CPC COOPERATIVE PATENT CLASSIFICATION

B01J CHEMICAL OR PHYSICAL PROCESSES, e.g. CATALYSIS, COLLOID CHEMISTRY; THEIR RELEVANT APPARATUS

(processes or apparatus for specific applications, see the relevant places for these processes or apparatus, e.g. F26B 3/08)

NOTES

1. In this subclass, the following terms or expressions are used with the meanings indicated :
   - "solid particles" includes such particles whether catalysts, reactants or inert in solid,semi-solid or pasty state;
   - "fluidised particles" means finely divided solid particles lifted and agitated by a stream of fluid;
   - "fluidised bed-technique" means fluid-solid contacting technique in which finely divided particles are lifted and agitated by a rising stream of fluid, said stream having such a speed as to form a lower dense phase (the "bed") and an upper dilute fluidised phase of "fluidised particles";
   - "processes conducted in the presence of solid particles" does not include processes wherein the only solid particles present are formed during the reaction.
2. In this subclass, tradenames that are often found in scientific and patent literature have been used in order to define precisely the scope of the groups

WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

B01J 37/025 covered by B01J 37/02

B01J 2/00 **Processes or devices for granulating materials, {e.g. fertilisers} in general** (granulating metals B22F 9/00, {granulating slag C21B 3/06} , ores or scrap C22B 1/14; mechanical aspects of working of plastics or substances in a plastic state to make granules B29B 9/00; processes for granulating fertilisers characterised by their chemical constitution, see the relevant groups in C05B - C05G; chemical aspects of powdering or granulating of macromolecular substances C08J 3/12)**; Rendering particulate materials free flowing in general, e.g. making them hydrophobic**

B01J 2/003 . {followed by coating of the granules (to prevent the granules sticking together B01J 2/30)}

B01J 2/006 . {Coating of the granules without description of the process or the device by which the granules are obtained (to prevent the granules sticking together B01J 2/30)}

B01J 2/02 . by dividing the liquid material into drops, e.g. by spraying, and solidifying the drops (evaporating by spraying B01D 1/16)

B01J 2/04 . . in a gaseous medium {(if combined with suspending the material in a gas, e.g. fluidised beds B01J 2/16)}

B01J 2/06 . . in a liquid medium

B01J 2/08 . . . Gelation of a colloidal solution

B01J 2/10 . in stationary drums or troughs, provided with kneading or mixing appliances

B01J 2/12 . in rotating drums

B01J 2/14 . in rotating dishes or pans

B01J 2/16 . by suspending the powder material in a gas, e.g. in fluidised beds or as a falling curtain

NOTE

For classification in B01J 2/16, the fact that during the process the material is suspended in a gas prevails over the aggregation state of the material at the moment of its suspension in the gas

B01J 2/18 . using a vibrating apparatus

B01J 2/20 . by expressing the material, e.g. through sieves and fragmenting the extruded length

B01J 2/22 . by pressing in moulds or between rollers

B01J 2/24 . Obtaining flakes by scraping a solid layer from a surface

B01J 2/26 . on endless conveyor belts

B01J 2/28 . using special binding agents

B01J 2/30 . using agents to prevent the granules sticking together; Rendering particulate materials free flowing in general, e.g. making them hydrophobic

B01J 3/00 **Processes of utilising sub-atmospheric or super-atmospheric pressure to effect chemical or physical change of matter; Apparatus therefor** (apparatus for compacting or sintering of metal powders B22F 3/00; pressure vessels in general F16J 12/00; pressure vessels for containing or storing compressed, liquefied or solidified gases F17C; pressure vessels for nuclear reactors G21C)

B01J 3/002 . {Component parts of these vessels not mentioned in B01J 3/004, B01J 3/006, B01J 3/02 - B01J 3/08; Measures taken in conjunction with the process to be carried out, e.g. safety measures}

B01J 3/004 . {Sight-glasses therefor (see also G02B)}

B01J 3/006 . {Processes utilising sub-atmospheric pressure; Apparatus therefor}

B01J 3/008 . {Processes carried out under supercritical conditions}

B01J 3/02 . Feed or outlet devices therefor

B01J 3/03 . Pressure vessels, or vacuum vessels, having closure members or seals specially adapted therefor

B01J 3/04 . Pressure vessels, e.g. autoclaves

B01J 3/042 . . {in the form of a tube}

B01J 3/044 . . {in the form of a loop}

B01J 3/046 . . {Pressure-balanced vessels}

B01J 3/048 . . {Multiwall, strip or filament wound vessels (for pressurised gas vessels F17C 1/06; for making them B29)}

B01J 3/06 . Processes using ultra high pressure, e.g. for the formation of diamonds; Apparatus therefor, e.g. moulds, dies (B01J 3/04 takes precedence; presses in general B30B)

B01J 3/062 . . {characterised by the composition of the materials to be processed}

B01J 3/065 . . {Presses for the formation of diamonds or boronitrides}

B01J 3/067 . . . {Presses using a plurality of pressing members working in different directions}

B01J 3/08 . . Application of shock-waves for chemical reactions or for modifying the crystal structure of substances, {e.g. reactions carried out by explosions or in a combustion engine-type reactor} (blasting F42D)

B01J 4/00 **Feed {or outlet} devices; Feed or outlet regulating devices** (feed or outlet devices for pressure vessels B01J 3/02; {feeding of particles into and evacuation of particles out of the reactor B01J 8/0015})

B01J 4/001 . {Feed or outlet devices as such, e.g. feeding tubes}

B01J 4/002 . . {Nozzle-type elements (nozzle-type reactors B01J 19/26)}

B01J 4/004 . . {Sparger-type elements}

B01J 4/005 . . {provided with baffles}

B01J 4/007 . . {provided with moving parts}

B01J 4/008 . {Feed or outlet regulating or controlling devices}

B01J 4/02 . for feeding measured {i.e. prescribed} quantities of reagents

B01J 4/04 . using osmotic pressure {using membranes, porous plates}

B01J 6/00 **{Heat treatments such as} Calcining; Fusing {Pyrolysis** (furnaces F27D)**}**

B01J 6/001 . {Calcining}

B01J 6/002 . . {using rotating drums}

B01J 6/004 . . {using hot gas streams in which the material is moved}

B01J 6/005 . {Fusing}

B01J 6/007 . . {in crucibles}

B01J 6/008 . {Pyrolysis reactions (of hydrocarbons C10G 9/00)}

B01J 7/00 **Apparatus for generating gases** (production of inert gas mixtures B01J 19/14; for generating specific gases, see the relevant subclasses, e.g. C01B, C10J; {in "air bags" on vehicles B60R 21/26; for starter gas F02C 7/26; blasting cartridges for producing gas under pressure F42B 3/04})

B01J 7/02 . by wet methods

B01J 8/00 **Chemical or physical processes in general, conducted in the presence of fluids and solid particles; Apparatus for such processes** (processes or devices for granulating material B01J 2/00; furnaces F27B; {heat exchange apparatus F28C 3/10; F28D 13/00, F28D 17/00, F28D 19/00})

B01J 8/0005 . {Catalytic processes under superatmospheric pressure (non-catalytic processes B01J 3/00)}

B01J 8/001 . {Controlling catalytic processes (B01J 8/1809 takes precedence)}

B01J 8/0015 . {Feeding of the particles in the reactor; Evacuation of the particles out of the reactor}

B01J 8/002 . . {with a moving instrument}

B01J 8/0025 . . {by an ascending fluid}

B01J 8/003 . . {in a downward flow}

B01J 8/0035 . . {Periodical feeding or evacuation}

B01J 8/004 . . {by means of a nozzle}

B01J 8/0045 . . {by means of a rotary device in the flow channel}

B01J 8/005 . {Separating solid material from the gas/liquid stream (separation processes per se B01D)}

B01J 8/0055 . . {using cyclones}

B01J 8/006 . . {by filtration}

B01J 8/0065 . . {by impingement against stationary members}

B01J 8/007 . . {by sedimentation}

B01J 8/0075 . . {by electrostatic precipitation}

B01J 8/008 . {Details of the reactor or of the particulate material; Processes to increase or to retard the rate of reaction (B01J 8/0285, B01J 8/067, B01J 8/087, B01J 8/1836 take precedence)}

B01J 8/0085 . . {promoting uninterrupted fluid flow, e.g. by filtering out particles in front of the catalyst layer}

B01J 8/009 . . {Membranes, e.g. feeding or removing reactants or products to or from the catalyst bed through a membrane}

B01J 8/0095 . {in which two different types of particles react with each other}

B01J 8/02 . with stationary particles, e.g. in fixed beds

B01J 8/0207 . . {the fluid flow within the bed being predominantly horizontal}

B01J 8/0214 . . . {in a cylindrical annular shaped bed}

B01J 8/0221 . . . {in a cylindrical shaped bed (B01J 8/0214 takes precedence)}

B01J 8/0228 . . . {in a conically shaped bed}

B01J 8/0235 . . . {in a spiral shaped bed}

B01J 8/0242 . . {the fluid flow within the bed being predominantly vertical}

B01J 8/025 . . . {in a cylindrical shaped bed}

B01J 8/0257 . . . {in a cylindrical annular shaped bed}

B01J 8/0264 . . . {in a conically shaped bed}

B01J 8/0271 . . . {in a spiral shaped bed}

B01J 8/0278 . . {Feeding reactive fluids (for solid material B01J 8/0015)}

B01J 8/0285 . . {Heating or cooling the reactor (for tubular reactors in furnaces B01J 8/062)}

B01J 8/0292 . . {with stationary packing material in the bed, e.g. bricks, wire rings, baffles}

B01J 8/04 . . the fluid passing successively through two or more beds

B01J 8/0403 . . . {the fluid flow within the beds being predominantly horizontal}

B01J 8/0407 . . . . {through two or more cylindrical annular shaped beds}

B01J 8/0411 . . . . . {the beds being concentric}

B01J 8/0415 . . . . . {the beds being superimposed one above the other (B01J 8/0434 takes precedence)}

