ECLA EUROPEAN CLASSIFICATION

C01F COMPOUNDS OF THE METALS BERYLLIUM, MAGNESIUM, ALUMINIUM, CALCIUM, STRONTIUM, BARIUM, RADIUM, THORIUM, OR OF THE RARE-EARTH METALS

(metal hydrides [N: monoborane, diborane or addition complexes thereof] C01B6/00; salts of oxyacids of halogens C01B11/00; peroxides, salts of peroxyacids C01B15/00; sulfides or polysulfides of magnesium, calcium, strontium, or barium C01B17/42; thiosulfates, dithionites, polythionates C01B17/64; compounds containing selenium or tellurium C01B19/00; binary compounds of nitrogen with metals C01B21/06; azides C01B21/08; [N: compounds other than ammonia or cyanogen containing nitrogen and non-metals and optionally metals C01B21/082; amides or imides of silicon C01B21/087]; metal [N: imides or] amides C01B21/092, [N: C01B21/092B]; nitrites C01B21/50; [N: compounds of noble gases C01B23/00B]; phosphides C01B25/08; salts of oxyacids of phosphorus C01B25/16; carbides C01B31/30; compounds containing silicon C01B 33/00; compounds containing boron C01B35/00; compounds having molecular sieve properties but not having base-exchange properties C01B37/00; compounds having molecular sieve and base-exchange properties, e.g. crystalline zeolites, C01B39/00;cyanides C01C3/08; salts of cyanic acid C01C3/14; salts of cyanamide C01C3/16; thiocyanates C01C3/20; [N: double sulfates of magnesium with sodium or potassium C01D5/12; with other alkali metals C01D15/00, C01D17/00]) [C9602]

C01F1/00 **Methods of preparing compounds of the metals beryllium, magnesium, aluminium, calcium, strontium, barium, radium, thorium, or the rare earths, in general**

C01F3/00 **Compounds of beryllium**

C01F3/00F . [N: Fluorides or double fluorides of beryllium with alkali metals or ammonium; Preparation of beryllium compounds therefrom]

C01F3/02 . Oxides; Hydroxides

C01F5/00 **Compounds of magnesium**

C01F5/02 . Magnesia

C01F5/04 . . by oxidation of metallic magnesium

C01F5/06 . . by thermal decomposition of magnesium compounds (calcining magnesite or dolomite C04B2/10)

C01F5/08 . . . by calcining magnesium hydroxide

C01F5/10 . . . by thermal decomposition of magnesium chloride with water vapour

C01F5/12 . . . by thermal decomposition of magnesium sulfate, with or without reduction

C01F5/14 . Magnesium hydroxide

C01F5/14P . . [N: Purification] [N9505]

C01F5/16 . . by treating magnesia, e.g. calcined dolomite, with water or solutions of salts not containing magnesium

C01F5/20 . . by precipitation from solutions of magnesium salts with ammonia

C01F5/22 . . from magnesium compounds with alkali hydroxides or alkaline- earth oxides or hydroxides

C01F5/24 . Magnesium carbonates

C01F5/26 . Magnesium halides

C01F5/28 . . Fluorides

C01F5/30 . . Chlorides

C01F5/30C . . . [N: Dehydrating ammonium or alkali magnesium chlorides, e.g. carnalite] [N9501]

C01F5/32 . . . Preparation of anhydrous magnesium chloride by chlorinating magnesium compounds

C01F5/34 . . . Dehydrating magnesium chloride containing water of crystallisation

C01F5/36 . . Bromides

C01F5/38 . Magnesium nitrates

C01F5/40 . Magnesium sulfates (double sulfates of magnesium with sodium or potassium C01D5/12, with other alkali metals [N: C01D15/00], C01D17/00)

C01F5/42 . Magnesium sulfites

C01F7/00 Compounds of aluminium

C01F7/00C . [N: Aluminium carbonate]

C01F7/00D . [N: 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 C01F7/54; compounds containing sulfur and other cations besides aluminium C01F7/68)]

C01F7/00D2 . . [N: containing carbonate ions, e.g. dawsonite] [C9506]

C01F7/00D2H . . . [N: Hydrotalcite] [N9506]

C01F7/00D4 . . [N: containing, besides aluminium, only anions, e.g. Al(OH)xCLy(SO4)z (mixed halides C01F7/48)]

