/0502	. . 12th Group	2924/0549	. . being a combination of two or more materials provided in the groups <a href="#">H01L 2924/0531</a> - <a href="#">H01L 2924/0546</a>
2924/0503	. . 13th Group	2924/05491	. . having a monocrystalline microstructure
2924/05032	. . . AlN	2924/05492	. . having a polycrystalline microstructure
2924/0504	. . 14th Group	2924/05494	. . having an amorphous microstructure, i.e. glass
2924/05042	. . . Si <sub>3</sub> N <sub>4</sub>	2924/055	. Chalcogenides other than oxygen i.e. sulfides, selenides and tellurides composed of metals from groups of the periodic table
2924/0505	. . Lanthanides	2924/0551	. . 1st Group
2924/0506	. . Actinides	2924/0552	. . 2nd Group
2924/0509	. . being a combination of two or more materials provided in the groups <a href="#">H01L 2924/0491</a> - <a href="#">H01L 2924/0506</a>	2924/0553	. . 3rd Group
2924/05091	. . having a monocrystalline microstructure	2924/0554	. . 4th Group
2924/05092	. . having a polycrystalline microstructure	2924/0555	. . 5th Group
2924/05094	. . having an amorphous microstructure, i.e. glass	2924/0556	. . 6th Group
2924/051	. Phosphides composed of metals from groups of the periodic table	2924/0557	. . 7th Group
2924/0511	. . 1st Group	2924/0558	. . 8th Group
2924/0512	. . 2nd Group	2924/0559	. . 9th Group
2924/0513	. . 3rd Group	2924/056	. . 10th Group
2924/0514	. . 4th Group	2924/0561	. . 11th Group
2924/0515	. . 5th Group	2924/0562	. . 12th Group
2924/0516	. . 6th Group	2924/0563	. . 13th Group
2924/0517	. . 7th Group	2924/0564	. . 14th Group
2924/0518	. . 8th Group	2924/0565	. . Lanthanides
2924/0519	. . 9th Group	2924/0566	. . Actinides
2924/052	. . 10th Group	2924/0569	. . being a combination of two or more materials provided in the groups <a href="#">H01L 2924/0551</a> - <a href="#">H01L 2924/0566</a>
2924/0521	. . 11th Group	2924/05691	. . having a monocrystalline microstructure
2924/0522	. . 12th Group	2924/05692	. . having a polycrystalline microstructure
2924/0523	. . 13th Group	2924/05694	. . having an amorphous microstructure, i.e. glass
2924/0524	. . 14th Group	2924/057	. Halides composed of metals from groups of the periodic table
2924/0525	. . Lanthanides	2924/0571	. . 1st Group
2924/0526	. . Actinides	2924/0572	. . 2nd Group
2924/0529	. . being a combination of two or more materials provided in the groups <a href="#">H01L 2924/0511</a> - <a href="#">H01L 2924/0526</a>	2924/0573	. . 3rd Group
2924/05291	. . having a monocrystalline microstructure	2924/0574	. . 4th Group
2924/05292	. . having a polycrystalline microstructure	2924/0575	. . 5th Group

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- 2924/0576 . . 6th Group
- 2924/0577 . . 7th Group
- 2924/0578 . . 8th Group
- 2924/0579 . . 9th Group
- 2924/058 . . 10th Group
- 2924/0581 . . 11th Group
- 2924/0582 . . 12th Group
- 2924/0583 . . 13th Group
- 2924/0584 . . 14th Group
- 2924/0585 . . Lanthanides
- 2924/0586 . . Actinides
- 2924/0589 . . being a combination of two or more materials provided in the groups [H01L 2924/0571](#) - [H01L 2924/0586](#)
- 2924/05891 . . having a monocrystalline microstructure
- 2924/05892 . . having a polycrystalline microstructure
- 2924/05894 . . having an amorphous microstructure, i.e. glass
- 2924/059 . . Being combinations of any of the materials from the groups [H01L 2924/042](#) - [H01L 2924/0584](#), e.g. oxynitrides
- 2924/05991 . . having a monocrystalline microstructure
- 2924/05992 . . having a polycrystalline microstructure
- 2924/05994 . . having an amorphous microstructure, i.e. glass
- 2924/06 . . Polymers
- 2924/061 . . Polyolefin polymer
- 2924/0615 . . Styrenic polymer
- 2924/062 . . Halogenated polymer
- 2924/0625 . . Polyvinyl alcohol
- 2924/063 . . Polyvinyl acetate
- 2924/0635 . . Acrylic polymer
- 2924/064 . . Graft polymer
- 2924/0645 . . Block copolymer
- 2924/065 . . ABS
- 2924/0655 . . Polyacetal
- 2924/066 . . Phenolic resin
- 2924/0665 . . Epoxy resin
- 2924/067 . . Polyphenylene
- 2924/0675 . . Polyester
- 2924/068 . . Polycarbonate
- 2924/0685 . . Polyether
- 2924/069 . . Polyurethane
- 2924/0695 . . Polyamide
- 2924/07 . . Polyamine or polyimide
- 2924/07001 . . . Polyamine
- 2924/07025 . . . Polyimide
- 2924/0705 . . Sulfur containing polymer
- 2924/0715 . . Polysiloxane
- 2924/078 . . Adhesive characteristics other than chemical
- 2924/07802 . . . not being an ohmic electrical conductor
- 2924/0781 . . . being an ohmic electrical conductor
- 2924/07811 . . . . Extrinsic, i.e. with electrical conductive fillers
- 2924/07812 . . . . Intrinsic, e.g. polyaniline [PANI]
- 2924/0782 . . . being pressure sensitive
- 2924/095 . . with a principal constituent of the material being a combination of two or more materials provided in the groups [H01L 2924/013](#) - [H01L 2924/0715](#)
- 2924/0951 . . Glass epoxy laminates