B01J 8/0419 . . . . . {the beds being placed in separate reactors}

B01J 8/0423 . . . . {through two or more otherwise shaped beds}

B01J 8/0426 . . . . . {the beds being superimposed one above the other}

B01J 8/043 . . . . . {in combination with one cylindrical annular shaped bed}

B01J 8/0434 . . . . . {in combination with two or more cylindrical annular shaped beds}
B01J 8/0438 . . . . . {the beds being placed next to each other}
B01J 8/0442 . . . . . {the beds being placed in separate reactors}
B01J 8/0446 . . . {the flow within the beds being predominantly vertical}
B01J 8/0449 . . . . {in two or more cylindrical beds}
B01J 8/0453 . . . . . {the beds being superimposed one above the other}
B01J 8/0457 . . . . . {the beds being placed in separate reactors}
B01J 8/0461 . . . . {in two or more cylindrical annular shaped beds}
B01J 8/0465 . . . . . {the beds being concentric}
B01J 8/0469 . . . . . {the beds being superimposed one above the other}
B01J 8/0473 . . . . . {the beds being placed in separate reactors}
B01J 8/0476 . . . . {in two or more otherwise shaped beds}
B01J 8/048 . . . . . {the beds being superimposed one above the other}
B01J 8/0484 . . . . . {the beds being placed next to each other}
B01J 8/0488 . . . . . {the beds being placed in separate reactors}
B01J 8/0492 . . . {Feeding reactive fluids (for solid material, see B01J 8/0015)}
B01J 8/0496 . . . {Heating or cooling the reactor}
B01J 8/06 . . in tube reactors; the solid particles being arranged in tubes
B01J 8/062 . . . {being installed in a furnace}
B01J 8/065 . . . {Feeding reactive fluids}
B01J 8/067 . . . {Heating or cooling the reactor (B01J 8/062 takes precedence)}
B01J 8/08 . with moving particles (with fluidised particles B01J 8/18)
B01J 8/082 . . {Controlling processes}
B01J 8/085 . . {Feeding reactive fluids (for solid material, see B01J 8/0015)}
B01J 8/087 . . {Heating or cooling the reactor}
B01J 8/10 . . moved by stirrers or by rotary drums or rotary receptacles {or endless belts}
B01J 8/12 . . moved by gravity in a downward flow
B01J 8/125 . . . {with multiple sections one above the other separated by distribution aids, e.g. reaction and regeneration sections}
B01J 8/14 . . moving in free vortex flow apparatus (free vortex flow apparatus in general B04C)
B01J 8/16 . with particles being subjected to vibrations or pulsations (B01J 8/40 takes precedence)
B01J 8/18 . with fluidised particles {(combustion apparatus with fluidised bed in general F23C 10/00; furnaces with fluidised bed F27B 15/00)}
B01J 8/1809 . . {Controlling processes}
B01J 8/1818 . . {Feeding of the fluidising gas (B01J 8/44 takes precedence)}
B01J 8/1827 . . . {the fluidising gas being a reactant}
B01J 8/1836 . . {Heating and cooling the reactor (B01J 8/42 takes precedence)}
B01J 8/1845 . . {with particles moving upwards while fluidised}

B01J 8/1854 . . . {followed by a downward movement inside the reactor to form a loop}

B01J 8/1863 . . . {followed by a downward movement outside the reactor and subsequently re-entering it}

B01J 8/1872 . . {Details of the fluidised bed reactor (B01J 8/1836 takes precedence)}

B01J 8/1881 . . {with particles moving downwards while fluidised}

B01J 8/189 . . . {moving downwards in a zig-zag manner}

B01J 8/20 . . with liquid as a fluidising medium

B01J 8/22 . . . gas being introduced into the liquid

B01J 8/222 . . . . {in the presence of a rotating device only}

B01J 8/224 . . . . {the particles being subject to a circulatory movement (B01J 8/222 takes precedence)}

B01J 8/226 . . . . . {internally, i.e. the particles rotate within the vessel}

B01J 8/228 . . . . . {externally, i.e. the particles leaving the vessel and subsequently re-entering it}

B01J 8/24 . . according to "fluidised-bed" technique (B01J 8/20 takes precedence; combustion apparatus in which combustion takes place in a fluidised bed of fuel or other particles F23C 10/00)

B01J 8/245 . . . {Spouted-bed technique}

B01J 8/26 . . . with two or more fluidised beds, e.g. reactor and regeneration installations

B01J 8/28 . . . . the one above the other

B01J 8/30 . . . . . the edge of a lower bed projecting beyond the edge of the superjacent bed

B01J 8/32 . . . with introduction into the fluidised bed of more than one kind of moving particles

B01J 8/34 . . . with stationary packing material in the fluidised bed, e.g. bricks, wire rings, baffles

B01J 8/36 . . . with fluidised bed through which there is an essentially horizontal flow of particles

B01J 8/38 . . . with fluidised bed containing a rotatable device or being subject to rotation {or to a circulatory movement, i.e. leaving a vessel and subsequently re-entering it}

B01J 8/382 . . . . {with a rotatable device only}

B01J 8/384 . . . . {being subject to a circulatory movement only (B01J 8/382 takes precedence)}

B01J 8/386 . . . . . {internally, i.e. the particles rotate within the vessel}

B01J 8/388 . . . . . {externally, i.e. the particles leaving the vessel and subsequently re-entering it}

B01J 8/40 . . . with fluidised bed subjected to vibrations or pulsations

B01J 8/42 . . . with fluidised bed subjected to electric current or to radiations {this sub-group includes the fluidised bed subjected to electric or magnetic fields}

B01J 8/44 . . . Fluidisation grids

B01J 8/46 . . . for treatment of endless filamentary, band or sheet material

B01J 10/00	**Chemical processes in general for reacting liquid with gaseous media other than in the presence of solid particles, or apparatus specially adapted therefor** (B01J 19/08 takes precedence; separation, e.g. distillation, also combined with chemical reactions B01D, {e.g. B01D 3/009})
B01J 10/002	. {carried out in foam, aerosol or bubbles}
B01J 10/005	. {carried out at high temperatures in the presence of a molten material}
B01J 10/007	. {in the presence of catalytically active bodies, e.g. porous plates}
B01J 10/02	. of the thin-film type
B01J 12/00	**Chemical processes in general for reacting gaseous media with gaseous media; Apparatus specially adapted therefor** (B01J 3/08, B01J 8/00, B01J 19/08 take precedence)
B01J 12/002	. {carried out in the plasma state (generating or handling plasma H05H 1/00)}
B01J 12/005	. {carried out at high temperatures, e.g. by pyrolysis}
B01J 12/007	. {in the presence of catalytically active bodies, e.g. porous plates}
B01J 12/02	. for obtaining at least one reaction product which, at normal temperature, is in the solid state
B01J 13/00	**Colloid chemistry, e.g. the production of colloidal materials or their solutions, not otherwise provided for; Making micro-capsules or micro-balloons** (use of substances as emulsifying, wetting, dispersing or foam producing agents B01F 17/00)
B01J 13/0004	. {Preparation of sols (by physical processes B01J 13/0086, aerosols B01J 13/0095)}
B01J 13/0008	. . {Sols of inorganic materials in water}
B01J 13/0013	. . . {from a precipitate}
B01J 13/0017	. . . {by extraction of ions from aqueous solutions}
B01J 13/0021	. . {containing a solid organic phase}
B01J 13/0026	. . {containing a liquid organic phase}
B01J 13/003	. . . {Preparation from aqueous sols}
B01J 13/0034	. . {Additives, e.g. in view of promoting stabilisation or peptisation}
B01J 13/0039	. . {Post treatment}
B01J 13/0043	. . {containing elemental metal (for medical or diagnostical purposes A61K, G01N)}
B01J 13/0047	. . {containing a metal oxide}
B01J 13/0052	. {Preparation of gels}
B01J 13/0056	. . {containing inorganic material and water}
B01J 13/006	. . . {by precipitation, coagulation, hydrolyse coacervation}
B01J 13/0065	. . {containing an organic phase}
B01J 13/0069	. . {Post treatment}
B01J 13/0073	. {Preparation of non-Newtonian sols, e.g. thixotropic solutions}
B01J 13/0078	. . {containing inorganic material and water}
B01J 13/0082	. . {containing an organic phase}

B01J 13/0086 . {Preparation of sols by physical processes (colloid mills B02C)}

B01J 13/0091 . {Preparation of aerogels, e.g. xerogels}

B01J 13/0095 . {Preparation of aerosols}

B01J 13/02 . Making micro-capsules or micro-balloons {(for medical preparations A61K 9/50)}

B01J 13/025 . . {Applications of micro-capsules not provided for in other subclasses}

B01J 13/04 . . by physical processes, e.g. drying, spraying

B01J 13/043 . . . {Drying and spraying}

B01J 13/046 . . . {combined with gelification or coagulation}

B01J 13/06 . . by phase separation

B01J 13/08 . . . Simple coacervation, i.e. addition of highly hydrophilic material {(combined with spraying B01J 13/043; combined with mechanical division B01J 13/04)}

B01J 13/10 . . . Complex coacervation, i.e. interaction of oppositely charged particles

B01J 13/12 . . . removing solvent from the wall-forming material solution

B01J 13/125 . . . . {by evaporation of the solvent (apparatus therefor B01J 13/043)}

B01J 13/14 . . . Polymerisation; cross-linking

B01J 13/16 . . . . Interfacial polymerisation

B01J 13/18 . . . . In situ polymerisation with all reactants being present in the same phase

B01J 13/185 . . . . . {in an organic phase}

B01J 13/20 . . After-treatment of capsule walls, e.g. hardening

B01J 13/203 . . . {Exchange of core-forming material by diffusion through the capsule wall}

B01J 13/206 . . . {Hardening; drying}

B01J 13/22 . . . Coating

B01J 14/00 **Chemical processes in general for reacting liquids with liquids; Apparatus specially adapted therefor** (B01J 8/00, B01J 19/08 take precedence)

B01J 14/005 . {in the presence of catalytically active bodies, e.g. porous plates}

B01J 15/00 **Chemical processes in general for reacting gaseous media with non-particulate solids, e.g. sheet material; Apparatus specially adapted therefor** (B01J 19/08 takes precedence)

B01J 15/005 . {in the presence of catalytically active bodies, e.g. porous plates}

B01J 16/00 **Chemical processes in general for reacting liquids with non- particulate solids, e.g. sheet material; Apparatus specially adapted therefor** (B01J 19/08 takes precedence)

B01J 16/005 . {in the presence of catalytically active bodies, e.g. porous plates}

B01J 19/00 **Chemical, physical, or physico-chemical processes in general** (physical treatment of fibres, threads, yarns, fabrics, feathers or fibrous goods made from such materials, see the relevant places for such treatment, e.g. D06M 10/00)**; Their relevant apparatus** (packings, fillings or grids specially adapted for biological treatment of water, waste water or sewage C02F 3/10; splashing boards or grids specially adapted for trickle coolers F28F 25/08)