C01F7/00D20 . . [N: Ammonium aluminium fluorides]

C01F7/02 . Aluminium oxide; Aluminium hydroxide; Aluminates

C01F7/02B . . [N: After-treatment of oxides or hydroxides] [C9610]

C01F7/02B2 . . . [N: Classification] [N9610]

C01F7/02B4 . . . [N: Grinding, deagglomeration, disintegration] [N9610]

C01F7/02B6 . . . [N: Granulation, agglomeration] [N9610]

C01F7/02B8 . . . [N: Making or stabilising dispersions] [N9610]

C01F7/02B10 . . . [N: Treatment involving fusion or vaporisation] [N9610]

C01F7/02H . . [N: Beta-aluminas]

C01F7/04 . . Preparation of alkali metal aluminates; Aluminium oxide or hydroxide therefrom [N: (C01F7/02H takes precedence)] [C9508]

C01F7/04B . . . [N: Lithium aluminate]

C01F7/04S . . . [N: Stabilisation of aluminates] [N9411]

C01F7/06 . . . by treating aluminous minerals [N: or waste-like raw materials] with alkali hydroxide, [N: e.g. leaching of bauxite according to the Bayer process (obtaining aluminium oxide or hydroxide from the resulting aluminate solution C01F7/14)]

C01F7/06A . . . . [N: Make-up of the alkali hydroxide solution from recycled spent liquor]

C01F7/06B . . . . [N: Pretreatment of the minerals, e.g. grinding]

C01F7/06D . . . . [N: Digestion]

C01F7/06D6 . . . . . [N: Processes making use of tube digestion only] [N9411]

C01F7/06D8 . . . . . [N: characterised by the use of additives] [N9411]

C01F7/06D10 . . . . . [N: Apparatus for digestion, e.g. digestor vessels, heat exchangers] [N9411]

C01F7/06G . . . . [N: Separation of the insoluble residue, e.g. red mud]

C01F7/06G2 . . . . . [N: characterised by the flocculant added to the slurry (final clarification of the aluminate solution C01F7/47)]

C01F7/06H . . . . [N: Treatment of the separated residue]

C01F7/06M . . . . [N: Process control or regulation (control per se G05)]

C01F7/06P . . . . [N: from phosphate-containing minerals]

C01F7/06R . . . . [N: from carbonate-containing minerals, e.g. dawsonite]

C01F7/06S . . . . [N: from sulfate-containing minerals, e.g. alunite]

C01F7/06T . . . . [N: from waste-like raw materials, e.g. fly ash, Bayer calcination dust]

C01F7/08 . . . by treating aluminous minerals with sodium carbonate, [N: e.g. sinter processes (C01F7/06B and C01F7/06H take precedence)]

C01F7/08C . . . . [N: according to the lime-sinter process]

C01F7/10 . . . by treating aluminous minerals with alkali sulfates and reducing agents

C01F7/12 . . . Alkali metal aluminates from alkaline-earth metal aluminates

C01F7/14 . . . Aluminium oxide or hydroxide from alkali metal aluminates

C01F7/14A . . . . [N: from aqueous aluminate solutions by neutralisation with an acidic agent]

C01F7/14A2 . . . . . [N: with carbon dioxide]

C01F7/14C . . . . [N: from aqueous aluminate solutions by precipitation due to cooling, e.g. as part of the Bayer process]

C01F7/14C4 . . . . . [N: characterised by a crystal growth modifying agent other than aluminium hydroxide seed] [N9411]

C01F7/14C6 . . . . . [N: Apparatus for precipitation]

C01F7/14C8 . . . . . [N: Separation of the obtained hydroxide, e.g. filtration, dewatering]

C01F7/16 . . Preparation of alkaline-earth metal aluminates [N: or magnesium aluminate]; Aluminium oxide or hydroxide therefrom [N: (C01F7/02H takes precedence)] [C9508]

C01F7/16B . . . [N: Magnesium aluminates] [N9610]

C01F7/16D . . . [N: Calcium aluminates] [N9610]

C01F7/16F . . . [N: Strontium aluminates] [N9610]

C01F7/16H . . . [N: Barium aluminates] [N9610]

