CPC COOPERATIVE PATENT CLASSIFICATION

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 31/30; 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 })

Guidance heading:

C01F 1/00 Methods of preparing compounds of the metals beryllium, magnesium, aluminium, calcium, strontium, barium, radium, thorium, or the rare earths, in general

C01F 3/00 Compounds of beryllium

C01F 3/005 . {Fluorides or double fluorides of beryllium with alkali metals or ammonium; Preparation of beryllium compounds therefrom }

C01F 3/02 . Oxides; Hydroxides

C01F 5/00 Compounds of magnesium

C01F 5/02 . Magnesia

C01F 5/04 . . by oxidation of metallic magnesium

C01F 5/06 . . by thermal decomposition of magnesium compounds (calcining magnesite or dolomite C04B 2/10)

C01F 5/08 . . . by calcining magnesium hydroxide

C01F 5/10 . . . by thermal decomposition of magnesium chloride with water vapour

C01F 5/12 . . . by thermal decomposition of magnesium sulfate, with or without reduction

C01F 5/14 . Magnesium hydroxide

C01F 5/145 . . {Purification }

C01F 5/16 . . by treating magnesia, e.g. calcined dolomite, with water or solutions of salts not containing magnesium

C01F 5/20 . . by precipitation from solutions of magnesium salts with ammonia

C01F 5/22 . . from magnesium compounds with alkali hydroxides or alkaline- earth oxides or hydroxides

C01F 5/24 . Magnesium carbonates

C01F 5/26 . Magnesium halides

C01F 5/28 . . Fluorides

C01F 5/30 . . Chlorides

C01F 5/305 . . . {Dehydrating ammonium or alkali magnesium chlorides, e.g. carnalite }

C01F 5/32 . . . Preparation of anhydrous magnesium chloride by chlorinating magnesium compounds

C01F 5/34 . . . Dehydrating magnesium chloride containing water of crystallisation

C01F 5/36 . . Bromides

C01F 5/38 . Magnesium nitrates

C01F 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)

C01F 5/42 . Magnesium sulfites

C01F 7/00 Compounds of aluminium

C01F 7/001 . {Aluminium carbonate }

C01F 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) }

C01F 7/004 . . {containing carbonate ions, e.g. dawsonite }

C01F 7/005 . . . {Hydrotalcite }

C01F 7/007 . . {containing, besides aluminium, only anions, e.g. Al(OH)xCLy(SO4)z (mixed halides C01F 7/48) }

C01F 7/008 . . {Ammonium aluminium fluorides }

C01F 7/02 . Aluminium oxide; Aluminium hydroxide; Aluminates

C01F 7/021 . . {After-treatment of oxides or hydroxides }

C01F 7/022 . . . {Classification }

C01F 7/023 . . . {Grinding, deagglomeration, disintegration }

C01F 7/025 . . . {Granulation, agglomeration }

C01F 7/026 . . . {Making or stabilising dispersions }

C01F 7/027 . . . {Treatment involving fusion or vaporisation }

C01F 7/028 . . {Beta-aluminas }

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

C01F 7/043 ... {Lithium aluminate }

C01F 7/046 ... {Stabilisation of aluminates }

C01F 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) }

C01F 7/0606 .... {Make-up of the alkali hydroxide solution from recycled spent liquor }

C01F 7/0613 .... {Pretreatment of the minerals, e.g. grinding }

C01F 7/062 .... {Digestion }

C01F 7/0626 ..... {Processes making use of tube digestion only }

C01F 7/0633 ..... {characterised by the use of additives }

C01F 7/064 ..... {Apparatus for digestion, e.g. digestor vessels, heat exchangers }

C01F 7/0646 .... {Separation of the insoluble residue, e.g. red mud }

C01F 7/0653 ..... {characterised by the flocculant added to the slurry (final clarification of the aluminate solution C01F 7/47) }

C01F 7/066 .... {Treatment of the separated residue }

C01F 7/0666 .... {Process control or regulation (control per se G05) }

C01F 7/0673 .... {from phosphate-containing minerals }

C01F 7/068 .... {from carbonate-containing minerals, e.g. dawsonite }

C01F 7/0686 .... {from sulfate-containing minerals, e.g. alunite }

C01F 7/0693 .... {from waste-like raw materials, e.g. fly ash, Bayer calcination dust }

C01F 7/08 ... by treating aluminous minerals with sodium carbonate, {e.g. sinter processes (C01F 7/0613 and C01F 7/066 take precedence) }

C01F 7/085 .... {according to the lime-sinter process }

C01F 7/10 ... by treating aluminous minerals with alkali sulfates and reducing agents