B01J 19/0006 . {Controlling or regulating processes (controlling or regulating in general G05)}

B01J 19/0013 . . {Controlling the temperature of the process}

B01J 19/002 . . {Avoiding undesirable reactions or side-effects, e.g. avoiding explosions, or improving the yield by suppressing side-reactions}

B01J 19/0026 . . . {Avoiding carbon deposits (inhibiting incrustation in general, C23F 14/00, C23F 15/00)}

B01J 19/0033 . . {Optimalisation processes, i.e. processes with adaptive control systems (adaptive control systems per se G05B 13/00)}

B01J 19/004 . . {Multifunctional apparatus for automatic manufacturing of various chemical products (sequential reactions B01J 19/0046)}

B01J 19/0046 . {Sequential or parallel reactions, e.g. for the synthesis of polypeptides or polynucleotides; Apparatus and devices for combinatorial chemistry or for making molecular arrays (synthesis methods per se C40B 50/00)}

B01J 19/0053 . {Details of the reactor}

B01J 19/006 . . {Baffles}

B01J 19/0066 . . {Stirrers (mixing per se B01F)}

B01J 19/0073 . . {Sealings (sealings for pressure vessels per se F16J 15/00)}

B01J 19/008 . {Processes for carrying out reactions under cavitation conditions}

B01J 19/0086 . {Processes carried out with a view to control or to change the pH-value; Applications of buffer salts; Neutralisation reactions}

B01J 19/0093 . {Microreactors, e.g. miniaturised or micro-fabricated reactors (laboratory containers with capillary fluid transport in microfabricated channels or chambers B01L 3/5027)}

B01J 19/02 . Apparatus characterised by being constructed of material selected for its chemically-resistant properties (refractory details of furnaces F27D)

B01J 19/06 . Solidifying liquids (making microcapsules B01J 13/02)

B01J 19/08 . Processes employing the direct application of electric or wave energy, or particle radiation; Apparatus therefor (application of shock waves B01J 3/08; generating or handling plasma H05H 1/00)

B01J 19/081 . . {employing particle radiation or gamma-radiation}

B01J 19/082 . . . {Gamma-radiation only}

B01J 19/084 . . . {Neutron beams only}

B01J 19/085 . . . {Electron beams only}

B01J 19/087 . . {employing electric or magnetic energy}

B01J 19/088 . . . {giving rise to electric discharges (for heating purposes H05B 7/00; for the production of ozone C01B 13/11, H01T 19/00)}

B01J 19/10 . . employing sonic or ultrasonic vibrations (for auxiliary pretreatment of gases or vapours to be cleaned B01D 51/08; for cleaning B08B 3/12; {for degasification of liquids B01D 19/0073; for mixing purposes B01F 11/02})

B01J 19/12 . . employing electromagnetic waves

B01J 19/121 . . . {Coherent waves, e.g. laser beams (lasers per se H01S 3/00)}

B01J 19/122 . . . {Incoherent waves (gamma-radiation B01J 19/082)}

B01J 19/123 . . . . {Ultra-violet light}

B01J 19/124 . . . . . {generated by microwave irradiation}

B01J 19/125 . . . . {X-rays}

B01J 19/126 . . . . {Microwaves}

B01J 19/127 . . . . {Sunlight; Visible light}

B01J 19/128 . . . . {Infra-red light}

B01J 19/129 . . . . {Radiofrequency}

B01J 19/14 . Production of inert gas mixtures; Use of inert gases in general (apparatus for generating gases B01J 7/00; separation of gases or vapours B01D 53/00 {application in storage tanks B65D 90/44})

B01J 19/16 . Preventing evaporation or oxidation of non-metallic liquids by applying a floating layer, e.g. of micro-balloons {(in storage tanks B65D 90/42)}

B01J 19/18 . Stationary reactors having moving elements inside (B01J 19/08, B01J 19/26 take precedence)

B01J 19/1806 . . {resulting in a turbulent flow of the reactants, such as in centrifugal-type reactors, or having a high Reynolds-number}

B01J 19/1812 . . {Tubular reactors}

B01J 19/1818 . . . {in series}

B01J 19/1825 . . . {in parallel}

B01J 19/1831 . . . {spirally, concentrically or zigzag wound}

B01J 19/1837 . . . {Loop-type reactors}

B01J 19/1843 . . . {Concentric tube}

B01J 19/185 . . {of the pulsating type}

B01J 19/1856 . . {placed in parallel}

B01J 19/1862 . . {placed in series}

B01J 19/1868 . . {resulting in a loop-type movement}

B01J 19/1875 . . . {internally, i.e.the mixture circulating inside the vessel such that the upwards stream is separated physically from the downwards stream(s)}

B01J 19/1881 . . . {externally, i.e. the mixture leaving the vessel and subsequently re-entering it}

B01J 19/1887 . . {forming a thin film}

B01J 19/1893 . . {Membrane reactors (membranes B01D 71/00; catalytic membranes B01J 35/065)}

B01J 19/20 . . in the form of helices, e.g. screw reactors (thin-film reactors B01J 10/02)

B01J 19/22 . . in the form of endless belts

B01J 19/24 . Stationary reactors without moving elements inside (B01J 19/08, B01J 19/26 take precedence; with stationary particles B01J 8/02)

B01J 19/2405 . . {provoking a turbulent flow of the reactants, such as in cyclones, or having a high Reynolds-number}

B01J 19/241 . . {of the pulsating type}

B01J 19/2415 . . {Tubular reactors}

B01J 19/242 . . . {in series}

B01J 19/2425 . . . {in parallel}

B01J 19/243 . . . {spirally, concentrically or zigzag wound}

B01J 19/2435 . . . {Loop-type reactors}

B01J 19/244 . . . {Concentric tubes}

B01J 19/2445 . . {placed in parallel}

B01J 19/245 . . {placed in series}

B01J 19/2455 . . {provoking a loop type movement of the reactants (tubular loop-type reactors B01J 19/2435; loop reactors having moving elements inside B01J 19/1868)}

B01J 19/246 . . . {internally, i.e. the mixture circulating inside the vessel such that the upward stream is separated physically from the downward stream(s)}

B01J 19/2465 . . . {externally, i.e. the mixture leaving the vessel and subsequently re-entering it}

B01J 19/247 . . {Suited for forming thin films}

B01J 19/2475 . . {Membrane reactors}

B01J 19/248 . . {Reactors comprising multiple separated flow channels}

B01J 19/2485 . . . {Monolithic reactors}

B01J 19/249 . . . {Plate-type reactors}

B01J 19/2495 . . . {Net-type reactors}

B01J 19/26 . Nozzle-type reactors, i.e. the distribution of the initial reactants within the reactor is effected by their introduction or injection through nozzles

B01J 19/28 . Moving reactors, e.g. rotary drums (B01J 19/08 takes precedence; centrifuges B04B; rotary drum furnaces {B01J 6/002} , F27B 7/00)

B01J 19/285 . . {Shaking or vibrating reactors; reactions under the influence of low-frequency vibrations or pulsations (for sonic and ultrasonic vibrations B01J 19/10)}

B01J 19/30 . Loose or shaped packing elements, e.g. Raschig rings or Berl saddles, for pouring into the apparatus for mass or heat transfer

B01J 19/305 . . {Supporting elements therefor, e.g. grids, perforated plates}

B01J 19/32 . Packing elements in the form of grids or built-up elements for forming a unit or module inside the apparatus for mass or heat transfer

B01J 19/325 . . {Attachment devices therefor, e.g. hooks, consoles, brackets}

Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Catalysts

NOTES

1. In groups B01J 20/00 - B01J 31/00, metal salts having an anion composed of metal and oxygen only, e.g. molybdates, are considered as chemically bound mixtures of the component metal oxides.
2. Attention is drawn to the definitions of groups of chemical elements following the title of section C.
3. In group B01J 20/00 and in each set of groups B01J 21/00 - B01J 31/00 and B01J 32/00 - B01J 38/00, the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place.
4. Pure compounds or elements, or their recovery from solid sorbent compositions, filter aid compositions, or catalysts, are classified in the appropriate subclass for chemical compounds or elements. However, when it is explicitly stated that the pure compound or element, in a particular form, is especially useful as a solid sorbent, filter aid, or catalyst, it is further classified in group B01J 20/00 or B01J 35/00.
5. {In groups B01J 21/00 - B01J 38/00, the following term is used with the meaning indicated:
   - "catalyst" covers also a carrier forming part of the catalyst.

   }
6. {Classification of the:
   - carriers;
   - forms or physical properties;
   - preparation or activation;
   - regeneration or reactivation of catalysts according to more than one of main groups B01J 21/00 - B01J 31/00 is made in the following general groups:
     - B01J 32/00 for such carriers;
     - B01J 35/00 for such forms or physical properties;
     - B01J 37/00 for such preparation or activation;
     - B01J 38/00 for such regeneration or reactivation.

   }

B01J 20/00	**Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Processes for preparing, regenerating or reactivating thereof** (use of sorbent compositions in liquid separation B01D 15/00, use of filter aid compositions B01D 37/02; use of sorbent compositions in gas separation B01D 53/02, B01D 53/14)
B01J 20/02	. comprising inorganic material
B01J 20/0203	. . {comprising compounds of metals not provided for in B01J 20/04 (oxides or hydroxides thereof B01J 20/06)} **NOTE** Compounds classified in group B01J 20/0203 and subgroups are also classified in B01J 20/0274 according to the type of anion
B01J 20/0207	. . . {Compounds of Sc, Y or Lanthanides}
B01J 20/0211	. . . {Compounds of Ti, Zr, Hf}
B01J 20/0214	. . . {Compounds of V, Nb, Ta}
B01J 20/0218	. . . {Compounds of Cr, Mo, W}
B01J 20/0222	. . . {Compounds of Mn, Re}
B01J 20/0225	. . . {Compounds of Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt}

