

## ECLA EUROPEAN CLASSIFICATION

**C04B** **LIME, MAGNESIA; SLAG; CEMENTS; COMPOSITIONS THEREOF, e.g. MORTARS, CONCRETE OR LIKE BUILDING MATERIALS; ARTIFICIAL STONE** [N: (roofing granules [E04D7/00B](#)); **CERAMICS** (devitrified glass-ceramics [C03C10/00](#)); **REFRACTORIES; TREATMENT OF NATURAL STONE**

[N: **WARNING** [C0808]

The following IPC groups are not used in the internal ECLA classification system. Subject matter covered by these groups is classified in the following ECLA groups:

[C04B5/02](#) covered by [B01J2/00](#), [C21B3/06](#)  
[C04B33/132](#) to [C04B33/138](#) covered by [C04B33/13](#)  
[C04B35/035](#) covered by [C04B35/26+s.gr.](#)  
[C04B35/567](#), [C04B35/569](#), [C04B35/576](#), [C04B35/577](#) covered by  
[C04B35/565](#), [C04B35/571](#) to [C04B35/575B](#), [C04B35/80D](#)  
[C04B35/582](#) covered by [C04B35/581](#), [C04B35/80D](#)  
[C04B35/5833](#), [C04B35/5835](#) covered by [C04B35/583](#), [C04B35/80D](#)  
[C04B35/586](#), [C04B35/587](#), [C04B35/594](#), [C04B35/596](#) covered by  
[C04B35/584](#), [C04B35/589](#) to [C04B35/593B](#), [C04B35/80D](#)  
[C04B35/599](#) covered by [C04B35/597](#)  
[C04B35/81](#) covered by [C04B35/78](#)  
[C04B35/84](#) covered by [C04B35/628](#), [C04B35/78](#)  
]

[N: **Notes**  
[C0807]

]

**Guide heading:** **Lime; Magnesia; Slag**

**C04B2/00** **Lime, magnesia or dolomite** (hydraulic lime cements [C04B7/34](#))

[C04B2/00B](#) . [N: obtained from an industrial by-product]

[C04B2/02](#) . Lime [N: (obtaining Ca(OH)<sub>2</sub> otherwise than by simple slaking of quick lime [C01F11/02](#))]

[C04B2/04](#) . . Slaking [N: (simultaneous dehydrating of gypsum and slaking of lime [C04B11/02A](#))]  
[C9707]

[C04B2/04B](#) . . . [N: After-treatment of slaked lime]

[C04B2/06](#) . . . with addition of substances, e.g. hydrophobic agents; [N: Slaking in the presence of other compounds] [C9704]

[C04B2/06D](#) . . . . [N: Slaking of impure quick lime, e.g. contained in fly ash]

[C04B2/06H](#) . . . . [N: Making use of the hydration reaction, e.g. the reaction heat for dehydrating gypsum; Chemical drying by using unslaked lime] [N9704]  
[C0203]

[C04B2/08](#) . . . Devices therefor

[C04B2/10](#) . Preheating, burning calcining or cooling (decarbonation during burning of cement raw materials [C04B7/43](#); [N: obtaining CaO or MgO otherwise than by thermal decomposition of the corresponding carbonates [C01F11/02](#), [C01F5/02](#)])

- C04B2/10B . . [N: of magnesia, e.g. dead burning]
- C04B2/10D . . [N: Ingredients added before or during the burning process]
- C04B2/10F . . [N: in fluidised bed furnaces]
- C04B2/10L . . [N: Treatment or selection of the fuel therefor] [C9702]
- C04B2/12 . . in shaft or vertical furnaces (shaft or vertical furnaces in general [F27B1/00](#))
  
- C04B5/00** **Treatment of [N: metallurgical] slag** (manufacture of slag wool [C03B](#); in, or for, the production of metals [C21B](#), [C22B](#)); **Artificial stone from molten [N: metallurgical] slag** (mechanical aspects [B28B1/54](#)) [N: other cast stone [C04B32/00B](#)]
  
- C04B5/06 . Ingredients, other than water, added to the molten slag [N: or to the granulating medium or before remelting]; Treatment with gases or gas generating compounds, e.g. to obtain porous slag
- C04B5/06B . . [N: Porous slag] [N9512]
  
- Guide heading:** **Cements**
  
- C04B7/00** **Hydraulic cements** (calcium sulfate cements [C04B11/00](#))
  
- C04B7/00B . [N: Barium or strontium cements] [C9706]
- C04B7/00K . [N: Cement-clinker used in the unground state in mortar - or concrete compositions]
- C04B7/02 . Portland cement
- C04B7/04 . . using raw materials containing gypsum, [N: i.e. processes of the Mueller-Kuehne type] [C9802]
- C04B7/06 . . using alkaline raw materials ([C04B7/60](#) takes precedence)
  
- C04B7/12 . Natural pozzuolanes; Natural pozzuolana cements; [N: Artificial pozzuolanes or artificial pozzuolana cements other than those obtained from waste or combustion residues, e.g. burned clay; Treating inorganic materials to improve their pozzuolanic characteristics] (cements containing slag [C04B7/14](#))
- C04B7/13 . . Mixtures thereof with inorganic cementitious materials, e.g. Portland cements
- C04B7/14 . Cements containing slag (slags from waste incineration [C04B7/28](#)) [C9704]
- C04B7/147 . . Metallurgical slag
- C04B7/153 . . . Mixtures thereof with other inorganic cementitious materials or other activators
- C04B7/153B . . . . [N: with alkali metal containing activators, e.g. sodium hydroxide or waterglass]
- C04B7/17 . . . . with calcium oxide containing activators [N: ([C04B7/153B](#) takes precedence)] [C9706]
- C04B7/19 . . . . . Portland cements
- C04B7/21 . . . . with calcium sulfate containing activators [N: ([C04B7/153B](#) takes precedence)] [C9706]
  
- C04B7/22 . Iron ore cements; [N: Iron rich cements, e.g. Ferrari cements, Kühl cements] [C0008]
  
- C04B7/24 . Cements from oil shales, residues or waste other than slag

- C04B7/24A . . [N: Mixtures thereof with activators or composition-correcting additives, e.g. mixtures of fly ash and alkali activators] [N9802]
- C04B7/24B . . [N: from waste building materials, e.g. waste asbestos-cement products, demolition waste] [N9510]
- C04B7/26 . . from raw materials containing flue dust, [N: i.e. fly ash ([C04B7/24A](#) takes precedence)] [C9802]
- C04B7/28 . . from combustion residues, [N: e.g. ashes or slags from waste incineration] ([N: [C04B7/24A](#)], [C04B7/26](#) take precedence) [C9802]
- C04B7/30 . . from oil shale; from oil shale residues; [N: from lignite processing, e.g. using certain lignite fractions] [C9810]
  
- C04B7/32 . Aluminous cements
- C04B7/32B . . [N: Calcium aluminosulfate cements, e.g. cements hydrating into ettringite]
- C04B7/32H . . [N: Calcium aluminohalide cements, e.g. based on  $11\text{CaO} \cdot 7\text{Al}_2\text{O}_3 \cdot \text{CaX}_2$ , where X is Cl or F] [N9807]
  
- C04B7/34 . Hydraulic lime cements; Roman cements; [N: natural cements]
  
- C04B7/345 . Hydraulic cements not provided for in one of the groups [C04B7/02](#) to [C04B7/34](#)
- C04B7/345B . . [N: Belite cements, e.g. self-disintegrating cements based on dicalciumsilicate]
- C04B7/345N . . [N: Alinite cements, e.g. "Nudelman"-type cements, bromo-alinite cements, fluoro-alinite cements] [C0008]
  
- C04B7/36 . Manufacture of hydraulic cements in general
- C04B7/36B . . [N: Condition or time responsive control in hydraulic cement manufacturing processes (controlling or regulating in general [G05](#); [F27B7/42](#) takes precedence)]
- C04B7/36B2 . . . [N: for raw materials handling, e.g. during the grinding or mixing step] [N9902]
- C04B7/36E . . [N: Avoiding environmental pollution during cement-manufacturing]
- C04B7/36E2 . . . [N: by extracting part of the material from the process flow and returning it into the process after a separate treatment, e.g. in a separate retention unit under specific conditions] [N0407]
- C04B7/36E4 . . . [N: Avoiding or minimising carbon dioxide emissions] [N0503]
- C04B7/36S . . [N: Obtaining spherical cement particles] [N9412]
- C04B7/38 . . Preparing or treating the raw materials individually or as batches, [N: e.g. mixing with fuel; ([C04B7/36B2](#) takes precedence)] [C9902]
- C04B7/40 . . . Dehydrating; Forming, e.g. granulating (apparatus for granulating [B01J2/00](#))
- C04B7/42 . . . Active ingredients added before, or during, the burning process (after the burning process [C04B22/00](#), [C04B24/00](#))
- C04B7/42B . . . . [N: Inorganic materials]
- C04B7/42B2 . . . . [N: Elements]
- C04B7/42B4 . . . . [N: Oxides, Hydroxides]
- C04B7/42B6 . . . . [N: Acids or salts thereof]
- C04B7/42B8 . . . . [N: Silicates]
- C04B7/42D . . . . [N: Organic materials]
- C04B7/43 . . Heat treatment, e.g. precalcining, burning, melting; Cooling [N: (aspects only relating to the installation [F27B](#))]
- C04B7/43B . . . [N: Preheating without addition of fuel] [C0006]
- C04B7/43D . . . [N: Preheating with addition of fuel, e.g. calcining] [C9810]

- C04B7/43K . . . [N: Special arrangements for treating part or all of the cement kiln dust]
- C04B7/43P . . . [N: Evacuating at least part of the heat treated material before the final burning or melting step, the evacuated material being used as a cement as such]
- C04B7/44 . . . Burning; Melting
- C04B7/44B . . . . [N: Treatment or selection of the fuel therefor, e.g. use of hazardous waste as secondary fuel (fuels in general [C10L](#)); Use of particular energy sources, e.g. waste hot gases from other processes] [C0008]
- C04B7/44B1 . . . . . [N: Waste hot gases] [N0008]
- C04B7/44B2 . . . . . [N: Waste or refuse used as fuel] [N9809]
- C04B7/44B2T . . . . . [N: Tyres, e.g. shredded] [N9809]
- C04B7/44B4 . . . . . [N: the fuel being introduced directly into the rotary kiln] [N9809]
- C04B7/44B10 . . . . . [N: the fuel being treated in a separate gasifying or decomposing chamber, e.g. a separate combustion chamber] [N9809]
- C04B7/44D . . . . . [N: using plasmas or radiations]
- C04B7/44F . . . . . [N: Grate sintering]
- C04B7/44G . . . . . [N: in shaft or vertical kilns]
- C04B7/44H . . . . . [N: Selection of the kiln atmosphere]
- C04B7/44K . . . . . [N: Non-electric melting]
- C04B7/44R . . . . . [N: Inhibiting the formation of or eliminating incrustations in the cement kiln (removing incrustations from rotary-drum furnaces [F27B7/20D](#))] [C9807]
- C04B7/45 . . . . . in fluidised beds, [N: e.g. spouted beds] [C9802]
- C04B7/46 . . . . . electric
- C04B7/47 . . . . . Cooling; [N: Waste heat management] [C9704]
- C04B7/47B . . . . . [N: using the waste heat, e.g. of the cooled clinker, in an other way than by simple heat exchange in the cement production line, e.g. for generating steam] [N9702] [C9704]
- C04B7/48 . . . Clinker treatment ([C04B7/47](#) takes precedence)
- C04B7/51 . . . Hydrating
- C04B7/52 . . . Grinding; [N: After-treatment of ground cement] [C9707]
- C04B7/52A . . . . . [N: After-treatment of ground cement ([C04B7/36S](#) takes precedence)] [N9707]
- C04B7/52A2 . . . . . [N: Briquetting] [N9707]
- C04B7/52H . . . . . [N: obtaining cements characterised by fineness, e.g. by multi-modal particle size distribution]
- C04B7/60 . . . Methods for eliminating alkali metals or compounds thereof, [N: e.g. from the raw materials or during the burning process; methods for eliminating other harmful components (avoiding environmental pollution [C04B7/36E](#))]

#### **C04B9/00 Magnesium cements or similar cements**

- C04B9/02 . . . Magnesium cements containing chlorides, e.g. Sorel cement
- C04B9/04 . . . Magnesium cements containing sulfates, nitrates, phosphates or fluorides
- C04B9/06 . . . Cements containing metal compounds other than magnesium compounds, e.g. compounds of zinc or lead
- C04B9/11 . . . Mixtures thereof with other inorganic cementitious materials

- C04B9/12 . . with hydraulic cements, e.g. Portland cement
- C04B9/20 . Manufacture, e.g. preparing the batches (preheating, burning, calcining or cooling lime stone, magnesite or dolomite [C04B2/10](#))
- C04B11/00            Calcium sulfate cements**
- C04B11/00B . [N: Mixtures of different CaSO<sub>4</sub>-modifications, e.g. plaster of Paris and anhydrite, used as cements]
- C04B11/00D . [N: Preparing or treating the raw materials] [N0406]
- C04B11/00F . [N: After-treatment of the dehydration products, e.g. aging, stabilisation] [N0406]
- C04B11/02 . [N: Methods and apparatus for] dehydrating gypsum [N: (for other purposes than cement manufacture [C01F11/46F](#))] [C9607]
- C04B11/02A . . [N: Simultaneous dehydrating of gypsum and slaking of lime] [N9707]
- C04B11/024 . . Ingredients added before, or during, the calcining process, e.g. calcination modifiers
- C04B11/028 . . Devices therefor [N: characterised by the type of calcining devices used therefor or by the type of hemihydrate obtained] [C9607]
- C04B11/028B . . . [N: Kettles; Marmites; Autoclaves] [N9607]
- C04B11/028B2 . . . . [N: Autoclaves, e.g. using chariots] [N9607]
- C04B11/028D . . . [N: Fluidised beds] [N9607]
- C04B11/028F . . . [N: Rotary kilns] [N9607]
- C04B11/028H . . . [N: Suspension heaters for flash calcining, e.g. cyclones] [N9607]
- C04B11/028L . . . [N: Multi-storey horizontal furnaces] [N9607]
- C04B11/028M . . . [N: Grates] [N9607]
- C04B11/032 . . . for the wet process, e.g. dehydrating in solution or under saturated vapour conditions, [N: i.e. to obtain alpha-hemihydrate ([C04B11/028B](#) to [C04B11/028M](#) take precedence)] [C9607]
- C04B11/036 . . . for the dry process, e.g. dehydrating in a fluidised bed or in a rotary kiln, [N: i.e. to obtain beta-hemihydrate ([C04B11/028B](#) to [C04B11/028M](#) take precedence)] [C9607]
- C04B11/05 . obtaining anhydrite, [N: e.g. Keene`s cement] ([C04B11/028](#) takes precedence)
- C04B11/06 . starting from anhydrite
- C04B11/26 . [N: strating from chemical gypsum]; starting from phosphogypsum or from waste, e.g. purification products of smoke ([C04B11/02](#) takes precedence; chemical purification of smoke, fumes or exhaust gases [B01D53/00](#) [N: purification of gypsum [C01F11/46](#)]) [C0301]
- C04B11/26B . . [N: waste gypsum other than phosphogypsum]
- C04B11/26B2 . . . [N: Gypsum from the desulfurisation of flue gases]
- C04B11/26C . . [N: Chemical gypsum] [N0301]
- C04B11/26D . . [N: pelletizing of the material before starting the manufacture]
- C04B11/28 . Mixtures thereof with other inorganic cementitious materials ([C04B7/04](#), [C04B7/153](#) take precedence)

C04B11/30 . . with hydraulic cements, e.g. Portland cements

**C04B12/00** **Cements not provided for in groups [C04B7/00](#) to [C04B11/00](#)**

C04B12/00G . [N: Geopolymer cements, e.g. reaction products of aluminosilicates with alkali metal hydroxides or silicates]

C04B12/02 . Phosphate cements (in, or for, the manufacture of ceramics [C04B33/00](#), [C04B35/00](#))

C04B12/02B . . [N: Al-phosphates]

C04B12/02D . . [N: Phosphates of ammonium or of the alkali or alkaline earth metals] [C9707]

C04B12/02E . . [N: mixtures thereof with other inorganic cementitious materials]

C04B12/04 . Alkali metal or ammonium silicate cements [N: Alkyl silicate cements; Silica sol cements; Soluble silicate cements] (alkali metal silicates per se, their preparation [C01B33/32](#); ammonium silicates per se, their preparation [C01C1/00](#)) [C9508]

**Guide heading:** **Use of materials as fillers** ([ceramics C04B33/00](#), [C04B35/00](#); [reinforcing elements for building materials E04C5/00](#))

**C04B14/00** **Use of inorganic materials as fillers, e.g. pigments, for mortars, concrete or artificial stone; Treatment of inorganic materials specially adapted to enhance their filling properties in mortars, concrete or artificial stone** ([expanding or defibrillating materials C04B20/00](#))

[N: **Note**

Fillers with a well-defined shape other than granular are considered to be reinforcing elements and thus are classified in [E04C5/00](#). However, if they are only characterised by their composition, classification is made in [C04B](#) only ]

C04B14/00B . [N: Inorganic fillers with a shape other than granular or fibrous ([carbon nanotubes C04B14/02B10](#))] [C0310]