- 2924/09511 . . . FR-4
- 2924/09512 . . . FR-5
- 2924/09522 . . . G10
- 2924/09523 . . . G11
- 2924/096 . . Cermets, i.e. composite material composed of ceramic and metallic materials
- 2924/097 . . Glass-ceramics, e.g. devitrified glass
- 2924/09701 . . . Low temperature co-fired ceramic [LTCC]
- 2924/10 . . Details of semiconductor or other solid state devices to be connected
- 2924/1011 . . Structure
- 2924/1015 . . Shape
- 2924/10155 . . . being other than a cuboid
- 2924/10156 . . . . at the periphery
- 2924/10157 . . . . at the active surface
- 2924/10158 . . . . at the passive surface
- 2924/1016 . . . being a cuboid
- 2924/10161 . . . . with a rectangular active surface
- 2924/10162 . . . . with a square active surface
- 2924/1017 . . . being a sphere
- 2924/102 . . Material of the semiconductor or solid state bodies
- 2924/1025 . . . Semiconducting materials
- 2924/10251 . . . . Elemental semiconductors, i.e. Group IV
- 2924/10252 . . . . . Germanium [Ge]
- 2924/10253 . . . . . Silicon [Si]
- 2924/10254 . . . . . Diamond [C]
- 2924/1026 . . . . Compound semiconductors
- 2924/1027 . . . . . IV
- 2924/10271 . . . . . Silicon-germanium [SiGe]
- 2924/10272 . . . . . Silicon Carbide [SiC]
- 2924/1032 . . . . . III-V
- 2924/10321 . . . . . Aluminium antimonide [AlSb]
- 2924/10322 . . . . . Aluminium arsenide [AlAs]
- 2924/10323 . . . . . Aluminium nitride [AlN]
- 2924/10324 . . . . . Aluminium phosphide [AlP]
- 2924/10325 . . . . . Boron nitride [BN], e.g. cubic, hexagonal, nanotube
- 2924/10326 . . . . . Boron phosphide [BP]
- 2924/10327 . . . . . Boron arsenide [BAs, B<sub>12</sub>As<sub>2</sub>]
- 2924/10328 . . . . . Gallium antimonide [GaSb]
- 2924/10329 . . . . . Gallium arsenide [GaAs]
- 2924/1033 . . . . . Gallium nitride [GaN]
- 2924/10331 . . . . . Gallium phosphide [GaP]
- 2924/10332 . . . . . Indium antimonide [InSb]
- 2924/10333 . . . . . Indium arsenide [InAs]
- 2924/10334 . . . . . Indium nitride [InN]
- 2924/10335 . . . . . Indium phosphide [InP]
- 2924/10336 . . . . . Aluminium gallium arsenide [AlGaAs]
- 2924/10337 . . . . . Indium gallium arsenide [InGaAs]
- 2924/10338 . . . . . Indium gallium phosphide [InGaP]
- 2924/10339 . . . . . Aluminium indium arsenide [AlInAs]
- 2924/1034 . . . . . Aluminium indium antimonide [AlInSb]
- 2924/10341 . . . . . Gallium arsenide nitride [GaAsN]
- 2924/10342 . . . . . Gallium arsenide phosphide [GaAsP]
- 2924/10343 . . . . . Gallium arsenide antimonide [GaAsSb]
- 2924/10344 . . . . . Aluminium gallium nitride [AlGaN]
- 2924/10345 . . . . . Aluminium gallium phosphide [AlGaP]
- 2924/10346 . . . . . Indium gallium nitride [InGaN]
- 2924/10347 . . . . . Indium arsenide antimonide [InAsSb]
- 2924/10348 . . . . . Indium gallium antimonide [InGaSb]
- 2924/10349 . . . . . Aluminium gallium indium phosphide [AlGaInP]
- 2924/1035 . . . . . Aluminium gallium arsenide phosphide [AlGaInP]

2924/10351	. . . . .	Indium gallium arsenide phosphide [InGaAsP]	2924/10676	. . . . .	Bismuth trioxide [Bi <sub>2</sub> O <sub>3</sub> ]
2924/10352	. . . . .	Indium gallium arsenide antimonide [InGaAsSb]	2924/10677	. . . . .	Tin dioxide [SnO <sub>2</sub> ]
2924/10353	. . . . .	Indium arsenide antimonide phosphide [InAsSbP]	2924/10678	. . . . .	Barium titanate [BaTiO <sub>3</sub> ]
2924/10354	. . . . .	Aluminium indium arsenide phosphide [AlInAsP]	2924/10679	. . . . .	Strontium titanate [SrTiO <sub>3</sub> ]
2924/10355	. . . . .	Aluminium gallium arsenide nitride [AlGaAsN]	2924/1068	. . . . .	Lithium niobate [LiNbO <sub>3</sub> ]
2924/10356	. . . . .	Indium gallium arsenide nitride [InGaAsN]	2924/10681	. . . . .	Lanthanum copper oxide [La <sub>2</sub> CuO <sub>4</sub> ]
2924/10357	. . . . .	Indium aluminium arsenide nitride [InAlAsN]	2924/1072	. . . . .	Layered
2924/10358	. . . . .	Gallium arsenide antimonide nitride [GaAsSbN]	2924/10721	. . . . .	Lead(II)iodide [PbI <sub>2</sub> ]
2924/10359	. . . . .	Gallium indium nitride arsenide antimonide [GaInNAsSb]	2924/10722	. . . . .	Molybdenum disulfide [MoS <sub>2</sub> ]
2924/1036	. . . . .	Gallium indium arsenide antimonide phosphide [GaInAsSbP]	2924/10723	. . . . .	Gallium selenide [GaSe]
2924/1037	. . . . .	II-VI	2924/10724	. . . . .	Tin sulfide [SnS]
2924/10371	. . . . .	Cadmium selenide [CdSe]	2924/10725	. . . . .	Bismuth sulfide [Bi <sub>2</sub> S <sub>3</sub> ]
2924/10372	. . . . .	Cadmium sulfide [CdS]	2924/1077	. . . . .	Magnetic diluted [DMS]
2924/10373	. . . . .	Cadmium telluride [CdTe]	2924/10771	. . . . .	Gallium manganese arsenide [GaMnAs]
2924/10375	. . . . .	Zinc selenide [ZnSe]	2924/10772	. . . . .	Indium manganese arsenide [InMnAs]
2924/10376	. . . . .	Zinc sulfide [ZnS]	2924/10773	. . . . .	Cadmium manganese telluride [CdMnTe]
2924/10377	. . . . .	Zinc telluride [ZnTe]	2924/10774	. . . . .	Lead manganese telluride [PbMnTe]
