

# CPC COOPERATIVE PATENT CLASSIFICATION

## C CHEMISTRY; METALLURGY

(NOTES omitted)

### CHEMISTRY

#### C01 INORGANIC CHEMISTRY

(NOTES omitted)

**C01G** **COMPOUNDS CONTAINING METALS NOT COVERED BY SUBCLASSES [C01D](#) OR [C01F](#)** (metal hydrides {monoborane, diborane or addition complexes thereof} [C01B 6/00](#); salts of oxyacids of halogens [C01B 11/00](#); peroxides, salts or peroxyacids [C01B 15/00](#); thiosulfates, dithionites, polythionates [C01B 17/64](#); compounds containing selenium, or tellurium [C01B 19/00](#); binary compounds of nitrogen with metals [C01B 21/06](#); azides [C01B 21/08](#); {compounds containing nitrogen, other non-metals and metal [C01B 21/082](#)}; metal amides [C01B 21/092](#); nitrites [C01B 21/50](#); {compounds of noble gases [C01B 23/0005](#)}; phosphides [C01B 25/08](#); salts of oxyacids of phosphorus [C01B 25/16](#); carbides [C01B 32/90](#); compounds containing silicon [C01B 33/00](#); compounds containing boron [C01B 35/00](#); compounds having molecular sieve properties but not having base-exchange properties [C01B 37/00](#); compounds having molecular sieve and base-exchange properties, e.g. crystalline zeolites, [C01B 39/00](#); cyanides [C01C 3/08](#); salts of cyanamide [C01C 3/16](#); thiocyanates [C01C 3/20](#))

**1/00** **Methods of preparing compounds of metals not covered by subclasses [C01B](#), [C01C](#), [C01D](#), or [C01F](#), in general** (electrolytic production of inorganic compounds [C25B 1/00](#))

- 1/02 . Oxides
- 1/04 . Carbonyls
- 1/06 . Halides
- 1/08 . Nitrates
- 1/10 . Sulfates
- 1/12 . Sulfides
- 1/14 . Sulfitess

**3/00** **Compounds of copper**

- 3/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 3/006 . {Compounds containing, besides copper, two or more other elements, with the exception of oxygen or hydrogen}
- 3/02 . Oxides; Hydroxides
- 3/04 . Halides
- 3/05 . . Chlorides
- 3/06 . . Oxychlorides
- 3/08 . Nitrates
- 3/10 . Sulfates
- 3/12 . Sulfides
- 3/14 . Complexes with ammonia

**5/00** **Compounds of silver**

- 5/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 5/006 . {Compounds containing, besides silver, two or more other elements, with the exception of oxygen or hydrogen}
- 5/02 . Halides

**7/00** **Compounds of gold**

- 7/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 7/006 . {Compounds containing, besides gold, two or more other elements, with the exception of oxygen or hydrogen}

**9/00** **Compounds of zinc**

- 9/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 9/006 . {Compounds containing, besides zinc, two or more other elements, with the exception of oxygen or hydrogen}
- 9/02 . Oxides; Hydroxides
- 9/03 . . Processes of production using dry methods, e.g. vapour phase processes
- 9/04 . Halides
- 9/06 . Sulfates
- 9/08 . Sulfides

**11/00** **Compounds of cadmium**

- 11/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 11/006 . {Compounds containing, besides cadmium, two or more other elements, with the exception of oxygen or hydrogen}
- 11/02 . Sulfides

**13/00** **Compounds of mercury**

- 13/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 13/006 . {Compounds containing, besides mercury, two or more other elements, with the exception of oxygen or hydrogen}
- 13/02 . Oxides