C01F7/18 . . . Aluminium oxide or hydroxide from alkaline-earth metal aluminates

C01F7/20 . . Preparation of aluminium oxide or hydroxide from aluminous ores with acids or salts

C01F7/22 . . . with halides [N: or halogen acids] [C0811]
C01F7/24 . . . with nitric acid or nitrogen oxides
C01F7/26 . . . with sulfuric acids or sulfates
C01F7/28 . . . with sulfurous acid
C01F7/30 . . Preparation of aluminium oxide or hydroxide by thermal decomposition [N: or by hydrolysis or oxidation] of aluminium compounds
C01F7/30B . . . [N: Hydrolysis or oxidation of gaseous aluminium compounds in the gas phase]
C01F7/30B2 . . . . [N: of organic aluminium compounds]
C01F7/30C . . . [N: Thermal decomposition of hydrated chlorides, e.g. aluminium trichloride hexahydrate]
C01F7/30D . . . [N: Thermal decomposition of nitrates]
C01F7/32 . . . [N: Thermal decomposition] of sulfates [N: including complex sulfates, e.g. alums]
C01F7/34 . . Preparation of aluminium hydroxide by precipitation from solutions containing aluminium salts
C01F7/36 . . . from organic aluminium salts
C01F7/38 . . Preparation of aluminium oxide by thermal reduction of aluminous minerals
C01F7/40 . . . in the presence of aluminium sulfide
C01F7/42 . . Preparation of aluminium oxide or hydroxide from metallic aluminium, e.g. by oxidation
C01F7/42B . . . [N: by oxidation with a gaseous oxidator at a high temperature] [N9411]
C01F7/42B8 . . . . [N: using a plasma] [N9411]
C01F7/42E . . . [N: by applying mechanical energy to solid aluminium at a low temperature] [N9411]
C01F7/42H . . . [N: by oxidation in an aqueous solution] [N9411]
C01F7/44 . . Dehydration of aluminium [N: oxide or] hydroxide, [N: i.e. all conversions of one form into another involving a loss of water]
C01F7/44C . . . [N: by calcination] [N9509]
C01F7/44C2 . . . . [N: in presence of a calcination additive] [N9509]
C01F7/44C6 . . . . [N: Apparatus therefor] [N9509]
C01F7/44C8 . . . . [N: making use of a fluidised bed] [N9509]
C01F7/44D . . . [N: by wet processes]
C01F7/44D2 . . . . [N: using superatmospheric pressure, e.g. hydrothermal conversion of gibbsite into boehmite]
C01F7/46 . . Purification of aluminium oxide, aluminium hydroxide or aluminates [N: (7/02H takes precedence)]
C01F7/47 . . . of aluminates, [N: e.g. removal of compounds of Si, Fe, Ga or of organic compounds from Bayer process liquors]
C01F7/47B . . . . [N: Removal of organic compounds, e.g. sodium oxalate]
C01F7/47B2 . . . . . [N: by oxidation]

C01F7/48 . Aluminium halides
C01F7/50 . . Fluorides
C01F7/52 . . . Double compounds containing both fluorine and other acid [N: halide] groups [N1104]
C01F7/54 . . . Double compounds containing both aluminium and alkali metals or

earth metals

C01F7/56 . . Chlorides (containing fluorine C01F7/52) [C1104]
C01F7/58 . . . Preparation of anhydrous aluminium chloride
C01F7/60 . . . . from oxygen-containing aluminium compounds
C01F7/62 . . . Purification
C01F7/64 . . Bromides (containing fluorine C01F7/52) [C1104]

C01F7/66 . Aluminium nitrates (containing fluorine [N: C01F7/00D])

C01F7/68 . Aluminium compounds containing sulfur (containing fluorine [N: C01F7/00D])
C01F7/70 . . Sulfides
C01F7/72 . . Sulfites
C01F7/74 . . Sulfates
C01F7/74B . . . [N: Preparation from elemental aluminium or elemental aluminium containing materials, e.g. foil, dross] [N9706]
C01F7/74D . . . [N: Preparation from silicoaluminious materials, e.g. clays, bauxite] [N9706]
C01F7/74F . . . [N: Preparation from alums, e.g. alunite] [N9706]
C01F7/74T . . . [N: After-treatment, e.g. dehydration, stabilisation] [N9706]
C01F7/74T2 . . . . [N: Purification] [N9706]
C01F7/76 . . . Double salts, [N: i.e. compounds containing, besides aluminium and sulfate ions, only other cations], e.g. alums
C01F7/76B . . . . [N: Ammonium or alkali metal aluminium sulfates] [N9706]
C01F7/76B2 . . . . . [N: Ammonium aluminium sulfates] [N9706]
C01F7/76D . . . . [N: Alkaline earth metal aluminium sulfates] [N9706]