2924/10378	. . . . .	Cadmium zinc telluride, i.e. CZT [CdZnTe]	2924/10775	. . . . .	Lanthanum calcium manganate [La <sub>0.7</sub> Ca <sub>0.3</sub> MnO <sub>3</sub> ]
2924/10379	. . . . .	Mercury cadmium telluride [HgZnTe]	2924/10776	. . . . .	Iron(II)oxide [FeO]
2924/1038	. . . . .	Mercury zinc telluride [HgZnSe]	2924/10777	. . . . .	Nickel(II)oxide [NiO]
2924/10381	. . . . .	Mercury zinc selenide [HgZnSe]	2924/10778	. . . . .	Europium(II)oxide [EuO]
2924/1042	. . . . .	I-VII	2924/10779	. . . . .	Europium(II)sulfide [EuS]
2924/10421	. . . . .	Cuprous chloride [CuCl]	2924/1078	. . . . .	Chromium(III)bromide [CrBr <sub>3</sub> ]
2924/1047	. . . . .	I-VI	2924/1082	. . . . .	Other
2924/10471	. . . . .	Copper sulfide [CuS]	2924/10821	. . . . .	Copper indium gallium selenide, CIGS [CuInGa]Se <sub>2</sub>
2924/1052	. . . . .	IV-VI	2924/10822	. . . . .	Copper zinc tin sulfide, CZTS [Cu <sub>2</sub> ZnSnS <sub>4</sub> ]
2924/10521	. . . . .	Lead selenide [PbSe]	2924/10823	. . . . .	Copper indium selenide, CIS [CuInSe <sub>2</sub> ]
2924/10522	. . . . .	Lead(II)sulfide [PbS]	2924/10824	. . . . .	Silver gallium sulfide [AgGaS <sub>2</sub> ]
2924/10523	. . . . .	Lead telluride [PbTe]	2924/10825	. . . . .	Zinc silicon phosphide [ZnSiP <sub>2</sub> ]
2924/10524	. . . . .	Tin sulfide [SnS, SnS <sub>2</sub> ]	2924/10826	. . . . .	Arsenic selenide [As <sub>2</sub> S <sub>3</sub> ]
2924/10525	. . . . .	Tin telluride [SnTe]	2924/10827	. . . . .	Platinum silicide [PtSi]
2924/10526	. . . . .	Lead tin telluride [PbSnTe]	2924/10828	. . . . .	Bismuth(III)iodide [BiI <sub>3</sub> ]
2924/10527	. . . . .	Thallium tin telluride [Tl <sub>2</sub> SnTe <sub>5</sub> ]	2924/10829	. . . . .	Mercury(II)iodide [HgI <sub>2</sub> ]
2924/10528	. . . . .	Thallium germanium telluride [Tl <sub>2</sub> GeTe <sub>5</sub> ]	2924/1083	. . . . .	Thallium(I)bromide [TlBr]
2924/1057	. . . . .	V-VI	2924/10831	. . . . .	Selenium [Se]
2924/10571	. . . . .	Bismuth telluride [Bi <sub>2</sub> Te <sub>3</sub> ]	2924/10832	. . . . .	Silver sulfide [Ag <sub>2</sub> S]
2924/1062	. . . . .	II-V	2924/10833	. . . . .	Iron disulfide [FeS <sub>2</sub> ]
2924/10621	. . . . .	Cadmium phosphide [Cd <sub>3</sub> P <sub>2</sub> ]	2924/11	. . . . .	Device type
2924/10622	. . . . .	Cadmium arsenide [Cd <sub>3</sub> As <sub>2</sub> ]	2924/12	. . . . .	Passive devices, e.g. 2 terminal devices
2924/10623	. . . . .	Cadmium antimonide [Cd <sub>3</sub> Sb <sub>2</sub> ]	2924/1203	. . . . .	Rectifying Diode
2924/10624	. . . . .	Zinc phosphide [Zn <sub>3</sub> P <sub>2</sub> ]	2924/12031	. . . . .	PIN diode
2924/10625	. . . . .	Zinc arsenide [Zn <sub>3</sub> As <sub>2</sub> ]	2924/12032	. . . . .	Schottky diode
2924/10626	. . . . .	Zinc antimonide [Zn <sub>3</sub> Sb <sub>2</sub> ]	2924/12033	. . . . .	Gunn diode
2924/1067	. . . . .	Oxide	2924/12034	. . . . .	Varactor
2924/10671	. . . . .	Titanium dioxide, anatase, rutile, brookite [TiO <sub>2</sub> ]	2924/12035	. . . . .	Zener diode
2924/10672	. . . . .	Copper(I)oxide [Cu <sub>2</sub> O]	2924/12036	. . . . .	PN diode
2924/10673	. . . . .	Copper(II)oxide [CuO]	2924/12037	. . . . .	Cat's whisker diode
2924/10674	. . . . .	Uranium dioxide [UO <sub>2</sub> ]	2924/12038	. . . . .	Point contact
2924/10675	. . . . .	Uranium trioxide [UO <sub>3</sub> ]	2924/1204	. . . . .	Optical Diode
			2924/12041	. . . . .	LED
			2924/12042	. . . . .	LASER
			2924/12043	. . . . .	Photo diode
			2924/12044	. . . . .	OLED
			2924/1205	. . . . .	Capacitor
			2924/1206	. . . . .	Inductor
			2924/1207	. . . . .	Resistor
			2924/13	. . . . .	Discrete devices, e.g. 3 terminal devices
			2924/1301	. . . . .	Thyristor

2924/13011	. . . . .	Anode Gate Thyristor [AGT]	2924/13067	. . . . .	FinFET, source/drain region shapes fins on the silicon surface
2924/13013	. . . . .	Bidirectional Control Thyristor [BCT]	2924/13068	. . . . .	Fast-reverse epitaxial diode field-effect transistor [FREDFET]
2924/13014	. . . . .	Breakover Diode [BOD]	2924/13069	. . . . .	Thin film transistor [TFT]
2924/13015	. . . . .	DIAC - Bidirectional trigger device	2924/1307	. . . . .	Organic Field-Effect Transistor [OFET]
2924/13016	. . . . .	Dynistor - Unidirectional switching device	2924/13071	. . . . .	Ballistic transistor
2924/13017	. . . . .	Shockley diode - Unidirectional trigger and switching device	2924/13072	. . . . .	Sensor FET
2924/13018	. . . . .	SIDAC - Bidirectional switching device	2924/13073	. . . . .	ion-sensitive field-effect transistor [ISFET]
2924/13019	. . . . .	Trisil, SIDACtor - Bidirectional protection devices	2924/13074	. . . . .	Electrolyte-oxide-semiconductor field effect transistor [EOSFET], e.g. Neurochip
2924/1302	. . . . .	GTO - Gate Turn-Off thyristor	2924/13075	. . . . .	Deoxyribonucleic acid field-effect transistor [DNAFET]