B01J 20/0229 . . . . {Compounds of Fe}
B01J 20/0233 . . . {Compounds of Cu, Ag, Au}
B01J 20/0237 . . . . {Compounds of Cu}
B01J 20/024 . . . {Compounds of Zn, Cd, Hg}
B01J 20/0244 . . . . {Compounds of Zn}
B01J 20/0248 . . . {Compounds of B, Al, Ga, In, Tl (B01J 20/08 takes precedence)}
B01J 20/0251 . . . {Compounds of Si, Ge, Sn, Pb (B01J 20/10 takes precedence)}
B01J 20/0255 . . . . {Compounds of Pb}
B01J 20/0259 . . . {Compounds of N, P, As, Sb, Bi}
B01J 20/0262 . . . {Compounds of O, S, Se, Te}
B01J 20/0266 . . . . {Compounds of S}
B01J 20/027 . . . {Compounds of F, Cl, Br, I}
B01J 20/0274 . . . {characterised by the type of anion}
B01J 20/0277 . . . . {Carbonates of compounds other than those provided for in B01J 20/043}
B01J 20/0281 . . . . {Sulfates of compounds other than those provided for in B01J 20/045}
B01J 20/0285 . . . . {Sulfides of compounds other than those provided for in B01J 20/045}
B01J 20/0288 . . . . {Halides of compounds other than those provided for in B01J 20/046}
B01J 20/0292 . . . . {Phosphates of compounds other than those provided for in B01J 20/048}
B01J 20/0296 . . . . {Nitrates of compounds other than those provided for in B01J 20/04}
B01J 20/04 . . comprising compounds of alkali metals, alkaline earth metals or magnesium

WARNING

Groups B01J 20/041 - B01J 20/048 are not complete, pending a reorganisation. See also B01J 20/04

B01J 20/041 . . . {Oxides or hydroxides}
B01J 20/043 . . . {Carbonates or bicarbonates, e.g. limestone, dolomite, aragonite}
B01J 20/045 . . . {containing sulfur, e.g. sulfates, thiosulfates, gypsum}
B01J 20/046 . . . {containing halogens, e.g. halides}
B01J 20/048 . . . {containing phosphorus, e.g. phosphates, apatites, hydroxyapatites}
B01J 20/06 . . comprising oxides or hydroxides of metals not provided for in group B01J 20/04
B01J 20/08 . . . comprising aluminium oxide or hydroxide; comprising bauxite
B01J 20/10 . . comprising silica or silicate
B01J 20/103 . . . {comprising silica}
B01J 20/106 . . . . {Perlite}
B01J 20/12 . . . Naturally occurring clays or bleaching earth
B01J 20/14 . . . Diatomaceous earth
B01J 20/16 . . . Alumino-silicates (B01J 20/12 takes precedence)
B01J 20/165 . . . . {Natural alumino-silicates, e.g. zeolites}

B01J 20/18 . . . . Synthetic zeolitic molecular sieves

B01J 20/183 . . . . . {Physical conditioning without chemical treatment, e.g. drying, granulating, coating, irradiation}

B01J 20/186 . . . . . {Chemical treatments in view of modifying the properties of the sieve, e.g. increasing the stability or the activity, also decreasing the activity}

B01J 20/20 . . comprising free carbon; comprising carbon obtained by carbonising processes (active carbon C01B 31/08)

B01J 20/205 . . . {Carbon nanostructures, e.g. nanotubes, nanohorns, nanocones, nanoballs (carbon nanotubes per se C01B 31/0206)}

B01J 20/22 . comprising organic material

WARNING

Groups B01J 20/223 and B01J 20/226 are not complete, pending a reorganisation. See also B01J 20/22

B01J 20/223 . . {containing metals, e.g. organo-metallic compounds, coordination complexes}

B01J 20/226 . . . {Coordination polymers, e.g. metal-organic frameworks [MOF], zeolitic imidazolate frameworks [ZIF] (preparation of metal complexes containing carboxylic acid moieties C07C 51/418; MOF's per se C07F)}

B01J 20/24 . . Naturally occurring macromolecular compounds, e.g. humic acids or their derivatives

B01J 20/26 . . Synthetic macromolecular compounds

WARNING

Groups B01J 20/261 - B01J 20/268 are not complete, pending a reorganisation. See also this group

B01J 20/261 . . . {obtained by reactions only involving carbon to carbon unsaturated bonds (macromolecular compounds obtained by reactions only involving carbon-to-carbon unsaturated bonds per se C08F)}

B01J 20/262 . . . {obtained otherwise than by reactions only involving carbon to carbon unsaturated bonds, e.g. obtained by polycondensation (macromolecular compounds obtained otherwise than by reactions only involving unsaturated carbon-to-carbon bonds per se C08G)}

B01J 20/264 . . . {derived from different types of monomers, e.g. linear or branched copolymers, block copolymers, graft copolymers}

B01J 20/265 . . . {modified or post-treated polymers (polymer carriers or substrates subjected to further impregnating or coating B01J 20/3208)}

B01J 20/267 . . . . {Cross-linked polymers}

B01J 20/268 . . . {Polymers created by use of a template, e.g. molecularly imprinted polymers}

B01J 20/28 . characterised by their form or physical properties

WARNING

Groups B01J 20/281 - B01J 20/29 might be incomplete. A number of documents presently classified in G01N 30/48 and G01N 30/482 still need reclassification to one or more of these groups

B01J 20/28002 . . {characterised by their physical properties}

B01J 20/28004 . . . {Sorbent size or size distribution, e.g. particle size}

B01J 20/28007 . . . . {with size in the range 1-100 nanometers, e.g. nano-sized particles, nanofibers, nanotubes, nanowires or the like (carbon nanostructures B01J 20/205)}

B01J 20/28009 . . . {Magnetic properties}

B01J 20/28011 . . . {Other properties, e.g. density, crush strength}

B01J 20/28014 . . {characterised by their form}

B01J 20/28016 . . . {Particle form}

B01J 20/28019 . . . . {Spherical, ellipsoidal or cylindrical}

B01J 20/28021 . . . . {Hollow particles, e.g. hollow spheres, micro-spheres or cenospheres}

B01J 20/28023 . . . {Fibres or filaments (fibres or filaments in the form of membranes B01J 20/28038; B01J 20/28007 takes precedence)}

B01J 20/28026 . . . {Particles within, immobilised, dispersed, entrapped in or on a matrix, e.g. a resin}

B01J 20/28028 . . . {Particles immobilised within fibres or filaments}

B01J 20/2803 . . . {Sorbents comprising a binder, e.g. for forming aggregated, agglomerated or granulated products}

B01J 20/28033 . . . {Membrane, sheet, cloth, pad, lamellar or mat}

B01J 20/28035 . . . . {with more than one layer, e.g. laminates, separated sheets}

B01J 20/28038 . . . . {Membranes or mats made from fibers or filaments}

B01J 20/2804 . . . . {Sheets with a specific shape, e.g. corrugated, folded, pleated, helical}

B01J 20/28042 . . . {Shaped bodies; Monolithic structures}

B01J 20/28045 . . . . {Honeycomb or cellular structures; Solid foams or sponges}

B01J 20/28047 . . . {Gels}

B01J 20/2805 . . . {Sorbents inside a permeable or porous casing e.g. inside a container, bag or membrane}

B01J 20/28052 . . . {Several layers of identical or different sorbents stacked in a housing, e.g. in a column}

B01J 20/28054 . . {characterised by their surface properties or porosity}

B01J 20/28057 . . . {Surface area, e.g. B.E.T specific surface area}

B01J 20/28059 . . . . {being less than 100 m2/g}

B01J 20/28061 . . . . {being in the range 100-500 m2/g}

B01J 20/28064 . . . . {being in the range 500-1000 m2/g}

B01J 20/28066 . . . . {being more than 1000 m2/g}

B01J 20/28069 . . . {Pore volume, e.g. total pore volume, mesopore volume, micropore volume}

B01J 20/28071 . . . . {being less than 0.5 ml/g}

B01J 20/28073 . . . . {being in the range 0.5-1.0 ml/g}

B01J 20/28076 . . . . {being more than 1.0 ml/g}

B01J 20/28078 . . . {Pore diameter}

B01J 20/2808 . . . . {being less than 2 nm, i.e. micropores or nanopores}

B01J 20/28083 . . . . {being in the range 2-50 nm, i.e. mesopores}

B01J 20/28085 . . . . {being more than 50 nm, i.e. macropores}

B01J 20/28088 . . . {Pore-size distribution}

B01J 20/2809 . . . . {Monomodal or narrow distribution, uniform pores}

B01J 20/28092 . . . . {Bimodal, polymodal, different types of pores or different pore size distributions in different parts of the sorbent}

B01J 20/28095 . . . {Shape or type of pores, voids, channels, ducts}

B01J 20/28097 . . . . {being coated, filled or plugged with specific compounds}

B01J 20/281 . Sorbents specially adapted for preparative, analytical or investigative chromatography

NOTE

In groups B01J 20/281 - B01J 20/292 it is desirable to add indexing codes for aspects relating to sorbents specially adapted for preparative, analytical or investigative chromatography. The indexing codes are chosen from groups B01J 2220/80 - B01J 2220/86

B01J 20/282 . . Porous sorbents (ion exchange B01J 39/00 - B01J 41/00)

B01J 20/283 . . . based on silica

B01J 20/284 . . . based on alumina

B01J 20/285 . . . based on polymers

B01J 20/286 . . Phases chemically bonded to a substrate, e.g. to silica or to polymers

B01J 20/287 . . . Non-polar phases; Reversed phases

B01J 20/288 . . . Polar phases

B01J 20/289 . . . bonded via a spacer

B01J 20/29 . . Chiral phases

B01J 20/291 . . Gel sorbents

B01J 20/292 . . Liquid sorbents

B01J 20/30 . Processes for preparing, regenerating, or reactivating

WARNING

Groups B01J 20/3007 - B01J 20/3092 are not complete, pending a reorganisation. See also B01J 20/30

B01J 20/3007 . . {Moulding, shaping or extruding}

B01J 20/3014 . . {Kneading}

B01J 20/3021 . . {Milling, crushing or grinding}

B01J 20/3028 . . {Granulating, agglomerating or aggregating}

B01J 20/3035 . . {Compressing}

B01J 20/3042 . . {Use of binding agents; addition of materials ameliorating the mechanical properties of the produced sorbent}

B01J 20/305 . . {Addition of material, later completely removed, e.g. as result of heat treatment, leaching or washing, e.g. for forming pores}

B01J 20/3057 . . . {Use of a templating or imprinting material (molecularly imprinted polymers B01J 20/268); filling pores of a substrate or matrix followed by the removal of the substrate or matrix}

B01J 20/3064 . . . {Addition of pore forming agents, e.g. pore inducing or porogenic agents}

B01J 20/3071 . . {Washing or leaching}

B01J 20/3078 . . {Thermal treatment, e.g. calcining or pyrolizing}

B01J 20/3085 . . {Chemical treatments not covered by groups B01J 20/3007 - B01J 20/3078}

