

# CPC COOPERATIVE PATENT CLASSIFICATION

## C CHEMISTRY; METALLURGY

(NOTES omitted)

### CHEMISTRY

**C01 INORGANIC CHEMISTRY** (processing powders of inorganic compounds preparatory to the manufacturing of ceramic products [C04B 35/00](#); fermentation or enzyme-using processes for the preparation of elements or inorganic compounds except carbon dioxide [C12P 3/00](#); obtaining metal compounds from mixtures, e.g. ores, which are intermediate compounds in a metallurgical process for obtaining a free metal [C21B](#), [C22B](#); production of non-metallic elements or inorganic compounds by electrolysis or electrophoresis [C25B](#))

(NOTES omitted)

**C01F COMPOUNDS OF THE METALS BERYLLIUM, MAGNESIUM, ALUMINIUM, CALCIUM, STRONTIUM, BARIUM, RADIUM, THORIUM, OR OF THE RARE-EARTH METALS** (metal hydrides {monoborane, diborane or addition complexes thereof} [C01B 6/00](#); salts of oxyacids of halogens [C01B 11/00](#); peroxides, salts of peroxyacids [C01B 15/00](#); sulfides or polysulfides of magnesium, calcium, strontium, or barium [C01B 17/42](#); 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 other than ammonia or cyanogen containing nitrogen and non-metals and optionally metals [C01B 21/082](#); amides or imides of silicon [C01B 21/087](#)}; metal {imides or} amides [C01B 21/092](#), {[C01B 21/0923](#)}; 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 cyanic acid [C01C 3/14](#); salts of cyanamide [C01C 3/16](#); thiocyanates [C01C 3/20](#); {double sulfates of magnesium with sodium or potassium [C01D 5/12](#); with other alkali metals [C01D 15/00](#), [C01D 17/00](#)})

1/00	<b>Methods of preparing compounds of the metals beryllium, magnesium, aluminium, calcium, strontium, barium, radium, thorium, or the rare earths, in general</b>	5/14	. Magnesium hydroxide
		5/145	. . {Purification}
		5/16	. . by treating magnesia, e.g. calcined dolomite, with water or solutions of salts not containing magnesium
3/00	<b>Compounds of beryllium</b>	5/20	. . by precipitation from solutions of magnesium salts with ammonia
3/005	. {Fluorides or double fluorides of beryllium with alkali metals or ammonium; Preparation of beryllium compounds therefrom}	5/22	. . from magnesium compounds with alkali hydroxides or alkaline- earth oxides or hydroxides
3/02	. Oxides; Hydroxides		
5/00	<b>Compounds of magnesium</b>	5/24	. Magnesium carbonates
5/02	. Magnesia	5/26	. Magnesium halides
5/04	. . by oxidation of metallic magnesium	5/28	. . Fluorides
5/06	. . by thermal decomposition of magnesium compounds (calcining magnesite or dolomite <a href="#">C04B 2/10</a> )	5/30	. . Chlorides
		5/305	. . . {Dehydrating ammonium or alkali magnesium chlorides, e.g. carnalite}
5/08	. . . by calcining magnesium hydroxide	5/32	. . . Preparation of anhydrous magnesium chloride by chlorinating magnesium compounds
5/10	. . . by thermal decomposition of magnesium chloride with water vapour	5/34	. . . Dehydrating magnesium chloride containing water of crystallisation
5/12	. . . by thermal decomposition of magnesium sulfate, with or without reduction	5/36	. . Bromides