2924/13021	. . . . .	DB-GTO - Distributed Buffer Gate Turn-Off thyristor	2924/13076	. . . . .	DEPFET
2924/13022	. . . . .	MA-GTO - Modified Anode Gate Turn-Off thyristor	2924/13078	. . . . .	Unijunction transistors
2924/13023	. . . . .	IGCT - Integrated Gate Commutated Thyristor	2924/13079	. . . . .	Single-electron transistors [SET]
2924/13024	. . . . .	LASCR - Light Activated SCR, or LTT - Light triggered thyristor	2924/1308	. . . . .	Nanofluidic transistor
2924/13025	. . . . .	Light Activated Semiconducting Switch [LASS]	2924/13081	. . . . .	Multigate devices
2924/13026	. . . . .	MCT - MOSFET Controlled Thyristor - It contains two additional FET structures for on/off control	2924/13082	. . . . .	Tetrode transistor
2924/13027	. . . . .	BRT - Base Resistance Controlled Thyristor	2924/13083	. . . . .	Pentode transistor
2924/13028	. . . . .	RCT - Reverse Conducting Thyristor	2924/13084	. . . . .	Trigate transistor
2924/13029	. . . . .	PUT or PUJT - Programmable Unijunction Transistor - A thyristor with gate on n-type layer near to the anode used as a functional replacement for unijunction transistor	2924/13085	. . . . .	Dual gate FETs
2924/1303	. . . . .	SCS - Silicon Controlled Switch or Thyristor Tetrode - A thyristor with both cathode and anode gates	2924/13086	. . . . .	Junctionless Nanowire Transistor [JNT]
2924/13032	. . . . .	SITh - Static Induction Thyristor, or FCTh - Field Controlled Thyristor - containing a gate structure that can shut down anode current flow	2924/13087	. . . . .	Vertical-Slit Field-Effect Transistor [VeSFET]
2924/13033	. . . . .	TRIAC - Triode for Alternating Current - A bidirectional switching device containing two thyristor structures with common gate contact	2924/13088	. . . . .	Graphene Nanoribbon Field-Effect Transistor [GNRFET]
2924/13034	. . . . .	Silicon Controlled Rectifier [SCR]	2924/13089	. . . . .	Nanoparticle Organic Memory Field-Effect Transistor [NOMFET]
2924/13035	. . . . .	Asymmetrical SCR [ASCR]	2924/1309	. . . . .	Modulation-Doped Field Effect Transistor [MODFET]
2924/1304	. . . . .	Transistor	2924/13091	. . . . .	Metal-Oxide-Semiconductor Field-Effect Transistor [MOSFET]
2924/1305	. . . . .	Bipolar Junction Transistor [BJT]	2924/13092	. . . . .	Dual Gate Metal-Oxide-Semiconductor Field-Effect Transistor [DGMOSFET]
2924/13051	. . . . .	Heterojunction bipolar transistor [HBT]	2924/14	. . . . .	Integrated circuits
2924/13052	. . . . .	Schottky transistor	2924/141	. . . . .	Analog devices
2924/13053	. . . . .	Avalanche transistor	2924/142	. . . . .	HF devices
2924/13054	. . . . .	Darlington transistor	2924/1421	. . . . .	RF devices
2924/13055	. . . . .	Insulated gate bipolar transistor [IGBT]	2924/14211	. . . . .	Voltage-controlled oscillator [VCO]
2924/13056	. . . . .	Photo transistor	2924/14215	. . . . .	Low-noise amplifier [LNA]
2924/1306	. . . . .	Field-effect transistor [FET]	2924/1422	. . . . .	Mixer
2924/13061	. . . . .	Carbon nanotube field-effect transistor [CNFET]	2924/14221	. . . . .	Electronic mixer
2924/13062	. . . . .	Junction field-effect transistor [JFET]	2924/14222	. . . . .	Frequency mixer
2924/13063	. . . . .	Metal-Semiconductor Field-Effect Transistor [MESFET]	2924/1423	. . . . .	Monolithic Microwave Integrated Circuit [MMIC]
2924/13064	. . . . .	High Electron Mobility Transistor [HEMT, HFET [heterostructure FET], MODFET]	2924/1424	. . . . .	Operational amplifier
2924/13066	. . . . .	Inverted-T field effect transistor [ITFET]	2924/1425	. . . . .	Converter
			2924/14251	. . . . .	Frequency converter
			2924/14252	. . . . .	Voltage converter
			2924/14253	. . . . .	Digital-to-analog converter [DAC]
			2924/1426	. . . . .	Driver
			2924/1427	. . . . .	Voltage regulator [VR]
			2924/143	. . . . .	Digital devices
			2924/1431	. . . . .	Logic devices
			2924/1432	. . . . .	Central processing unit [CPU]
			2924/1433	. . . . .	Application-specific integrated circuit [ASIC]
			2924/14335	. . . . .	Digital signal processor [DSP]
			2924/1434	. . . . .	Memory

2924/1435	. . . . .	Random access memory [RAM]	2924/153	. . .	Connection portion
2924/1436	. . . . .	Dynamic random-access memory [DRAM]	2924/1531	. . . .	the connection portion being formed only on the surface of the substrate opposite to the die mounting surface
2924/14361	. . . . .	Synchronous dynamic random access memory [SDRAM]	2924/15311	. . . . .	being a ball array, e.g. BGA
2924/14362	. . . . .	RAS Only Refresh [ROR]	2924/15312	. . . . .	being a pin array, e.g. PGA
2924/14363	. . . . .	CAS before RAS refresh [CBR]	2924/15313	. . . . .	being a land array, e.g. LGA
2924/14364	. . . . .	Multibank DRAM [MDRAM]	2924/1532	. . . . .	the connection portion being formed on the die mounting surface of the substrate
2924/14365	. . . . .	Video DRAM [VRAM]	2924/15321	. . . . .	being a ball array, e.g. BGA
2924/14366	. . . . .	Window DRAM [WRAM]	2924/15322	. . . . .	being a pin array, e.g. PGA
