CPC  Cooperative Patent Classification

C  Chemistry; Metallurgy
  (NOTES omitted)

Chemistry

C01  Inorganic Chemistry
  (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; nitrites C01B 21/50; compounds of noble gases C01B 23/00; 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  Methods of preparing compounds of the metals beryllium, magnesium, aluminium, calcium, strontium, barium, radium, thorium, or the rare earths, in general

3/00  Compounds of beryllium

3/005 . [Fluorides or double fluorides of beryllium with alkali metals or ammonium; Preparation of beryllium compounds therefrom]

3/02 . Oxides; Hydroxides

5/00  Compounds of magnesium

5/02 . Magnesia

5/04 . . . by oxidation of metallic magnesium

5/06 . . . by thermal decomposition of magnesium compounds (calcining magnesite or dolomite C04B 2/10)

5/08 . . . by calcining magnesium hydroxide

5/10 . . . by thermal decomposition of magnesium chloride with water vapour

5/12 . . . by thermal decomposition of magnesium sulfate, with or without reduction

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

5/20 . . . by precipitation from solutions of magnesium salts with ammonia

5/22 . . . from magnesium compounds with alkali hydroxides or alkaline-earth oxides or hydroxides

5/24 . Magnesium carbonates

5/26 . Magnesium halides

5/28 . . . Fluorides

5/30 . . . Chlorides

5/305 . . . . [Dehydrating ammonium or alkali magnesium chlorides, e.g. carnalite]

5/32 . . . Preparation of anhydrous magnesium chloride by chlorinating magnesium compounds

5/34 . . . Dehydrating magnesium chloride containing water of crystallisation

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]
7/02 . . . [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)]

7/04 . . . [containing carbonate ions, e.g. dawsonite]

7/05 . . . [Hydrotalcite]

7/07 . . . [containing, besides aluminium, only anions, e.g. Al(OH)xClx(Ly(SO4)z (mixed halides C01F 7/48)]

7/08 . . . [Ammonium aluminium fluorides]

7/02 . . . Aluminium oxide; Aluminium hydroxide; Aluminates

7/21 . . . [After-treatment of oxides or hydroxides]

7/22 . . . [Classification]

7/23 . . . [Grinding, deagglomeration, disintegration]

7/25 . . . [Granulation, agglomeration]

7/26 . . . [Making or stabilising dispersions]

7/27 . . . [Treatment involving fusion or vapourisation]

7/28 . . . [Beta-aluminas]

7/04 . . . Preparation of alkali metal aluminates; Aluminium oxide or hydroxide therefrom (C01F 7/028 takes precedence)

7/043 . . . [Lithium aluminates]

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. digestor 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 7/42)]

7/066 . . . [Treatment of the separated residue]

7/0666 . . . [Process control or regulation (control per se Gb)]

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 alkalai 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 sulfuric 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]

7/441 . . . [by calcination]

7/442 . . . [in presence of a calcination additive]

7/444 . . . [Apparatus therefor]

7/445 . . . [making use of a fluidised bed]
Compounds of calcium, strontium, or barium (C01F 7/03 takes precedence)

11/005 . . . [Preparation involving liquid-liquid extraction, absorption or ion-exchange]
11/02 . . . Oxides or hydroxides (production of lime C04B 2/00)
11/04 . . . by thermal decomposition
11/06 . . . of carbonates
11/08 . . . by reduction of sulfates
11/10 . . . from sulfides
11/12 . . . from silicates
11/16 . . . Purification
11/18 . . . Carbonates

11/00 . . . [Preparation of calcium carbonate by carbonation of aqueous solutions and characterised by control of the carbonation conditions]
11/02 . . . [Preparation of calcium carbonate by carbonation of aqueous solutions and characterised by an additive other than CaCO₃-seeds]
11/03 . . . [the additive being an organic compound]
11/04 . . . [Preparation of calcium carbonate by carbonation of solutions based on non-aqueous solvents]
11/05 . . . [After-treatment, e.g. grinding, purification, conversion of crystal morphology]
11/06 . . . [Strontium or barium carbonate]
11/07 . . . [Strontium carbonate]
11/08 . . . [Barium carbonate]
11/20 . . . Halides
11/22 . . . Florides
11/24 . . . Chlorides
11/26 . . . from sulfides
11/28 . . . by chlorination of alkaline-earth metal compounds
11/30 . . . Concentrating; Dehydrating; Preventing the adsorption of moisture or caking
11/32 . . . Purification
11/34 . . . Bromides
11/36 . . . Nitrates
11/38 . . . Preparation with nitric acid or nitrogen oxides
11/40 . . . Preparation by double decomposition with nitrates
11/42 . . . Double salts (with magnesium C01F 5/38)
11/44 . . . Concentrating; Crystallisating; Dehydrating; Preventing the absorption of moisture or caking
11/46 . . . Sulfates (dehydration of gypsum [for the production of calcium sulfate cements] C04B 11/02)
11/462 . . . [Sulfates of Sr or Ba]
11/464 . . . [Sulfates of Ca from gases containing sulfur oxides]
11/466 . . . [Conversion of one form of calcium sulfate to another]
11/468 . . . [Purification of calcium sulfates]
11/48 . . . Sulfites