13/04	. Halides	23/024	. . . {Purification of tetrachloride}
<b>15/00</b>	<b>Compounds of gallium, indium or thallium</b>	23/026	. . {Titanium trichloride}
15/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}	23/028	. . {Titanium fluoride}
15/006	. {Compounds containing, besides gallium, indium, or thallium, two or more other elements, with the exception of oxygen or hydrogen}	23/04	. Oxides; Hydroxides
<b>17/00</b>	<b>Compounds of germanium</b>	23/043	. . {Titanium sub-oxides}
17/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}	23/047	. . Titanium dioxide
17/006	. {Compounds containing, besides germanium, two or more other elements, with the exception of oxygen or hydrogen}	23/0475	. . . {Purification}
17/02	. Germanium dioxide	23/053	. . . Producing by wet processes, e.g. hydrolysing titanium salts
17/04	. Halides of germanium	23/0532	. . . . {by hydrolysing sulfate-containing salts}
<b>19/00</b>	<b>Compounds of tin</b>	23/0534	. . . . {in the presence of seeds}
19/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}	23/0536	. . . . {by hydrolysing chloride-containing salts}
19/006	. {Compounds containing, besides tin, two or more other elements, with the exception of oxygen or hydrogen}	23/0538	. . . . {in the presence of seeds}
19/02	. Oxides	23/07	. . . Producing by vapour phase processes, e.g. halide oxidation
19/04	. Halides	23/075	. . . . {Evacuation and cooling of the gaseous suspension containing the oxide; Desacidification and elimination of gases occluded in the separated oxide}
19/06	. . Stannous chloride	23/08	. . . Drying; Calcining {; After treatment of titanium oxide}
19/08	. . Stannic chloride	<b>25/00</b>	<b>Compounds of zirconium</b>
<b>21/00</b>	<b>Compounds of lead</b>	25/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
21/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}	25/006	. {Compounds containing, besides zirconium, two or more other elements, with the exception of oxygen or hydrogen}
21/006	. {Compounds containing, besides lead, two or more other elements, with the exception of oxygen or hydrogen}	25/02	. Oxides
21/02	. Oxides	25/04	. Halides
21/04	. . Lead suboxide [Pb <sub>2</sub> O]	25/06	. Sulfates
21/06	. . Lead monoxide [PbO]	<b>27/00</b>	<b>Compounds of hafnium</b>
21/08	. . Lead dioxide [PbO <sub>2</sub> ]	27/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
21/10	. . Red lead [Pb <sub>3</sub> O <sub>4</sub> ]	27/006	. {Compounds containing, besides hafnium, two or more other elements, with the exception of oxygen or hydrogen}
21/12	. Hydroxides	27/02	. Oxides
21/14	. Carbonates	27/04	. Halides
21/16	. Halides	27/06	. Sulfates
21/18	. Nitrates	<b>28/00</b>	<b>Compounds of arsenic</b>
21/20	. Sulfates	28/001	. {Preparation involving a solvent-solvent extraction, an adsorption or an ion-exchange}
21/21	. Sulfides	28/002	. {Compounds containing, besides arsenic, two or more other elements, with the exception of oxygen or hydrogen (C01G 28/001 takes precedence)}
21/22	. Plumbates; Plumbites	28/004	. . {containing halogen}
<b>23/00</b>	<b>Compounds of titanium {(preparation of Ti-compounds from ores or scraps C22B 34/12)}</b>	28/005	. {Oxides; Hydroxides; Oxyacids (C01G 28/001 takes precedence)}
23/001	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}	28/007	. {Halides (C01G 28/001 takes precedence)}
23/002	. {Compounds containing, besides titanium, two or more other elements, with the exception of oxygen or hydrogen (C01G 23/001, C01G 23/003 take precedence)}	28/008	. {Sulfides (C01G 28/001 takes precedence)}
23/003	. {Titanates (C01G 23/001 takes precedence)}	28/02	. Arsenates; Arsenites {(C01G 28/001 takes precedence)}
23/005	. . {Alkali titanates}	28/023	. . {of ammonium, alkali or alkaline-earth metals or magnesium}
23/006	. . {Alkaline earth titanates}	28/026	. . {containing at least two metals}
23/007	. {Titanium sulfides (C01G 23/001 takes precedence)}	<b>29/00</b>	<b>Compounds of bismuth</b>
23/008	. {Titanium- and titanyl sulfate (C01G 23/001 takes precedence)}	29/003	. {Preparations involving a liquid-liquid extraction, an adsorption or an ion-exchange}
23/02	. Halides of titanium		
23/022	. . {Titanium tetrachloride}		