- 5/38 . Magnesium nitrates
- 5/40 . Magnesium sulfates (double sulfates of magnesium with sodium or potassium [C01D 5/12](#), with other alkali metals {[C01D 15/00](#)}, [C01D 17/00](#))
- 5/42 . Magnesium sulfites
- 7/00 Compounds of aluminium**
- 7/001 . {Aluminium carbonate}
- 7/002 . {Compounds containing, besides aluminium, two or more other elements, with the exception of oxygen and hydrogen (compounds containing aluminium, fluorine and alkali or alkaline earth metals [C01F 7/54](#); compounds containing sulfur and other cations besides aluminium [C01F 7/68](#))}
- 7/004 . . {containing carbonate ions, e.g. dawsonite}
- 7/005 . . . {Hydrotalcite}
- 7/007 . . {containing, besides aluminium, only anions, e.g.  $\text{Al(OH)}_x\text{CL}_y(\text{SO}_4)_z$  (mixed halides [C01F 7/48](#))}
- 7/008 . . {Ammonium aluminium fluorides}
- 7/02 . Aluminium oxide; Aluminium hydroxide; Aluminates
- 7/021 . . {After-treatment of oxides or hydroxides}
- 7/022 . . . {Classification}
- 7/023 . . . {Grinding, deagglomeration, disintegration}
- 7/025 . . . {Granulation, agglomeration}
- 7/026 . . . {Making or stabilising dispersions}
- 7/027 . . . {Treatment involving fusion or vaporisation}
- 7/028 . . {Beta-aluminas}
- 7/04 . . Preparation of alkali metal aluminates; Aluminium oxide or hydroxide therefrom {([C01F 7/028](#) takes precedence)}
- 7/043 . . . {Lithium aluminate}
- 7/046 . . . {Stabilisation of aluminates}
- 7/06 . . . by treating aluminous minerals {or waste-like raw materials} with alkali hydroxide {, e.g. leaching of bauxite according to the Bayer process (obtaining aluminium oxide or hydroxide from the resulting aluminate solution [C01F 7/14](#))}
- 7/0606 . . . . {Make-up of the alkali hydroxide solution from recycled spent liquor}
- 7/0613 . . . . {Pretreatment of the minerals, e.g. grinding}
- 7/062 . . . . {Digestion}
- 7/0626 . . . . . {Processes making use of tube digestion only}
- 7/0633 . . . . . {characterised by the use of additives}
- 7/064 . . . . . {Apparatus for digestion, e.g. digester vessels, heat exchangers}
- 7/0646 . . . . {Separation of the insoluble residue, e.g. red mud}
- 7/0653 . . . . . {characterised by the flocculant added to the slurry (final clarification of the aluminate solution [C01F 7/47](#))}
- 7/066 . . . . {Treatment of the separated residue}
- 7/0666 . . . . {Process control or regulation ([control per se G05](#))}
- 7/0673 . . . . {from phosphate-containing minerals}
- 7/068 . . . . {from carbonate-containing minerals, e.g. dawsonite}
- 7/0686 . . . . {from sulfate-containing minerals, e.g. alunite}
- 7/0693 . . . . {from waste-like raw materials, e.g. fly ash, Bayer calcination dust}