2924/14367	. . . . .	Fast page mode DRAM [FPM DRAM]	2924/15323	. . . . .	being a land array, e.g. LGA
2924/14368	. . . . .	Extended data out DRAM [EDO DRAM]	2924/1533	. . . . .	the connection portion being formed both on the die mounting surface of the substrate and outside the die mounting surface of the substrate
2924/14369	. . . . .	Burst EDO DRAM [BEDO DRAM]	2924/15331	. . . . .	being a ball array, e.g. BGA
2924/1437	. . . . .	Static random-access memory [SRAM]	2924/15332	. . . . .	being a pin array, e.g. PGA
2924/1438	. . . . .	Flash memory	2924/15333	. . . . .	being a land array, e.g. LGA
2924/1441	. . . . .	Ferroelectric RAM [FeRAM or FRAM]	2924/156	. . .	Material
2924/1442	. . . . .	Synchronous graphics RAM [SGRAM]	2924/157	. . . .	with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
2924/1443	. . . . .	Non-volatile random-access memory [NVRAM]	2924/15701	. . . . .	the principal constituent melting at a temperature of less than 400 C
2924/1444	. . . . .	PBRAM	2924/15717	. . . . .	the principal constituent melting at a temperature of greater than or equal to 400 C and less than 950 C
2924/145	. . . . .	Read-only memory [ROM]	2924/15724	. . . . .	Aluminium [Al] as principal constituent
2924/1451	. . . . .	EPROM	2924/15738	. . . . .	the principal constituent melting at a temperature of greater than or equal to 950 C and less than 1550 C
2924/14511	. . . . .	EEPROM	2924/15747	. . . . .	Copper [Cu] as principal constituent
2924/1453	. . . . .	PROM	2924/1576	. . . . .	Iron [Fe] as principal constituent
2924/146	. .	Mixed devices	2924/15763	. . . . .	the principal constituent melting at a temperature of greater than 1550 C
2924/1461	. . .	MEMS	2924/15786	. . . . .	with a principal constituent of the material being a non metallic, non metalloid inorganic material
2924/15	. .	Details of package parts other than the semiconductor or other solid state devices to be connected	2924/15787	. . . . .	Ceramics, e.g. crystalline carbides, nitrides or oxides
2924/151	. .	Die mounting substrate	2924/15788	. . . . .	Glasses, e.g. amorphous oxides, nitrides or fluorides
2924/1511	. . .	Structure	2924/1579	. . . . .	with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
2924/1515	. . .	Shape	2924/15791	. . . . .	The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
2924/15151	. . . .	the die mounting substrate comprising an aperture, e.g. for underfilling, outgassing, window type wire connections	2924/15793	. . . . .	with a principal constituent of the material being a solid not provided for in groups <a href="#">H01L 2924/157</a> - <a href="#">H01L 2924/15791</a> , e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
2924/15153	. . . .	the die mounting substrate comprising a recess for hosting the device	2924/15798	. . . . .	with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
2924/15155	. . . . .	the shape of the recess being other than a cuboid	2924/161	. . .	Cap
2924/15156	. . . . .	Side view	2924/1611	. . .	Structure
2924/15157	. . . . .	Top view	2924/1615	. . .	Shape
2924/15158	. . . . .	the die mounting substrate being other than a cuboid			
2924/15159	. . . . .	Side view			
2924/15162	. . . . .	Top view			
2924/15165	. . .	Monolayer substrate			
2924/1517	. . .	Multilayer substrate			
2924/15172	. . . .	Fan-out arrangement of the internal vias			
2924/15173	. . . . .	in a single layer of the multilayer substrate			
2924/15174	. . . . .	in different layers of the multilayer substrate			
2924/15182	. . . .	Fan-in arrangement of the internal vias			
2924/15183	. . . . .	in a single layer of the multilayer substrate			
2924/15184	. . . . .	in different layers of the multilayer substrate			
2924/15192	. . . .	Resurf arrangement of the internal vias			
2924/152	. . .	Disposition			

H01L

- 2924/16151 . . . . Cap comprising an aperture, e.g. for pressure control, encapsulation
- 2924/16152 . . . . Cap comprising a cavity for hosting the device, e.g. U-shaped cap
- 2924/16153 . . . . Cap enclosing a plurality of side-by-side cavities [e.g. E-shaped cap]
- 2924/1616 . . . . Cavity shape
- 2924/1617 . . . . Cavity coating
- 2924/16171 . . . . Material
- 2924/16172 . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
- 2924/16173 . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
- 2924/16174 . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
- 2924/16175 . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
- 2924/16176 . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
- 2924/16177 . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
- 2924/16178 . . . . with a principal constituent of the material being a solid not provided for in groups [H01L 2924/157](#) - [H01L 2924/15791](#), e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
- 2924/16179 . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
