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: C01B21/0923]; nitrites C01B21/50; [N: compounds of noble gases C01B23/0005]; phosphides C01B25/08; salts of oxyacids of phosphorus C01B25/16; carbides C01B31/30; compounds containing silicon C01B33/00; 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])

Definition statement

This subclass/group covers:

All compounds of Be,Mg,Al,Ca,Sr,Ba,Ra,Th or rare earth metals except those compounds which are classified in C01G because of application of the last appropriate place rule. So, in principle does this subclass comprise all Al-compounds with elements as such being part of C01B-C01D, e.g. Al2O3, Al(NO3)3, Al2S3.

References relevant to classification in this subclass

This subclass/group does not cover:

Exceptions to the last appropriate place rule:

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

Preparation of inorganic compounds in general:

Halides:	C01B 9/00
(hydr)oxides:	C01B 13/14
(poly)sulfides:	C01B 17/20
Sulfates:	C01B 17/96
Sulfites:	C01B 17/62
Nitrates:	C01B 21/48
Nitrites:	C01B 21/50
(bi)carbonates:	C01B 31/24
Ammonium-salts:	C01C 1/28

Informative references

Attention is drawn to the following places, which may be of interest for search:

Shaped ceramic bodies:	C04B

Macroscopic single crystals:	C30B
Obtaining compounds by metallurgical methods:	C22B
Obtaining metals (in elemental form):	C22B
Obtaining compounds by electrochemistry:	C25B, C25C
Improving pigmenting or filling properties of inorganic compounds:	C09C
Catalysts in general:	B01J
Chemical processing in general:	B01J

Special rules of classification within this subclass

- In the whole class C01 (thus also in this subclass C01F) is the last appropriate place rule applied (see the Note after the class title) and are chemical names to be taken in a strictly limitative sense (see the Note after the class title C01).
- Compounds comprising in addition to Al, two or more other elements (H and O not counted) are classified in C01F 7/002-C01F 7/008.

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

In this subclass, the nomenclature of groups of elements used is defined in the Note after the section title C.

C01F 1/00

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

Definition statement

This subclass/group covers:

General preparation features for (mostly groups) of compounds of the

elements specified and being part of subclass C01F.

References relevant to classification in this group

This subclass/group does not cover:

General preparation features of compounds which comprise elements classified in C01G (mostly transition elements):	C01G 1/00

Examples of places where the subject matter of this group is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Preparation of inorganic compounds in general:

Halides:	C01B 9/00
(hydr)oxides:	C01B 13/14
(poly)sulfides:	C01B 17/20
Sulfates:	C01B 17/96
Sulfites:	C01B 17/62
Nitrates:	C01B 21/48
Nitrites:	C01B 21/50
(bi)carbonates:	C01B 31/24
Ammonium-salts:	C01C 1/28

C01F 3/00

Compounds of beryllium

Definition statement

This subclass/group covers:

All compounds of beryllium except those with elements as such classified after C01F 3/00 and except those as specified after the subclass title of C01F.

C01F 5/00

Compounds of magnesium

Definition statement

This subclass/group covers:

All compounds of magnesium except those with elements as such classified after C01F 5/00 and except those as specified after the subclass title C01F.

C01F 7/00

Compounds of aluminium

Definition statement

This subclass/group covers:

All compounds of aluminium except those with elements as such classified after C01F 7/00 and except those as specified after the subclass title C01F.

Synonyms and Keywords

In patent documents the following synonyms are often used:

Aluminium	aluminum

C01F 7/002

[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)]

Definition statement

This subclass/group covers:

compounds comprising apart from aluminium more than one other element, thereby not taken into account O and H. So simple compounds like Al2S3, Al(NO3)3 or AlCl3 are classified according to the groups specially created therefore (see the subgroups of C01F 7/00). More complex compounds however comprising two or more elements (cations or anions; O and H excluded) other than alumuminium are classified in this group C01F 7/002.

References relevant to classification in this group

This subclass/group does not cover:

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 7/007

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

Definition statement

This subclass/group covers:

compounds comprising apart from aluminium more than one other anionic element, thereby not taken into account O.