- 7/08 . . . by treating aluminous minerals with sodium carbonate {, e.g. sinter processes ([C01F 7/0613](#) and [C01F 7/066](#) take precedence)}
- 7/085 . . . . {according to the lime-sinter process}
- 7/10 . . . by treating aluminous minerals with alkali sulfates and reducing agents
- 7/12 . . . Alkali metal aluminates from alkaline-earth metal aluminates
- 7/14 . . . Aluminium oxide or hydroxide from alkali metal aluminates
- 7/141 . . . . {from aqueous aluminate solutions by neutralisation with an acidic agent}
- 7/142 . . . . . {with carbon dioxide}
- 7/144 . . . . {from aqueous aluminate solutions by precipitation due to cooling, e.g. as part of the Bayer process}
- 7/145 . . . . . {characterised by a crystal growth modifying agent other than aluminium hydroxide seed}
- 7/147 . . . . . {Apparatus for precipitation}
- 7/148 . . . . . {Separation of the obtained hydroxide, e.g. filtration, dewatering}
- 7/16 . . Preparation of alkaline-earth metal aluminates {or magnesium aluminate}; Aluminium oxide or hydroxide therefrom {([C01F 7/028](#) takes precedence)}
- 7/162 . . . {Magnesium aluminates}
- 7/164 . . . {Calcium aluminates}
- 7/166 . . . {Strontium aluminates}
- 7/168 . . . {Barium aluminates}
- 7/18 . . . Aluminium oxide or hydroxide from alkaline-earth metal aluminates
- 7/20 . . Preparation of aluminium oxide or hydroxide from aluminous ores with acids or salts
- 7/22 . . . with halides {or halogen acids}
- 7/24 . . . with nitric acid or nitrogen oxides
- 7/26 . . . with sulfuric acids or sulfates
- 7/28 . . . with sulfurous acid
- 7/30 . . Preparation of aluminium oxide or hydroxide by thermal decomposition {or by hydrolysis or oxidation} of aluminium compounds
- 7/302 . . . {Hydrolysis or oxidation of gaseous aluminium compounds in the gas phase}
- 7/304 . . . . {of organic aluminium compounds}
- 7/306 . . . {Thermal decomposition of hydrated chlorides, e.g. aluminium trichloride hexahydrate}
- 7/308 . . . {Thermal decomposition of nitrates}
- 7/32 . . . {Thermal decomposition} of sulfates {including complex sulfates, e.g. alums}
- 7/34 . . Preparation of aluminium hydroxide by precipitation from solutions containing aluminium salts
- 7/36 . . . from organic aluminium salts
- 7/38 . . Preparation of aluminium oxide by thermal reduction of aluminous minerals
- 7/40 . . . in the presence of aluminium sulfide
- 7/42 . . Preparation of aluminium oxide or hydroxide from metallic aluminium, e.g. by oxidation
- 7/422 . . . {by oxidation with a gaseous oxidator at a high temperature}
- 7/424 . . . . {using a plasma}
- 7/426 . . . {by applying mechanical energy to solid aluminium at a low temperature}
- 7/428 . . . {by oxidation in an aqueous solution}