- 2924/1619 . . . . Cavity coating shape
- 2924/16195 . . . . Flat cap [not enclosing an internal cavity]
- 2924/16196 . . . . Cap forming a cavity, e.g. being a curved metal foil
- 2924/162 . . . . Disposition
- 2924/16235 . . . . Connecting to a semiconductor or solid-state bodies, i.e. cap-to-chip
- 2924/16251 . . . . Connecting to an item not being a semiconductor or solid-state body, e.g. cap-to-substrate
- 2924/1626 . . . . Cap-in-cap assemblies
- 2924/1627 . . . . stacked type assemblies, e.g. stacked multi-cavities
- 2924/163 . . . . Connection portion, e.g. seal
- 2924/1631 . . . . Structure
- 2924/16315 . . . . Shape
- 2924/1632 . . . . Disposition
- 2924/164 . . . . Material
- 2924/165 . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
- 2924/16586 . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
- 2924/16587 . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
- 2924/16588 . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
- 2924/1659 . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
- 2924/16593 . . . . with a principal constituent of the material being a solid not provided for in groups [H01L 2924/157](#) - [H01L 2924/15791](#), e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
- 2924/16598 . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
- 2924/166 . . . . Material
- 2924/167 . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
- 2924/16701 . . . . the principal constituent melting at a temperature of less than 400 C
- 2924/16717 . . . . the principal constituent melting at a temperature of greater than or equal to 400 C and less than 950 C
- 2924/16724 . . . . Aluminium [Al] as principal constituent
- 2924/16738 . . . . the principal constituent melting at a temperature of greater than or equal to 950 C and less than 1550 C
- 2924/16747 . . . . Copper [Cu] as principal constituent
- 2924/1676 . . . . Iron [Fe] as principal constituent
- 2924/16763 . . . . the principal constituent melting at a temperature of greater than 1550 C
- 2924/16786 . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
- 2924/16787 . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
- 2924/16788 . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
- 2924/1679 . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
- 2924/16791 . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
- 2924/16793 . . . . with a principal constituent of the material being a solid not provided for in groups [H01L 2924/167](#) - [H01L 2924/16791](#), e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
- 2924/16798 . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
- 2924/171 . . . . Frame
- 2924/1711 . . . . Structure
- 2924/1715 . . . . Shape

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- 2924/17151 . . . . Frame comprising an aperture, e.g. for pressure control, encapsulation
- 2924/172 . . . Disposition
- 2924/173 . . . Connection portion, e.g. seal
- 2924/176 . . . Material
- 2924/177 . . . . with a principal constituent of the material being a metal or a metalloid, e.g. boron [B], silicon [Si], germanium [Ge], arsenic [As], antimony [Sb], tellurium [Te] and polonium [Po], and alloys thereof
- 2924/17701 . . . . . the principal constituent melting at a temperature of less than 400 C
- 2924/17717 . . . . . the principal constituent melting at a temperature of greater than or equal to 400 C and less than 950 C
- 2924/17724 . . . . . Aluminium [Al] as principal constituent
- 2924/17738 . . . . . the principal constituent melting at a temperature of greater than or equal to 950 C and less than 1550 C
- 2924/17747 . . . . . Copper [Cu] as principal constituent
- 2924/1776 . . . . . Iron [Fe] as principal constituent
- 2924/17763 . . . . . the principal constituent melting at a temperature of greater than 1550 C
- 2924/17786 . . . . with a principal constituent of the material being a non metallic, non metalloid inorganic material
- 2924/17787 . . . . . Ceramics, e.g. crystalline carbides, nitrides or oxides
- 2924/17788 . . . . . Glasses, e.g. amorphous oxides, nitrides or fluorides
- 2924/1779 . . . . with a principal constituent of the material being a polymer, e.g. polyester, phenolic based polymer, epoxy
- 2924/17791 . . . . . The principal constituent being an elastomer, e.g. silicones, isoprene, neoprene
- 2924/17793 . . . . with a principal constituent of the material being a solid not provided for in groups [H01L 2924/177](#) - [H01L 2924/17791](#), e.g. allotropes of carbon, fullerene, graphite, carbon-nanotubes, diamond
- 2924/17798 . . . . with a principal constituent of the material being a combination of two or more materials in the form of a matrix with a filler, i.e. being a hybrid material, e.g. segmented structures, foams
- 2924/181 . . Encapsulation