C01F 7/12 ... Alkali metal aluminates from alkaline-earth metal aluminates

C01F 7/14 ... Aluminium oxide or hydroxide from alkali metal aluminates

C01F 7/141 .... {from aqueous aluminate solutions by neutralisation with an acidic agent }

C01F 7/142 ..... {with carbon dioxide }

C01F 7/144 .... {from aqueous aluminate solutions by precipitation due to cooling, e.g. as part of the Bayer process }

C01F 7/145 ..... {characterised by a crystal growth modifying agent other than aluminium hydroxide seed }

C01F 7/147 ..... {Apparatus for precipitation }

C01F 7/148 ..... {Separation of the obtained hydroxide, e.g. filtration, dewatering }

C01F 7/16 .. Preparation of alkaline-earth metal aluminates {or magnesium aluminate }; Aluminium oxide or hydroxide therefrom { (C01F 7/028 takes precedence) }

C01F 7/162 ... {Magnesium aluminates }

C01F 7/164 ... {Calcium aluminates }

C01F 7/166 ... {Strontium aluminates }

C01F 7/168 ... {Barium aluminates }

C01F 7/18 ... Aluminium oxide or hydroxide from alkaline-earth metal aluminates

C01F 7/20 .. Preparation of aluminium oxide or hydroxide from aluminous ores with acids or salts

C01F 7/22 . . . with halides { or halogen acids }

C01F 7/24 . . . with nitric acid or nitrogen oxides

C01F 7/26 . . . with sulfuric acids or sulfates

C01F 7/28 . . . with sulfurous acid

C01F 7/30 . . Preparation of aluminium oxide or hydroxide by thermal decomposition {or by hydrolysis or oxidation } of aluminium compounds

C01F 7/302 . . . {Hydrolysis or oxidation of gaseous aluminium compounds in the gas phase }

C01F 7/304 . . . . {of organic aluminium compounds }

C01F 7/306 . . . {Thermal decomposition of hydrated chlorides, e.g. aluminium trichloride hexahydrate }

C01F 7/308 . . . {Thermal decomposition of nitrates }

C01F 7/32 . . . {Thermal decomposition } of sulfates {including complex sulfates, e.g. alums }

C01F 7/34 . . Preparation of aluminium hydroxide by precipitation from solutions containing aluminium salts

C01F 7/36 . . . from organic aluminium salts

C01F 7/38 . . Preparation of aluminium oxide by thermal reduction of aluminous minerals

C01F 7/40 . . . in the presence of aluminium sulfide

C01F 7/42 . . Preparation of aluminium oxide or hydroxide from metallic aluminium, e.g. by oxidation

C01F 7/422 . . . {by oxidation with a gaseous oxidator at a high temperature }

C01F 7/424 . . . . {using a plasma }

C01F 7/426 . . . {by applying mechanical energy to solid aluminium at a low temperature }

C01F 7/428 . . . {by oxidation in an aqueous solution }

C01F 7/44 . . Dehydration of aluminium {oxide or } hydroxide, {i.e. all conversions of one form into another involving a loss of water }

C01F 7/441 . . . {by calcination }

C01F 7/442 . . . . {in presence of a calcination additive }

C01F 7/444 . . . . {Apparatus therefor }

C01F 7/445 . . . . {making use of a fluidised bed }

C01F 7/447 . . . {by wet processes }

C01F 7/448 . . . . {using superatmospheric pressure, e.g. hydrothermal conversion of gibbsite into boehmite }

C01F 7/46 . . Purification of aluminium oxide, aluminium hydroxide or aluminates { (7/02H takes precedence) }

C01F 7/47 . . . of aluminates, {e.g. removal of compounds of Si, Fe, Ga or of organic compounds from Bayer process liquors }

C01F 7/473 . . . . {Removal of organic compounds, e.g. sodium oxalate }

C01F 7/476 . . . . . {by oxidation }

C01F 7/48 . Aluminium halides

C01F 7/50 . . Fluorides

C01F 7/52 . . . Double compounds containing both fluorine and other acid { halide } groups

C01F 7/54 . . . Double compounds containing both aluminium and alkali metals or alkaline-earth metals

C01F 7/56 . . Chlorides (containing fluorine C01F 7/52)

C01F 7/58 . . . Preparation of anhydrous aluminium chloride
C01F 7/60 . . . . from oxygen-containing aluminium compounds
C01F 7/62 . . . Purification
C01F 7/64 . . Bromides (containing fluorine C01F 7/52)

C01F 7/66 . Aluminium nitrates (containing fluorine {C01F 7/002 })

