

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

- 28/004 . . {containing halogen}
- 28/005 . {Oxides; Hydroxides; Oxyacids ([C01G 28/001 takes precedence](#))}
- 28/007 . {Halides ([C01G 28/001 takes precedence](#))}
- 28/008 . {Sulfides ([C01G 28/001 takes precedence](#))}
- 28/02 . Arsenates; Arsenites {( [C01G 28/001 takes precedence](#))}
- 28/023 . . {of ammonium, alkali or alkaline-earth metals or magnesium}
- 28/026 . . {containing at least two metals}
- 29/00 Compounds of bismuth**
- 29/003 . {Preparations involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 29/006 . {Compounds containing, besides bismuth, two or more other elements, with the exception of oxygen or hydrogen}
- 30/00 Compounds of antimony**
- 30/001 . {Preparation involving a solvent-solvent extraction, an adsorption or an ion-exchange}
- 30/002 . {Compounds containing, besides antimony, two or more other elements, with the exception of oxygen or hydrogen ([C01G 30/001 takes precedence](#))}
- 30/003 . . {containing halogen}
- 30/004 . {Oxides; Hydroxides; Oxyacids ([C01G 30/001 takes precedence](#))}
- 30/005 . . {Oxides}
- 30/006 . {Halides ([C01G 30/001 takes precedence](#))}
- 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}
- 30/008 . {Sulfides ([C01G 30/001 takes precedence](#))}
- 30/02 . Antimonates; Antimonites {( [C01G 30/001 takes precedence](#))}
- 30/023 . . {of ammonium, alkali or alkaline-earth metals or magnesium}
- 30/026 . . {containing at least two metals}
- 31/00 Compounds of vanadium**
- 31/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 31/006 . {Compounds containing, besides vanadium, two or more other elements, with the exception of oxygen or hydrogen}
- 31/02 . Oxides
- 31/04 . Halides
- 33/00 Compounds of niobium**
- 33/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 33/006 . {Compounds containing, besides niobium, two or more other elements, with the exception of oxygen or hydrogen}
- 35/00 Compounds of tantalum**
- 35/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 35/006 . {Compounds containing, besides tantalum, two or more other elements, with the exception of oxygen or hydrogen}
- 35/02 . Halides
- 37/00 Compounds of chromium**
- 37/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 37/006 . {Compounds containing, besides chromium, two or more other elements, with the exception of oxygen or hydrogen}
- 37/02 . Oxides or hydrates thereof
- 37/027 . . Chromium dioxide
- 37/033 . . Chromium trioxide; Chromic acid
- 37/04 . Chromium halides
- 37/06 . . Chromylhalides
- 37/08 . Chromium sulfates
- 37/10 . . Chrome alum
- 37/14 . Chromates; Bichromates
- 39/00 Compounds of molybdenum**
- 39/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 39/006 . {Compounds containing, besides molybdenum, two or more other elements, with the exception of oxygen or hydrogen}
- 39/02 . Oxides; Hydroxides
- 39/04 . Halides
- 39/06 . Sulfides
- 41/00 Compounds of tungsten**
- 41/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 41/006 . {Compounds containing, besides tungsten, two or more other elements, with the exception of oxygen or hydrogen}
- 41/02 . Oxides; Hydroxides
- 41/04 . Halides
- 43/00 Compounds of uranium**
- 43/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 43/006 . {Compounds containing, besides uranium, two or more other elements, with the exception of oxygen or hydrogen}
- 43/01 . Oxides; Hydroxides
- 43/025 . . Uranium dioxide
- 43/04 . Halides of uranium
- 43/06 . . Fluorides
- 43/063 . . . {Hexafluoride (UF<sub>6</sub>)}
- 43/066 . . . . {Preparation}
- 43/08 . . Chlorides
- 43/10 . . Bromides
- 43/12 . . Iodides
- 45/00 Compounds of manganese**
- 45/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 45/006 . {Compounds containing, besides manganese, two or more other elements, with the exception of oxygen or hydrogen ([manganates, manganites or permanganates C01G 45/12](#))}
- 45/02 . Oxides; Hydroxides
- 45/04 . Carbonyls
- 45/06 . Halides
- 45/08 . Nitrates
- 45/10 . Sulfates
- 45/12 . Manganates {manganites or} permanganates
- 45/1207 . . {Permanganates ([MnO]<sub>4</sub><sup>-</sup>) or manganates ([MnO<sub>4</sub>]<sub>2</sub><sup>-</sup>)}
- 45/1214 . . . {containing alkali metals}