C04B14/02 . Granular materials, [N: e.g. micro-balloons]

C04B14/02B . . [N: Carbon]

C04B14/02B2 . . . [N: Graphite] [N9607]

C04B14/02B10 . . . [N: of particular shape, e.g. nanotubes] [N0310]

C04B14/02B10A . . . . [N: Carbon aerogels][N0310]

C04B14/04 . . Silica-rich materials; Silicates

C04B14/04A . . . [N: Aluminium silicates other than clay]

C04B14/04C . . . [N: Magnesium silicates, e.g. talc, sepiolite] [C9906]

C04B14/04F . . . [N: Alkaline-earth metal silicates, e.g. wollastonite]

C04B14/04G . . . [N: Polysilicates, e.g. geopolymers] [N0805]

C04B14/04H . . . [N: Alkali-metal containing silicates, e.g. petalite ([waterglass C04B12/04](#))] [C0312]

C04B14/04K . . . [N: Zircon]

C04B14/04L . . . [N: Zeolites]

C04B14/04N . . . [N: Granite]

C04B14/06	. . .	Quartz; Sand
C04B14/06C	. . . .	[N: Micro-silica, e.g. colloidal silica (preparing micro-silica slurries or suspensions <a href="#">C04B18/14F2S</a> )] [C9811]
C04B14/06G	. . . .	[N: Silica aerogel] [N9611]
C04B14/06P	. . . .	[N: Precipitated or pyrogenic silica] [N0910]
C04B14/06S	. . . .	[N: Specific natural sands, e.g. sea -, beach -, dune - or desert sand] [C0007]
C04B14/08	. . .	Diatomaceous earth
C04B14/10	. . .	Clay [N: (sepiolite <a href="#">C04B14/04C</a> ; grog <a href="#">C04B18/02F2</a> )] [C9906]
C04B14/10A	. . . .	[N: Attapulgite clay]
C04B14/10B	. . . .	[N: Bentonite, e.g. montmorillonite]
C04B14/10K	. . . .	[N: Kaolin]
C04B14/10S	. . . .	[N: Shale, slate (colliery shale <a href="#">C04B18/12B</a> )]
C04B14/12	. . . .	Expanded clay
C04B14/14	. . .	Minerals of vulcanic origin [N: (granite <a href="#">C04B14/04N</a> )] [C0103]
C04B14/16	. . . .	porous, e.g. pumice
C04B14/18	. . . .	Perlite
C04B14/18B	. . . . .	[N: expanded]
C04B14/20	. . .	Mica; Vermiculite [N: (Mechanical splitting <a href="#">B28D</a> )]
C04B14/20B	. . . .	[N: Vermiculite]
C04B14/20D	. . . .	[N: expanded]
C04B14/20G	. . . .	[N: Mica or vermiculite modified by cation-exchange; chemically exfoliated vermiculate][C0304]
C04B14/20G2	. . . . .	[N: delaminated mica or vermiculite platelets]
C04B14/22	. . .	Glass; [N: Devitrified glass]
C04B14/24	. . . .	porous, e.g. foamed glass
C04B14/26	. .	Carbonates
C04B14/28	. . .	of calcium
C04B14/28B	. . . .	[N: Marble]
C04B14/30	. .	Oxides other than silica [N: ferrites <a href="#">C04B14/36F</a> ]
C04B14/30A	. . .	[N: porous or hollow]
C04B14/30A2	. . . .	[N: Aerogels] [N0007]
C04B14/30B	. . .	[N: Alumina]
C04B14/30D	. . .	[N: Magnesia]
C04B14/30G	. . .	[N: Titanium oxide, e.g. titanates] [C9807]
C04B14/30K	. . .	[N: Zirconium oxide (zircon <a href="#">C04B14/04K</a> )] [C0205]
C04B14/30L	. . .	[N: Chromium oxide]
C04B14/30N	. . .	[N: Iron oxide]
C04B14/30S	. . .	[N: Copper oxide or solid solutions thereof]
C04B14/32	. .	Carbides; Nitrides; Borides; [N: Silicides] [C0012]
C04B14/32B	. . .	[N: Borides]
C04B14/32C	. . .	[N: Carbides]
C04B14/32C2	. . . .	[N: Boron carbide]

- C04B14/32C4 . . . . [N: Silicon carbide]
- C04B14/32N . . . . [N: Nitrides]
- C04B14/32N2 . . . . [N: Aluminium nitride]
- C04B14/32N4 . . . . [N: Boron nitride]
- C04B14/32N6 . . . . [N: Silicon nitride]
- C04B14/34 . . Metals, [N: e.g. ferro-silicon]
- C04B14/36 . . Inorganic materials not provided for in groups [N: [C04B14/02B](#) and] [C04B14/04](#) to [C04B14/34](#)
- C04B14/36B . . . . [N: Soil, e.g. laterite]
- C04B14/36F . . . . [N: Ferrites]
- C04B14/36G . . . . [N: Gypsum (synthetic gypsum [C04B18/04J](#), [C04B18/06D2](#))]
- C04B14/36P . . . . [N: Phosphates, e.g. apatite] [N0308]
- C04B14/36S . . . . [N: Baryte] [N0810]
  
- C04B14/38 . . Fibrous materials; Whiskers
- C04B14/38A . . . . [N: Whiskers] [N0205]
- C04B14/38B . . . . [N: Carbon (carbon nanotubes [C04B14/02B10](#))] [C0310]
- C04B14/40 . . Asbestos
- C04B14/40W . . . . [N: Waste asbestos]
- C04B14/42 . . Glass
- C04B14/44 . . . . Treatment for enhancing alkali resistance [N: composition of alkali resistant glass fibres [C03C13/00](#); coating of glass fibres [C03C25/10](#)]
- C04B14/46 . . Rock wool; [N: Ceramic or silicate fibres ([C04B14/40](#), [C04B14/42](#) take precedence)]
- C04B14/46A . . . . [N: added as organic or organo-mineral precursors] [N0308]
- C04B14/46B . . . . [N: Al-borates] [N0806]
- C04B14/46D . . . . [N: Oxides]
- C04B14/46D2 . . . . . [N: Alumina]
- C04B14/46D4 . . . . . [N: Silica]
- C04B14/46G . . . . [N: Zirconia or zircon]
- C04B14/46H . . . . [N: Silicates other than zircon] [C9411]
- C04B14/46H2 . . . . . [N: Ca-silicate, e.g. wollastonite]
- C04B14/46H4 . . . . . [N: Al-silicates, e.g. clay]
- C04B14/46H6 . . . . . [N: Polysilicates, e.g. geopolymers] [N0805]
- C04B14/46H8 . . . . . [N: of vulcanic origin]
- C04B14/46H10 . . . . . [N: from slags]
- C04B14/46K . . . . [N: Titanates]
- C04B14/46R . . . . [N: Non-oxide ceramics (carbon or graphite fibres [C04B14/38B](#))] [C9810]
- C04B14/46R4 . . . . [N: Silicon carbide]
- C04B14/48 . . Metal
  
- C04B16/00** . . . . **Use of organic materials as fillers, e.g. pigments, for mortars, concrete or artificial stone; Treatment of organic materials specially adapted to enhance their filling properties in mortars, concrete or artificial stone**

**[N: Note**

Fillers with a well-defined shape other than granular are considered to be reinforcing elements and thus are classified in [E04C5/00](#). However, if they are only characterised by their composition, classification is made in [C04B](#) only

]

- C04B16/02 . Cellulosic materials ([cellulosic waste materials](#), e.g. sawdust, rice husks, [C04B18/24](#))
- C04B16/04 . Macromolecular compounds ([C04B16/02](#) takes precedence)
- C04B16/06 . . fibrous
- C04B16/06B . . . [N: Fibrilles, e.g. fibrillated films]
- C04B16/06D . . . [N: from polymers obtained by reactions only involving carbon-to-carbon unsaturated bonds] [N9510]
- C04B16/06D2 . . . . [N: Polyalkenes, e.g. polyethylene] [N9510]
- C04B16/06D2B . . . . . [N: Polypropylene] [N9510]
- C04B16/06D4 . . . . . [N: Polyvinylalcohols; Polyvinylacetates] [N9510]
- C04B16/06D6 . . . . . [N: Polyacrylates; Polymethacrylates] [N9510]
- C04B16/06D6B . . . . . [N: Polyacrylonitrile] [N9510]
- C04B16/06D8 . . . . . [N: Polystyrene] [N9510]
- C04B16/06F . . . [N: from polymers obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds] [N9510]
- C04B16/06F4 . . . . [N: Polyesters, e.g. polylactides] [N9510]
- C04B16/06F6 . . . . [N: Polyamides; Polyaramides] [N9510]
- C04B16/08 . . porous, e.g. expanded polystyrene beads [N: or micro-balloons]
- C04B16/08A . . . [N: other than polystyrene based, e.g. polyurethane foam] [N9810]
- C04B16/08B . . . [N: expanded in situ, i.e. during or after mixing the mortar, concrete or artificial stone ingredients]
- C04B16/08S . . . [N: shredded]
- C04B16/10 . . Treatment for enhancing the mixability with the mortar [N: ([coating C04B20/10](#))]
- C04B16/12 . characterised by the shape ([fibrous macromolecular compounds C04B16/06](#); porous macromolecular compounds [C04B16/08](#)), [N: e.g. perforated strips]

**C04B18/00**

**Use of agglomerated or waste materials or refuse as fillers for mortars, concrete or artificial stone (use of waste materials for the manufacture of cement [C04B7/24](#)); Treatment of agglomerated or waste materials or refuse, specially adapted to enhance their filling properties in mortars, concrete or artificial stone**

**[N: Note**

Fillers with a well defined shape other than granular are considered to be reinforcing elements and thus are classified in [E04C5/00](#). However, if they are only characterised by their composition, classification is made in [C04B](#) only

]

- C04B18/02 . Agglomerated materials, [N: e.g. artificial aggregates] [C0607]
- C04B18/02B . . [N: agglomerated by a mineral binder, e.g. cement]

- C04B18/02D . . [N: agglomerated by an organic binder]
- C04B18/02F . . [N: Fired or melted materials ([C04B20/06](#) takes precedence)]
- C04B18/02F2 . . . [N: Grog]
- C04B18/02F4 . . . [N: Melted materials ([C04B14/22](#) takes precedence)] [C0001]
- C04B18/02L . . [N: Lightweight material ([C04B14/12](#) takes precedence)] [C9906]
- C04B18/02T . . [N: temporarily agglomerated, e.g. agglomerates which fall apart during mixing with the other mortar or concrete ingredients] [N0310]
  
- C04B18/04 . Waste materials; Refuse [N: ([C04B14/40W](#) takes precedence)]
- C04B18/04B . . [N: Waste from the purification of bauxite, e.g. red mud]
- C04B18/04C . . [N: Wet materials, e.g. slurries]
- C04B18/04D . . [N: Dry materials]
- C04B18/04H . . [N: Dredged harbour or river sludge (other slurries or sludges [C04B18/04C](#))] [C9803]
- C04B18/04J . . [N: Synthetic gypsum, e.g. phosphogypsum (gypsum from smoke purification [C04B18/06D2](#))]
- C04B18/04K . . [N: Bleaching earth]
- C04B18/04M . . [N: Hazardous waste] [C9411]
- C04B18/04M2 . . . [N: Waste material contaminated by heavy metals]
- C04B18/04Z . . [N: Other specific industrial waste materials not provided for elsewhere in [C04B18/00](#)] [C9411]
  
- C04B18/04Z10 . . . [N: Wastes from oil or other wells, e.g. drilling mud]
- C04B18/06 . . Combustion residues, e.g. purification products of smoke, fumes or exhaust gases
- C04B18/06B . . . [N: Ashes from fluidised bed furnaces]
- C04B18/06D . . . [N: Purification products of smoke, fume or exhaust-gases]
- C04B18/06D2 . . . . [N: Gypsum]
- C04B18/06G . . . [N: Residues from coal gasification]
- C04B18/06S . . . [N: Slags]
- C04B18/06W . . . [N: from burning wood] [N0105]
- C04B18/08 . . . Flue dust, [N: i.e. fly ash] [C9704]
- C04B18/08A . . . . [N: from brown coal or lignite] [N9706]
- C04B18/08B . . . . [N: Cenospheres]
- C04B18/08C . . . . [N: obtained from mixtures of pulverised coal and additives, added to influence the composition of the resulting flue dust] [N0107]
- C04B18/08D . . . . [N: Pelletizing]
- C04B18/08L . . . . [N: from liquid fuels, e.g. oil] [N0111]
- C04B18/08V . . . . [N: in high volume fly ash compositions] [N9903]
- C04B18/10 . . . Burned [N: or pyrolised] refuse
- C04B18/10B . . . . [N: Burned rice husks or other burned vegetable material]
- C04B18/10D . . . . [N: Burned or pyrolised sludges] [N9705]
- C04B18/10F . . . . [N: Gaseous combustion products or dusts collected from waste incineration, e.g. sludge resulting from the purification of gaseous combustion products of waste incineration]
  
- C04B18/10F2 . . . . . [N: Fly ash from waste incinerators] [C9704]
- C04B18/10M . . . . . [N: involving a melting step] [N9601]

- C04B18/12 . . . from quarries, mining or the like
- C04B18/12B . . . . [N: Slate residues, e.g. colliery shale or oil shale or oil shale ash]
- C04B18/14 . . . from metallurgical processes ([treatment of slag C04B5/00](#); for manufacture of cement [C04B7/14](#))
- C04B18/14B . . . . [N: Slags]
- C04B18/14B2 . . . . . [N: Steelmaking slags, converter slags]
- C04B18/14B2D . . . . . [N: L.D. slags, i.e. Linz-Donawitz slags]
- C04B18/14B4 . . . . . [N: Slags from the production of specific metals other than iron or of specific alloys, e.g. ferrochrome slags] [N9410] [C9510]
- C04B18/14B6 . . . . . [N: Phosphorus slags]
- C04B18/14F . . . . [N: Silica fume]
- C04B18/14F2 . . . . . [N: Conditioning]
- C04B18/14F2S . . . . . [N: Preparing silica fume slurries or suspensions] [C9811]
- C04B18/14H . . . . [N: other than silica fume or slag]
- C04B18/16 . . . from building or ceramic industry [N: ([separating plants for waste concrete slurry B03B9/06D2](#))] [C9702]
- C04B18/16B . . . . [N: Cement kiln dust; Lime kiln dust]
- C04B18/16C . . . . [N: Ceramic waste]
- C04B18/16R . . . . [N: Recycled material, i.e. waste material reused in the production of the same material]
- C04B18/18 . . . organic ([C04B18/10 takes precedence](#))
- C04B18/20 . . . . from macromolecular compounds [N: ([recycled expanded polystyrene C04B16/08](#))]
- C04B18/22 . . . . . Rubber [N: e.g. ground waste tires]
- C04B18/24 . . . . Vegetable refuse, e.g. rice husks, maize-ear refuse; Cellulosic materials, e.g. paper, [N: cork]
- C04B18/24B . . . . . [N: Paper, e.g. waste paper; Paper pulp] [C9411]
- C04B18/24B2 . . . . . [N: Waste from paper processing or recycling paper, e.g. de-inking sludge ([burned paper processing waste C04B18/10](#))] [N9411]
- C04B18/24D . . . . . [N: Cork; Bark]
- C04B18/24E . . . . . [N: expanded] [N9802]
- C04B18/24Z . . . . . [N: from specific plants, e.g. hemp fibres] [N9803]
- C04B18/26 . . . . . Wood, e.g. sawdust, wood shavings
- C04B18/26Z . . . . . [N: from specific species, e.g. birch] [N9803]
- C04B18/28 . . . . . Mineralising; Compositions therefor
- C04B18/30 . . . Mixed waste; Waste of undefined composition, ([C04B18/10 takes precedence](#))
- C04B18/30B . . . . [N: Municipal waste]

**C04B20/00** Use of materials as fillers for mortars, concrete or artificial stone according to more than one of groups [C04B14/00](#) to [C04B18/00](#) and characterised by shape or grain distribution; Treatment of materials according to more than one of the groups [C04B14/00](#) to [C04B18/00](#) specially adapted to enhance their filling properties in mortars, concrete or artificial stone; Expanding or defibrillating materials

[N: **Note**

Fillers with a well-defined shape other than granular are considered to be reinforcing

elements and thus are classified in [E04C5/00](#). However, if they are only characterised by their composition, classification is made in [C04B](#) only  
]