B01J 20/3092 . . {Packing of a container, e.g. packing a cartridge or column (of chromatography columns B01D 15/206)}

B01J 20/32 . . Impregnating or coating; {Solid sorbent compositions obtained from processes involving impregnating or coating}

WARNING

Groups B01J 20/3202 - B01J 20/3297 are not complete, pending a reorganization. See also B01J 20/32

B01J 20/3202 . . . {characterised by the carrier, support or substrate used for impregnation or coating}

B01J 20/3204 . . . . {Inorganic carriers, supports or substrates}

B01J 20/3206 . . . . {Organic carriers, supports or substrates}

B01J 20/3208 . . . . . {Polymeric carriers, supports or substrates}

B01J 20/321 . . . . . {consisting of a polymer obtained by reactions involving only carbon to carbon unsaturated bonds}

B01J 20/3212 . . . . . {consisting of a polymer obtained by reactions otherwise than involving only carbon to carbon unsaturated bonds}

B01J 20/3214 . . . {characterised by the method for obtaining this coating or impregnating}

B01J 20/3217 . . . . {Resulting in a chemical bond between the coating or impregnating layer and the carrier, support or substrate, e.g. a covalent bond}

B01J 20/3219 . . . . . {involving a particular spacer or linking group, e.g. for attaching an active group}

B01J 20/3221 . . . . . {the chemical bond being an ionic interaction}

B01J 20/3223 . . . . {by means of an adhesive agent}

B01J 20/3225 . . . . {involving a post-treatment of the coated or impregnated product}

B01J 20/3227 . . . . . {by end-capping, i.e. with or after the introduction of functional or ligand groups}

B01J 20/3229 . . . . . {for preventing leaching, leaking of attached functional or ligand groups}

B01J 20/3231 . . . {characterised by the coating or impregnating layer}

B01J 20/3234 . . . . {Inorganic material layers}

B01J 20/3236 . . . . . {containing metal, other than zeolites, e.g. oxides, hydroxides, sulphides or salts}

B01J 20/3238 . . . . . {containing any type of zeolite}

B01J 20/324 . . . . . {containing free carbon, e.g. activated carbon}

B01J 20/3242 . . . . {Layers with a functional group, e.g. an affinity material, a ligand, a reactant or a complexing group}

B01J 20/3244 . . . . . {Non-macromolecular compounds}

B01J 20/3246 . . . . . {having a well defined chemical structure}

B01J 20/3248 . . . . . {the functional group or the linking, spacer or anchoring group as a whole comprising at least one type of heteroatom selected from a nitrogen, oxygen or sulfur, these atoms not being part of the carrier as such}

B01J 20/3251 . . . . . {comprising at least two different types of heteroatoms selected from nitrogen, oxygen or sulphur}

B01J 20/3253 . . . . . {comprising a cyclic structure not containing any of the heteroatoms nitrogen, oxygen or sulfur, e.g. aromatic structures}

B01J 20/3255 . . . . . {comprising a cyclic structure containing at least one of the heteroatoms nitrogen, oxygen or sulfur, e.g. heterocyclic or heteroaromatic structures}

B01J 20/3257 . . . . . {the functional group or the linking, spacer or anchoring group as a whole comprising at least one of the heteroatoms nitrogen, oxygen or sulfur together with at least one silicon atom, these atoms not being part of the carrier as such}

B01J 20/3259 . . . . . {comprising at least two different types of heteroatoms selected from nitrogen, oxygen or sulfur with at least one silicon atom}

B01J 20/3261 . . . . . {comprising a cyclic structure not containing any of the heteroatoms nitrogen, oxygen or sulfur, e.g. aromatic structures}

B01J 20/3263 . . . . . {comprising a cyclic structure containing at least one of the heteroatoms nitrogen, oxygen or sulfur, e.g. an heterocyclic or heteroaromatic structure}

B01J 20/3265 . . . . . {with an organic functional group containing a metal, e.g. a metal affinity ligand}

B01J 20/3268 . . . . . {Macromolecular compounds}

B01J 20/327 . . . . . {Polymers obtained by reactions involving only carbon to carbon unsaturated bonds}

B01J 20/3272 . . . . . {Polymers obtained by reactions otherwise than involving only carbon to carbon unsaturated bonds}

B01J 20/3274 . . . . . {Proteins, nucleic acids, polysaccharides, antibodies or antigens}

B01J 20/3276 . . . . . {Copolymers}

B01J 20/3278 . . . . . {Polymers being grafted on the carrier}

B01J 20/328 . . . . . {Polymers on the carrier being further modified}

B01J 20/3282 . . . . . {Crosslinked polymers}

B01J 20/3285 . . . . . {Coating or impregnation layers comprising different type of functional groups or interactions, e.g. different ligands in various parts of the sorbent, mixed mode, dual zone, bimodal, multimodal, ionic or hydrophobic, cationic or anionic, hydrophilic or hydrophobic}

B01J 20/3287 . . . . {Layers in the form of a liquid}

B01J 20/3289 . . . . {Coatings involving more than one layer of same or different nature}

B01J 20/3291 . . . {Characterised by the shape of the carrier, the coating or the obtained coated product}

B01J 20/3293 . . . . {Coatings on a core, the core being particle or fiber shaped, e.g. encapsulated particles, coated fibers}

B01J 20/3295 . . . . {Coatings made of particles, nanoparticles, fibers, nanofibers}

B01J 20/3297 . . . . {Coatings in the shape of a sheet}

B01J 20/34 . . Regenerating or reactivating

B01J 20/3408 . . . {of aluminosilicate molecular sieves}

WARNING

Groups B01J 20/3416 - B01J 20/3491 are not complete, pending a reorganisation. See also B01J 20/34

B01J 20/3416 . . . {of sorbents or filter aids comprising free carbon, e.g. activated carbon}

B01J 20/3425 . . . {of sorbents or filter aids comprising organic materials}

B01J 20/3433 . . . {of sorbents or filter aids other than those covered by B01J 20/3408 - B01J 20/3425}

B01J 20/3441 . . . {Regeneration or reactivation by electric current, ultrasound or irradiation, e.g. electromagnetic radiation such as X-rays, UV, light, microwaves}

B01J 20/345 . . . {using a particular desorbing compound or mixture (elution or regeneration of stationary phases in liquid chromatography B01D 15/08)}

B01J 20/3458 . . . . {in the gas phase}

B01J 20/3466 . . . . . {with steam}

B01J 20/3475 . . . . {in the liquid phase}

B01J 20/3483 . . . {by thermal treatment not covered by groups B01J 20/3441 - B01J 20/3475, e.g. by heating or cooling}

B01J 20/3491 . . . {by pressure treatment}

B01J 21/00 **Catalysts comprising the elements, oxides, or hydroxides of magnesium, boron, aluminium, carbon, silicon, titanium, zirconium, or hafnium**

B01J 21/005 . {Spinels}

B01J 21/02 . Boron or aluminium; Oxides or hydroxides thereof

B01J 21/04 . . Alumina

B01J 21/06 . Silicon, titanium, zirconium or hafnium; Oxides or hydroxides thereof

B01J 21/063 . . {Titanium; Oxides or hydroxides thereof}

B01J 21/066 . . {Zirconium or hafnium; Oxides or hydroxides thereof}

B01J 21/08 . . Silica

B01J 21/10 . Magnesium; Oxides or hydroxides thereof

B01J 21/12 . Silica and alumina

B01J 21/14 . Silica and magnesia

B01J 21/16 . Clays or other mineral silicates

B01J 21/18 . Carbon

B01J 21/185 . . {Carbon nanotubes (carbon nanotubes per se C01B 31/0206)}

B01J 21/20 . Regeneration or reactivation

B01J 23/00 **Catalysts comprising metals or metal oxides or hydroxides, not provided for in group B01J 21/00** (B01J 21/16 takes precedence)

B01J 23/002 . {Mixed oxides other than spinels, e.g. perovskite}

NOTE

In group B01J 23/002, elements constituting the exemplified mixed oxide are further indexed under the form of a C-set with B01J 2523/00 as base symbol using the relevant classification symbols of B01J 2523/10 - B01J 2523/847, in numerical order, as further symbols and separated by ",", e.g. the mixed oxide $Mo_aV_bTe_cO_x$ is classified as (B01J 2523/00, B01J 2523/55, B01J 2523/64, B01J 2523/68).

B01J 23/005 . {Spinels}

B01J 23/007 . {Mixed salts}

B01J 23/02 . of the alkali- or alkaline earth metals or beryllium

B01J 23/04 . . Alkali metals

B01J 23/06 . of zinc, cadmium or mercury

B01J 23/08 . of gallium, indium or thallium

B01J 23/10 . of rare earths

B01J 23/12 . of actinides

B01J 23/14 . of germanium, tin or lead

B01J 23/16 . of arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium

B01J 23/18 . . Arsenic, antimony or bismuth

B01J 23/20 . . Vanadium, niobium or tantalum

B01J 23/22 . . . Vanadium

B01J 23/24 . . Chromium, molybdenum or tungsten

B01J 23/26 . . . Chromium

B01J 23/28 . . . Molybdenum

B01J 23/30 . . . Tungsten

B01J 23/31 . . . combined with bismuth

B01J 23/32 . . Manganese, technetium or rhenium

B01J 23/34 . . . Manganese

B01J 23/36 . . . Rhenium

B01J 23/38 . of noble metals

B01J 23/40 . . of the platinum group metals

B01J 23/42 . . . Platinum

B01J 23/44 . . . Palladium

B01J 23/46 . . . Ruthenium, rhodium, osmium or iridium

B01J 23/462 . . . . {Ruthenium}

B01J 23/464 . . . . {Rhodium}

B01J 23/466 . . . . {Osmium}

B01J 23/468 . . . . {Iridium}

B01J 23/48	. . Silver or gold
B01J 23/50	. . . Silver
B01J 23/52	. . . Gold
B01J 23/54	. . combined with metals, oxides or hydroxides provided for in groups B01J 23/02 - B01J 23/36
B01J 23/56	. . . Platinum group metals
B01J 23/58	. . . . with alkali- or alkaline earth metals
B01J 23/60	. . . . with zinc, cadmium or mercury
B01J 23/62	. . . . with gallium, indium, thallium, germanium, tin or lead
B01J 23/622	. . . . . {with germanium, tin or lead}
B01J 23/624	. . . . . . {with germanium}
B01J 23/626	. . . . . . {with tin}
B01J 23/628	. . . . . . {with lead}
B01J 23/63	. . . . with rare earths or actinides
B01J 23/64	. . . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 23/644	. . . . . Arsenic, antimony or bismuth
B01J 23/6442	. . . . . . {Arsenic}
B01J 23/6445	. . . . . . {Antimony}
B01J 23/6447	. . . . . . {Bismuth}
B01J 23/648	. . . . . Vanadium, niobium or tantalum {or polonium}
B01J 23/6482	. . . . . . {Vanadium}
B01J 23/6484	. . . . . . {Niobium}
B01J 23/6486	. . . . . . {Tantalum}
B01J 23/6488	. . . . . . {Polonium}
B01J 23/652	. . . . . Chromium, molybdenum or tungsten
B01J 23/6522	. . . . . . {Chromium}
B01J 23/6525	. . . . . . {Molybdenum}
B01J 23/6527	. . . . . . {Tungsten}
B01J 23/656	. . . . . Manganese, technetium or rhenium
B01J 23/6562	. . . . . . {Manganese}
B01J 23/6565	. . . . . . {Technetium}
B01J 23/6567	. . . . . . {Rhenium}
B01J 23/66	. . . Silver or gold
B01J 23/68	. . . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 23/681	. . . . . {with arsenic, antimony or bismuth}
B01J 23/682	. . . . . {with vanadium, niobium, tantalum or polonium}
B01J 23/683	. . . . . {with chromium, molybdenum or tungsten}