C01F 7/68 . Aluminium compounds containing sulfur (containing fluorine {C01F 7/002 })
C01F 7/70 . . Sulfides
C01F 7/72 . . Sulfites
C01F 7/74 . . Sulfates
C01F 7/741 . . . {Preparation from elemental aluminium or elemental aluminium containing materials, e.g. foil, dross }
C01F 7/743 . . . {Preparation from silicoaluminious materials, e.g. clays, bauxite }
C01F 7/745 . . . {Preparation from alums, e.g. alunite }
C01F 7/746 . . . {After-treatment, e.g. dehydration, stabilisation }
C01F 7/748 . . . . {Purification }
C01F 7/76 . . . Double salts, {i.e. compounds containing, besides aluminium and sulfate ions, only other cations }, e.g. alums
C01F 7/762 . . . . {Ammonium or alkali metal aluminium sulfates }
C01F 7/765 . . . . . {Ammonium aluminium sulfates }
C01F 7/767 . . . . {Alkaline earth metal aluminium sulfates }

C01F 11/00 **Compounds of calcium, strontium, or barium** (C01F 7/00 takes precedence)

C01F 11/005 . {Preparation involving liquid-liquid extraction, absorption or ion-exchange }

C01F 11/02 . Oxides or hydroxides (production of lime C04B 2/00)
C01F 11/04 . . by thermal decomposition
C01F 11/06 . . . of carbonates
C01F 11/08 . . by reduction of sulfates
C01F 11/10 . . from sulfides
C01F 11/12 . . from silicates
C01F 11/16 . . Purification

C01F 11/18 . Carbonates
C01F 11/181 . . {Preparation of calcium carbonate by carbonation of aqueous solutions and characterised by control of the carbonation conditions }
C01F 11/182 . . {Preparation of calcium carbonate by carbonation of aqueous solutions and characterised by an additive other than CaCO3-seeds }
C01F 11/183 . . . {the additive being an organic compound }
C01F 11/184 . . {Preparation of calcium carbonate by carbonation of solutions based on non-aqueous solvents }
C01F 11/185 . . {After-treatment, e.g. grinding, purification, conversion of crystal morphology }
C01F 11/186 . . {Strontium or barium carbonate }

C01F 11/187 . . . {Strontium carbonate }
C01F 11/188 . . . {Barium carbonate }

C01F 11/20 . Halides
C01F 11/22 . . Fluorides
C01F 11/24 . . Chlorides
C01F 11/26 . . . from sulfides
C01F 11/28 . . . by chlorination of alkaline-earth metal compounds
C01F 11/30 . . . Concentrating; Dehydrating; Preventing the adsorption of moisture or caking
C01F 11/32 . . . Purification
C01F 11/34 . . Bromides

C01F 11/36 . Nitrates
C01F 11/38 . . Preparation with nitric acid or nitrogen oxides
C01F 11/40 . . Preparation by double decomposition with nitrates
C01F 11/42 . . Double salts (with magnesium C01F 5/38)
C01F 11/44 . . Concentrating; Crystallisating; Dehydrating; Preventing the absorption of moisture or caking

C01F 11/46 . Sulfates (dehydration of gypsum {for the production of calcium sulfate cements } C04B 11/02)
C01F 11/462 . . {Sulfates of Sr or Ba }
C01F 11/464 . . {Sulfates of Ca from gases containing sulfur oxides }
C01F 11/466 . . {Conversion of one form of calcium sulfate to another }
C01F 11/468 . . {Purification of calcium sulfates }

C01F 11/48 . Sulfites

C01F 13/00 Compounds of radium

C01F 15/00 Compounds of thorium

C01F 17/00 Compounds of the rare earth metals, i.e. scandium, yttrium, lanthanum, or the group of the lanthanides

NOTE

In this group "rare earth metals" means one single element or a combination of elements taken from the group as specified above

C01F 17/0006 . {Preparation involving a liquid-liquid extraction, an adsorption or an ion exchange }

C01F 17/0012 . {Compounds containing besides rare earth metals two or more other element with the exception of oxygen or hydrogen, e.g. La4S3Br6 or ternary oxides or hydroxides, e.g. NaCeO2 }
C01F 17/0018 . . {Oxygen being the only anion }

C01F 17/0025 . . . {Aluminates }

C01F 17/0031 . . {Halogen being the only anion (compounds containing besides rare earth metals only different halogens, e.g. Sc C01F 17/0056) }

C01F 17/0037 . . {Sulfur being the only anion }

C01F 17/0043 . {Oxides or hydroxides (ternary oxides or hydroxides, e.g. NaCeO2 C01F 17/0018) }

C01F 17/005 . {Carbonates }

C01F 17/0056 . {Halides }

C01F 17/0062 . . {Fluorides }

C01F 17/0068 . . {Chlorides }

C01F 17/0075 . {Nitrates }

C01F 17/0081 . {Sulfates }

C01F 17/0087 . {Sulfides }

C01F 17/0093 . . {Oxysulfides }