- 2924/1811 . . . Structure
- 2924/1815 . . . Shape
- 2924/1816 . . . . Exposing the passive side of the semiconductor or solid-state body
- 2924/18161 . . . . . of a flip chip
- 2924/18162 . . . . . of a chip with build-up interconnect
- 2924/18165 . . . . . of a wire bonded chip
- 2924/182 . . . Disposition
- 2924/183 . . . Connection portion, e.g. seal
- 2924/18301 . . . . being an anchoring portion, i.e. mechanical interlocking between the encapsulation resin and another package part
- 2924/186 . . . Material
- 2924/19 . . Details of hybrid assemblies other than the semiconductor or other solid state devices to be connected
- 2924/1901 . . Structure
- 2924/19011 . . . including integrated passive components
- 2924/19015 . . . including thin film passive components
- 2924/1902 . . . including thick film passive components
- 2924/1903 . . . including wave guides
- 2924/19031 . . . . being a strip line type
- 2924/19032 . . . . being a microstrip line type
- 2924/19033 . . . . being a coplanar line type
- 2924/19038 . . . . being a hybrid line type
- 2924/19039 . . . . . impedance transition between different types of wave guides
- 2924/1904 . . . Component type
- 2924/19041 . . . . being a capacitor
- 2924/19042 . . . . being an inductor
- 2924/19043 . . . . being a resistor
- 2924/1905 . . Shape
- 2924/19051 . . . Impedance matching structure [e.g. balun]
- 2924/191 . . Disposition
- 2924/19101 . . . of discrete passive components
- 2924/19102 . . . . in a stacked assembly with the semiconductor or solid state device
- 2924/19103 . . . . . interposed between the semiconductor or solid-state device and the die mounting substrate, i.e. chip-on-passive
- 2924/19104 . . . . . on the semiconductor or solid-state device, i.e. passive-on-chip
- 2924/19105 . . . . in a side-by-side arrangement on a common die mounting substrate
- 2924/19106 . . . . in a mirrored arrangement on two different side of a common die mounting substrate
- 2924/19107 . . . . off-chip wires
- 2924/20 . . Parameters
- 2924/201 . . Temperature ranges
- 2924/20101 . . . Temperature range  $T < 0\text{ C}$ ,  $T < 273.15\text{ K}$
- 2924/20102 . . . Temperature range  $0\text{ C} = < T < 60\text{ C}$ ,  $273.15\text{ K} = < T < 333.15\text{ K}$
- 2924/20103 . . . Temperature range  $60\text{ C} = < T < 100\text{ C}$ ,  $333.15\text{ K} = < T < 373.15\text{ K}$
- 2924/20104 . . . Temperature range  $100\text{ C} = < T < 150\text{ C}$ ,  $373.15\text{ K} = < T < 423.15\text{ K}$
- 2924/20105 . . . Temperature range  $150\text{ C} = < T < 200\text{ C}$ ,  $423.15\text{ K} = < T < 473.15\text{ K}$
- 2924/20106 . . . Temperature range  $200\text{ C} = < T < 250\text{ C}$ ,  $473.15\text{ K} = < T < 523.15\text{ K}$
- 2924/20107 . . . Temperature range  $250\text{ C} = < T < 300\text{ C}$ ,  $523.15\text{ K} = < T < 573.15\text{ K}$
- 2924/20108 . . . Temperature range  $300\text{ C} = < T < 350\text{ C}$ ,  $573.15\text{ K} = < T < 623.15\text{ K}$
- 2924/20109 . . . Temperature range  $350\text{ C} = < T < 400\text{ C}$ ,  $623.15\text{ K} = < T < 673.15\text{ K}$
- 2924/2011 . . . Temperature range  $400\text{ C} = < T < 450\text{ C}$ ,  $673.15\text{ K} = < T < 723.15\text{ K}$
- 2924/20111 . . . Temperature range  $450\text{ C} = < T < 500\text{ C}$ ,  $723.15\text{ K} = < T < 773.15\text{ K}$
- 2924/202 . . Electromagnetic wavelength ranges [W]
- 2924/20201 . . . Gamma radiation, i.e. wavelength less than 0.01 nm
- 2924/20202 . . . X-ray radiation, i.e. wavelength 0.01 to 10 nm
- 2924/2021 . . . Ultraviolet radiation
- 2924/20211 . . . . UV-C  $100 = < W < 280\text{ nm}$
- 2924/20212 . . . . UV-B  $280 = < W < 315\text{ nm}$
- 2924/20213 . . . . UV-A  $315 = < W < 400\text{ nm}$
- 2924/2024 . . . Visible spectrum wavelength  $390 = < W < 700\text{ nm}$ , i.e. 400-790 THz

2924/2026	. . . Infrared radiation 700= $\leq$ W<3000 nm	2924/2075	. . . larger or equal to 1 micron less than 10 microns
2924/20261	. . . IR-A 700= $\leq$ W<1400 nm, i.e. 215 THz-430 THz	2924/20751	. . . larger or equal to 10 microns less than 20 microns
2924/20262	. . . IR-B 1400= $\leq$ W<3000 nm, i.e. 100THz-215 THz	2924/20752	. . . larger or equal to 20 microns less than 30 microns
2924/20263	. . . IR-C 3000 nm = $\leq$ W<1 mm, i.e. 300 GHz-100THz	2924/20753	. . . larger or equal to 30 microns less than 40 microns
2924/2027	. . . Radio 1 mm - km 300 GHz - 3 Hz	2924/20754	. . . larger or equal to 40 microns less than 50 microns
2924/20271	. . . Microwave radiation 1 mm - 1 meter, i.e 300 GHz - 300 MHz	2924/20755	. . . larger or equal to 50 microns less than 60 microns
2924/203	. . Ultrasonic frequency ranges, i.e. KHz	2924/20756	. . . larger or equal to 60 microns less than 70 microns
2924/20301	. . . Ultrasonic frequency [f] f<25 kHz	2924/20757	. . . larger or equal to 70 microns less than 80 microns