- C04B20/00A . [N: Microcomposites or nanocomposites, e.g. composite particles obtained by polymerising monomers onto inorganic materials] [N0105]
- C04B20/00B . [N: Materials specified by a shape not covered by [C04B20/00D](#) to [C04B20/00F4](#), e.g. nanotubes] [C0310]
- C04B20/00B2 . . [N: Irregular shaped fillers] [N0705]
- C04B20/00D . [N: Granular materials, e.g. micro-balloons]
- C04B20/00D2 . . [N: Hollow or porous granular materials]
- C04B20/00D2B . . . [N: expanded in situ, i.e. the material is expanded or made hollow after primary shaping of the mortar, concrete or artificial stone mixture ([C04B16/08B](#) takes precedence)]
- C04B20/00D2C . . . [N: crushable] [N0303]
- C04B20/00D2G . . . [N: characterised by the gas filling pores, e.g. inert gas or air at reduced pressure] [N0312]
- C04B20/00D2H . . . [N: Micro-sized or nano-sized] [N0005]
- C04B20/00D2M . . . [N: inorganic] [N0409]
- C04B20/00D10 . . [N: obtained from irregularly shaped particles] [N0303]
- C04B20/00F . [N: Fibrous materials]
- C04B20/00F2 . . [N: Mixtures of fibres of different physical characteristics, e.g. different lengths]
- C04B20/00F4 . . [N: Hollow or porous fibres] [C9803]
- C04B20/00F5 . . [N: Microfibres; Nanofibres] [N9811]
- C04B20/00F6 . . [N: Ground fibres]
- C04B20/00F8 . . [N: Composite fibres, e.g. fibres with a core and sheath of different material] [N0310]
- C04B20/00F10 . . [N: Continuous fibres] [N9503]
- C04B20/00H . [N: characterised by the grain distribution]
- C04B20/00H2 . . [N: Micro- or nanosized fillers, e.g. micronised fillers with particle size smaller than that of the hydraulic binder (*colloidal silica* [C04B14/06C](#); *silica fume* [C04B18/14F](#))] [C0312]
- C04B20/00H2S . . . [N: Conditioning, e.g. preparing suspensions thereof ([C04B18/14F2S](#) takes precedence)] [N0004] [C0105]
- C04B20/00H4 . . [N: Fillers with mono- or narrow grain size distribution] [N0304]
- C04B20/00H4B . . . [N: Fillers with fine grain sizes only] [N0503]
- C04B20/00H6 . . [N: Fillers with bimodal grain size distribution] [N0910]
- C04B20/02 . Treatment
- C04B20/02C . . [N: Chemical treatment] [N9412]
- C04B20/02M . . [N: Comminuting, e.g. by grinding or breaking; Defibrillating fibres other than asbestos] [C9909]

- C04B20/04 . . Heat treatment
- C04B20/06 . . . Expanding clay, perlite, vermiculite or like granular materials
- C04B20/06B . . . . [N: in rotary kilns]
- C04B20/06C . . . . [N: by grate sintering]
- C04B20/06D . . . . [N: in fluidised beds]
- C04B20/06F . . . . [N: in shaft or vertical furnaces]
- C04B20/06M . . . . [N: Selection of ingredients added before or during the thermal treatment, e.g. expansion promoting agents or particle-coating materials]
- C04B20/08 . . Defibrilating asbestos [N: (defibrillating other fibres [C04B20/02M](#))] [C9909]
  
- C04B20/10 . Coating or impregnating [N: (roofing granules [E04D7/00B](#))] [C9810]
- C04B20/10A . . [N: Non-compositional aspects of the coating or impregnation] [C9410]
- C04B20/10A2 . . . [N: Porous or lightweight coatings] [C0406]
- C04B20/10A4 . . . [N: Temporary coatings] [N9410]
- C04B20/10A6 . . . [N: Coating or impregnating materials characterised by the shape, e.g. fibrous materials] [N9410]
- C04B20/10B . . [N: with organic materials (pigments or dyes [C04B20/10P2](#))] [C9704]
- C04B20/10B2 . . . [N: Non-macromolecular compounds] [N9602]
- C04B20/10B2F . . . . [N: Fats; Fatty oils; Ester type waxes; Higher fatty acids; Derivatives thereof] [N9602]
- C04B20/10B4 . . . [N: Macromolecular compounds]
- C04B20/10B4D . . . . [N: obtained by reactions only involving carbon-to-carbon unsaturated bonds]
- C04B20/10B4F . . . . [N: obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds]
- C04B20/10B4G . . . . [N: Natural resins, e.g. tall oil] [N9707]
- C04B20/10B4H . . . . [N: Bituminous materials]
- C04B20/10B4K . . . . [N: Polysaccharides, e.g. cellulose, or derivatives thereof]
- C04B20/10D . . [N: Organo-metallic compounds; Organo-silicon compounds, e.g. bentone] [C9810]
- C04B20/10F . . [N: with inorganic materials]
- C04B20/10F1 . . . [N: Pigments or precursors thereof]
- C04B20/10F2 . . . [N: Metals]
- C04B20/10F4 . . . [N: Oxides, Hydroxides]
- C04B20/10F6 . . . [N: Acids or salts thereof]
- C04B20/10F8 . . . [N: Silicates, e.g. glass] [C9707]
- C04B20/10F10 . . . [N: Cements, e.g. waterglass]
- C04B20/10F10G . . . . [N: Mineral polymers, e.g. geopolymers] [N1110]
- C04B20/10F10W . . . . [N: Waterglass] [N9611]
- C04B20/10F20 . . . [N: Water]
- C04B20/10P . . [N: with pigments or dyes ([C04B20/10F1](#) takes precedence)] [N9704]
- C04B20/10P2 . . . [N: organic] [N9704]
- C04B20/12 . . Multiple coating or impregnating
- C04B20/12A . . . [N: Multiple coatings, for one of the coatings of which at least one alternative is described] [N9803]

- C04B20/12B . . . [N: Multiple coatings, comprising a coating layer of the same material as a previous coating layer] [N1109]

**Guide heading:** **Use of materials as active ingredients**

**Note**

Active ingredients which react with cement compounds for forming new or modified mineralogical phases and are added before the hardening process, as well as cements added as additives to other cements, are classified in groups [C04B7/00](#) to [C04B12/00](#), e.g. in group [C04B7/42](#).

**C04B22/00** **Use of inorganic materials as active ingredients for mortars, concrete or artificial stone, e.g. accelerators, [N: shrink compensating agents] [C9410]**

- C04B22/00B . [N: Waste inorganic materials]
- C04B22/00D . [N: Boron compounds]
- C04B22/00H . [N: Water]
- C04B22/00H2 . . [N: Salt water, e.g. seawater]
- C04B22/00H2M . . . [N: other than sea water, e.g. from mining activities] [N9706]
- C04B22/00H4 . . [N: containing dissolved additives or active agents, i.e. aqueous solutions used as gauging water ([C04B22/00H2](#) takes precedence)] [N9710]
- C04B22/00H6 . . [N: Waste slurries or solutions used as gauging water] [N0406]
- C04B22/00H10 . . [N: added in a particular physical form, e.g. atomised or in the gas phase] [N9710]
- C04B22/00H20 . . [N: released by a chemical reaction, e.g. polymer condensation] [N9902]
- C04B22/00K . [N: Compounds chosen for their high crystalwater content]
- C04B22/00K2 . . [N: added in the non-hydrated or only partially-hydrated form] [N0004]
- C04B22/00L . [N: Cement and like inorganic materials added as expanding or shrinkage compensating ingredients in mortar or concrete compositions, the expansion being the result of a recrystallisation (**mixtures of cements** [C04B7/00](#), [C04B28/00](#))]
- C04B22/00N . [N: Seeding materials]
- C04B22/00R . [N: Aluminates]
- C04B22/02 . Elements
- C04B22/04 . . Metals, e.g. aluminium used as blowing agent
- C04B22/06 . Oxides, Hydroxides ([C04B22/00D](#) takes precedence)
- C04B22/06B . . [N: of the alkali or alkaline-earth metals]
- C04B22/06B6 . . . [N: of the alkaline-earth metals]
- C04B22/06D . . [N: Magnesia; Magnesium hydroxide]
- C04B22/06H . . [N: Peroxides, e.g. hydrogen peroxide]
- C04B22/08 . Acids or salts thereof [N: [C04B22/00D](#) takes precedence]
- C04B22/08A . . [N: Acids]

- C04B22/08B . . [N: containing nitrogen in the anion, e.g. nitrites]
- C04B22/08C . . [N: containing chromium in the anion, e.g. chromates]
- C04B22/10 . . containing carbon in the anion
- C04B22/10A . . . [N: Acids]
- C04B22/10B . . . [N: Bicarbonates]
- C04B22/12 . . containing halogen in the anion
- C04B22/12A . . . [N: Acids]
- C04B22/12B . . . [N: Chlorides of ammonium or of the alkali or alkaline earth metals, e.g. calcium chloride] [C9706]
- C04B22/12G . . . [N: Fluorine compounds, e.g. silico-fluorine compounds] [C9704]
- C04B22/12H . . . [N: Bromine compounds]
- C04B22/14 . . containing sulfur in the anion, e.g. sulfides
- C04B22/14A . . . [N: Acids]
- C04B22/14G . . . [N: Sulfates]
- C04B22/14G2 . . . . [N: Calcium-sulfate]
- C04B22/14G2B . . . . . [N: Phosphogypsum]
- C04B22/14G2D . . . . . [N: Gypsum from the desulfuration of flue gases]
- C04B22/14G2G . . . . . [N: other waste Ca-sulfate]
- C04B22/14G4 . . . . [N: Alkali-metal sulfates; Ammonium sulfate] [C9704]
- C04B22/14G6 . . . . [N: Aluminium-sulfate]
- C04B22/14G8 . . . . [N: Iron-sulfates] [N9802]
- C04B22/16 . . containing phosphorus in the anion, e.g. phosphates
- C04B22/16A . . . [N: Acids]

**C04B24/00 Use of organic materials as active ingredients for mortars, concrete or artificial stone, e.g. plasticisers**

[N: **Note**

Groups [C04B24/00D](#) to [C04B24/00G](#) take precedence over groups [C04B24/00H](#) to [C04B24/22N](#)

]

- C04B24/00B . [N: Waste organic materials]
- C04B24/00D . [N: Phosphorus-containing compounds]
- C04B24/00F . [N: Halogen-containing compounds]
- C04B24/00G . [N: Boron-containing compounds]
- C04B24/00H . [N: Aldehydes, ketones]
- C04B24/02 . Alcohols; Phenols; Ethers
- C04B24/02B . . [N: Ethers]
- C04B24/02F . . [N: Fatty alcohols]
- C04B24/04 . Carboxylic acids; Salts, anhydrides or esters thereof

- C04B24/04B . . [N: Esters, e.g. lactones] [C9706]
- C04B24/06 . . containing hydroxy groups
- C04B24/08 . Fats; Fatty oils; Ester type waxes; Higher fatty acids, i.e. having at least seven carbon atoms in an unbroken chain bound to a carboxyl group; Oxidised oils or fats
- C04B24/08B . . [N: Higher fatty acids]
- C04B24/10 . Carbohydrates or derivatives thereof
- C04B24/12 . Nitrogen containing compounds [N: organic derivatives of hydrazine (**hydrazine** [C04B22/00](#))]
- C04B24/12B . . [N: Amines, polyamines]
- C04B24/12D . . [N: Hydroxy amines]
- C04B24/12F . . [N: Amino-carboxylic acids]
- C04B24/12H . . [N: Amides]
- C04B24/12K . . [N: Compounds containing one or more carbon-to-nitrogen double or triple bonds, e.g. imines]
- C04B24/12L . . [N: Urea]
- C04B24/12M . . [N: Nitro-compounds]
- C04B24/12N . . [N: Heterocyclic nitrogen compounds]
- C04B24/12P . . [N: Compounds containing one or more nitrogen-to-nitrogen double bonds, e.g. azo-compounds]
- C04B24/14 . . Peptides; Proteins; Derivatives thereof
- C04B24/16 . Sulfur-containing compounds
- C04B24/16P . . [N: Macromolecular compounds comprising sulfonate or sulfate groups] [N9603]
- C04B24/16P2 . . . [N: obtained by reactions only involving carbon-to-carbon unsaturated bonds] [N9603]
- C04B24/16P2A . . . . [N: containing polyether side chains] [N0702]
- C04B24/16P4 . . . [N: obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds] [N9603]
- C04B24/16P10 . . . [N: Polysaccharide derivatives, e.g. starch sulfate] [N9802]
- C04B24/18 . . Lignin sulfonic acid or derivatives thereof, e.g. sulfite lye
- C04B24/20 . . Sulfonated aromatic compounds
- C04B24/22 . . . Condensation [N: or polymerisation] products thereof [C9603]
- [N: **Note**
- In this group the following term is used with the meaning indicated:
- "aldehydes" also covers other organic compounds reacting as aldehydes, e.g. glyoxylic acid
- ]
- C04B24/22M . . . . [N: Sulfonated melamine-formaldehyde condensation products]
- C04B24/22N . . . . [N: Sulfonated naphthalene-formaldehyde condensation products]
- C04B24/24 . Macromolecular compounds ([C04B24/14](#) takes precedence; macromolecular compounds comprising sulfonate or sulfate groups [C04B24/16](#))
- C04B24/24D . . [N: Phosphorus-containing polymers] [N9412]
- C04B24/24D10 . . . [N: containing polyether side chains] [N0702]

- C04B24/26 . . . obtained by reactions only involving carbon-to-carbon unsaturated bonds [N: (C04B24/24D takes precedence)] [C9603]
- C04B24/26A . . . [N: containing polyether side chains] [N0609]
- C04B24/26C . . . [N: Polyalkenes]
- C04B24/26D . . . [N: Coumarone polymers]
- C04B24/26F . . . [N: Polyvinylalcohols; Polyvinylacetates]
- C04B24/26F10 . . . [N: containing polyether side chains][N0410]
- C04B24/26H . . . [N: Polyvinylacetals]
- C04B24/26K . . . [N: Polyacrylates; Polymethacrylates]
- C04B24/26K10 . . . [N: containing polyether side chains][N04]
- C04B24/26N . . . [N: Nitrogen containing polymers, e.g. polyacrylamides, polyacrylonitriles]
- C04B24/26N10 . . . [N: containing polyether side chains][N0410]
- C04B24/26R . . . [N: of ethylenically unsaturated dicarboxylic acid polymers, e.g. maleic anhydride copolymers] [C9704]
- C04B24/26R10 . . . [N: containing polyether side chains][N0410]
- C04B24/26S . . . [N: Polystyrenes]
- C04B24/26T . . . [N: Halogen containing polymers, e.g. PVC]
- C04B24/26V . . . [N: Copolymers containing at least three different monomers]
- C04B24/26V10 . . . [N: containing polyether side chains] [N0503]
- C04B24/28 . . . obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds [N: (C04B24/24D takes precedence)] [C9603]
- C04B24/28D . . . [N: Polyepoxides]
- C04B24/28G . . . [N: Polyurethanes; Polyisocyanates]
- C04B24/28K . . . [N: Polyesters]
- C04B24/28K2 . . . [N: Polylactides] [N0910]
- C04B24/28M . . . [N: Polycarbonates]
- C04B24/28P . . . [N: Polyamides]
- C04B24/28T . . . [N: Halogen containing polymers] [N0308]
- C04B24/30 . . . Condensation polymers of aldehydes or ketones
- [N: **Note**  
In this group the following term is used with the meaning indicated:  
- "aldehydes" also covers other organic compounds reacting as aldehydes, e.g. glyoxylic acid  
]
- C04B24/30B . . . [N: Phenol-formaldehyde condensation polymers]
- C04B24/30D . . . [N: Melamine-formaldehyde condensation polymers]
- C04B24/30F . . . [N: Urea-formaldehyde condensation polymers]
- C04B24/32 . . . Polyethers, e.g. alkylphenol polyglycolether
- C04B24/34 . . . Natural resins, e.g. rosin [N: (C04B24/24D takes precedence)] [C9603]
- C04B24/36 . . . Bituminous materials, e.g. tar, pitch [N: (C04B24/24D takes precedence)] [C9603]
- C04B24/38 . . . Polysaccharides or derivatives thereof [N: (C04B24/24D takes precedence)] [C9603]
- C04B24/38B . . . [N: Cellulose or derivatives thereof]
- C04B24/38B10 . . . [N: containing polyether side chains] [N0810]

- C04B24/40 . Compounds containing silicon, titanium or zirconium [N: or other organo-metallic compounds; Organo-clays; Organo-inorganic complexes] [C9810]
- C04B24/40C . . [N: Organo-inorganic complexes] [N9810]
- C04B24/42 . . Organo-silicon compounds
- C04B24/42C . . . [N: Organo-modified inorganic compounds, e.g. organo-clays] [C9710]

**Guide heading:** **Compositions of mortars, concrete or artificial stone** ([artificial stone from molten slag C04B5/00](#))

**C04B26/00** **Compositions of mortars, concrete or artificial stone, containing only organic binders, [N: e.g. polymer or resin concrete (mechanical aspects moulding polymer or resin concrete B29C67/24C)] [C9603]**

- C04B26/00B . [N: Oil-based binders, e.g. containing linseed oil] [C9710]
- C04B26/00W . [N: Waste materials as binder] [N9410]
- C04B26/02 . Macromolecular compounds
- C04B26/02A . . [N: Organic ionomer cements] [N9803]
- C04B26/02B . . [N: Proteins or derivatives thereof]
- C04B26/04 . . obtained by reactions only involving carbon-to-carbon unsaturated bonds
- C04B26/04B . . . [N: Polyalkenes]
- C04B26/06 . . . Acrylates
- C04B26/08 . . . containing halogen
- C04B26/10 . . obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds
- C04B26/10F . . . [N: Furfuryl alcohol polymers, e.g. furan-polymers]
- C04B26/12 . . . Condensation polymers of aldehydes or ketones

**[N: Note**

In this group the following term is used with the meaning indicated:

- "aldehydes" also covers other organic compounds reacting as aldehydes, e.g. glyoxylic acid

]