29/006	. {Compounds containing, besides bismuth, two or more other elements, with the exception of oxygen or hydrogen}	39/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
<b>30/00</b>	<b>Compounds of antimony</b>	39/006	. {Compounds containing, besides molybdenum, two or more other elements, with the exception of oxygen or hydrogen}
30/001	. {Preparation involving a solvent-solvent extraction, an adsorption or an ion-exchange}	39/02	. Oxides; Hydroxides
30/002	. {Compounds containing, besides antimony, two or more other elements, with the exception of oxygen or hydrogen ( <a href="#">C01G 30/001</a> takes precedence)}	39/04	. Halides
30/003	. . {containing halogen}	39/06	. Sulfides
30/004	. {Oxides; Hydroxides; Oxyacids ( <a href="#">C01G 30/001</a> takes precedence)}	<b>41/00</b>	<b>Compounds of tungsten</b>
30/005	. . {Oxides}	41/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
30/006	. {Halides ( <a href="#">C01G 30/001</a> takes precedence)}	41/006	. {Compounds containing, besides tungsten, two or more other elements, with the exception of oxygen or hydrogen}
30/007	. . {of binary type SbX <sub>3</sub> or SbX <sub>5</sub> with X representing a halogen, or mixed of the type SbX <sub>3</sub> X' <sub>2</sub> with X,X' representing different halogens}	41/02	. Oxides; Hydroxides
30/008	. {Sulfides ( <a href="#">C01G 30/001</a> takes precedence)}	41/04	. Halides
30/02	. Antimonates; Antimonites {( <a href="#">C01G 30/001</a> takes precedence)}	<b>43/00</b>	<b>Compounds of uranium</b>
30/023	. . {of ammonium, alkali or alkaline-earth metals or magnesium}	43/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
30/026	. . {containing at least two metals}	43/006	. {Compounds containing, besides uranium, two or more other elements, with the exception of oxygen or hydrogen}
<b>31/00</b>	<b>Compounds of vanadium</b>	43/01	. Oxides; Hydroxides
31/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}	43/025	. . Uranium dioxide
31/006	. {Compounds containing, besides vanadium, two or more other elements, with the exception of oxygen or hydrogen}	43/04	. Halides of uranium
31/02	. Oxides	43/06	. . Fluorides
31/04	. Halides	43/063	. . . {Hexafluoride (UF <sub>6</sub> )}
<b>33/00</b>	<b>Compounds of niobium</b>	43/066	. . . . {Preparation}
33/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}	43/08	. . Chlorides
33/006	. {Compounds containing, besides niobium, two or more other elements, with the exception of oxygen or hydrogen}	43/10	. . Bromides
<b>35/00</b>	<b>Compounds of tantalum</b>	43/12	. . Iodides
35/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}	<b>45/00</b>	<b>Compounds of manganese</b>
35/006	. {Compounds containing, besides tantalum, two or more other elements, with the exception of oxygen or hydrogen}	45/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
35/02	. Halides	45/006	. {Compounds containing, besides manganese, two or more other elements, with the exception of oxygen or hydrogen ( <a href="#">manganates</a> , <a href="#">manganites</a> or <a href="#">permanganates</a> <a href="#">C01G 45/12</a> )}
<b>37/00</b>	<b>Compounds of chromium</b>	45/02	. Oxides; Hydroxides
37/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}	45/04	. Carbonyls
37/006	. {Compounds containing, besides chromium, two or more other elements, with the exception of oxygen or hydrogen}	45/06	. Halides
37/02	. Oxides or hydrates thereof	45/08	. Nitrates
37/027	. . Chromium dioxide	45/10	. Sulfates
37/033	. . Chromium trioxide; Chromic acid	45/12	. Manganates {manganites or} permanganates
37/04	. Chromium halides	45/1207	. . {Permanganates ([MnO] <sub>4</sub> <sup>-</sup> ) or manganates ([MnO <sub>4</sub> ] <sup>2-</sup> )}
37/06	. . Chromylhalides	45/1214	. . . . {containing alkali metals}
37/08	. Chromium sulfates	45/1221	. . {Manganates or manganites with a manganese oxidation state of Mn(III), Mn(IV) or mixtures thereof}
37/10	. . Chrome alum	45/1228	. . . . {of the type [MnO <sub>2</sub> ] <sup>n-</sup> , e.g. LiMnO <sub>2</sub> , Li[MxMn <sub>1-x</sub> ]O <sub>2</sub> }
37/14	. Chromates; Bichromates	45/1235	. . . . {of the type [Mn <sub>2</sub> O <sub>4</sub> ] <sup>2-</sup> , e.g. Li <sub>2</sub> Mn <sub>2</sub> O <sub>4</sub> , Li <sub>2</sub> [MxMn <sub>2-x</sub> ]O <sub>4</sub> }
<b>39/00</b>	<b>Compounds of molybdenum</b>	45/1242	. . . . {of the type [Mn <sub>2</sub> O <sub>4</sub> ] <sup>-</sup> , e.g. LiMn <sub>2</sub> O <sub>4</sub> , Li[MxMn <sub>2-x</sub> ]O <sub>4</sub> }
		45/125	. . . . {of the type [MnO <sub>3</sub> ] <sup>n-</sup> , e.g. Li <sub>2</sub> MnO <sub>3</sub> , Li <sub>2</sub> [MxMn <sub>1-x</sub> ]O <sub>3</sub> }, (La,Sr)MnO <sub>3</sub> }
		45/1257	. . . . {containing lithium, e.g. Li <sub>2</sub> MnO <sub>3</sub> , Li <sub>2</sub> [MxMn <sub>1-x</sub> ]O <sub>3</sub> }
		45/1264	. . . . {containing rare earth, e.g. La <sub>1-x</sub> CaxMnO <sub>3</sub> , LaMnO <sub>3</sub> }