2924/20302	. . . Ultrasonic frequency [f] 25 Khz= $\leq$ f< 50 KHz	2924/20758	. . . larger or equal to 80 microns less than 90 microns
2924/20303	. . . Ultrasonic frequency [f] 50 Khz= $\leq$ f< 75 KHz	2924/20759	. . . larger or equal to 90 microns less than 100 microns
2924/20304	. . . Ultrasonic frequency [f] 75 Khz= $\leq$ f< 100 KHz	2924/2076	. . . equal to or larger than 100 microns
2924/20305	. . . Ultrasonic frequency [f] 100 Khz= $\leq$ f< 125 KHz	2924/30	. Technical effects
2924/20306	. . . Ultrasonic frequency [f] 125 Khz= $\leq$ f< 150 KHz	2924/301	. . Electrical effects
2924/20307	. . . Ultrasonic frequency [f] 150 Khz= $\leq$ f< 175 KHz	2924/30101	. . . Resistance
2924/20308	. . . Ultrasonic frequency [f] 175 Khz= $\leq$ f< 200 KHz	2924/30105	. . . Capacitance
2924/20309	. . . Ultrasonic frequency [f] f $\geq$ 200 KHz	2924/30107	. . . Inductance
2924/206	. . Length ranges	2924/3011	. . . Impedance
2924/2064	. . . larger or equal to 1 micron less than 100 microns	2924/30111	. . . . matching
2924/20641	. . . larger or equal to 100 microns less than 200 microns	2924/302	. . . Electrostatic
2924/20642	. . . larger or equal to 200 microns less than 300 microns	2924/30201	. . . . Charge
2924/20643	. . . larger or equal to 300 microns less than 400 microns	2924/30205	. . . . Discharge
2924/20644	. . . larger or equal to 400 microns less than 500 microns	2924/3025	. . . Electromagnetic shielding
2924/20645	. . . larger or equal to 500 microns less than 600 microns	2924/35	. . Mechanical effects
2924/20646	. . . larger or equal to 600 microns less than 700 microns	2924/351	. . . Thermal stress
2924/20647	. . . larger or equal to 700 microns less than 800 microns	2924/3511	. . . . Warping
2924/20648	. . . larger or equal to 800 microns less than 900 microns	2924/3512	. . . . Cracking
2924/20649	. . . larger or equal to 900 microns less than 1000 microns	2924/35121	. . . . . Peeling or delaminating
2924/2065	. . . larger or equal to 1000 microns less than 1500 microns	2924/36	. . Material effects
2924/20651	. . . larger or equal to 1500 microns less than 2000 microns	2924/364	. . . Polymers
2924/20652	. . . larger or equal to 2000 microns less than 2500 microns	2924/3641	. . . . Outgassing
2924/20653	. . . larger or equal to 2500 microns less than 3000 microns	2924/365	. . . Metallurgical effects
2924/20654	. . . larger or equal to 3000 microns less than 4000 microns	2924/3651	. . . . Formation of intermetallics
2924/20655	. . . larger or equal to 4000 microns less than 5000 microns	2924/36511	. . . . . Purple plague
2924/20656	. . . larger or equal to 5000 microns less than 6000 microns	2924/3656	. . . . Formation of Kirkendall voids
2924/20657	. . . larger or equal to 6000 microns less than 7000 microns	2924/37	. . Effects of the manufacturing process
2924/20658	. . . larger or equal to 7000 microns less than 8000 microns	2924/37001	. . . Yield
2924/207	. . Diameter ranges	2924/37002	. . . Shelf life
		2924/3701	. . . increased through put
		2924/38	. . Effects and problems related to the device integration
		2924/381	. . . Pitch distance
		2924/384	. . . Bump effects
		2924/3841	. . . . Solder bridging
		2924/386	. . . Wire effects
		2924/3861	. . . . Sag
		2924/3862	. . . . Sweep
		2924/40	. Details of apparatuses used for either manufacturing connectors or connecting the semiconductor or solid-state body
		2924/401	. . LASER
		2924/40101	. . . Mode
		2924/40102	. . . . being pulsed
		2924/40103	. . . . being continous

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- 2924/40105 . . . Beam details
- 2924/4015 . . . . Shape
- 2924/402 . . . Type
- 2924/40201 . . . . being a chemical
- 2924/40202 . . . . . Deuterium Flouride [DF] LASER
- 2924/40203 . . . . . Hydrogen Flouride [HF] LASER
- 2924/40207 . . . . . Dye laser
- 2924/4025 . . . . being a gas
- 2924/40251 . . . . . argon-ion LASER
- 2924/40252 . . . . . CO<sub>2</sub> LASER
- 2924/40253 . . . . . HeAg LASER
- 2924/40254 . . . . . HeNe LASER
- 2924/40255 . . . . . NeCu LASER
- 2924/403 . . . . being an Excimer
- 2924/40301 . . . . . ArF LASER
- 2924/40302 . . . . . F2 LASER
- 2924/40303 . . . . . KrCl LASER
- 2924/40304 . . . . . KrF LASER
- 2924/40305 . . . . . XeCl LASER
- 2924/40306 . . . . . XeF LASER
- 2924/4035 . . . . being a fiber hosted LASER
- 2924/404 . . . . being a solid state
- 2924/40401 . . . . . Free electron LASER
- 2924/40402 . . . . . Photonic crystal LASER
- 2924/40403 . . . . . Fiber solid state LASER
- 2924/40404 . . . . . Yttrium Aluminium Garnet Nd:YAG  
LASER
- 2924/40405 . . . . . Yttrium Lithium Flouride Nd:YLF  
LASER
- 2924/40406 . . . . . Ruby LASER
- 2924/40407 . . . . . Yb:YAG LASER
- 2924/405 . . . Wavelength
- 2924/40501 . . . . UV spectrum
- 2924/40502 . . . . Visible spectrum
- 2924/40503 . . . . IR spectrum