- C04B26/12B . . . . [N: Phenol-formaldehyde condensation polymers]
- C04B26/12D . . . . [N: Melamine-formaldehyde condensation polymers]
- C04B26/12F . . . . [N: Urea formaldehyde condensation polymers]
- C04B26/14 . . . Polyepoxides
- C04B26/16 . . . Polyurethanes
- C04B26/18 . . . Polyesters; Polycarbonates
- C04B26/20 . . . Polyamides
- C04B26/22 . . Natural resins, e.g. rosin
- C04B26/24 . . . Cellulosic waste liquor, e.g. sulfite lye
- C04B26/26 . . Bituminous materials, e.g. tar, pitch [N: [C08L95/00](#) takes precedence]
- C04B26/28 . . Polysaccharides or derivatives thereof

- C04B26/28B . . . [N: Cellulose or derivatives thereof, e.g. starch ([C04B26/24](#) takes precedence)]
- C04B26/30 . Compounds having one or more carbon-to-metal or carbon-to-silicon linkages; [N: Other silicon-containing organic compounds; Boron-organic compounds] [[C9802](#)]
- C04B26/32 . . containing silicon
  
- C04B28/00** **Compositions of mortars, concrete or artificial stone, containing inorganic binders or the reaction product of an inorganic and an organic binder, e.g. polycarboxylate cements**
- [N: **Note**  
While using Combination Sets in this main group, the presence of an organic binder is indicated with symbols chosen from group [C04B24/00](#), and the presence of a supplementary inorganic binder with symbols chosen from groups [C04B7/00](#) to [C04B12/00](#)  
]
- C04B28/00B . [N: containing unburned clay (polymer binder - clay mixtures used in well cementing [C09K8/44](#))] [[C1109](#)]
- C04B28/00D . [N: containing hybrid binders other than those of the polycarboxylate type]
- C04B28/00F . [N: containing gelatinous or gel forming binders, e.g. gelatinous Al(OH)<sub>3</sub>, sol-gel binders] [[C0203](#)]
- C04B28/00G . [N: containing mineral polymers, e.g. geopolymers of the Davidovits type]
- C04B28/00G2 . . [N: Mineral polymers other than those of the Davidovits type, e.g. from a reaction mixture containing waterglass]
- C04B28/02 . containing hydraulic cements other than calcium sulfates
- C04B28/02A . . [N: Ash cements, e.g. fly ash cements (fly ash as filler [C04B18/08](#)); Cements based on incineration residues, e.g. alkali-activated slags from waste incineration (alkali-activated combustion residues as such [C04B7/24A](#); mixtures of the lime-pozzuolane type [C04B28/18](#)); Kiln dust cements] [[C0203](#)]
- C04B28/02B . . [N: Barium cements]
- C04B28/02D . . [N: Belite cements]
- C04B28/02H . . [N: Oil shale cements]
- C04B28/02N . . [N: Alinite cements, i.e. "Nudelman"-type cements]
- C04B28/04 . . Portland cements
- C04B28/06 . . Aluminous cements (monolithic refractories or refractory mortars [C04B35/66](#))
- C04B28/06B . . . [N: Calcium aluminosulfate cements, e.g. cements hydrating into ettringite]
- C04B28/08 . . Slag cements
- C04B28/08B . . . [N: Steelmaking slags; Converter slags] [[N9410](#)]
- C04B28/08D . . . [N: Slags from the production of specific alloys, e.g. ferrochrome slags] [[N9410](#)]
- C04B28/08P . . . [N: Phosphorus slags] [[N9410](#)]
- C04B28/10 . . Lime cements or magnesium oxide cements
- C04B28/10M . . . [N: Magnesium oxide or magnesium carbonate cements]
- C04B28/12 . . . Hydraulic lime
- C04B28/14 . containing calcium sulfate cements [N: gypsum-paper plates [E04C](#)]

- C04B28/14B . . [N: containing dihydrated gypsum before the final hardening step, e.g. forming a dihydrated gypsum product followed by a de- and rehydration step]
- C04B28/14F . . [N: containing synthetic or waste calcium sulfate cements] [C9710]
- C04B28/14F2 . . . [N: the synthetic calcium sulfate being phosphogypsum]
- C04B28/14F4 . . . [N: the synthetic calcium sulfate being a flue gas desulfurization product]
- C04B28/14H . . [N: Calcium sulfate hemi-hydrate with a specific crystal form]
- C04B28/14H2 . . . [N: alpha-hemihydrate]
- C04B28/14H4 . . . [N: beta-hemihydrate]
- C04B28/14S . . [N: containing calcium sulfate formed in situ, e.g. by the reaction of iron sulfate with lime]
- C04B28/16 . . containing anhydrite, [N: e.g. Keene`s cement]
- C04B28/16F . . . [N: containing synthetic anhydrite]
- C04B28/18 . containing mixtures of the silica-lime type
- C04B28/18A . . [N: based on calcium silicate forming mixtures not containing lime or lime producing ingredients, e.g. waterglass based mixtures heated with a calcium salt] [N9603]
- C04B28/18B . . [N: based on an oxide other than lime]
- C04B28/18C . . [N: containing formed Ca-silicates before the final hardening step]
- C04B28/18C2 . . . [N: the Ca-silicates being present in the starting mixture]
- C04B28/20 . . Sand-lime  
  - [N: **WARNING**
  - [N0503] Group [C04B28/20](#) is not complete, see also [C04B28/18](#)
  - ]
- C04B28/22 . . Lime and pozzuolanas  
  - [N: **WARNING**
  - [N0503] Group [C04B28/22](#) and subgroup are not complete, see also [C04B28/18](#)
  - ]
- C04B28/22B . . . [N: artificial pozzuolanas]
- C04B28/24 . containing alkyl, ammonium or metal silicates; containing silica sols [N: (reaction mixtures resulting in mineral polymers [C04B28/00G](#); polymeric reaction products of alkali metal silicates with isocyanates [C08G18/38N2](#))] [C9501]
- C04B28/26 . . Silicates of the alkali metals
- C04B28/28 . containing organic polyacids, e.g. polycarboxylate cements, [N: i.e. ionomeric systems] [C9412]
- C04B28/30 . containing magnesium cements [N: or similar cements] (magnesium oxide cements [C04B28/10](#))
- C04B28/32 . . Magnesium oxychloride cements, e.g. Sorel cement
- C04B28/34 . containing cold phosphate binders [C1009]  
  - [N: **Notes** [N1010]
  - While using Combination Sets in this main group, the presence of a reactive or reacted oxide is indicated with symbols chosen from [C04B14/06](#) and [C04B14/30](#) (and subgroups), except for boron oxide ([C04B22/00D](#)) and oxides of the alkali or

alkaline-earth metals, with the exception of magnesium ([C04B22/06B](#) and [C04B22/06B6](#)), e.g. a composition containing a mixture of phosphoric acid, AlCr phosphate and magnesium oxide will be classified in [C04B28/34K](#) and will be indexed with codes [C04B14/30B](#), [C04B14/30D](#) and [C04B14/30L](#). "Phosphates" includes monobasic and dibasic phosphates  
]

- C04B28/34A . . [N: the phosphate binder being present in the starting composition as a mixture of free acid and one or more reactive oxides]
- C04B28/34H . . [N: the phosphate binder being present in the starting composition solely as one or more phosphates]
- C04B28/34K . . [N: the phosphate binder being present in the starting composition as a mixture of free acid and one or more phosphates]
- C04B28/34K2 . . . [N: the starting mixture also containing one or more reactive oxides]
- C04B28/36 . containing sulfur, sulfides or selenium
- C04B28/36D . . [N: containing sulfides or selenium]

#### **C04B30/00 Compositions for artificial stone, not containing binders**

- C04B30/02 . containing fibrous materials

#### **C04B32/00 Artificial stone not provided for in other groups of this subclass**

- C04B32/00B . [N: Artificial stone obtained by melting at least part of the composition, e.g. metal ([C04B28/36](#) and [C03C](#) take precedence) (cast stone from molten slag [C04B5/00](#); artificial stone obtained by melting the polymeric ingredient of the composition [C04B26/00](#))] [C9508]
- C04B32/02 . with reinforcements [N: (contains no documents; reinforcing elements [E04C5/00](#))]

[N: **Note**  
This group is only used for indexing purposes  
]

#### **Guide heading: Ceramics**

#### **C04B33/00 Clay-wares (monolithic refractories or refractory mortars [C04B35/66](#); porous products [C04B38/00](#))**

[N: **Note** [C0810]

In groups [C04B33/00](#) to [C04B33/36](#), from 01-10-2008 onwards, the indexing codes of groups [M04B235/00](#) to [M04B235/96J](#) are used (with the exception of [M04B235/34H](#), [M04B235/602N](#), [M04B235/604](#) and [M04B235/96J10](#)) to identify aspects relating to ceramic starting mixtures and sintered ceramic products  
]

- C04B33/02 . Preparing or treating the raw materials individually or as batches
- C04B33/02H . . [N: Mixtures of materials with different sizes] [N1102]

- C04B33/04 . . . clay; kaolin
- C04B33/06 . . . Rendering lime harmless
- C04B33/08 . . . . Preventing efflorescence
- C04B33/10 . . . Eliminating iron or lime
- C04B33/13 . . . Compounding ingredients ([C04B33/36](#), [C04B35/71](#) take precedence; [N: pigments for ceramics [C09C1/00D](#)]) [[C9903](#)]
- C04B33/13B . . . . [N: Organic additives] [[N1102](#)]
- C04B33/13D . . . . [N: Inorganic additives] [[N1102](#)]
- C04B33/13L . . . . [N: Non-ceramic binders] [[N1102](#)]
- C04B33/132 . . . . Waste materials; Refuse; [N: Residues] ([C04B33/16](#) takes precedence; [N: waste glass [C04B33/13](#)]) [[N0807](#)]
- C04B33/132B . . . . . [N: Waste slurries, e.g. harbour sludge, industrial muds (slurries of specific well-defined waste streams, e.g. phosphate muds, other than red mud, [C04B33/132](#))] [[N0807](#)]
- C04B33/132B2 . . . . . [N: Red mud] [[N0807](#)]
- C04B33/132D . . . . . [N: Recycled material, e.g. tile dust, stone waste, spent refractory material] [[N0807](#)]
- C04B33/132K . . . . . [N: Hazardous waste other than combustion residues (dredging sludge [C04B33/132B](#))] [[N0807](#)]
- C04B33/132K2 . . . . . [N: containing heavy metals]
- C04B33/132P . . . . . [N: without additional clay] [[N0807](#)]
- C04B33/135 . . . . . Combustion residues, e.g fly ash, incineration waste [N: (silica fume [C04B33/132](#))] [[N0807](#)]
- C04B33/135B . . . . . [N: Fuel ashes, e.g. fly ash] [[N0807](#)]
- C04B33/135D . . . . . [N: Incineration residues] [[N0807](#)]
- C04B33/135D2 . . . . . [N: Sewage sludge ash or slag] [[N0807](#)]
- C04B33/138 . . . . . from metallurgical processes, e.g. slag, furnace dust, galvanic waste [[N0807](#)]
- C04B33/14 . . . . Colouring matters
- C04B33/16 . . . . Lean materials, e.g. grog, quartz
- C04B33/18 . . . . for liquefying the batches
- C04B33/20 . . . for dry-pressing ([C04B33/13](#) takes precedence)
- C04B33/22 . . . Grog products
- C04B33/24 . . . Manufacture of porcelain or white ware
- C04B33/26 . . . of porcelain for electrical insulation
- C04B33/28 . . . Slip casting ([mechanical features \[B28B1/26\]\(#\)](#))
- C04B33/30 . . . Drying methods
- C04B33/32 . . . Burning methods
- C04B33/32M . . . . [N: involving melting, fusion or softening] [[N0810](#)]
- C04B33/32P . . . . [N: under pressure] [[N0810](#)]
- C04B33/34 . . . combined with glazing
- C04B33/36 . . . Reinforced clay-wares

**C04B35/00**

**Shaped ceramic products characterised by their composition** [N: (porous ceramic products [C04B38/00](#); ceramic articles characterised by particular shape, see the relevant classes, e.g. linings for casting ladles, tundishes, cups or the like [B22D41/02](#); ceramic substrates for microelectronic semi-conductors [H01L23/15](#)); **Ceramics compositions** <explanation>containing free metal bonded to carbides, diamond, oxides, borides, nitrides, silicides, e.g. cermets, or other metal compounds, e.g. oxynitrides or sulfides other than as macroscopic reinforcing agents [C22C](#); [N: [shaping of ceramics B28B](#)]</explanation>; **Processing powders of inorganic compounds preparatory to the manufacturing of ceramic products** [N: (Chemical preparation of powders of inorganic compounds [C01](#); infiltration of sintered ceramic preforms with molten metal [C04B41/51](#))] [[C0807](#)]

[N: **WARNING** [[C0808](#)]

Attention is drawn to WARNINGS 3 and 4 after subclass title

]

**Notes**

1. In this group, in the absence of an indication to the contrary, compositions are classified according to the constituent present in the highest proportion by weight.
2. In this group, magnesium is considered as an alkaline earth metal.
3. In this group, a composite is considered as a sintered material containing more than one phase, where the secondary phases are not resulting from sintering aids
4. In this group, fine ceramics are considered as products having a polycrystalline, fine-grained microstructure, e.g. of dimensions below 100 micrometers.
5. The production of ceramic powder is classified in this group in so far as it relates to the preparation of powder with specific characteristics.

[N: **Notes** [[C0811](#)]

1. In groups [C04B35/00](#) to [C04B35/83](#), from 01-01-2005 onwards, the indexing codes of groups [M04B235/00](#) to [M04B235/96M6](#) are used to identify aspects relating to ceramic starting mixtures and sintered ceramic products

2.

]

- [C04B35/01](#) . based on oxide ceramics
- [C04B35/01B](#) . . [N: containing carbon ([C04B35/103](#) takes precedence)] [[N9411](#)] [[C0807](#)]
- [C04B35/01M](#) . . [N: based on manganites]
- [C04B35/03](#) . . based on magnesium oxide, calcium oxide or oxide mixtures derived from dolomite
- [C04B35/04](#) . . . based on magnesium oxide
- [C04B35/043](#) . . . . Refractories from grain sized mixtures
- [C04B35/043B](#) . . . . . [N: containing refractory metal compounds other than chromium oxide or chrome ore]
- [C04B35/047](#) . . . . . containing chromium oxide or chrome ore
- [C04B35/047D](#) . . . . . . [N: obtained from fused grains]
- [C04B35/047F](#) . . . . . . [N: obtained from prereacted sintered grains ("simultaneous sinter")]
- [C04B35/05](#) . . . . Refractories by fusion casting

C04B35/05B	. . . . .	[N: containing chromium oxide or chrome ore]
C04B35/053	. . . . .	Fine ceramics
C04B35/057	. . . . .	based on calcium oxide
C04B35/06	. . . . .	based on oxide mixtures derived from dolomite
C04B35/08	. . . . .	based on beryllium oxide
C04B35/10	. . . . .	based on aluminium oxide
C04B35/101	. . . . .	Refractories from grain sized mixtures
C04B35/101B	. . . . .	[N: containing refractory metal compounds other than those covered by <a href="#">C04B35/103</a> to <a href="#">C04B35/106</a> ]
C04B35/103	. . . . .	containing non-oxide refractory materials, e.g. carbon ( <a href="#">C04B35/106</a> takes precedence)
C04B35/105	. . . . .	containing chromium oxide or chrome ore
C04B35/106	. . . . .	containing zirconium oxide or zircon (ZrSiO <sub>4</sub> )
C04B35/107	. . . . .	Refractories by fusion casting
C04B35/109	. . . . .	containing zirconium oxide or zircon (ZrSiO <sub>4</sub> )
C04B35/111	. . . . .	Fine ceramics
C04B35/111B	. . . . .	[N: Minute sintered entities, e.g. sintered abrasive grains or shaped particles such as platelets ( <a href="#">abrasives C09K3/14</a> )]
C04B35/113	. . . . .	based on beta-aluminium oxide
C04B35/115	. . . . .	Translucent or transparent products
C04B35/117	. . . . .	Composites
C04B35/119	. . . . .	with zirconium oxide
C04B35/12	. . . . .	based on chromium oxide ( <a href="#">C04B35/047</a> and <a href="#">C04B35/105</a> take precedence)
C04B35/14	. . . . .	based on silica
C04B35/16	. . . . .	based on silicates other than clay [N: (zircon <a href="#">C04B35/48</a> )]
C04B35/18	. . . . .	rich in aluminium oxide
C04B35/185	. . . . .	Mullite [N: $3Al_2O_3-2SiO_2$ ]
C04B35/19	. . . . .	Alkali metal aluminosilicates, e.g. spodumene
C04B35/195	. . . . .	Alkaline earth aluminosilicates, e.g. cordierite [N: or anorthite] [C0807]
C04B35/20	. . . . .	rich in magnesium oxide, [N: e.g. forsterite ( <a href="#">C04B35/195</a> takes precedence)] [C0807]
C04B35/22	. . . . .	rich in calcium oxide, [N: e.g. wollastonite ( <a href="#">C04B35/195</a> takes precedence)] [C0807]
C04B35/26	. . . . .	based on ferrites
C04B35/26B	. . . . .	[N: Compositions containing one or more ferrites of the group comprising manganese, zinc, nickel, copper or cobalt and one or more ferrites of the group comprising rare earth metals, alkali metals, alkaline earth metals or lead]
C04B35/26B2	. . . . .	[N: containing lithium]
C04B35/26B4	. . . . .	[N: containing magnesium]
C04B35/26B6	. . . . .	[N: containing barium, strontium or calcium]
C04B35/26D	. . . . .	[N: Compositions containing one or more ferrites of the group comprising rare earth metals and one or more ferrites of the group comprising alkali metals, alkaline earth metals or lead]
C04B35/26F	. . . . .	[N: Compositions containing one or more ferrites of the group comprising manganese or zinc and one or more ferrites of the group comprising nickel,