References relevant to classification in this group

This subclass/group does not cover:

Mixed halides	C01F 7/48

C01F 7/02

Aluminium oxide; Aluminium hydroxide; Aluminates

Definition statement

This subclass/group covers:

All aluminium oxides, hydroxides, (oxy)hydroxides or aluminates.

References relevant to classification in this group

This subclass/group does not cover:

Organic compounds containing aluminium:	C07F 5/06

Examples of places where the subject matter of this group is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Aluminosilicates:	C01B 33/26
Zeolites:	C01B 39/00

Special rules of classification within this group

A document disclosing an aluminium oxide or hydroxide prepared by one single preparation method is classified according to the method. A document teaching the oxide or hydroxide compound as such and specifying method(s) for preparation is classified according to the method(s) and is also classified in C01F 7/02 according to the compound.

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Aluminium oxide or hydroxide:	aluminium oxide (all polymorphs, e.g. alpha, gamma), hydroxide or (oxy)hydroxide
Bayerite, hydrargilite/gibbsite and norstrandite:	polymorphs of Al(OH)3
Boehmite or diaspore:	polymorphs of AlOOH
Corundum or alpha-alumina:	high temperature phase of Al2O3

Synonyms and Keywords

In patent documents the following expressions are often used as synonyms:

AlO(OH) aluminium oxyhydroxide	Al2O3.H2O aluminium monohydrate
Al(OH)3 aluminium hydroxide	Al2O3.3H2O aluminium trihydrate

C01F 7/021

[N: After-treatment of oxides or hydroxides]

Definition statement

This subclass/group covers:

The physical and chemical after-treatments of aluminium (hydr)oxides in general.

References relevant to classification in this group

This subclass/group does not cover:

(After-)Treatments of aluminium (hydr)oxides in order to improve their pigmenting or filling properties:	C09C 1/407

C01F 7/04

Preparation of alkali metal aluminates; Aluminium oxide or hydroxide therefrom [N: (C01F7/028 takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Aluminates with a minor amount of other elements and chaaracterised as beta-alumina's:	C01F 7/028

C01F 7/06

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)]

Definition statement

This subclass/group covers:

C01F 7/06 and subgroups cover treatments of bauxite according to the Bayer process insofar it relates to the pretreatment and digestion of the ore and separation of the red mud. Also included are the recovery of the spent liquor cycle stream.

References relevant to classification in this group

This subclass/group does not cover:

Precipitation of aluminium hydroxide from the pregnant aluminate stream by cooling, according to the Bayer process:	C01F 7/144
Purification of the aluminate solution (clarification) obtained after separation of the red mud as part of the Bayer process:	C01F 7/47
Obtaining aluminium oxide (alumina) by calcination of aluminium hydroxide obtained via the Bayer process:	C01F 7/441

C01F 7/0653

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

Definition statement

This subclass/group covers:

The addition of agents for settling the red mud in Bayer process decanters.

References relevant to classification in this group

This subclass/group does not cover:

The final clarification of aluminate solutions obtained from the settling tanks in the Bayer process:	C01F 7/47

C01F 7/16

Preparation of alkaline-earth metal aluminates [N: or magnesium aluminate]; Aluminium oxide or hydroxide therefrom [N: (C01F7/028 takes precedence)]

Definition statement

This subclass/group covers:

Some of the phases in the subgroups of C01F 7/16 are qualified as having the spinel structure.

References relevant to classification in this group

This subclass/group does not cover:

Aluminates with a small amount of non-aluminium elements and having the beta-alumina structure:	C01F 7/028

Synonyms and Keywords

In patent documents the expression is often used with the meaning:

Alkaline earth metal aluminate, (MgAl2O4):	spinel

C01F 7/302

[N: Hydrolysis or oxidation of gaseous aluminium compounds in the gas phase]

Definition statement

This subclass/group covers:

E.g. the oxidation of aluminium chloride in the gas phase.