13/00 Compounds of radium
15/00 Compounds of thorium
17/00 Compounds of rare earth metals

NOTES
1. In this group, the following expression is used with the meaning indicated; “rare earth metals” means elements from the group of the lanthanides as well as scandium or yttrium, taken alone or in combination.
2. When classifying a compound in groups C01F 17/20 - C01F 17/38, then its specific preparation or treatment must also be classified in groups C01F 17/10 - C01F 17/17 as long as the compound is characterised by its preparation or treatment and vice versa.
WARNING
Group C01F 17/00 is impacted by reclassification into group C01F 17/20.
Groups C01F 17/00 and C01F 17/20 should be considered in order to perform a complete search.

17/10 . Preparation or treatment, e.g. separation or purification

WARNING
Group C01F 17/10 is impacted by reclassification into groups C01F 17/13 and C01F 17/17.
Groups C01F 17/10, C01F 17/13, and C01F 17/17 should be considered in order to perform a complete search.

17/13 . by using ion exchange resins, e.g. chelate resins

WARNING
Group C01F 17/13 is incomplete pending reclassification of documents from group C01F 17/10.
Groups C01F 17/10 and C01F 17/13 should be considered in order to perform a complete search.

17/17 . involving a liquid-liquid extraction

WARNING
Group C01F 17/17 is incomplete pending reclassification of documents from group C01F 17/10.
Groups C01F 17/10 and C01F 17/17 should be considered in order to perform a complete search.

17/20 . Compounds containing only rare earth metals as the metal element

WARNING
Group C01F 17/20 is incomplete pending reclassification of documents from group C01F 17/00.
Groups C01F 17/00 and C01F 17/20 should be considered in order to perform a complete search.

17/206 . oxide or hydroxide being the only anion

WARNING
Group C01F 17/206 is impacted by reclassification into groups C01F 17/212, C01F 17/218, C01F 17/224, C01F 17/229, C01F 17/235, and C01F 17/241.
All groups listed in this Warning should be considered in order to perform a complete search.

17/212 . . . Scandium oxides or hydroxides

WARNING
Group C01F 17/212 is incomplete pending reclassification of documents from group C01F 17/206.
Groups C01F 17/206 and C01F 17/212 should be considered in order to perform a complete search.

17/218 . . . Yttrium oxides or hydroxides

WARNING
Group C01F 17/218 is incomplete pending reclassification of documents from group C01F 17/206.
Groups C01F 17/206 and C01F 17/218 should be considered in order to perform a complete search.

17/224 . . . Oxides or hydroxides of lanthanides

WARNING
Group C01F 17/224 is incomplete pending reclassification of documents from group C01F 17/206.
Groups C01F 17/206 and C01F 17/224 should be considered in order to perform a complete search.

17/229 . . . Lanthanum oxides or hydroxides

WARNING
Group C01F 17/229 is incomplete pending reclassification of documents from group C01F 17/206.
Groups C01F 17/206 and C01F 17/229 should be considered in order to perform a complete search.

17/235 . . . Cerium oxides or hydroxides

WARNING
Group C01F 17/235 is incomplete pending reclassification of documents from group C01F 17/206.
Groups C01F 17/206 and C01F 17/235 should be considered in order to perform a complete search.

17/241 . . . containing two or more rare earth metals, e.g. NdPrO$_3$ or LaNdPrO$_3$

WARNING
Group C01F 17/241 is incomplete pending reclassification of documents from group C01F 17/206.
Groups C01F 17/206 and C01F 17/241 should be considered in order to perform a complete search.

17/247 . . . Carbonates
17/253 . . . Halides

**WARNING**

Group C01F 17/253 is impacted by reclassification into group C01F 17/259.
Groups C01F 17/253 and C01F 17/259 should be considered in order to perform a complete search.

17/259 . . . Oxyhalides

**WARNING**

Group C01F 17/259 is incomplete pending reclassification of documents from group C01F 17/253.
Groups C01F 17/253 and C01F 17/259 should be considered in order to perform a complete search.

17/265 . . . Fluorides
17/271 . . . Chlorides
17/276 . . . Nitrates
17/282 . . . Sulfates
17/288 . . . Sulfides
17/294 . . . Oxysulfides
17/30 . . . Compounds containing rare earth metals and at least one element other than a rare earth metal, oxygen or hydrogen, e.g. La₄S₃Br₆ (C01F 17/247 - C01F 17/294 take precedence)
17/32 . . . oxide or hydroxide being the only anion, e.g. NaCeO₂ or Mg₃Ca₃EuO
17/34 . . . Aluminates, e.g. YAlO₃ or Y₃-Gd₆Al₅O₁₂
17/36 . . . halogen being the only anion, e.g. NaYF₄
17/38 . . . sulfur being the only anion, e.g. CaLa₃S₄