- copper or cobalt]
- C04B35/26H . . . [N: Other ferrites containing manganese or zinc, e.g. Mn-Zn ferrites] [C0807]
- C04B35/26K . . . [N: Other ferrites containing nickel, copper or cobalt]
- C04B35/26L . . . [N: Other ferrites containing rare earth metals, e.g. rare earth ferrite garnets] [C0807]
- C04B35/26M . . . [N: Other ferrites containing alkaline earth metals or lead]
- C04B35/26N . . . [N: Other ferrites containing alkaline metals]
- C04B35/42 . . based on chromites ([C04B35/047](#) and [C04B35/105](#) take precedence)
- C04B35/44 . . based on aluminates
- C04B35/443 . . . Magnesium aluminate spinel
- C04B35/447 . . based on phosphates, [N: e.g. hydroxyapatite] [C0807]
- C04B35/45 . . based on copper oxide or solid solutions thereof with other oxides
  
- [N: **Note** [C0807]  
In groups [C04B35/45D](#) to [C04B35/45L2](#) an invention is classified in the last appropriate place  
]
- C04B35/45D . . . [N: containing rare earth oxides]
- C04B35/45D2 . . . . [N: Type 1-2-3]
- C04B35/45H . . . [N: containing thallium oxide]
- C04B35/45H2 . . . . [N: also containing lead oxide]
- C04B35/45L . . . [N: containing bismuth oxide]
- C04B35/45L2 . . . . [N: also containing lead oxide]
- C04B35/453 . . based on zinc, tin, or bismuth oxides or solid solutions thereof with other oxides, e.g. zincates, stannates or bismuthates
- C04B35/457 . . . based on tin oxides or stannates
- C04B35/46 . . based on titanium oxide or titanates (containing also zirconium or hafnium oxides, zirconates or hafnates [C04B35/49](#))
- C04B35/462 . . . based on titanates
- C04B35/465 . . . . based on alkaline earth metal titanates
- C04B35/468 . . . . . based on barium titanates
- C04B35/468B . . . . . [N: based on BaTiO<sub>3</sub> perovskite phase] [N9606]
- C04B35/468B2 . . . . . {7 dots} [N: containing lead compounds ([C04B35/472](#) takes precedence)] [N9606]
- C04B35/468D . . . . . [N: based on phases other than BaTiO<sub>3</sub> perovskite phase] [N9606]
- C04B35/468D2 . . . . . {7 dots} [N: containing lead compounds ([C04B35/472](#) takes precedence)] [N9606]
- C04B35/47 . . . . . based on strontium titanates
- C04B35/472 . . . . . based on lead titanates
- C04B35/475 . . . . . based on bismuth titanates
- C04B35/478 . . . . . based on aluminium titanates
- C04B35/48 . . based on zirconium or hafnium oxides, zirconates, [N: zircon] or hafnates
- C04B35/48B . . . [N: containing silicon, e.g. zircon] [C0807]
- C04B35/482 . . . Refractories from grain sized mixtures
- C04B35/484 . . . Refractories by fusion casting

- C04B35/486 . . . Fine ceramics
- C04B35/488 . . . . Composites
- C04B35/488A . . . . . [N: with aluminium oxide] [N9912]
- C04B35/49 . . . containing also titanium oxides or titanates
- C04B35/491 . . . . based on lead zirconates and lead titanates, [N: e.g. PZT] [C0807]
- C04B35/493 . . . . . containing also other lead compounds
- C04B35/495 . . based on vanadium, niobium, tantalum, molybdenum or tungsten oxides or solid solutions thereof with other oxides, e.g. vanadates, niobates, tantalates, molybdates or tungstates
- C04B35/497 . . . based on solid solutions with lead oxides
- C04B35/499 . . . . containing also titanates
- C04B35/50 . based on rare-earth compounds [N: (non-oxide rare earth compounds [C04B35/515R](#))] [C1201]
- C04B35/505 . . based on yttrium oxide
- C04B35/51 . based on compounds of actinides ([N: non-oxide actinide compounds [C04B35/515T](#)]; nuclear fuel materials [G21C3/62](#)) [C1201]
- C04B35/515 . based on non-oxide ceramics
- C04B35/515H . . [N: based on halogenides other than fluorides]
- C04B35/515P . . [N: based on phosphides]
- C04B35/515R . . [N: based on rare earth compounds]
- C04B35/515T . . [N: based on actinide compounds]
- C04B35/52 . . based on carbon, e.g. graphite
- C04B35/52C . . . [N: obtained by impregnation of carbon products with a carbonisable material]
- C04B35/52G . . . [N: Graphite ([C04B35/536](#) takes precedence)] [N0302] [C0807]
- C04B35/524 . . . obtained from polymer precursors, e.g. glass-like carbon material
- C04B35/528 . . . obtained from carbonaceous particles with or without other non-organic components
- C04B35/532 . . . . containing a carbonisable binder
- C04B35/536 . . . based on expanded graphite [N: or complexed graphite]
- C04B35/547 . . based on sulfides or selenides [N: or tellurides] [C0807]
- C04B35/553 . . based on fluorides
- C04B35/56 . . based on carbides [N: or oxycarbides (containing free metal binder [C22C29/00](#))] [C0807]
- C04B35/56D . . . [N: with a well-defined oxygen content, e.g. oxycarbides] [N0807]
- C04B35/56H . . . [N: based on refractory metal carbides] [N0807]
- C04B35/56H2 . . . . [N: based on titanium carbides] [N0807]
- C04B35/56H2D . . . . . [N: based on titanium silicon carbides] [N0807]
- C04B35/56H2F . . . . . [N: based on titanium aluminium carbides] [N0807]
- C04B35/56H8 . . . . [N: based on zirconium or hafnium carbides] [N0807]
- C04B35/56H14 . . . . [N: based on tungsten carbides] [N0807]
- C04B35/563 . . . based on boron carbide
- C04B35/565 . . . based on silicon carbide

- C04B35/571 . . . . obtained from [N: Si-containing] polymer precursors [N: or organosilicon monomers] [C0905]
- C04B35/573 . . . . obtained by reaction sintering [N: or recrystallisation]
- C04B35/575 . . . . obtained by pressure sintering
- C04B35/575B . . . . . [N: obtained by gas pressure sintering]
- C04B35/58 . . based on borides, nitrides, [i.e. nitrides, oxynitrides, carbonitrides or oxycarbonitrides] or silicides [N: (containing free binder metal [C22C29/00](#))] [C0807]
- C04B35/58H . . . . [N: based on refractory metal nitrides] [N0807]
- C04B35/58H2 . . . . . [N: based on titanium nitrides, e.g. TiAlON] [N0807]
- C04B35/58H2C . . . . . [N: based on titanium carbonitrides] [N0807]
- C04B35/58H8 . . . . . [N: based on zirconium or hafnium nitrides] [N0807]
- C04B35/58H8C . . . . . [N: based on zirconium or hafnium carbonitrides] [N0807]
- C04B35/58K . . . . [N: based on iron group metals nitrides] [N0807]
- C04B35/58R . . . . [N: based on borides] [N0807]
- C04B35/58R14 . . . . . [N: based on magnesium boride, e.g. MgB2] [N0807]
- C04B35/58R28 . . . . . [N: based on refractory borides] [N0807]
- C04B35/58R28B . . . . . [N: based on titanium borides] [N0807]
- C04B35/58R28H . . . . . [N: based on zirconium or hafnium borides] [N0807]
- C04B35/58S . . . . [N: based on silicides] [N0807]
- C04B35/58S28 . . . . . [N: based on refractory metal silicides] [N0807]
- C04B35/581 . . . . based on aluminium nitride
- C04B35/583 . . . . based on boron nitride
- C04B35/5831 . . . . . based on cubic boron nitrides [N: or Wurtzitic boron nitrides, including crystal structure transformation of powder]
- C04B35/584 . . . . based on silicon nitride
- C04B35/587 . . . . . Fine ceramics
- C04B35/589 . . . . . obtained from [N: Si-containing] polymer precursors [N: or organosilicon monomers] [C0905]
- C04B35/591 . . . . . obtained by reaction sintering
- C04B35/593 . . . . . obtained by pressure sintering
- C04B35/593B . . . . . [N: obtained by gas pressure sintering]
- C04B35/597 . . . . based on silicon oxynitride, [N: e.g. SIALONS]
  
- C04B35/622 . Forming processes; Processing powders of inorganic compounds preparatory to the manufacturing of ceramic products
  - [N: **Note** [N0808]
  - In groups [C04B35/622](#) and subgroups indexing codes are given for aspects relating to the preparation, properties or mechanical treatment or to heat treatments of green bodies. The codes are chosen from [M04B235/60](#) to [M04B235/660P](#)
  - ]
- C04B35/622A . . . [N: using waste materials or refuse (clay-wares containing waste materials [C04B33/132](#))] [N9506] [C0807]
- C04B35/622A2 . . . . [N: using woody material, remaining in the ceramic products (to obtain porous material by burning out [C04B38/06](#))] [N0807]
- C04B35/622A4 . . . . [N: using rice material, e.g. bran or hulls or husks] [N0807]

- C04B35/622B . . [N: obtaining ceramic films, e.g. by using temporary supports] [N9411]
- C04B35/622C . . [N: obtaining ceramic coatings (coating of mortars, concrete, artificial or natural stone or ceramics [C04B41/45](#); laminated ceramic products [B32B18/00](#); coating metallic materials [C23](#); coating of glass [C03C17/00](#), applying ceramic coatings on silicon for semi-conductor purposes [H01L](#))] [N9411] [C0807]
- C04B35/622F . . [N: obtaining fibres] [C9411]
- C04B35/622F2 . . . [N: based on oxide ceramics]
- C04B35/622F2B . . . . [N: Fibres based on aluminium oxide]
- C04B35/622F2D . . . . [N: Fibres based on silica]
- C04B35/622F2D2 . . . . . [N: rich in aluminium oxide]
- C04B35/622F2F . . . . [N: Fibres based on zirconium oxide, e.g. zirconates such as PZT] [0807]
- C04B35/622F2H . . . . [N: Fibres based on copper oxide]
- C04B35/622F2J . . . . [N: Fibres based on titanium oxide]
- C04B35/622F2N . . . . [N: Fibres based on magnesium oxide]
- C04B35/622F2P . . . . [N: Fibres based on metal phosphorus oxides, e.g. phosphates] [N0807]
- C04B35/622F4 . . . . [N: based on non-oxide ceramics (carbon nanotubes [C01B31/02B](#); carbon fibers [D01F9/12](#))] [C1201]
- C04B35/622F4D . . . . [N: Fibres based on carbides] [N0807]
- C04B35/622F4D18 . . . . . [N: based on silicon carbide ([C04B35/571](#) takes precedence)] [N0807] [C1201]
- C04B35/622F4F . . . . [N: Fibres based on nitrides] [N0807]
- C04B35/622F4F6 . . . . . [N: based on boron nitride] [N0807]
- C04B35/622F4F18 . . . . . [N: based on silicon nitride ([C04B35/589](#) takes precedence)] [N0807] [C1201]
- C04B35/624 . . Sol-gel processing
- C04B35/626 . . Preparing or treating the powders individually or as batches [N: (pigments for ceramics [C09C1/00D](#)); preparing or treating macroscopic reinforcing agents for ceramic products, e.g. fibres; mechanical aspects section B] [C0807]
- [N: **WARNING** [C0808]  
Groups [C04B35/626A](#) to [C04B35/626A24](#) are not complete, see also other subgroups of [C04B35/00](#), e.g. [C04B35/626](#)  
]
- C04B35/626A . . . [N: Treating the starting powders individually or as mixtures] [N0807]
- C04B35/626A6 . . . . [N: Milling] [N0807]
- C04B35/626A6B . . . . . [N: High energy or reactive ball milling] [N0807]
- C04B35/626A6H . . . . . [N: of calcined, sintered clinker or ceramics] [N0807]
- C04B35/626A10 . . . . [N: Wet mixtures] [N0807]
- C04B35/626A10B . . . . . [N: characterised by their solids loadings, i.e. the percentage of solids] [N0807]
- C04B35/626A10K . . . . . [N: Mixing details] [N0807]
- C04B35/626A10M . . . . . [N: Mixing media, e.g. organic solvents] [N0807]
- C04B35/626A16 . . . . [N: Thermal treatment of powders or mixtures thereof other than sintering] [N0807]
- C04B35/626A16B . . . . . [N: involving reduction or oxidation] [N0807]
- C04B35/626A16F . . . . . [N: Drying, e.g. freeze-drying, spray-drying, microwave or supercritical drying] [N0807]

C04B35/626A16F2	. . . . .	[N: Humidity controlled drying] [N0807]
C04B35/626A16H	. . . . .	[N: Flame, plasma or melting treatment] [N0807]
C04B35/626A16R	. . . . .	[N: Pyrolysis, carbonisation or auto-combustion reactions] [N0807]
C04B35/626A16T	. . . . .	[N: characterised by the treatment temperature] [N0807]
C04B35/626A16V	. . . . .	[N: characterised by the applied pressure or type of atmosphere, e.g. in vacuum, hydrogen or a specific oxygen pressure] [N0807]
C04B35/626A20	. . . . .	[N: characterised by the order of addition of constituents or additives] [N0807]
C04B35/626A22	. . . . .	[N: Curing of mixtures] [N0807]
C04B35/626A24	. . . . .	[N: Granulation or pelletising (devices for shaping artificial aggregates from ceramic mixtures <a href="#">B28B1/00C</a> )] [N0807]
C04B35/628	. . . . .	Coating the powders [N: or the macroscopic reinforcing agents]
C04B35/628B	. . . . .	[N: Powder coating materials] [N0807]
C04B35/628B2	. . . . .	[N: Oxide ceramics] [N0807]
C04B35/628B2B	. . . . .	[N: Silica or silicates] [N0807]
C04B35/628B2D	. . . . .	[N: Alkaline earth metal oxides] [N0807]
C04B35/628B2F	. . . . .	[N: Alumina or aluminates] [N0807]
C04B35/628B2G	. . . . .	[N: Rare earth metal oxides] [N0807]
C04B35/628B2H	. . . . .	[N: Refractory metal oxides] [N0807]
C04B35/628B2H2	. . . . .	{7 dots} [N: Titanium oxide] [N0807]
C04B35/628B2H8	. . . . .	{7 dots} [N: Zirconium or hafnium oxide] [N0807]
C04B35/628B2K	. . . . .	[N: Iron group metal oxides] [N0807]
C04B35/628B8	. . . . .	[N: Non-oxide ceramics] [N0807]
C04B35/628B8D	. . . . .	[N: Carbides] [N0807]
C04B35/628B8D18	. . . . .	{7 dots} [N: Silicon carbide] [N0807]
C04B35/628B8F	. . . . .	[N: Nitrides] [N0807]
C04B35/628B8R	. . . . .	[N: Carbon] [N0807]
C04B35/628B10	. . . . .	[N: Metals] [N0807]
C04B35/628F	. . . . .	[N: Coating fibres] [N0807]
C04B35/628F2	. . . . .	[N: with oxide ceramics] [N0807]
C04B35/628F2B	. . . . .	[N: Silica or silicates] [N0807]
C04B35/628F2D	. . . . .	[N: Alumina or aluminates] [N0807]
C04B35/628F2H	. . . . .	[N: Refractory metal oxides] [N0807]
C04B35/628F8	. . . . .	[N: with non-oxide ceramics] [N0807]
C04B35/628F8D	. . . . .	[N: Carbides] [N0807]
C04B35/628F8D18	. . . . .	{7 dots} [N: Silicon carbide] [N0807]
C04B35/628F8F	. . . . .	[N: Nitrides] [N0807]
C04B35/628F8F6	. . . . .	{7 dots} [N: Boron nitride] [N0807]
C04B35/628F8F18	. . . . .	{7 dots} [N: Silicon nitride] [N0807]
C04B35/628F8R	. . . . .	[N: Carbon] [N0807]
C04B35/628F10	. . . . .	[N: with metals] [N0807]
C04B35/628F12	. . . . .	[N: with boron or silicon] [N0807]
C04B35/628F14	. . . . .	[N: with metal salts, e.g. phosphates] [N0807]