- 45/1271 . . . {of the type  $[\text{Mn}_2\text{O}_8]_n$ -, e.g.  $(\text{LaSr}_3)\text{Mn}_2\text{O}_8$ }
- 45/1278 . . . {of the type  $[\text{Mn}_2\text{O}_7]_n$ -, e.g.  $(\text{Sr}_2\text{-xNd}_x)\text{Mn}_2\text{O}_7$ ,  $\text{Ti}_2\text{Mn}_2\text{O}_7$ }
- 45/1285 . . . {of the type  $[\text{Mn}_2\text{O}_5]_n$  -}
- 45/1292 . . . {of the type  $[\text{Mn}_5\text{O}_{12}]_n$  -}
- 47/00 Compounds of rhenium**
- 47/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 47/006 . {Compounds containing, besides rhenium, two or more other elements, with the exception of oxygen or hydrogen}
- 49/00 Compounds of iron**
- 49/0009 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 49/0018 . {Mixed oxides or hydroxides, ([C01G 49/0009](#) takes precedence)}
- 49/0027 . . {containing one alkali metal}
- 49/0036 . . {containing one alkaline earth metal, magnesium or lead}
- 49/0045 . . {containing aluminium}
- 49/0054 . . {containing one rare earth metal, yttrium or scandium}
- 49/0063 . . {containing zinc}
- 49/0072 . . {containing manganese}
- 49/0081 . . {containing iron in unusual valence state [IV, V, VI]}
- 49/009 . {Compounds containing, besides iron, two or more other elements, with the exception of oxygen or hydrogen}
- 49/02 . Oxides; Hydroxides {([C01G 49/0018](#) takes precedence)}
- 49/04 . . Ferrous oxide  $[\text{FeO}]$
- 49/06 . . Ferric oxide  $[\text{Fe}_2\text{O}_3]$
- 49/08 . . Ferroso-ferric oxide  $[\text{Fe}_3\text{O}_4]$
- 49/10 . Halides {([C01G 49/0018](#) takes precedence)}
- 49/12 . Sulfides {([C01G 49/0018](#) takes precedence)}
- 49/14 . Sulfates {([C01G 49/0018](#) takes precedence)}
- 49/16 . Carbonyls {([C01G 49/0018](#) takes precedence)}
- 51/00 Compounds of cobalt**
- 51/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 51/006 . {Compounds containing, besides cobalt, two or more other elements, with the exception of oxygen or hydrogen ([cobaltates C01G 51/40](#))}
- 51/02 . Carbonyls
- 51/04 . Oxides; Hydroxides
- 51/06 . Carbonates
- 51/08 . Halides
- 51/085 . . {Chlorides}
- 51/10 . Sulfates
- 51/12 . Complexes with ammonia
- 51/30 . {Sulfides}
- 51/40 . {Cobaltates}
- 51/42 . . {containing alkali metals, e.g.  $\text{LiCoO}_2$ }
- 51/44 . . . {containing manganese}
- 51/50 . . . . {of the type  $[\text{MnO}_2]_n$  -, e.g.  $\text{Li}(\text{CoxMn}_{1-x})\text{O}_2$ ,  $\text{Li}(\text{MyCoxMn}_{1-x-y})\text{O}_2$ }
- 51/52 . . . . {of the type  $[\text{Mn}_2\text{O}_4]_2$ -, e.g.  $\text{Li}_2(\text{CoxMn}_{2-x})\text{O}_4$ ,  $\text{Li}_2(\text{MyCoxMn}_{2-x-y})\text{O}_4$ }
- 51/54 . . . . {of the type  $[\text{Mn}_2\text{O}_4]$ -, e.g.  $\text{Li}(\text{CoxMn}_{2-x})\text{O}_4$ ,  $\text{Li}(\text{MyCoxMn}_{2-x-y})\text{O}_4$ }
- 51/56 . . . . {of the type  $[\text{MnO}_3]_2$ -, e.g.  $\text{Li}_2(\text{CoxMn}_{1-x})\text{O}_3$ ,  $\text{Li}_2(\text{MyCoxMn}_{1-x-y})\text{O}_3$ }
- 51/58 . . . . {of the type  $[\text{Mn}_2\text{O}_8]_n$  -}
- 51/60 . . . . {of the type  $[\text{Mn}_2\text{O}_7]_n$  -}
- 51/62 . . . . {of the type  $[\text{Mn}_2\text{O}_5]_n$  -}
- 51/64 . . . . {of the type  $[\text{Mn}_5\text{O}_{12}]_n$  -}
- 51/66 . . {containing alkaline earth metals, e.g.  $\text{SrCoO}_3$ }
- 51/68 . . . {containing rare earth, e.g.  $\text{La}_{0.3}\text{Sr}_{0.7}\text{CoO}_3$ }