B01J 23/685 . . . . . {with chromium}
B01J 23/686 . . . . . {with molybdenum}
B01J 23/687 . . . . . {with tungsten}
B01J 23/688 . . . . . {with manganese, technetium or rhenium}
B01J 23/70 . of the iron group metals or copper
B01J 23/72 . . Copper
B01J 23/74 . . Iron group metals
B01J 23/745 . . . Iron
B01J 23/75 . . . Cobalt
B01J 23/755 . . . Nickel
B01J 23/76 . . combined with metals, oxides or hydroxides provided for in groups B01J 23/02 - B01J 23/36
B01J 23/78 . . . with alkali- or alkaline earth metals
B01J 23/80 . . . with zinc, cadmium or mercury
B01J 23/825 . . . with gallium, indium or thallium
B01J 23/83 . . . with rare earths or actinides
B01J 23/835 . . . with germanium, tin or lead
B01J 23/84 . . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 23/843 . . . . Arsenic, antimony or bismuth
B01J 23/8432 . . . . . {Arsenic}
B01J 23/8435 . . . . . {Antimony}
B01J 23/8437 . . . . . {Bismuth}
B01J 23/847 . . . . Vanadium, niobium or tantalum {or polonium}
B01J 23/8472 . . . . . {Vanadium}
B01J 23/8474 . . . . . {Niobium}
B01J 23/8476 . . . . . {Tantalum}
B01J 23/8478 . . . . . {Polonium}
B01J 23/85 . . . . Chromium, molybdenum or tungsten
B01J 23/86 . . . . . Chromium
B01J 23/862 . . . . . {Iron and chromium}
B01J 23/864 . . . . . {Cobalt and chromium}
B01J 23/866 . . . . . {Nickel and chromium}
B01J 23/868 . . . . . {copper and chromium}
B01J 23/88 . . . . . Molybdenum
B01J 23/881 . . . . . and iron
B01J 23/882 . . . . . and cobalt
B01J 23/883 . . . . . and nickel
B01J 23/885 . . . . . and copper
B01J 23/887 . . . . . containing in addition other metals, oxides or hydroxides provided for in groups B01J 23/02 - B01J 23/36

B01J 23/8871 . . . . . {Rare earth metals or actinides}
B01J 23/8872 . . . . . {Alkali or alkaline earth metals}
B01J 23/8873 . . . . . {Zinc, cadmium or mercury}
B01J 23/8874 . . . . . {Gallium, indium or thallium}
B01J 23/8875 . . . . . {Germanium, tin or lead}
B01J 23/8876 . . . . . {Arsenic, antimony or bismuth}
B01J 23/8877 . . . . . {Vanadium, tantalum, niobium or polonium}
B01J 23/8878 . . . . . {Chromium}
B01J 23/888 . . . . . Tungsten
B01J 23/8885 . . . . . {containing also molybdenum}
B01J 23/889 . . . . Manganese, technetium or rhenium
B01J 23/8892 . . . . . {Manganese}
B01J 23/8894 . . . . . {Technetium}
B01J 23/8896 . . . . . {Rhenium}
B01J 23/8898 . . . . . {containing also molybdenum}
B01J 23/89 . . combined with noble metals
B01J 23/8906 . . . {Iron and noble metals}
B01J 23/8913 . . . {Cobalt and noble metals}
B01J 23/892 . . . {Nickel and noble metals}
B01J 23/8926 . . . {Copper and noble metals}
B01J 23/8933 . . . {also combined with metals, or metal oxides or hydroxides provided for in groups B01J 23/02 - B01J 23/36}
B01J 23/894 . . . . {with rare earths or actinides}
B01J 23/8946 . . . . {with alkali or alkaline earth metals}
B01J 23/8953 . . . . {with zinc, cadmium or mercury}
B01J 23/896 . . . . {with gallium, indium or thallium}
B01J 23/8966 . . . . {with germanium, tin or lead}
B01J 23/8973 . . . . {with arsenic, antimony or bismuth}
B01J 23/898 . . . . {with vanadium, tantalum, niobium or polonium}
B01J 23/8986 . . . . {with manganese, technetium or rhenium}
B01J 23/8993 . . . . {with chromium, molybdenum or tungsten}
B01J 23/90 . Regeneration or reactivation
B01J 23/92 . . of catalysts comprising metals, oxides or hydroxides provided for in groups B01J 23/02 - B01J 23/36
B01J 23/94 . . of catalysts comprising metals, oxides or hydroxides of the iron group metals or copper
B01J 23/96 . . of catalysts comprising metals, oxides or hydroxides of the noble metals

B01J 25/00 Catalysts of the Raney type

B01J 25/02 . Raney nickel
B01J 25/04 . Regeneration or reactivation

B01J 27/00 **Catalysts comprising the elements or compounds of halogens, sulfur, selenium, tellurium, phosphorus or nitrogen; Catalysts comprising carbon compounds**

NOTE

Metal catalysts or metal oxide catalysts activated or conditioned by halogens, sulfur or phosphorus, or compounds thereof are classified in the appropriate groups for metal or metal oxide catalysts

B01J 27/02 . Sulfur, selenium or tellurium; Compounds thereof

B01J 27/04 . . Sulfides

B01J 27/043 . . . with iron group metals or platinum group metals

B01J 27/045 . . . . Platinum group metals

B01J 27/047 . . . with chromium, molybdenum, tungsten or polonium

B01J 27/049 . . . . with iron group metals or platinum group metals

B01J 27/051 . . . . Molybdenum

B01J 27/0515 . . . . . {with iron group metals or platinum group metals}

B01J 27/053 . . Sulfates

B01J 27/055 . . . with alkali metals, copper, gold or silver

B01J 27/057 . . Selenium or tellurium; Compounds thereof

B01J 27/0573 . . . {Selenium; Compounds thereof}

B01J 27/0576 . . . {Tellurium; Compounds thereof}

B01J 27/06 . Halogens; Compounds thereof

B01J 27/08 . . Halides

B01J 27/10 . . . Chlorides

B01J 27/12 . . . Fluorides

B01J 27/122 . . . of copper

B01J 27/125 . . with scandium, yttrium, aluminium, gallium, indium or thallium

B01J 27/128 . . with iron group metals or platinum group metals

B01J 27/13 . . . Platinum group metals

B01J 27/132 . . with chromium, molybdenum, tungsten or polonium

B01J 27/135 . . with titanium, zirconium, hafnium, germanium, tin or lead

B01J 27/138 . . with alkaline earth metals, magnesium, beryllium, zinc, cadmium or mercury

B01J 27/14 . Phosphorus; Compounds thereof

B01J 27/16 . . containing oxygen {i.e. acids, anhydrides and their derivates with N, S, B or halogens without carriers or on carriers based on C, Si, Al or Zr; also salts of Si, Al and Zr}

B01J 27/18 . . . with metals {other than Al or Zr}

B01J 27/1802 . . . . {Salts or mixtures of anhydrides with compounds of other metals than V, Nb, Ta, Cr, Mo, W, Mn, Tc, Re, e.g. phosphates, thiophosphates}

B01J 27/1804 . . . . . {with rare earths or actinides}

B01J 27/1806 . . . . . {with alkaline or alkaline earth metals}

B01J 27/1808 . . . . . {with zinc, cadmium or mercury}

B01J 27/1811 . . . . . {with gallium, indium or thallium}
B01J 27/1813 . . . . . {with germanium, tin or lead}
B01J 27/1815 . . . . . {with arsenic, antimony or bismuth}
B01J 27/1817 . . . . . {with copper, silver or gold}
B01J 27/182 . . with silicon
B01J 27/185 . . with iron group metals or platinum group metals
B01J 27/1853 . . . {with iron, cobalt or nickel}
B01J 27/1856 . . . {with platinum group metals}
B01J 27/186 . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 27/187 . . . with manganese, technetium or rhenium
B01J 27/188 . . . with chromium, molybdenum, tungsten or polonium
B01J 27/19 . . . . Molybdenum
B01J 27/192 . . . . . with bismuth
B01J 27/195 . . . with vanadium, niobium or tantalum
B01J 27/198 . . . . Vanadium
B01J 27/199 . . . . . with chromium, molybdenum, tungsten or polonium
B01J 27/20 . Carbon compounds
B01J 27/22 . . Carbides
B01J 27/224 . . . Silicon carbide
B01J 27/228 . . . . with phosphorus, arsenic, antimony or bismuth
B01J 27/232 . . Carbonates
B01J 27/236 . . . Hydroxy carbonates
B01J 27/24 . Nitrogen compounds
B01J 27/25 . . Nitrates
B01J 27/26 . . Cyanides
B01J 27/28 . Regeneration or reactivation
B01J 27/285 . . {of catalysts comprising compounds of phosphorus}
B01J 27/30 . . of catalysts comprising compounds of sulfur, selenium or tellurium
B01J 27/32 . . of catalysts comprising compounds of halogens

B01J 29/00 **Catalysts comprising molecular sieves {**(molecular sieves per se C01B)**}**

NOTES

1. In this group, the following term is used with the meaning indicated:
   - "zeolites" means:
     i. crystalline aluminosilicates with base-exchange and molecular sieve properties, having three dimensional, microporous lattice framework structure of tetrahedral oxide units;
     ii. compounds isomorphous to those of the former category, wherein the aluminium or silicon atoms in the framework are partly or wholly replaced by atoms of other elements, e.g. by gallium, germanium, phosphorus or boron.