C04B35/628K	. . . .	[N: by gas phase techniques] [N0807]
C04B35/628L	. . . .	[N: by wet chemical techniques] [N0807]
C04B35/628M	. . . .	[N: with a discontinuous coating layer] [N0807]
C04B35/628N	. . . .	[N: with a coating layer consisting of particles] [N0807]
C04B35/628P	. . . .	[N: with more than one coating layer] [N0807]
C04B35/628T	. . . .	[N: Coatings characterised by their thickness] [N0807]
C04B35/63	. . .	using additives specially adapted for forming the products, [N: e.g.. binder binders]
C04B35/63B	. . . .	[N: Inorganic additives]
C04B35/63B2	. . . . .	[N: Binders based on phosphoric acids or phosphates]
C04B35/63B2B	. . . . .	[N: Aluminium phosphates]
C04B35/63B2D	. . . . .	[N: Alkali metal or alkaline earth metal phosphates]
C04B35/63B4	. . . . .	[N: Binders based on silicon compounds]
C04B35/632	. . . .	Organic additives
C04B35/632B	. . . . .	[N: based on organo-metallic compounds]
C04B35/634	. . . . .	Polymers (C04B35/636 takes precedence)
C04B35/634B	. . . . .	[N: obtained by reactions only involving carbon-to-carbon unsaturated bonds]
C04B35/634B2	. . . . .	{7 dots} [N: Polyalkenes]
C04B35/634B4	. . . . .	{7 dots} [N: Coumarone polymers]
C04B35/634B6	. . . . .	{7 dots} [N: Polyvinylalcohols (PVA); Polyvinylacetates] [C0807]
C04B35/634B8	. . . . .	{7 dots} [N: Polyvinylacetals, e.g. polyvinylbutyral (PVB)] [C0807]
C04B35/634B10	. . . . .	{7 dots} [N: Polyacrylates; Polymethacrylates]
C04B35/634B12	. . . . .	{7 dots} [N: of ethylenically unsaturated dicarboxylic acid anhydride polymers, e.g. maleic anhydride copolymers]
C04B35/634B14	. . . . .	{7 dots} [N: Polystyrenes]
C04B35/634B16	. . . . .	{7 dots} [N: Halogen-containing polymers, e.g. PVC]
C04B35/634B18	. . . . .	{7 dots} [N: Copolymers containing at least three different monomers]
C04B35/634B20	. . . . .	{7 dots} [N: Nitrogen-containing polymers, e.g. polyacrylamides, polyacrylonitriles, polyvinylpyrrolidone (PVP), polyethylenimine (PEI)] [N0807]
C04B35/634D	. . . . .	[N: obtained otherwise than by reactions only involving carbon-to-carbon unsaturated bonds]
C04B35/634D2	. . . . .	{7 dots} [N: Polyepoxides]
C04B35/634D4	. . . . .	{7 dots} [N: Polyurethanes; Polyisocyanates]
C04B35/634D6	. . . . .	{7 dots} [N: Polyesters]
C04B35/634D8	. . . . .	{7 dots} [N: Polycarbonates]
C04B35/634D10	. . . . .	{7 dots} [N: Polyamides]
C04B35/634D12	. . . . .	{7 dots} [N: Condensation polymers of aldehydes or ketones]

[N: **Note**

In this group the following term is used with the meaning indicated:  
- "aldehydes" also covers other organic compounds reacting as aldehydes, e.g. glyoxylic acid

]

- C04B35/634D12B . . . . . {8 dots} [N: Phenol-formaldehyde condensation polymers]
- C04B35/634D12D . . . . . {8 dots} [N: Melamine-formaldehyde condensation polymers]
- C04B35/634D12F . . . . . {8 dots} [N: Urea-formaldehyde condensation polymers]
- C04B35/634D14 . . . . . {7 dots} [N: Polyethers, e.g. alkylphenol polyglycoether, polyethylene glycol (PEG), polyethylene oxide (PEO)] [C0807]
- C04B35/634F . . . . . [N: Natural resins, e.g. rosin]
- C04B35/634H . . . . . [N: Bituminous materials, e.g. tar, pitch]
- C04B35/636 . . . . . Polysaccharides or derivatives thereof
- C04B35/636B . . . . . [N: Cellulose or derivatives thereof]
- C04B35/638 . . . . . Removal thereof
- C04B35/64 . . . . . Burning or sintering processes ([C04B33/32](#) takes precedence; [N: powder metallurgy [B22F](#)])
- C04B35/645 . . . . . Pressure sintering
- C04B35/645H . . . . . [N: Hot isostatic pressing]
- C04B35/65 . . . . . Reaction sintering of free metal- or free silicon-containing compositions [N: ([C04B35/573](#), [C04B35/591](#) take precedence)]
- C04B35/65C . . . . . [N: Thermite type sintering, e.g. combustion sintering]
- C04B35/65L . . . . . [N: Directional oxidation or solidification, e.g. Lanxide process] [C0807]
- C04B35/653 . . . . . Processes involving a melting step
- C04B35/657 . . . . . for manufacturing refractories ([C04B35/05](#), [C04B35/107](#), [C04B35/484](#) take precedence)
- C04B35/66 . . . . . Monolithic refractories or refractory mortars, including those whether or not containing clay [N: ([making or repairing of linings F27D1/16](#))] [C0807]
- C04B35/71 . . . . . Ceramic products containing macroscopic reinforcing agents ([C04B35/66](#) takes precedence; [N: infiltration of a porous ceramic matrix with a material forming a non-ceramic phase [C04B41/00](#), reaction infiltration with Si in order to form SiC [C04B35/573](#), in order to form Si<sub>3</sub>N<sub>4</sub> [C04B35/591](#)])
- [N: **Note** [N0807]  
In groups [C04B35/71](#) to [C04B35/83](#) the composition of the ceramic products is also classified in groups [C04B35/01](#) to [C04B35/597](#) ]
- C04B35/74 . . . . . containing shaped metallic materials
- C04B35/76 . . . . . Fibres, filaments, whiskers, platelets, or the like
- C04B35/78 . . . . . containing non-metallic materials
- C04B35/80 . . . . . Fibres, filaments, whiskers, platelets, or the like [N: ([carbon reinforced with carbon fibres see C04B35/83](#))]
- C04B35/80B . . . . . [N: The matrix of the ceramic products consisting of oxides only]
- C04B35/80D . . . . . [N: The matrix of the ceramic products consisting of non-oxides only]
- C04B35/82 . . . . . Asbestos; Glass; Fused silica
- C04B35/83 . . . . . Carbon fibres in a carbon matrix

**Note**

The products covered by this group are usually referred to as "carbon-carbon composites".

**C04B37/00**                      **Joining burned ceramic articles with other burned ceramic articles or other articles**

**by heating** (laminated products B32B, E04C; [N: soldering and welding materials [B23K35/24](#)]) [C0807]

[N: **WARNING** [N0810] [C0812]

Groups [C04B37/00D2](#), [C04B37/00D4](#), [C04B37/02D2](#) and [C04B37/02D4](#) are no longer used for classification as from September 1, 2008. Aspects relating to interlayers are from that date indexed by codes chosen from [M04B237/02](#) to [M04B237/16](#)  
]

[N: **Note** [N0810]

In groups [C04B37/00](#) to [C04B37/04](#), from 01-10-2008 onwards, features relating to interlayers, additional compositional information or further processing are indexed with codes chosen from [M04B237/00](#) to [M04B237/70R](#)  
]

- C04B37/00B . [N: directly with other burned ceramic articles]
- C04B37/00D . [N: by means of an interlayer consisting of a combination of materials selected from glass, or ceramic material with metals, metal oxides or metal salts]
- C04B37/00D2 . . [N: consisting of glass or ceramic material] [C0807]
- C04B37/00D4 . . [N: consisting of metals or metal salts] [C0807]
- C04B37/00K . [N: by means of an interlayer consisting of an organic adhesive, e.g. phenol resin or pitch] [C1111]
- C04B37/02 . with metallic articles
- C04B37/02B . . [N: in a direct manner, e.g. direct copper bonding (DCB)] [C0807]
- C04B37/02D . . [N: characterised by the interlayer used ([C04B37/02K](#) takes precedence)] [C0812]
- C04B37/02D2 . . . [N: consisting of glass or ceramic material] [C0807]
- C04B37/02D4 . . . [N: consisting of metals or metal salts] [C0807]
- C04B37/02K . . [N: by means of an interlayer consisting of an organic adhesive, e.g. phenol resin or pitch] [C1111]
- C04B37/04 . with articles made from glass
- [N: **WARNING**N0812]
- Groups [C04B37/04B](#), [C04B37/04D](#) and [C04B37/04K](#) are not complete, see also [C04B37/04](#)  
]
- C04B37/04B . . [N: in a direct manner] [N0812]
- C04B37/04D . . [N: characterised by the interlayer used ([C04B37/04K](#) takes precedence)] [N0812]
- C04B37/04K . . [N: by means of an interlayer consisting of an organic adhesive, e.g. phenol resin or pitch] [N0812] [C1111]
- C04B38/00** **Porous mortars, concrete, artificial stone or ceramic ware; Preparation thereof** (treating slag with gases or gas generating material [C04B5/06](#); [N: expanded graphite [C04B35/536](#)]) [C9807]

[N: **Note**

Porous materials based on fibres, i.e. materials where the porosity is due to the spaces

between the fibres, are not classified in this maingroup, but in one or more of the other relevant maingroups of this subclass, e.g. in [C04B30/02](#) ]

- C04B38/00A . [N: containing continuous channels, e.g. of the "dead-end" type or obtained by pushing bars in the green ceramic product ([B28B](#) takes precedence)]
  - C04B38/00B . [N: Honeycomb structures (from one or more corrugated sheets by winding or stocking [C04B38/00L2](#))]
  - C04B38/00B4 . . [N: characterised by features relating to the cell walls, e.g. wall thickness or distribution of pores in the walls] [N0409]
  - C04B38/00B6 . . [N: characterised by the material used for sealing or plugging (some of) the channels of the honeycombs][N0312]
  - C04B38/00B8 . . [N: assembled from subunits] [N0702]
  - C04B38/00B8J . . . [N: characterised by the material used for joining separate subunits] [N0702] [N: Note: When classifying in group C04B38/00B8J, classification is also made in C04B28/00 or C04B37/00 to give detailed information about the composition of the joining material]
  - C04B38/00C . [N: obtained by a chemical conversion or reaction other than those relating to the setting or hardening of cement-like material or to the formation of a sol or a gel, e.g. by carbonising or pyrolysing preformed cellular materials based on polymers, organo-metallic or organo-silicon precursors]
  - C04B38/00C2 . . [N: starting from inorganic materials only, e.g. metal foam; Lanxide type products]
  - C04B38/00C6 . . [N: Porous deposits from the gas phase, e.g. on a temporary support]
  - C04B38/00C10 . . [N: one of the precursor materials being a monolithic element having approximately the same dimensions as the final article, e.g. a paper sheet which after carbonisation will react with silicon to form a porous silicon carbide porous body] [N0308]
  - C04B38/00C12 . . [N: by evaporation induced self-assembly] [N0705]
  - C04B38/00D . [N: by superficial sintering or bonding of particulate matter] [C9603]
  - C04B38/00D4 . . [N: the particulate matter having preselected particle sizes] [N0806]
  - C04B38/00F . [N: by a process involving the formation of a sol or a gel, e.g. sol-gel or precipitation processes]
  - C04B38/00F2 . . [N: Precipitation processes]
  - C04B38/00H . [N: characterised by the pore size, pore shape or kind of porosity]
  - C04B38/00H1 . . [N: the pores being micro-sized or nano-sized] [N9902]
  - C04B38/00H2 . . [N: open porosity]
  - C04B38/00H4 . . [N: closed porosity]
  - C04B38/00H6 . . [N: Multimodal pore size distribution] [N0110]
  - C04B38/00J . [N: characterised by the density of the end product]
- [N: **Note**  
This group is mainly used for classification using Combination Sets in [C04B38/00](#) ]

- C04B38/00K . [N: characterised by the pore distribution, e.g. inhomogeneous distribution of pores]
  - [N: **Note**  
This group is mainly used for classification using Combination Sets in [C04B38/00](#) ]
- C04B38/00K2 . . [N: expressed as porosity percentage]
- C04B38/00K4 . . [N: Materials with a non-porous skin]
- C04B38/00L . [N: Bodies obtained by assembling separate elements having such a configuration that the final product is porous or by spirally winding one or more corrugated sheets]
- C04B38/00L2 . . [N: from one or more corrugated sheets or sheets bearing protrusions by winding or stacking]
- C04B38/00M . [N: by generating pores in the ceramic material while in the molten state]
- C04B38/00P . [N: Porous or hollow ceramic granular materials, e.g. micro-balloons ([C04B18/02L](#), [C04B20/00D2](#) take precedence)]
- C04B38/00Z . [N: Other features]
- C04B38/00Z4 . . [N: Pores with coated inner walls]
- C04B38/02 . by adding chemical blowing agents
- C04B38/02B . . [N: generated by microorganisms] [N9704]
- C04B38/04 . by dissolving-out added substances
- C04B38/04D . . [N: the dissolved-out substance being a monolithic element having approximately the same dimensions as the final article, e.g. a prepreg obtained by bonding together dissolvable particles ([C04B38/00C](#) takes precedence)] [N0003]
- C04B38/06 . by burning-out added substances [N: by burning natural expanding materials or by sublimating or melting out added substances]
  - [N: **Note**  
Documents in which the characteristic feature is the choice of meltable or sublimable material or the physical aspects of the porous body obtained are classified accordingly, and symbols [C04B38/06B](#) or [C04B38/06C](#) are allocated in Combination Sets. ]
- C04B38/06B . . [N: by sublimating]
- C04B38/06C . . [N: by melting out]
- C04B38/06D . . [N: the burned-out substance being a monolithic element having approximately the same dimensions as the final article, e.g. a porous polyurethane sheet or a prepreg obtained by bonding together resin particles ([C04B38/00C](#) takes precedence)] [C9707]
- C04B38/06D2 . . . [N: the burned-out substance being formed in situ, e.g. by polymerisation of a prepolymer composition containing ceramic powder] [N9707]
- C04B38/06D2F . . . . [N: involving a foaming step of the burnable material] [N9707]
- C04B38/06F . . [N: Preparing or treating the raw materials individually or as batches]
- C04B38/06F2 . . . [N: Compounding ingredients ([C04B38/06D](#) takes precedence)]
- C04B38/06F2B . . . . [N: Natural expanding materials, e.g. clay]

- C04B38/06F2D . . . . [N: Burnable, meltable, sublimable materials]
- C04B38/06F2D2 . . . . [N: characterised by physical aspects, e.g. shape, size or porosity]
- [N: **Note**  
Documents having this group as classification symbol or as part of a Combination Set can also get symbol [C04B38/00H](#) in the Combination Set, if the importance of the size of the pores obtained is emphasized.  
]
- C04B38/06F2D2P . . . . [N: Porous materials ([C04B38/06D2E](#) takes precedence)] [C9707]
- C04B38/06F2D4 . . . . [N: characterised by distribution, e.g. for obtaining inhomogeneous distribution of pores]
- [N: **Note**  
Documents having this group as classification symbol or as part of a Combination Set can also get symbol [C04B38/00K](#) in the Combination Set, if the importance of the distribution of the pores is emphasized.  
]
- C04B38/06F2D6 . . . . [N: Waste material; Refuse other than vegetable refuse]
- C04B38/06F2D8 . . . . [N: Macromolecular compounds ([C04B38/06D2](#) takes precedence; polysaccharides [C04B38/06F2D](#))] [C9707]
- C04B38/06F2D10 . . . . [N: Vegetable refuse; Cellulosic materials, e.g. wood chips, cork, peat, paper]
- C04B38/06F2D12 . . . . [N: Carbonaceous materials, e.g. coal, carbon, graphite, hydrocarbons]
- C04B38/06F2D14 . . . . [N: Minerals containing carbon, e.g. oil shale]
- C04B38/06F2H . . . . [N: Other materials, e.g. catalysts ([C04B33/13](#), [C04B35/00](#) take precedence)]
- C04B38/06H . . . [N: Physical aspects of the porous material obtained]
- C04B38/08 . . . by adding porous substances
- C04B38/08H . . . [N: of micro or nano size] [N0109]
- C04B38/10 . . . by using foaming agents ([C04B38/02](#) takes precedence) [N: or by using mechanical means, e.g. adding preformed foam]
- C04B38/10N . . . [N: the foaming being obtained by the introduction of a gas other than untreated air, e.g. nitrogen] [N0012] [C0312]
- C04B38/10P . . . [N: by adding preformed foams]
- C04B40/00** **Processes, in general, for influencing or modifying the properties of mortars, concrete or artificial stone compositions, e.g. their setting or hardening ability** (active ingredients [C04B22/00](#) to [C04B24/00](#); hardening of a well-defined composition [C04B26/00](#) to [C04B28/00](#); making porous, cellular or lightening [C04B38/00](#); mechanical aspects [B28](#), e.g. conditioning the materials prior to shaping [B28B17/02](#))
- C04B40/00A . . . [N: making use of electric or wave energy or particle radiation]
- C04B40/00A2 . . . [N: Electric, magnetic or electromagnetic fields]
- C04B40/00A4 . . . [N: Electromagnetic waves]
- C04B40/00A4B . . . . [N: Microwaves]
- C04B40/00A4D . . . . [N: Irradiation, i.e. gamma -, X -, UV rays]
- C04B40/00A10 . . . [N: Sonic or ultrasonic waves, e.g. to initiate sonochemical reactions] [C9807]

