

# 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](#))

<b>1/00</b>	<b>Methods of preparing compounds of metals not covered by subclasses <a href="#">C01B</a>, <a href="#">C01C</a>, <a href="#">C01D</a>, or <a href="#">C01F</a>, in general</b> (electrolytic production of inorganic compounds <a href="#">C25B 1/00</a> )	<b>7/00</b>	<b>Compounds of gold</b>
1/02	. Oxides	7/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
1/04	. Carbonyls	7/006	. {Compounds containing, besides gold, two or more other elements, with the exception of oxygen or hydrogen}
1/06	. Halides	<b>9/00</b>	<b>Compounds of zinc</b>
1/08	. Nitrates	9/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
1/10	. Sulfates	9/006	. {Compounds containing, besides zinc, two or more other elements, with the exception of oxygen or hydrogen}
1/12	. Sulfides	9/02	. Oxides; Hydroxides
1/14	. Sulfites	9/03	. . Processes of production using dry methods, e.g. vapour phase processes
<b>3/00</b>	<b>Compounds of copper</b>	9/04	. Halides
3/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}	9/06	. Sulfates
3/006	. {Compounds containing, besides copper, two or more other elements, with the exception of oxygen or hydrogen}	9/08	. Sulfides
3/02	. Oxides; Hydroxides	<b>11/00</b>	<b>Compounds of cadmium</b>
3/04	. Halides	11/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
3/05	. . Chlorides	11/006	. {Compounds containing, besides cadmium, two or more other elements, with the exception of oxygen or hydrogen}
3/06	. . Oxychlorides	11/02	. Sulfides
3/08	. Nitrates	<b>13/00</b>	<b>Compounds of mercury</b>
3/10	. Sulfates	13/003	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
3/12	. Sulfides	13/006	. {Compounds containing, besides mercury, two or more other elements, with the exception of oxygen or hydrogen}
3/14	. Complexes with ammonia	13/02	. Oxides
<b>5/00</b>	<b>Compounds of silver</b>		
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		

- 13/04 . Halides
- 15/00 Compounds of gallium, indium or thallium**
- 15/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 15/006 . {Compounds containing, besides gallium, indium, or thallium, two or more other elements, with the exception of oxygen or hydrogen}
- 17/00 Compounds of germanium**
- 17/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 17/006 . {Compounds containing, besides germanium, two or more other elements, with the exception of oxygen or hydrogen}
- 17/02 . Germanium dioxide
- 17/04 . Halides of germanium
- 19/00 Compounds of tin**
- 19/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 19/006 . {Compounds containing, besides tin, two or more other elements, with the exception of oxygen or hydrogen}
- 19/02 . Oxides
- 19/04 . Halides
- 19/06 . . Stannous chloride
- 19/08 . . Stannic chloride
- 21/00 Compounds of lead**
- 21/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 21/006 . {Compounds containing, besides lead, two or more other elements, with the exception of oxygen or hydrogen}
- 21/02 . Oxides
- 21/04 . . Lead suboxide [Pb<sub>2</sub>O]
- 21/06 . . Lead monoxide [PbO]
- 21/08 . . Lead dioxide [PbO<sub>2</sub>]
- 21/10 . . Red lead [Pb<sub>3</sub>O<sub>4</sub>]
- 21/12 . Hydroxides
- 21/14 . Carbonates
- 21/16 . Halides
- 21/18 . Nitrates
- 21/20 . Sulfates
- 21/21 . Sulfides
- 21/22 . Plumbates; Plumbites
- 23/00 Compounds of titanium** {(preparation of Ti-compounds from ores or scraps [C22B 34/12](#))}
- 23/001 . {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 ([C01G 23/001](#), [C01G 23/003](#) take precedence)}
- 23/003 . {Titanates ([C01G 23/001](#) takes precedence)}
- 23/005 . . {Alkali titanates}
- 23/006 . . {Alkaline earth titanates}
- 23/007 . {Titanium sulfides ([C01G 23/001](#) takes precedence)}
- 23/008 . {Titanium- and titanyl sulfate ([C01G 23/001](#) takes precedence)}
- 23/02 . Halides of titanium
- 23/022 . . {Titanium tetrachloride}
- 23/024 . . . {Purification of tetrachloride}
- 23/026 . . {Titanium trichloride}
- 23/028 . . {Titanium fluoride}
- 23/04 . Oxides; Hydroxides
- 23/043 . . {Titanium sub-oxides}
- 23/047 . . Titanium dioxide
- 23/0475 . . . {Purification}
- 23/053 . . . Producing by wet processes, e.g. hydrolysing titanium salts
- 23/0532 . . . . {by hydrolysing sulfate-containing salts}
- 23/0534 . . . . . {in the presence of seeds}
- 23/0536 . . . . . {by hydrolysing chloride-containing salts}
- 23/0538 . . . . . {in the presence of seeds}
- 23/07 . . . Producing by vapour phase processes, e.g. halide oxidation
- 23/075 . . . . {Evacuation and cooling of the gaseous suspension containing the oxide; Desacidification and elimination of gases occluded in the separated oxide}
- 23/08 . . . Drying; Calcining {; After treatment of titanium oxide}
- 25/00 Compounds of zirconium**
- 25/003 . {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}
- 25/02 . Oxides
- 25/04 . Halides
- 25/06 . Sulfates
- 27/00 Compounds of hafnium**
- 27/003 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion-exchange}
- 27/006 . {Compounds containing, besides hafnium, two or more other elements, with the exception of oxygen or hydrogen}
- 27/02 . Oxides
- 27/04 . Halides
- 27/06 . Sulfates
- 28/00 Compounds of arsenic**
- 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 ([C01G 28/001](#) 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  $SbX_3$  or  $SbX_5$  with X representing a halogen, or mixed of the type  $SbX_3X'_2$  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 ( $UF_6$ )}
- 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 ( $[MnO_4]^-$ ) or manganates ( $[MnO_4]^{2-}$ )}
- 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.  $LiMnO_2$ ,  $Li[MxMn_{1-x}O_2]$ }
- 45/1235 . . . {of the type  $[Mn_2O_4]^{2-}$ , e.g.  $Li_2Mn_2O_4$ ,  $Li_2[MxMn_{2-x}O_4]$ }
- 45/1242 . . . {of the type  $[Mn_2O_4]^-$ , e.g.  $LiMn_2O_4$ ,  $Li[MxMn_{2-x}O_4]$ }
- 45/125 . . . {of the type  $[MnO_3]^{n-}$ , e.g.  $Li_2MnO_3$ ,  $Li_2[MxMn_{1-x}O_3]$ , (La,Sr) $MnO_3$ }
- 45/1257 . . . . {containing lithium, e.g.  $Li_2MnO_3$ ,  $Li_2[MxMn_{1-x}O_3]$ }
- 45/1264 . . . . {containing rare earth, e.g.  $La_{1-x}Ca_xMnO_3$ ,  $LaMnO_3$ }

- 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.  $(\text{Sr}_{2-x}\text{Nd}_x)\text{Mn}_2\text{O}_7$ ,  $\text{Ti}_2\text{Mn}_2\text{O}_7$ }
- 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**

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- 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)}