B01J 29/00 (continued)

2. If metals are introduced into the framework of the molecular sieve already in the synthesis stage, B01J 29/86 - B01J 29/89 take precedence.

3. Mixtures of molecular sieves are classified in B01J 29/005 or B01J 29/80 and receive indexing codes chosen from groups B01J 29/03 - B01J 29/89 to identify the individual constituents of these mixtures

B01J 29/005 . {Mixtures of molecular sieves comprising at least one molecular sieve which is not an aluminosilicate zeolite, e.g. from groups B01J 29/03 - B01J 29/049 or B01J 29/82 - B01J 29/89}

B01J 29/03 . not having base-exchange properties {(B01J 29/005 takes precedence)}

B01J 29/0308 . . {Mesoporous materials not having base exchange properties, e.g. Si-MCM-41}

B01J 29/0316 . . . {containing iron group metals, noble metals or copper}

B01J 29/0325 . . . . {Noble metals}

B01J 29/0333 . . . . {Iron group metals or copper}

B01J 29/0341 . . . {containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium}

B01J 29/035 . . {Microporous crystalline materials not having base exchange properties, such as} silica polymorphs, e.g. silicalites

B01J 29/0352 . . . {containing iron group metals, noble metals or copper}

B01J 29/0354 . . . . {Noble metals}

B01J 29/0356 . . . . {Iron group metals or copper}

B01J 29/0358 . . . {containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium}

B01J 29/04 . having base-exchange properties, e.g. crystalline zeolites {(B01J 29/005 takes precedence)}

B01J 29/041 . . {Mesoporous materials having base exchange properties, e.g. Si/Al-MCM-41}

B01J 29/042 . . . {containing iron group metals, noble metals or copper}

B01J 29/043 . . . . {Noble metals}

B01J 29/044 . . . . {Iron group metals or copper}

B01J 29/045 . . . {containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium}

B01J 29/046 . . {Chromiasilicates; Aluminochromosilicates (B01J 29/005 takes precedence)}

B01J 29/047 . . {Germanosilicates; Aluminogermanosilicates (B01J 29/005 takes precedence)}

B01J 29/048 . . {Zincosilicates, Aluminozincosilicates (B01J 29/005 takes precedence)}

B01J 29/049 . . {Pillared clays}

B01J 29/06 . . Crystalline aluminosilicate zeolites; Isomorphous compounds thereof

B01J 29/061 . . . {containing metallic elements added to the zeolite}

B01J 2029/062 . . . {Mixtures of different aluminosilicates}

B01J 29/064 . . . containing iron group metals, noble metals or copper

B01J 29/068	. . . . Noble metals
B01J 29/072	. . . . Iron group metals or copper
B01J 29/076	. . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 29/08	. . . of the faujasite type, e.g. type X or Y
B01J 2029/081	. . . . {Increasing the silica/alumina ratio; Desalumination}
B01J 29/082	. . . . {X-type faujasite}
B01J 29/084	. . . . {Y-type faujasite}
B01J 29/085	. . . . {containing rare earth elements, titanium, zirconium, hafnium, zinc, cadmium, mercury, gallium, indium, thallium, tin or lead}
B01J 29/087	. . . . . {X-type faujasite}
B01J 29/088	. . . . . {Y-type faujasite}
B01J 29/10	. . . . containing iron group metals, noble metals or copper
B01J 29/103	. . . . . {X-type faujasite}
B01J 29/106	. . . . . {Y-type faujasite}
B01J 29/12	. . . . . Noble metals
B01J 29/123	. . . . . . {X-type faujasite}
B01J 29/126	. . . . . . {Y-type faujasite}
B01J 29/14	. . . . . Iron group metals or copper
B01J 29/143	. . . . . . {X-type faujasite}
B01J 29/146	. . . . . . {Y-type faujasite}
B01J 29/16	. . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 29/163	. . . . . {X-type faujasite}
B01J 29/166	. . . . . {Y-type faujasite}
B01J 29/18	. . . of the mordenite type
B01J 29/185	. . . . {containing rare earth elements, titanium, zirconium, hafnium, zinc, cadmium, mercury, gallium, indium, thallium, tin or lead}
B01J 29/20	. . . . containing iron group metals, noble metals or copper
B01J 29/22	. . . . . Noble metals
B01J 29/24	. . . . . Iron group metals or copper
B01J 29/26	. . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 29/40	. . . of the pentasil type, e.g. types ZSM-5, ZSM-8 or ZSM-11, as exemplified by patent documents US3702886, GB1334243 and US3709979, respectively
B01J 29/405	. . . . {containing rare earth elements, titanium, zirconium, hafnium, zinc, cadmium, mercury, gallium, indium, thallium, tin or lead}
B01J 29/42	. . . . containing iron group metals, noble metals or copper
B01J 29/44	. . . . . Noble metals

B01J 29/46	. . . . . Iron group metals or copper
B01J 29/48	. . . . containing arsenic, antimony, bismuth, vanadium, niobium tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 29/50	. . . of the erionite or offretite type, e.g. zeolite T, as exemplified by patent document US2950952
B01J 29/505	. . . . {containing rare earth elements, titanium, zirconium, hafnium, zinc, cadmium, mercury, gallium, indium, thallium, tin or lead}
B01J 29/52	. . . . containing iron group metals, noble metals or copper
B01J 29/54	. . . . . Noble metals
B01J 29/56	. . . . . Iron group metals or copper
B01J 29/58	. . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 29/60	. . . of the type L, as exemplified by patent document US3216789
B01J 29/605	. . . . {containing rare earth elements, titanium, zirconium, hafnium, zinc, cadmium, mercury, gallium, indium, thallium, tin or lead}
B01J 29/61	. . . . containing iron group metals, noble metals or copper
B01J 29/62	. . . . . Noble metals
B01J 29/63	. . . . . Iron group metals or copper
B01J 29/64	. . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 29/65	. . . of the ferrierite type, e.g. types ZSM-21, ZSM-35 or ZSM-38, as exemplified by patent documents US4046859, US4016245 and US4046859, respectively
B01J 29/655	. . . . {containing rare earth elements, titanium, zirconium, hafnium, zinc, cadmium, mercury, gallium, indium, thallium, tin or lead}
B01J 29/66	. . . . containing iron group metals, noble metals or copper
B01J 29/67	. . . . . Noble metals
B01J 29/68	. . . . . Iron group metals or copper
B01J 29/69	. . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 29/70	. . . of types characterised by their specific stucture not provided for in groups B01J 29/08 - B01J 29/65
B01J 29/7003	. . . . {A-type}
B01J 29/7007	. . . . {Zeolite Beta}
B01J 29/7011	. . . . {MAZ-type, e.g.Mazzite, Omega, ZSM-4 or LZ-202}
B01J 29/7015	. . . . {CHA-type, e.g. Chabazite, LZ-218}
B01J 29/7019	. . . . {EMT-type, e.g. EMC-2, ECR-30, CSZ-1, ZSM-3 or ZSM-20}
B01J 29/7023	. . . . {EUO-type, e.g. EU-1, TPZ-3 or ZSM-50}
B01J 29/7026	. . . . {MFS-type, e.g. ZSM-57}
B01J 29/703	. . . . {MRE-type, e.g. ZSM-48}

B01J 29/7034 . . . . {MTW-type, e.g. ZSM-12, NU-13, TPZ-12 or Theta-3}
B01J 29/7038 . . . . {MWW-type, e.g. MCM-22, ERB-1, ITQ-1, PSH-3 or SSZ-25}
B01J 29/7042 . . . . {TON-type, e.g. Theta-1, ISI-1, KZ-2, NU-10 or ZSM-22}
B01J 29/7046 . . . . {MTT-type, e.g. ZSM-23, KZ-1, ISI-4 or EU-13}
B01J 29/7049 . . . . {containing rare earth elements, titanium, zirconium, hafnium, zinc, cadmium, mercury, gallium, indium, thallium, tin or lead}
B01J 29/7053 . . . . . {A-type}
B01J 29/7057 . . . . . {Zeolite Beta}
B01J 29/7061 . . . . . {MAZ-type, e.g.Mazzite, Omega, ZSM-4 or LZ-202}
B01J 29/7065 . . . . . {CHA-type, e.g. Chabazite, LZ-218}
B01J 29/7069 . . . . . {EMT-type, e.g. EMC-2, ECR-30, CSZ-1, ZSM-3 or ZSM-20}
B01J 29/7073 . . . . . {EUO-type, e.g. EU-1, TPZ-3 or ZSM-50}
B01J 29/7076 . . . . . {MFS-type, e.g. ZSM-57}
B01J 29/708 . . . . . {MRE-type, e.g. ZSM-48}
B01J 29/7084 . . . . . {MTW-type, e.g. ZSM-12, NU-13, TPZ-12 or Theta-3}
B01J 29/7088 . . . . . {MWW-type, e.g. MCM-22, ERB-1, ITQ-1, PSH-3 or SSZ-25}
B01J 29/7092 . . . . . {TON-type, e.g. Theta-1, ISI-1, KZ-2, NU-10 or ZSM-22}
B01J 29/7096 . . . . . {MTT-type, e.g. ZSM-23, KZ-1, ISI-4 or EU-13}
B01J 29/72 . . . . containing iron group metals, noble metals or copper
B01J 29/7207 . . . . . {A-type}
B01J 29/7215 . . . . . {Zeolite Beta}
B01J 29/7223 . . . . . {MAZ-type, e.g.Mazzite, Omega, ZSM-4 or LZ-202}
B01J 29/723 . . . . . {CHA-type, e.g. Chabazite, LZ-218}
B01J 29/7238 . . . . . {EMT-type, e.g. EMC-2, ECR-30, CSZ-1, ZSM-3 or ZSM-20}
B01J 29/7246 . . . . . {EUO-type, e.g. EU-1, TPZ-3 or ZSM-50}
B01J 29/7253 . . . . . {MFS-type, e.g. ZSM-57}
B01J 29/7261 . . . . . {MRE-type, e.g. ZSM-48}
B01J 29/7269 . . . . . {MTW-type, e.g. ZSM-12, NU-13, TPZ-12 or Theta-3}
B01J 29/7276 . . . . . {MWW-type, e.g. MCM-22, ERB-1, ITQ-1, PSH-3 or SSZ-25}
B01J 29/7284 . . . . . {TON-type, e.g. Theta-1, ISI-1, KZ-2, NU-10 or ZSM-22}
B01J 29/7292 . . . . . {MTT-type, e.g. ZSM-23, KZ-1, ISI-4 or EU-13}
B01J 29/74 . . . . . Noble metals
B01J 29/7407 . . . . . {A-type}
B01J 29/7415 . . . . . {Zeolite Beta}
B01J 29/7423 . . . . . {MAZ-type, e.g.Mazzite, Omega, ZSM-4 or LZ-202}
B01J 29/743 . . . . . {CHA-type, e.g. Chabazite, LZ-218}
B01J 29/7438 . . . . . {EMT-type, e.g. EMC-2, ECR-30, CSZ-1, ZSM-3 or ZSM-20}
B01J 29/7446 . . . . . {EUO-type, e.g. EU-1, TPZ-3 or ZSM-50}
B01J 29/7453 . . . . . {MFS-type, e.g. ZSM-57}
B01J 29/7461 . . . . . {MRE-type, e.g. ZSM-48}