7/44	. . Dehydration of aluminium {oxide or} hydroxide {, i.e. all conversions of one form into another involving a loss of water}	11/08	. . by reduction of sulfates
7/441	. . . {by calcination}	11/10	. . from sulfides
7/442	. . . . {in presence of a calcination additive}	11/12	. . from silicates
7/444	. . . . {Apparatus therefor}	11/16	. . Purification
7/445	. . . . {making use of a fluidised bed}	11/18	. Carbonates
7/447	. . . . {by wet processes}	11/181	. . {Preparation of calcium carbonate by carbonation of aqueous solutions and characterised by control of the carbonation conditions}
7/448	. . . . {using superatmospheric pressure, e.g. hydrothermal conversion of gibbsite into boehmite}	11/182	. . {Preparation of calcium carbonate by carbonation of aqueous solutions and characterised by an additive other than CaCO <sub>3</sub> -seeds}
7/46	. . Purification of aluminium oxide, aluminium hydroxide or aluminates {(C01F 7/028 takes precedence)}	11/183	. . . {the additive being an organic compound}
7/47	. . . of aluminates {, e.g. removal of compounds of Si, Fe, Ga or of organic compounds from Bayer process liquors}	11/184	. . {Preparation of calcium carbonate by carbonation of solutions based on non-aqueous solvents}
7/473	. . . . {Removal of organic compounds, e.g. sodium oxalate}	11/185	. . {After-treatment, e.g. grinding, purification, conversion of crystal morphology}
7/476	. . . . . {by oxidation}	11/186	. . {Strontium or barium carbonate}
7/48	. Aluminium halides	11/187	. . . {Strontium carbonate}
7/50	. . Fluorides	11/188	. . . {Barium carbonate}
7/52	. . . Double compounds containing both fluorine and other acid {halide} groups	11/20	. Halides
7/54	. . . Double compounds containing both aluminium and alkali metals or alkaline-earth metals	11/22	. . Fluorides
7/56	. . Chlorides {containing fluorine C01F 7/52}	11/24	. . Chlorides
7/58	. . . Preparation of anhydrous aluminium chloride	11/26	. . . from sulfides
7/60	. . . . from oxygen-containing aluminium compounds	11/28	. . . by chlorination of alkaline-earth metal compounds
7/62	. . . Purification	11/30	. . . Concentrating; Dehydrating; Preventing the adsorption of moisture or caking
7/64	. . Bromides {containing fluorine C01F 7/52}	11/32	. . . Purification
7/66	. Aluminium nitrates {containing fluorine {C01F 7/002}}	11/34	. . Bromides
7/68	. Aluminium compounds containing sulfur {containing fluorine {C01F 7/002}}	11/36	. Nitrates
7/70	. . Sulfides	11/38	. . Preparation with nitric acid or nitrogen oxides
7/72	. . Sulfites	11/40	. . Preparation by double decomposition with nitrates
7/74	. . Sulfates	11/42	. . Double salts {with magnesium C01F 5/38}
7/741	. . . {Preparation from elemental aluminium or elemental aluminium containing materials, e.g. foil, dross}	11/44	. . Concentrating; Crystallising; Dehydrating; Preventing the absorption of moisture or caking
7/743	. . . {Preparation from silicoaluminous materials, e.g. clays, bauxite}	11/46	. Sulfates {dehydration of gypsum {for the production of calcium sulfate cements} C04B 11/02}
7/745	. . . {Preparation from alums, e.g. alunite}	11/462	. . {Sulfates of Sr or Ba}
7/746	. . . {After-treatment, e.g. dehydration, stabilisation}	11/464	. . {Sulfates of Ca from gases containing sulfur oxides}
7/748	. . . . {Purification}	11/466	. . {Conversion of one form of calcium sulfate to another}
7/76	. . . Double salts {, i.e. compounds containing, besides aluminium and sulfate ions, only other cations}, e.g. alums	11/468	. . {Purification of calcium sulfates}
7/762	. . . . {Ammonium or alkali metal aluminium sulfates}	11/48	. Sulfites
7/765	. . . . . {Ammonium aluminium sulfates}		
7/767	. . . . . {Alkaline earth metal aluminium sulfates}		
<b>11/00</b>	<b>Compounds of calcium, strontium, or barium</b> (C01F 7/00 takes precedence)	<b>13/00</b>	<b>Compounds of radium</b>
11/005	. {Preparation involving liquid-liquid extraction, absorption or ion-exchange}	<b>15/00</b>	<b>Compounds of thorium</b>
11/02	. Oxides or hydroxides {production of lime C04B 2/00}	<b>17/00</b>	<b>Compounds of the rare earth metals, i.e. scandium, yttrium, lanthanum, or the group of the lanthanides</b>
11/04	. . by thermal decomposition		<b>NOTE</b>
11/06	. . . of carbonates		In this group "rare earth metals" means one single element or a combination of elements taken from the group as specified above
		17/0006	. {Preparation involving a liquid-liquid extraction, an adsorption or an ion exchange}
		17/0012	. {Compounds containing, besides rare earth metals, two or more other elements with the exception of oxygen or hydrogen, e.g. La <sub>4</sub> S <sub>3</sub> Br <sub>6</sub> , or ternary oxides or hydroxides, e.g. NaCeO <sub>2</sub> }

## C01F

- 17/0018 . . {Oxygen being the only anion}
- 17/0025 . . . {Aluminates}
- 17/0031 . . {Halogen being the only anion (compounds containing besides rare earth metals only different halogens, e.g.  $\text{ScCl}_2\text{F}$  [C01F 17/0056](#))}
- 17/0037 . . {Sulfur being the only anion}
- 17/0043 . {Oxides or hydroxides (ternary oxides or hydroxides, e.g.  $\text{NaCeO}_2$  [C01F 17/0018](#))}
- 17/005 . {Carbonates}
- 17/0056 . {Halides}
- 17/0062 . . {Fluorides}
- 17/0068 . . {Chlorides}
- 17/0075 . {Nitrates}
- 17/0081 . {Sulfates}
- 17/0087 . {Sulfides}
- 17/0093 . . {Oxysulfides}