- 45/1221 . . {Manganates or manganites with a manganese oxidation state of Mn(III), Mn(IV) or mixtures thereof}
- 45/1228 . . . {of the type  $[MnO_2]n^-$ , e.g.  $LiMnO_2$ ,  $Li[MxMn1-x]O_2$ }
- 45/1235 . . . {of the type  $[Mn_2O_4]2^-$ , e.g.  $Li_2Mn_2O_4$ ,  $Li_2[MxMn2-x]O_4$ }
- 45/1242 . . . {of the type  $[Mn_2O_4]^-$ , e.g.  $LiMn_2O_4$ ,  $Li[MxMn2-x]O_4$ }
- 45/125 . . . {of the type  $[MnO_3]n^-$ , e.g.  $Li_2MnO_3$ ,  $Li_2[MxMn1-xO_3]$ ,  $(La,Sr)MnO_3$ }
- 45/1257 . . . . {containing lithium, e.g.  $Li_2MnO_3$ ,  $Li_2[MxMn1-xO_3]$ }
- 45/1264 . . . . {containing rare earth, e.g.  $La1-xCaxMnO_3$ ,  $LaMnO_3$ }
- 45/1271 . . . {of the type  $[Mn_2O_8]n^-$ , e.g.  $(LaSr_3)Mn_2O_8$ }
- 45/1278 . . . {of the type  $[Mn_2O_7]n^-$ , e.g.  $(Sr2-xNdx)Mn_2O_7$ ,  $Ti_2Mn_2O_7$ }
- 45/1285 . . . {of the type  $[Mn_2O_5]n^-$ }
- 45/1292 . . . {of the type  $[Mn_5O_{12}]n^-$ }
- 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 ( $FeO$ )
- 49/06 . . Ferric oxide ( $Fe_2O_3$ )
- 49/08 . . Ferroso-ferric oxide ( $Fe_3O_4$ )
- 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.  $LiCoO_2$ }
- 51/44 . . . {containing manganese}
- 51/50 . . . . {of the type  $[MnO_2]n^-$ , e.g.  $Li(CoxMn1-x)O_2$ ,  $Li(MyCoxMn1-x-y)O_2$ }
- 51/52 . . . . {of the type  $[Mn_2O_4]2^-$ , e.g.  $Li_2(CoxMn2-x)O_4$ ,  $Li_2(MyCoxMn2-x-y)O_4$ }
- 51/54 . . . . {of the type  $[Mn_2O_4]^-$ , e.g.  $Li(CoxMn2-x)O_4$ ,  $Li(MyCoxMn2-x-y)O_4$ }
- 51/56 . . . . {of the type  $[MnO_3]2^-$ , e.g.  $Li_2[CoxMn1-xO_3]$ ,  $Li_2[MyCoxMn1-x-yO_3]$ }
- 51/58 . . . . {of the type  $[Mn_2O_8]n^-$ }
- 51/60 . . . . {of the type  $[Mn_2O_7]n^-$ }
- 51/62 . . . . {of the type  $[Mn_2O_5]n^-$ }
- 51/64 . . . . {of the type  $[Mn_5O_{12}]n^-$ }
- 51/66 . . {containing alkaline earth metals, e.g.  $SrCoO_3$ }
- 51/68 . . . {containing rare earth, e.g.  $La_{0.3}Sr_{0.7}CoO_3$ }
- 51/70 . . {containing rare earth, e.g.  $LaCoO_3$  [\(C01G 51/68 takes precedence\)](#)}
- 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.  $LiNiO_2$ }
- 53/44 . . . {containing manganese}
- 53/50 . . . . {of the type  $[MnO_2]n^-$ , e.g.  $Li(NixMn1-x)O_2$ ,  $Li(MyNixMn1-x-y)O_2$ }
- 53/52 . . . . {of the type  $[Mn_2O_4]2^-$ , e.g.  $Li_2(NixMn2-x)O_4$ ,  $Li_2(MyNixMn2-x-y)O_4$ }
- 53/54 . . . . {of the type  $[Mn_2O_4]^-$ , e.g.  $Li(NixMn2-x)O_4$ ,  $Li(MyNixMn2-x-y)O_4$ }
- 53/56 . . . . {of the type  $[MnO_3]2^-$ , e.g.  $Li_2[NixMn1-xO_3]$ ,  $Li_2[MyNixMn1-x-yO_3]$ }
- 53/58 . . . . {of the type  $[Mn_2O_8]n^-$ }
- 53/60 . . . . {of the type  $[Mn_2O_7]n^-$ }
- 53/62 . . . . {of the type  $[Mn_2O_5]n^-$ }
- 53/64 . . . . {of the type  $[Mn_5O_{12}]n^-$ }
- 53/66 . . {containing alkaline earth metals, e.g.  $SrNiO_3$ ,  $SrNiO_2$ }
- 53/68 . . . {containing rare earth, e.g.  $La1.62Sr0.38NiO_4$ }
- 53/70 . . {containing rare earth, e.g.  $LaNiO_3$  [\(C01G 53/68 takes precedence\)](#)}
- 55/00 Compounds of ruthenium, rhodium, palladium, osmium, iridium, or platinum**

## C01G

- 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**
- 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)}