- 51/70 . . {containing rare earth, e.g.  $\text{LaCoO}_3$  ([C01G 51/68](#) takes precedence)}
- 53/00 Compounds of nickel**
- 53/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 53/006 . {Compounds containing, besides nickel, two or more other elements, with the exception of oxygen or hydrogen ([nickelates C01G 53/40](#))}
- 53/02 . Carbonyls
- 53/04 . Oxides; Hydroxides
- 53/06 . Carbonates
- 53/08 . Halides
- 53/09 . . Chlorides
- 53/10 . Sulfates
- 53/11 . Sulfides
- 53/12 . Complexes with ammonia
- 53/40 . {Nickelates}
- 53/42 . . {containing alkali metals, e.g.  $\text{LiNiO}_2$ }
- 53/44 . . . {containing manganese}
- 53/50 . . . . {of the type  $[\text{MnO}_2]_n$  -, e.g.  $\text{Li}(\text{NixMn}_{1-x})\text{O}_2$ ,  $\text{Li}(\text{MyNixMn}_{1-x-y})\text{O}_2$ }
- 53/52 . . . . {of the type  $[\text{Mn}_2\text{O}_4]_2$ -, e.g.  $\text{Li}_2(\text{NixMn}_{2-x})\text{O}_4$ ,  $\text{Li}_2(\text{MyNixMn}_{2-x-y})\text{O}_4$ }
- 53/54 . . . . {of the type  $[\text{Mn}_2\text{O}_4]$ -, e.g.  $\text{Li}(\text{NixMn}_{2-x})\text{O}_4$ ,  $\text{Li}(\text{MyNixMn}_{2-x-y})\text{O}_4$ }
- 53/56 . . . . {of the type  $[\text{MnO}_3]_2$ -, e.g.  $\text{Li}_2[\text{NixMn}_{1-x}\text{O}_3]$ ,  $\text{Li}_2[\text{MyNixMn}_{1-x-y}\text{O}_3]$ }
- 53/58 . . . . {of the type  $[\text{Mn}_2\text{O}_8]_n$  -}
- 53/60 . . . . {of the type  $[\text{Mn}_2\text{O}_7]_n$  -}
- 53/62 . . . . {of the type  $[\text{Mn}_2\text{O}_5]_n$  -}
- 53/64 . . . . {of the type  $[\text{Mn}_5\text{O}_{12}]_n$  -}
- 53/66 . . {containing alkaline earth metals, e.g.  $\text{SrNiO}_3$ ,  $\text{SrNiO}_2$ }
- 53/68 . . . {containing rare earth, e.g.  $\text{La}_{1.62}\text{Sr}_{0.38}\text{NiO}_4$ }
- 53/70 . . {containing rare earth, e.g.  $\text{LaNiO}_3$  ([C01G 53/68](#) takes precedence)}
- 55/00 Compounds of ruthenium, rhodium, palladium, osmium, iridium, or platinum**
- 55/001 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 55/002 . {Compounds containing, besides ruthenium, rhodium, palladium, osmium, iridium, or platinum, two or more other elements, with the exception of oxygen or hydrogen ([C01G 55/007](#) takes precedence)}
- 55/004 . {Oxides; Hydroxides}
- 55/005 . {Halides}
- 55/007 . {Compounds containing at least one carbonyl group}
- 55/008 . . {Carbonyls}
- 56/00 Compounds of transuranic elements**

## C01G

- 56/001 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 56/002 . . {by adsorption or by ion-exchange on a solid support}
- 56/003 . {Compounds comprising, besides transuranic elements, two or more other elements, with the exception of oxygen or hydrogen ([C01G 56/001 takes precedence](#))}
- 56/004 . {Compounds of plutonium ([C01G 56/001 takes precedence](#))}
- 56/005 . . {Oxides; Hydroxides}
- 56/006 . . {Halides}
- 56/007 . {Compounds of transuranic elements ([C01G 56/001 and C01G 56/004 take precedence](#))}
- 56/008 . . {Compounds of neptunium}
- 56/009 . . {Compounds of americium}
- 99/00 Subject matter not provided for in other groups of this subclass**
- 99/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 99/006 . {Compounds containing, besides a metal not provided for elsewhere in this subclass, two or more other elements other than oxygen or hydrogen ([C01G 99/003 takes precedence](#))}