C01F11/00 **Compounds of calcium, strontium, or barium** (C01F7/00 takes precedence)

C01F11/00B . [N: Preparation involving liquid-liquid extraction, absorption or ion-exchange]

C01F11/02 . Oxides or hydroxides (production of lime C04B2/00)
C01F11/04 . . by thermal decomposition
C01F11/06 . . . of carbonates
C01F11/08 . . by reduction of sulfates
C01F11/10 . . from sulfides
C01F11/12 . . from silicates
C01F11/16 . . Purification

C01F11/18 . Carbonates
C01F11/18A . . [N: Preparation of calcium carbonate by carbonation of aqueous solutions and characterised by control of the carbonation conditions]
C01F11/18B . . [N: Preparation of calcium carbonate by carbonation of aqueous solutions and characterised by an additive other than CaCO3-seeds]
C01F11/18B2 . . . [N: the additive being an organic compound]
C01F11/18C . . [N: Preparation of calcium carbonate by carbonation of solutions based on non-aqueous solvents]

C01F11/18D . . [N: After-treatment, e.g. grinding, purification, conversion of crystal morphology]
C01F11/18F . . [N: Strontium or barium carbonate]
C01F11/18F2 . . . [N: Strontium carbonate] [N0302]
C01F11/18F4 . . . [N: Barium carbonate][N0302]

C01F11/20 . Halides
C01F11/22 . . Fluorides
C01F11/24 . . Chlorides
C01F11/26 . . . from sulfides
C01F11/28 . . . by chlorination of alkaline-earth metal compounds
C01F11/30 . . . Concentrating; Dehydrating; Preventing the adsorption of moisture or caking
C01F11/32 . . . Purification
C01F11/34 . . Bromides

C01F11/36 . Nitrates
C01F11/38 . . Preparation with nitric acid or nitrogen oxides
C01F11/40 . . Preparation by double decomposition with nitrates
C01F11/42 . . Double salts (with magnesium C01F5/38)
C01F11/44 . . Concentrating; Crystallisating; Dehydrating; Preventing the absorption of moisture or caking

C01F11/46 . Sulfates (dehydration of gypsum [N: for the production of calcium sulfate cements] C04B11/02)
C01F11/46B . . [N: Sulfates of Sr or Ba]
C01F11/46D . . [N: Sulfates of Ca from gases containing sulfur oxides]
C01F11/46F . . [N: Conversion of one form of calcium sulfate to another]
C01F11/46P . . [N: Purification of calcium sulfates]

C01F11/48 . Sulfites

C01F13/00 **Compounds of radium**

C01F15/00 **Compounds of thorium**

C01F17/00 **Compounds of the rare earth metals, i.e. scandium, yttrium, lanthanum, or the group of the lanthanides**

[N: **Note**
In this group "rare earth metals" means one single element or a combination of elements taken from the group as specified above
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C01F17/00B . [N: Preparation involving a liquid-liquid extraction, an adsorption or an ion exchange]

C01F17/00D . [N: 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]

C01F17/00D2 . . [N: Oxygen being the only anion]
C01F17/00D2B . . . [N: Aluminates]
C01F17/00D5 . . [N: Halogen being the only anion (compounds containing besides rare earth metals only different halogens, e.g. Sc C01F17/00J)]
C01F17/00D8 . . [N: Sulfur being the only anion]

C01F17/00F . [N: Oxides or hydroxides (ternary oxides or hydroxides, e.g. NaCeO2 C01F17/00D2)]

C01F17/00H . [N: Carbonates]

C01F17/00J . [N: Halides]
C01F17/00J2 . . [N: Fluorides]
C01F17/00J4 . . [N: Chlorides]

C01F17/00K . [N: Nitrates]

C01F17/00M . [N: Sulfates]

C01F17/00N . [N: Sulfides]
C01F17/00N2 . . [N: Oxysulfides]