- C04B40/00B . [N: obtaining colloidal mortar]
- C04B40/00D . [N: Aspects relating to the mixing step of the mortar preparation]
- C04B40/00D1 . . [N: Controlling the process of mixing, e.g. adding ingredients in a quantity depending on a measured or desired value ([B28C7/00](#) takes precedence)] [C0012]
- C04B40/00D2 . . [N: Processes characterised by the absence of a mechanical mixing step, e.g. "no-mix" processes]
- C04B40/00D4 . . [N: Premixtures of ingredients]
- C04B40/00D4B . . . [N: Powdery mixtures] [C0005]
- C04B40/00D4P . . . [N: characterised by their processing, e.g. sequence of mixing the ingredients when preparing the premixtures] [N0409]
- C04B40/00D5 . . [N: High shear mixing; Obtaining macro-defect free materials] [C0202]
- C04B40/00D5B . . . [N: Obtaining macro-defect free materials otherwise than by high shear mixing] [N0202]
- C04B40/00D6 . . [N: Energetic mixing ([C04B40/00D5](#) takes precedence)] [N0109]
- C04B40/00D7 . . [N: involving the elimination of excess water from the mixture]
- C04B40/00D7H . . . [N: Processes of the Magnini or Hatscheck type]
- C04B40/00H . [N: making use of vibrations]
- C04B40/00P . [N: making use of a rise in pressure]
- C04B40/00R . [N: making use of a decrease in temperature] [N0007]
- C04B40/00R2 . . [N: by freezing] [N0007]
- C04B40/00T . [N: making use of a rise in temperature, e.g. caused by an exothermic reaction] [C9810]
- C04B40/00T2 . . [N: involving melting of at least part of the composition] [N0109]
- C04B40/00V . [N: making use of vacuum or reduced pressure]
- C04B40/00W . [N: Temporary binders, mortars or concrete, i.e. materials intended to be destroyed or removed after hardening, e.g. by acid dissolution] [C9909]
- C04B40/00Z . [N: Provisions for indicating condition of the compositions or the final products, e.g. degree of homogeneous mixing, degree of wear]
- C04B40/02 . Selection of the hardening environment
  - [N: **Note**
  - [N0406] In this group the following term is used with the meaning indicated:
  - "hardening" covers also setting, pre-curing and curing
  - ]
- C04B40/02A . . [N: making use of electric or wave energy or particle radiation]
- C04B40/02A2 . . . [N: Electric, magnetic or electromagnetic fields]
- C04B40/02A4 . . . [N: Electromagnetic waves]
- C04B40/02A4B . . . . [N: Microwaves]
- C04B40/02A4D . . . . [N: Irradiation, i.e. gamma -, X -, UV rays]

- C04B40/02A10 . . . [N: Sonic or ultrasonic waves]
- C04B40/02B . . [N: Carbon dioxide hardening]
- C04B40/02B2 . . . [N: Carbon dioxide post-treatment of already hardened material] [N9706] [C0002]
- C04B40/02D . . [N: Steam hardening, e.g. in an autoclave]
- C04B40/02D2 . . . [N: including a pre-curing step not involving a steam or autoclave treatment] [N0002]
- C04B40/02H . . [N: Adiabatic curing or hardening] [N0207]
- C04B40/02M . . [N: Hardening in an enclosed space, e.g. in a flexible container] [N0208]
- C04B40/02P . . [N: Hardening promoted by a rise in pressure ([C04B40/02D](#) takes precedence)]
- C04B40/02T . . [N: Hardening promoted by a rise in temperature ([C04B40/02D](#) takes precedence)]
- C04B40/02T4 . . . [N: Heating up to sintering temperatures ([C04B41/00T](#) takes precedence)]
- C04B40/02V . . [N: Hardening under vacuum or reduced pressure]
- C04B40/02W . . [N: Hardening promoted by using additional water, e.g. by spraying water on the green concrete element (**steam hardening** [C04B40/02D](#))]
- C04B40/02W1 . . . [N: Hardening in an atmosphere of increased relative humidity] [N9410]
- C04B40/02W2 . . . [N: Hardening under water]
- C04B40/02W4 . . . [N: using an aqueous solution or dispersion]
- C04B40/02Z . . [N: Inhomogeneous curing or hardening, e.g. accelerated curing of surface regions of a concrete article; Influencing the setting or hardening process or generate physical or mechanical effects, e.g. to create cracks] [N9909] [C0207]
  
- C04B40/04 . . Preventing evaporation of the mixing water (**permanent coverings** [C04B41/00](#))
  
- C04B40/06 . . Inhibiting the setting, e.g. mortars of the deferred action type containing water in breakable containers; [N: Inhibiting the action of active ingredients] [C9502]
- [N: **Note**  
Compositions with prolonged pot-life are not classified here.  
They are classified as other compositions and the symbol [M04B111/00M6](#) is allocated in Combination Set.  
]
- C04B40/06A . . [N: Dry ready-made mixtures, e.g. mortars at which only water or a water solution has to be added before use] [N9502]
- C04B40/06A2 . . . [N: preformed, e.g. bandages] [N9502]
- C04B40/06B . . [N: Wet ready-made mixtures, e.g. mortars in water- or airtight packages, or mortars containing an accelerator in a breakable emulsion] [C9610]
- C04B40/06C . . [N: Chemical separation of ingredients, e.g. slowly soluble activator] [N9502]
- C04B40/06D . . [N: Mechanical separation of ingredients, e.g. accelerator in breakable microcapsules] [C9502]
- C04B40/06D2 . . . [N: Two or more component mortars] [N9502]
- C04B40/06K . . [N: Retarder inhibited mortars activated by the addition of accelerators or retarder-neutralising agents] [N9502] [C9707]
- C04B40/06L . . [N: Chemical plugs based on hydraulic hardening materials] [N9502]
- C04B40/06M . . [N: Mortars activated by rain, percolating or sucked-up water; Self-healing mortars or concrete] [N9502] [C9807]
- C04B40/06S . . [N: inhibiting by freezing or cooling] [N9502] [C9704]
- C04B40/06T . . [N: Thermally activated mortars, e.g. by melting ingredients] [N9502] [C0109]

**Note**

In group [C04B41/00](#), the following terms or expressions are used with the meanings indicated:

- "mortars", "concrete" and "artificial stone" cover materials after primary shaping

**C04B41/00**

**After-treatment of mortars, concrete, artificial stone or ceramics; Treatment of natural stone** (conditioning of the materials prior to shaping [C04B40/00](#); applying liquids or other fluent materials to surfaces, in general B05; grinding or polishing B24; apparatus or processes for treating or working shaped articles of clay or other ceramic compositions, slag or mixtures containing cementitious material [B28B11/00](#); working stone or stone-like materials B28D; glazes, other than cold glazes, [C03C8/00](#); etching, surface-brightening or pickling compositions [C09K13/00](#))

**[N: Notes**

**[C0807]**

1. In this group, multiple classification is made according to the following rules:
  - a. when the substrate to be treated is of the artificial stone type, e.g. concrete, classification is made in the range [C04B41/00](#) to [C04B41/53T](#) as well as in the range [C04B41/60](#) to [C04B41/72](#)
  - b. when the substrate to be treated is of the ceramic type, classification is made in the range [C04B41/00](#) to [C04B41/53T](#) as well as in the range [C04B41/80](#) to [C04B41/91](#)
  - c. when the substrate to be treated is a-specific, classification is made only in the range [C04B41/00](#) to [C04B41/53T](#)
2. In groups [C04B41/00D](#) to [C04B41/53](#), in the absence of an indication to the contrary, classification is made in the last appropriate place.
3. Treating, e.g. coating or impregnating, a material with the same material or with a substance which ultimately is transformed into the same material is not considered after-treatment for this group but is classified as preparation of the material, e.g. a carbon body impregnated with a carbonisable substance is classified in [C04B35/52](#).
4. In groups [C04B41/00](#) to [C04B41/53](#), it is desirable to add the indexing codes relating to the nature of the substrate being treated. The indexing codes, which are chosen from groups [C04B26/00](#) to [C04B38/00](#) should be unlinked.
5. In groups [C04B41/00](#) to [C04B41/53](#), it is desirable to add the indexing codes relating to aspects of the coating composition or to the method of application. The indexing codes, which are chosen from groups [C04B41/00](#) to [C04B41/53T](#) should be unlinked.
6. Attention is drawn to internal Note (2) following the title of subclass C04B.

]

**C04B41/00B**

- **[N: Demolition agents based on cementitious or like materials]**

**[N: Note**

Products classified in group [C04B41/00B](#) should also be classified according to their composition, e.g. in [C04B28/00](#)

]

- C04B41/00D . [N: Coating or impregnating "in situ", e.g. impregnating of artificial stone by subsequent melting of a compound added to the artificial stone composition]
- C04B41/00H . [N: Ion-implantation, ion-irradiation or ion-injection]
- C04B41/00L . [N: Laser treatment (working by laser beam [B23K26/00](#))] [C0203]
- C04B41/00M . [N: Irradiation; Radiation, e.g. with UV or IR ([C04B41/00L](#) takes precedence)] [C9702]
- C04B41/00P . [N: Plasma-treatment, e.g. with gas-discharge plasma]
- C04B41/00S . [N: Cooling, e.g. freezing]
 

[N: **Note**  
In this group the term "cooling" is used in the sense of an additional cooling treatment, different from the traditional cooling step in the fabrication of materials involving a heating step, such as sintering of ceramics  
]
- C04B41/00T . [N: Heat treatment]
- C04B41/00T2 . . [N: characterised by the subsequent cooling step] [N9803]
- C04B41/00V . [N: characterised by the material treated] [N1109]
- C04B41/45 . Coating or impregnating (paints [C09D](#)), [N: e.g. injection in masonry, partial coating of green or fired ceramics, organic coating compositions for adhering together two concrete elements (ion-implantation [C04B41/00H](#))]
 

[N: **Note**

  1. In group [C04B41/45](#) and sub-groups, as a general rule, classification is made according to the end products, rather than according to the starting materials, in the coating or impregnating compositions.
  2. In groups [C04B41/45](#) to [C04B41/52H](#) the following term is used with the meaning indicated:
    - "coating" covers material applied to the substrates as powdery material or applied from the gas or liquid phase, e.g. as a slurry; it only covers the use of preformed sheet-like elements in so far as the thickness of these sheets is small compared with the thickness of the substrate and so far as the resulting product is not exclusively one of the type classifiable in [B32B](#)

]
- C04B41/45A . . [N: with preformed sheet-like elements]
- C04B41/45A2 . . . [N: having an adhesive layer]
- C04B41/45B . . [N: characterised by the method of application]
- C04B41/45B1 . . . [N: using keying elements, e.g. particulate material, to facilitate the adherence of coating layers] [N9610]
- C04B41/45B1S . . . . [N: The keying element being generated from indentations made in the substrate] [N9803]
- C04B41/45B2 . . . . [N: using temporarily supports, e.g. decalcomania transfers or mould surfaces]
- C04B41/45B2B . . . . [N: the temporary support- and coating material being mixed together, e.g. tile glazing paper sheets]

- C04B41/45B4 . . . [N: application under vacuum or reduced pressure]
- C04B41/45B6 . . . [N: application under inert, e.g. non-oxidising, atmosphere]
- C04B41/45B8 . . . [N: application under an other specific atmosphere]
- C04B41/45B10 . . . [N: application under increased pressure]
- C04B41/45B12 . . . [N: applied from the molten state (**vitreous materials** [C04B41/50M](#)); Thermal spraying, e.g. plasma spraying]
- [N: **Note**  
Coating or impregnating with a specific material in the molten state is classified according to the specific material and get symbol [C04B41/45B12](#) in Combination Sets  
]
- C04B41/45B12B . . . . [N: using a molten bath as vehicle, e.g. molten borax]
- C04B41/45B12P . . . . [N: Plasma spraying (**deposition from the gas phase using plasma** [C04B41/45B14P](#))]
- C04B41/45B14 . . . . [N: applied from the gas phase]
- [N: **Note**  
Coating or impregnating with a specific material from the gas phase is classified according to the specific material and symbol [C04B41/45B14](#) is allocated in Combination Sets  
]
- C04B41/45B14C . . . . [N: by C.V.D.]
- C04B41/45B14P . . . . [N: plasma assisted]
- C04B41/45B16 . . . . [N: applied as a solution, emulsion, dispersion or suspension] [C9803]
- [N: **Note**  
Coating or impregnation with a solution or a suspension of a specific material is classified according to the specific material and symbol [C04B41/45B16](#) is allocated in Combination Sets  
]
- C04B41/45B16B . . . . [N: by the sol-gel process]
- C04B41/45B16D . . . . [N: as a emulsion, dispersion or suspension] [C9803]
- C04B41/45B16P . . . . [N: Electroless plating]
- C04B41/45B16S . . . . [N: by spraying, e.g. by atomising] [C9610]
- C04B41/45B18 . . . . [N: applied as a powdery material]
- [N: **Note**  
Coating or impregnation with a specific powdery material is classified according to the specific material and symbols [C04B41/45B18](#) to [C04B41/45B18H2](#) are allocated in Combination Sets  
]
- C04B41/45B18H . . . . [N: characterised by the grain distribution] [N9902]
- C04B41/45B18H2 . . . . . [N: Nanometer-sized particles] [N9902]
- C04B41/45B20 . . . . [N: the coating or impregnating process including a chemical conversion or reaction]
- C04B41/45B20M . . . . [N: the end product being obtained by a multistep reaction or conversion] [N9810]
- C04B41/45B20P . . . . [N: the coating or impregnating material being an organic or organo-metallic precursor of an inorganic material]

- C04B41/45B20R . . . . [N: coating or impregnating with a product reacting with the substrate, e.g. generating a metal coating by surface reduction of a ceramic substrate] [C9710]
- C04B41/45B20S . . . . [N: Coating or impregnating involving the chemical conversion of an already applied layer, e.g. obtaining an oxide layer by oxidising an applied metal layer]
- C04B41/45B20S2 . . . . . [N: the conversion only taking place under certain conditions, e.g. avoiding damage of underlying layers or parts of the substrate] [N9512]
- C04B41/45B30 . . . . [N: Photographic methods, e.g. making use of photo-sensitive materials]
- C04B41/45B40 . . . . [N: Electrolytic or electrophoretic processes, e.g. electrochemical re-alkalisation of reinforced concrete ([desalination C04B41/53](#))]
- C04B41/45B40B . . . . . [N: Electrochemical re-alkalisation ([electrochemical desalination C04B41/53H](#); [cathodic protection C23F13/02](#))] [N9411]
- C04B41/45B42 . . . . [N: Electrostatic processes]
- C04B41/45C . . . . [N: Non-superficial impregnation or infiltration of the substrate]
- C04B41/45D . . . . [N: Partial coating or impregnation of the surface of the substrate]
- C04B41/45D2 . . . . [N: Coating different parts of the substrate with different materials]
- C04B41/45D4 . . . . [N: Inlaid coatings, i.e. resulting in a plane surface] [N9607]
- C04B41/45F . . . . [N: Coating or impregnating of green ceramics or unset concrete] [C9704]
- C04B41/45F2 . . . . [N: involving a mixing step with the top layer of the substrate] [N9704]
- C04B41/45L . . . . [N: Porous coatings, e.g. coating containing porous fillers] [C9706]
- C04B41/45P . . . . [N: Coating or impregnating of particulate or fibrous ceramic material ([C04B20/10](#), [C04B35/628](#) take precedence)]
- C04B41/45S . . . . [N: Non-chemical aspects relating to the substrate being coated or impregnated]
- C04B41/45S2 . . . . [N: Superficial melting of the substrate before or during the coating or impregnating step] [N9807]
- C04B41/45T . . . . [N: Temporary coatings or impregnations ([C04B40/04](#) takes precedence)] [C9704]
- C04B41/45T2 . . . . [N: for masking purposes]
- C04B41/45T2M . . . . . [N: in metallisation processes]
- C04B41/45V . . . . [N: with fibrous materials or whiskers]
- C04B41/45W . . . . [N: with waste materials]
- C04B41/46 . . . . with organic materials
- C04B41/46B . . . . [N: Organic solvents]
- C04B41/46P . . . . [N: Halogenated compounds, e.g. perfluor-compounds]
- C04B41/47 . . . . Oils, fats or waxes [N: natural resins]
- C04B41/47B . . . . . [N: Oils, e.g. linseed oil]
- C04B41/47G . . . . . [N: Natural resins, e.g. rosin]
- C04B41/47G2 . . . . . [N: Cellulosic waste liquor, e.g. sulfite lye] [N9704]
- C04B41/47K . . . . . [N: Bitumen, asphalt, e.g. paraffin]
- C04B41/48 . . . . Macromolecular compounds
- C04B41/48B . . . . . [N: Polysaccharides, e.g. cellulose, or derivatives thereof] [C9704]
- C04B41/48C . . . . . [N: Proteins or derivatives thereof]
- C04B41/48D . . . . . [N: Condensation polymers of aldehydes or ketones]

[N: **Note**

In this group the following term is used with the meaning indicated:  
 - "aldehydes" also covers other organic compounds reacting as aldehydes,  
 e.g. glyoxylic acid  
 ]