References relevant to classification in this group

This subclass/group does not cover:

The conversion of hydrated aluminium chloride by heating in the gase phase(i.e. thermal decomposition):	C01F 7/306

C01F 7/36

from organic aluminium salts

Definition statement

This subclass/group covers:

E.g. the preparation of aluminium hydroxide from aluminium alkoxides in non-aqueous (e.g. alcoholic) solutions.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Sol-gel processing in general for the preparation of oxides:	C01B 13/32

Special rules of classification within this group

The preparation of aluminum hydroxides Al(OH)3 from inorganic salts (like aluminium sulfate or nitrate) is classified in C01F 7/34.

C01F 11/00

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

Definition statement

This subclass/group covers:

All compounds of calcium, strontium or barium except those with elements as such classified after C01F 11/00 and except those elements as specified in maingroup C01F 7/00.

References relevant to classification in this group

This subclass/group does not cover:

Compounds of calcium, strontium or barium with aluminium:	C01F 7/00, e.g. C01F 7/16

C01F 11/185

[N: After-treatment, e.g. grinding, purification, conversion of crystal morphology]

References relevant to classification in this group

This subclass/group does not cover:

Treatment of calcium carbonate for improving the pigmenting or filling properties (e.g. for application as filler in plastics or paper):	C09C 1/021

Synonyms and Keywords

In patent documents the following expressions are often used:

CaCO3	Calcite, aragonite, vaterite

C01F 11/46

Sulfates (dehydration of gypsum [N: for the production of calcium sulfate cements] C04B11/02)

Definition statement

This subclass/group covers:

All forms of calcium sulfate, hydrated or free of crystal water

References relevant to classification in this group

This subclass/group does not cover:

Dehydration of gypsum for the production of calcium sulfate cements:	C04B 11/02

Synonyms and Keywords

In patent documents the following abbreviations are often used:

Gypsum	Dihydrate

In patent documents the expression are often used with the meaning:

Gypsum	CaSO4.2H2O
Calcium sulfate hemihydrate	CaSO4.1/2H2O
Anhydriite	CaSO4

C01F 11/466

[N: Conversion of one form of calcium sulfate to another]

Definition statement

This subclass/group covers:

All dehydrations, hydrations or conversions without a change in the water content, excluded the dehydration of the dihydrate (gypsum) into hemihydrate as part of the cement production (see below).

References relevant to classification in this group

This subclass/group does not cover:

Dehydration of gypsum for the production of calcium sulfate cements:	C04B 11/02

C01F 13/00

Compounds of radium

Definition statement

This subclass/group covers:

All compounds of radium except those with elements as such classified after C01F 13/00 and except those as specified after the subclass title C01F.

C01F 15/00

Compounds of thorium

Definition statement

This subclass/group covers:

All compounds of thorium except those with elements as such classified after C01F 15/00 and except those as specified after the subclass title C01F.

C01F 17/00

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

Definition statement

This subclass/group covers:

All compounds of rare earth metals, i.e. scandium, yttrium, lanthanum or the group of the lanthanides except those with elements as such classified after

C01F 17/00.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Abrasives consisting of rare earth metal compounds, e.g. ceria:	C09K 3/14

C01F 17/0031

[N: Halogen being the only anion (compounds containing besides rare earth metals only different halogens, e.g. Sc C01F17/0056)]

References relevant to classification in this group

This subclass/group does not cover:

Compounds containing besides rare earth metals only different halogens, e.g. ScClF:	C01F 17/0056

C01F 17/0043

[N: Oxides or hydroxides (ternary oxides or hydroxides, e.g. NaCeO2 C01F17/0018)]

Definition statement

This subclass/group covers:

Only oxides of (one or more) rare earth metals as binary compounds (one or more rare earth metals taken as single species). Ternary oxide of rare earth metals with other cations (e.g. NaCeO2 or K(La,Sm)O2) are classified in C01F 17/0018

References relevant to classification in this group

This subclass/group does not cover:

Ternary oxides or hydroxides, e.g. NaCeO2:	C01F 17/0018