C04B41/48D4	. . . . .	[N: Melamine-formaldehyde condensation products]
C04B41/48D8	. . . . .	[N: Urea-formaldehyde condensation products]
C04B41/48F	. . . . .	[N: Phenol-formaldehyde condensation products]
C04B41/48H	. . . . .	[N: Polyesters]
C04B41/48K	. . . . .	[N: Polyacrylates]
C04B41/48K10	. . . . .	[N: Polyacrylamides]
C04B41/48M	. . . . .	[N: Halogenated polymers]
C04B41/48M2	. . . . .	[N: Fluorine-containing polymers]
C04B41/48M2P	. . . . .	[N: Perfluoro-compounds]
C04B41/48N	. . . . .	[N: Sulfur-containing polymers] [N9810]
C04B41/48P	. . . . .	[N: Epoxides]
C04B41/48R	. . . . .	[N: Other macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds]
C04B41/48R2	. . . . .	[N: Polyalkenes]
C04B41/48R4	. . . . .	[N: Coumarone polymers]
C04B41/48R6	. . . . .	[N: Polyvinylalcohols, polyvinylacetates]
C04B41/48R8	. . . . .	[N: Polyvinylacetals]
C04B41/48R10	. . . . .	[N: Polystyrene]
C04B41/48T	. . . . .	[N: Other macromolecular compounds obtained otherwise than by reactions only involving unsaturated carbon-to-carbon bonds]
C04B41/48T2	. . . . .	[N: Polyurethanes; Polyisocyanates]
C04B41/48T4	. . . . .	[N: Polycarbonates]
C04B41/48T6	. . . . .	[N: Polyamides]
C04B41/48T8	. . . . .	[N: Polyethers]
C04B41/49	. . . . .	Compounds having one or more carbon-to-metal or carbon-to-silicon linkages[N: Organo-clay compounds; Organo-silicates, i.e. ortho- or polysilicic acid esters (to obtain SiO <sub>2</sub> <a href="#">C04B41/50T24</a> , <a href="#">C04B41/50P14</a> ); Organo-phosphorus compounds; Organo-inorganic complexes] [C9810]
		<b>[N: Note</b>
		As distinct from the general practice in <a href="#">C04B41/00</a> , classification in <a href="#">C04B41/49</a> and sub-groups is done according to the nature of the starting products, not according to the nature of the end products
		]
C04B41/49B	. . . . .	[N: containing silicon]
C04B41/49B2	. . . . .	[N: Organo-clay compounds]
C04B41/49B3	. . . . .	[N: applied to the substrate as a solventless liquid]
C04B41/49B4	. . . . .	[N: applied to the substrate as monomers, i.e. as organosilanes R <sub>n</sub> SiX <sub>4-n</sub> , e.g. alkyltrialkoxysilane, dialkyldialkoxysilane]
C04B41/49B4A	. . . . .	[N: Alkali metal or ammonium salts] [C9707]
C04B41/49B4C	. . . . .	[N: containing halogens, i.e. organohalogen silanes]
C04B41/49B4D	. . . . .	[N: containing silicon bound to hydroxy groups, e.g. trimethyl silanol]

- C04B41/49B4N . . . . . [N: containing atoms other than carbon, hydrogen, oxygen, silicon, alkali metals or halogens, e.g. N-silyldisilazane:
- Image  
]
- C04B41/49B6 . . . . . [N: applied to the substrate as oligomers or polymers]
- C04B41/49B6B . . . . . [N: Polyorganosilanes, i.e. polymers with a Si-Si-Si- chain]
- C04B41/49B6D . . . . . [N: Polyorganosiloxanes, i.e. polymers with a Si-O-Si-O-chain; "silicones"]
- C04B41/49B6D1 . . . . . {7 dots} [N: containing silicon bound to hydroxy groups, i.e. OH-blocked polysiloxanes]
- C04B41/49B6D3 . . . . . {7 dots} [N: Alkali metal or ammonium salts] [C9710]
- C04B41/49B6G . . . . . [N: characterised by the number of silicon atoms]
- C04B41/49B6H . . . . . [N: Polycarbosilanes, i.e. polymers with a -Si-C-Si-chain; Polysilazanes, i.e. polymers with a -Si-N-Si-chain; Polysilathianes, i.e. polymers with a -Si-S-Si-chain]
- C04B41/49B8 . . . . . [N: Organosilicium-organic copolymers, e.g. olefins with terminal silane groups] [C9602]
- C04B41/49P . . . . . [N: Organo-phosphorus compounds] [N9410]
- C04B41/50 . . . with inorganic materials
- C04B41/50B . . . . [N: with carbon or carbonisable materials]
- C04B41/50B2 . . . . [N: Diamond]
- C04B41/50B4 . . . . [N: Fullerenes or derivatives thereof] [N9706]
- C04B41/50B5 . . . . [N: Carbon fluorides; Halogen containing carbon or graphite intercalation products] [N9602] [C9803]
- C04B41/50C . . . . [N: Boron compounds]
- C04B41/50F . . . . [N: with salts or salty compositions, e.g. for salt glazing ([C04B41/50C](#) takes precedence)] [C9503]
- C04B41/50F2 . . . . [N: containing nitrogen in the anion, e.g. nitrites]
- C04B41/50F4 . . . . [N: containing carbon in the anion, e.g. carbonates]
- C04B41/50F6 . . . . [N: containing halogen in the anion]
- C04B41/50F6C . . . . [N: chlorides]
- C04B41/50F8 . . . . [N: containing sulfur in the anion, e.g. sulfides]
- C04B41/50F10 . . . . [N: containing phosphorus in the anion, e.g. phosphates]
- C04B41/50G . . . . [N: Acids]
- C04B41/50H . . . . [N: with fluorine compounds]
- C04B41/50H2 . . . . [N: applied from the gas phase, e.g. ocratation] [N9807]
- C04B41/50L . . . . [N: Water]
- C04B41/50M . . . . [N: with vitreous materials (composition of vitreous glazes and enamels [C03C](#); ceramic pigments [C09C1/00D](#))]
- [N: **Note**  
Glazing of concrete, natural or artificial stone or ceramics is only classified in [C04B41/50M](#) when non-compositional aspects are important, e.g. aspects relating to the method of application or the choice of the substrate  
]
- C04B41/50M4 . . . . [N: Glass-ceramics (compositions of glass-ceramics [C03C10/00](#))]

C04B41/50N	. . .	[N: Silicates ( <a href="#">C04B41/50M</a> takes precedence; silico-fluorides <a href="#">C04B41/50H</a> ) [ <a href="#">C9506</a> ]
C04B41/50P	. . .	[N: with ceramic materials (copper oxide or solid solutions thereof <a href="#">C04B41/50S8</a> )]
		[N: <b>Note</b> In this subgroup, the materials considered as ceramic materials are those covered by groups <a href="#">C04B33/00</a> to <a href="#">C04B35/83</a> ]
C04B41/50P1	. . . .	[N: Oxide ceramics in general; Specific oxide ceramics not covered by <a href="#">C04B41/50P4</a> to <a href="#">C04B41/50P495</a> ] [ <a href="#">C9510</a> ]
C04B41/50P1M	. . . . .	[N: Manganates] [ <a href="#">N9510</a> ]
C04B41/50P4	. . . . .	[N: Magnesia]
C04B41/50P10	. . . . .	[N: Alumina]
C04B41/50P10B	. . . . .	[N: Aluminates (aluminate spinels <a href="#">C04B41/50P443</a> )] [ <a href="#">N9811</a> ]
C04B41/50P12	. . . . .	[N: Chromium oxide]
C04B41/50P14	. . . . .	[N: Silica]
C04B41/50P26	. . . . .	[N: Ferrites]
C04B41/50P33	. . . . .	[N: Clay, Kaolin]
C04B41/50P33B	. . . . .	[N: Porcelain]
C04B41/50P33G	. . . . .	[N: Engobes]
C04B41/50P46	. . . . .	[N: Titanium oxide or titanates]
C04B41/50P48	. . . . .	[N: Zirconium oxides or zirconates; Hafnium oxides or hafnates] [ <a href="#">C9706</a> ]
C04B41/50P48H	. . . . .	[N: Hafnates] [ <a href="#">N9706</a> ]
C04B41/50P50	. . . . .	[N: Rare-earth oxides] [ <a href="#">C9810</a> ]
C04B41/50P443	. . . . .	[N: Spinels, e.g. magnesium aluminate spinels]
C04B41/50P447	. . . . .	[N: Phosphates]
C04B41/50P453	. . . . .	[N: Zinc or bismuth oxides] [ <a href="#">N9503</a> ]
C04B41/50P457	. . . . .	[N: Tin oxide]
C04B41/50P495	. . . . .	[N: Niobium oxides or niobates]
C04B41/50R	. . .	[N: non-oxide ceramics (carbon or carbonisable materials <a href="#">C04B41/50B</a> )] [ <a href="#">C0008</a> ]
C04B41/50R54	. . . . .	[N: Sulfides or selenides]
C04B41/50R55	. . . . .	[N: Fluorides] [ <a href="#">N9510</a> ]
C04B41/50R56	. . . . .	[N: Carbides]
C04B41/50R56C	. . . . .	[N: Boron carbide] [ <a href="#">N9706</a> ]
C04B41/50R56D	. . . . .	[N: Silicon carbide]
C04B41/50R56T	. . . . .	[N: Titanium carbide]
C04B41/50R58	. . . . .	[N: Borides, Nitrides or Silicides]
C04B41/50R58C	. . . . .	[N: Aluminium nitride]
C04B41/50R58D	. . . . .	[N: Boron nitride]
C04B41/50R58H	. . . . .	[N: Silicon nitride]
C04B41/50R58K	. . . . .	[N: Silicon oxynitrides, e.g. SIALON]
C04B41/50R58P	. . . . .	[N: Titanium nitride]
C04B41/50R58R	. . . . .	[N: Borides]

C04B41/50R58S	. . . . .	[N: Silicides]
C04B41/50S	. . . . .	[N: with oxides or hydroxides not covered by <a href="#">C04B41/50P</a> ( <a href="#">C04B40/02B2</a> takes precedence; boron oxide <a href="#">C04B41/50C</a> )] [C0002]
C04B41/50S8	. . . . .	[N: Copper oxide or solid solutions thereof (CuO-Cu eutectic <a href="#">C04B41/51J</a> )]
C04B41/50S8C	. . . . .	[N: Copper oxide] [N9410]
C04B41/50T	. . . . .	[N: with masses bonded by inorganic cements (sulfur compositions <a href="#">C04B41/50W8</a> )]
C04B41/50T1	. . . . .	[N: Geopolymer cements]
C04B41/50T4	. . . . .	[N: Portland cements]
C04B41/50T6	. . . . .	[N: Aluminous cements]
C04B41/50T6B	. . . . .	[N: Calcium alumino sulfate cements] [N9802]
C04B41/50T8	. . . . .	[N: Slag cements]
C04B41/50T10	. . . . .	[N: Lime, hydraulic lime or magnesium oxide cements]
C04B41/50T14	. . . . .	[N: Calcium sulfate cements]
C04B41/50T14B	. . . . .	[N: Anhydrite]
C04B41/50T18	. . . . .	[N: Cementitious compositions of the silica-lime type]
C04B41/50T24	. . . . .	[N: Silica sols, alkyl, ammonium or alkali metal silicate cements]
C04B41/50T30	. . . . .	[N: Magnesium cements, e.g. Sorel cement]
C04B41/50T34	. . . . .	[N: Phosphate cements]
C04B41/50W	. . . . .	[N: with elements other than metals or carbon (treatment with fluorine gas <a href="#">C04B41/50H2</a> )] [C9410]
C04B41/50W2	. . . . .	[N: Boron]
C04B41/50W4	. . . . .	[N: Silicon ( <a href="#">C04B35/573</a> takes precedence)] [C9911]
C04B41/50W8	. . . . .	[N: Sulfur]
C04B41/50Z	. . . . .	[N: Cermets] [N9710]
C04B41/51	. . . . .	Metallising, [N: e.g. infiltration of sintered ceramic preforms with molten metal (covering materials with metals in general <a href="#">C23C</a> ; ceramic compositions containing free metal bonded to carbides, diamond, oxides, borides, nitrides, silicides, e.g. cermets, or other metal compounds, e.g. oxynitrides or sulfides, other than as macroscopic reinforcing agents <a href="#">C22C</a> ; infiltration of preforms containing free metal, e.g. cermets <a href="#">C22C</a> )] [C9905]
C04B41/51B	. . . . .	[N: with a composition mainly composed of one or more of the noble metals or copper]
C04B41/51D	. . . . .	[N: Ag, Au, Pd, Pt or Cu]
C04B41/51F	. . . . .	[N: Ag or Au]
C04B41/51H	. . . . .	[N: Pd or Pt]
C04B41/51J	. . . . .	[N: Cu, e.g. Cu-CuO eutectic]
C04B41/51L	. . . . .	[N: with a composition mainly composed of one or more of the refractory metals]
C04B41/51N	. . . . .	[N: with a composition mainly composed of Mn and Mo, e.g. for the Moly-manganese method]
C04B41/51P	. . . . .	[N: with a composition mainly composed of one or more of the metals of the iron group]
C04B41/51Q	. . . . .	[N: Other specific metals]
C04B41/51Q2	. . . . .	[N: Aluminium]
C04B41/51Q4	. . . . .	[N: Tin]

- C04B41/51Q6 . . . . . [N: Lead]
- C04B41/51Q8 . . . . . [N: Cadmium]
- C04B41/51R . . . . . [N: characterised by the non-metallic part of the metallising composition]
- C04B41/51T . . . . . [N: inorganic]
- C04B41/51V . . . . . [N: organic]
- C04B41/51W . . . . . [N: Metallisation of multilayered ceramics, e.g. for the fabrication of multilayer ceramic capacitors]
- C04B41/52 . . . . . Multiple coating or impregnating [N: multiple coating or impregnating with the same composition or with compositions only differing in the concentration of the constituents, is classified as single coating or impregnation]
- [N: **Note**
- ]
- C04B41/52A . . . . . [N: Multiple coatings, for one of the coatings of which at least one alternative is described]
- C04B41/52B . . . . . [N: Multiple coatings, comprising a coating layer of the same material as a previous coating layer] [N1109]
- C04B41/52D . . . . . [N: Multiple coating or impregnation with materials having the same composition but different characteristics]
- C04B41/52H . . . . . [N: Applying layers containing opposite charged particles or materials in the successive layers]
- C04B41/53 . . . . . involving the removal of at least part of the materials of the treated article, [N: e.g. etching, drying of hardened concrete ([C04B41/00L](#) to [C04B41/00P](#) take precedence)] [C9411]
- C04B41/53A . . . . . [N: Removal of physically bonded water, e.g. drying of hardened concrete ([E04B1/70B](#) takes precedence)] [C9411]
- C04B41/53B . . . . . [N: Cleaning compositions, e.g. for removing hardened cement from ceramic tiles]
- C04B41/53D . . . . . [N: to make grain visible, e.g. for obtaining exposed aggregate concrete] [C9911]
- C04B41/53D2 . . . . . [N: Seeding methods, i.e. the exposed aggregates, at least partially, not making part of the starting mixture] [N0103]
- C04B41/53E . . . . . [N: Etching (for obtaining decorative effects [B44C1/22](#); etching of specific electronic compounds, see the relevant places, e.g. etching of semiconductor bodies [H01L21/306](#))] [C9908]
- C04B41/53E2 . . . . . [N: Dry etching]
- C04B41/53E4 . . . . . [N: Wet etching, e.g. with etchants dissolved in organic solvents]
- C04B41/53E6 . . . . . [N: Etching with molten material]
- C04B41/53H . . . . . [N: Desalination, e.g. of reinforced concrete] [N9411] [C9512]
- C04B41/53H2 . . . . . [N: Electrochemical desalination (electrochemical re-alkalisation [C04B41/45B40B](#); drying by electro-osmosis [E04B1/70B](#))] [N9512]
- C04B41/53K . . . . . [N: by electrochemical methods (electrochemical desalination [C04B41/53H2](#))] [N9603]
- C04B41/53T . . . . . [N: by burning ([C04B38/06](#) takes precedence)]
- C04B41/60 . . . . . of only artificial stone [N0503]
- C04B41/61 . . . . . Coating or impregnation [N0503]
- C04B41/62 . . . . . with organic materials [N0503]
- C04B41/63 . . . . . Macromolecular compounds [N0503]

- C04B41/64 . . . . Compounds having one or more carbon-to-metal or carbon-to-silicon linkages [N0503]
- C04B41/65 . . . . with inorganic materials [N0503]
- C04B41/66 . . . . Fluorides, e.g. fluorates [N0503]
- C04B41/67 . . . . Phosphates [N0503]
- C04B41/68 . . . . Silicic acid; Silicates [N0503]
- C04B41/69 . . . . Metals [N0503]
- C04B41/70 . . . . for obtaining at least two superposed coatings having different compositions [N0503]
- C04B41/71 . . . . at least one coating being an organic material [N0503]
- C04B41/72 . . . . involving the removal of part of the materials of the treated articles, e.g. etching [N0503]
  
- C04B41/80 . . . . of only ceramics [N0503]
- C04B41/81 . . . . Coating or impregnation [N0503]
- C04B41/82 . . . . with organic materials [N0503]
- C04B41/83 . . . . Macromolecular compounds [N0503]
- C04B41/84 . . . . Compounds having one or more carbon-to-metal or carbon-to-silicon linkages [N0503]
- C04B41/85 . . . . with inorganic materials [N0503]
- C04B41/86 . . . . Glazes; Cold glazes [N0503]
- C04B41/87 . . . . Ceramics [N0503]
- C04B41/88 . . . . Metals [N0503]
- C04B41/89 . . . . for obtaining at least two superposed coatings having different compositions [N0503]
- C04B41/90 . . . . at least one coating being a metal [N0503]
- C04B41/91 . . . . involving the removal of part of the materials of the treated articles, e.g. etching [N0503]