B01J 29/7469 . . . . . {MTW-type, e.g. ZSM-12, NU-13, TPZ-12 or Theta-3}
B01J 29/7476 . . . . . {MWW-type, e.g. MCM-22, ERB-1, ITQ-1, PSH-3 or SSZ-25}
B01J 29/7484 . . . . . {TON-type, e.g. Theta-1, ISI-1, KZ-2, NU-10 or ZSM-22}
B01J 29/7492 . . . . . {MTT-type, e.g. ZSM-23, KZ-1, ISI-4 or EU-13}
B01J 29/76 . . . . . Iron group metals or copper
B01J 29/7607 . . . . . {A-type}
B01J 29/7615 . . . . . {Zeolite Beta}
B01J 29/7623 . . . . . {MAZ-type, e.g.Mazzite, Omega, ZSM-4 or LZ-202}
B01J 29/763 . . . . . {CHA-type, e.g. Chabazite, LZ-218}
B01J 29/7638 . . . . . {EMT-type, e.g. EMC-2, ECR-30, CSZ-1, ZSM-3 or ZSM-20}
B01J 29/7646 . . . . . {EUO-type, e.g. EU-1, TPZ-3 or ZSM-50}
B01J 29/7653 . . . . . {MFS-type, e.g. ZSM-57}
B01J 29/7661 . . . . . {MRE-type, e.g. ZSM-48}
B01J 29/7669 . . . . . {MTW-type, e.g. ZSM-12, NU-13, TPZ-12 or Theta-3}
B01J 29/7676 . . . . . {MWW-type, e.g. MCM-22, ERB-1, ITQ-1, PSH-3 or SSZ-25}
B01J 29/7684 . . . . . {TON-type, e.g. Theta-1, ISI-1, KZ-2, NU-10 or ZSM-22}
B01J 29/7692 . . . . . {MTT-type, e.g. ZSM-23, KZ-1, ISI-4 or EU-13}
B01J 29/78 . . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
B01J 29/7807 . . . . . {A-type}
B01J 29/7815 . . . . . {Zeolite Beta}
B01J 29/7823 . . . . . {MAZ-type, e.g.Mazzite, Omega, ZSM-4 or LZ-202}
B01J 29/783 . . . . . {CHA-type, e.g. Chabazite, LZ-218}
B01J 29/7838 . . . . . {EMT-type, e.g. EMC-2, ECR-30, CSZ-1, ZSM-3 or ZSM-20}
B01J 29/7846 . . . . . {EUO-type, e.g. EU-1, TPZ-3 or ZSM-50}
B01J 29/7853 . . . . . {MFS-type, e.g. ZSM-57}
B01J 29/7861 . . . . . {MRE-type, e.g. ZSM-48}
B01J 29/7869 . . . . . {MTW-type, e.g. ZSM-12, NU-13, TPZ-12 or Theta-3}
B01J 29/7876 . . . . . {MWW-type, e.g. MCM-22, ERB-1, ITQ-1, PSH-3 or SSZ-25}
B01J 29/7884 . . . . . {TON-type, e.g. Theta-1, ISI-1, KZ-2, NU-10 or ZSM-22}
B01J 29/7892 . . . . . {MTT-type, e.g. ZSM-23, KZ-1, ISI-4 or EU-13}
B01J 29/80 . . . Mixtures of different zeolites
B01J 29/82 . Phosphates {(B01J 29/005 takes precedence)}
B01J 29/83 . . Aluminophosphates (APO compounds)
B01J 29/84 . . Aluminophosphates containing other elements, e.g. metals, boron
B01J 29/85 . . . Silicoaluminophosphates (SAPO compounds)
B01J 29/86 . Borosilicates; Aluminoborosilicates {(B01J 29/005 takes precedence)}
B01J 29/87 . Gallosilicates; Aluminogallosilicates; Galloborosilicates {(B01J 29/005 takes precedence)}
B01J 29/88 . Ferrosilicates; Ferroaluminosilicates {(B01J 29/005 takes precedence)}

B01J 29/89 . Silicates, aluminosilicates or borosilicates of titanium, zirconium or hafnium {(B01J 29/005 takes precedence)}

B01J 29/90 . Regeneration or reactivation

B01J 31/00 **Catalysts comprising hydrides, coordination complexes or organic compounds** (catalyst compositions used only in polymerisation reactions C08; {catalytic antibodies C12N 9/0002})

NOTES

1. Group B01J 31/003 takes precedence over groups B01J 31/02 - B01J 31/24 (catalytic antibodies C12N 9/0002)
2. In this group, the following terms or expressions are used with the meanings indicated:
   - "Organic compound" a compound in which carbon is bonded to
     (1)a second carbon;
     (2)at least one atom of hydrogen or halogen; or
     (3)nitrogen by a single or double bond; except cyanic acid (HOCN), cyanogen (NCCN), cyanamide (H2NCN), cyanogen halide (HalCN), hydrocyanic acid (HCN) isocyanic acid (HNCO) fulminic acid (HCNO)and metal carbides (MCCM) (catalysts comprising any of these exceptions or their salts B01J 27/20 - B01J 27/26.
   - "Organometallic compounds" includes all organic compounds wherein a metal or metalloid atom is bonded directly to a carbon fragment, the latter being formally anionic, no further neutral ligands being coordinated to the metal and the compound requiring no further cations for charge balance; e.g. M(1-CR3)n with M= main group metal, n= valency of metal and R= H or hydrocarbyl. (Compounds comprising anionic organonitrogen, organooxygen and organosulfur fragments, excluding carboxylates, with a metal bonded to these heteroatoms B01J 31/02 - B01J 31/0254; unsaturated carbon fragments in combination with transition metals B01J 31/2282.
   - "Coordination complexes" includes any donor-acceptor compounds or complex ions comprising organic or inorganic, anionic or neutral Lewis basic ligands, attached to a Lewis acid central metal or metal ion through one or several complexing donor atoms with at least one lone-pair of electrons, e.g. N, O, S, P, to provide at least a Sigma-bond. Typically the maximum number of same or different ligands according to the coordination number, spatial requirements of the ligand and electronic configuration of the metal is bound in a predictable geometry. Complexes of neutral, cationic or anionic hydrocarbon ligands with delocalised charge and/or bonding site, e.g. Pd-olefin complexes or metallocenes, are also included (the following groups take precedence: simple hydrocarbyl metal compounds, e.g. of main group metal(loids) B01J 31/12; oxoacid salts B01J 31/04 - B01J 31/10; other compounds comprising anionic organonitrogen, organooxygen and organosulfur fragments with a metal bonded to these heteroatoms B01J 31/02 - B01J 31/0254.
   - "Organometallic complexes" includes all coordination complexes comprising a M-C bond, e.g. metal carbonyls (complex cyanides such as M4[Fe(CN)6] B01J 27/26).Included are furthermore complexes which are not strictly organometallic per se, e.g. comprising only N, O, S and/or P coordinated ligands, but are described as involving, or known to involve, organometallic intermediates and/or transition states during use, e.g. Group 8-10 metal complexes for a variety of catalytic reactions or

B01J 31/00 (continued)

steps thereof, such as oxidative addition, e.g. of ArX, hydrogenation, carbonylation, epoxidation, etc.
- "Organic complexes" includes all coordination complexes comprising organic ligands (groups B01J 31/1608 - B01J 31/1895 take precedence).
- "Polymer" includes any macromolecular substance (typically M>10000 g/mol), which comprises repeating units made up of one or several kinds of atoms or groups of atoms, which are identically connected to one another. Oligomers, i.e. more than two identical repeating units connected to one another and typically 500<M<10000 g/mol, are grouped with the respective polymers (polymers per se C08).

3. In this group, if two or more aspects are of equal importance, these are each classified, e.g. two components in a catalyst system such as:
   - support and pendant or otherwise immobilised coordination complex; or
   - coordination complex and essential additive.

   However, if two components, even if separately added, are described as forming, or known to form, a coordination complex, only the latter is classified, e.g. phosphine and Group 8-10 metal such as rhodium. The groups B01J 31/26 - B01J 31/38 are not to be used for the central metals in coordination complexes but rather for separately added further inorganic ingredients.

   Each specifically disclosed alternative is separately classified, i.e. specifically disclosed by ways of worked examples, specific claims and/or explicit alternatives therein.

4. When classifying in B01J 31/00, additional information for the catalysts is provided as follows:
   (4-1) the specifically disclosed intended uses are indexed in B01J 2231/00;
   (4-2) general aspects of the complexes of group B01J 31/16 and the specifically disclosed central metal(s) therein, as well as additional information regarding any special solvents used for any catalyst system of this group are indexed in B01J 2531/00.
   (4-3) conceptual articles, e.g. reviews, are separately indexed in B01J 2231/005 and B01J 2531/001;
   (4-4) additional information regarding the complexes or ligands classified in B01J 31/16 - B01J 31/24 and indexed in B01J 2531/00 is indexed in B01J 2540/00, e.g. non-coordinating substituents on the ligand periphery]

B01J 31/003 . {containing enzymes}

NOTE

In this group, the presence of water is disregarded for classification purposes

B01J 31/006 . {comprising organic radicals, e.g. TEMPO}

B01J 31/02 . containing organic compounds or metal hydrides

B01J 31/0201 . . {Oxygen-containing compounds}

B01J 31/0202 . . . {Alcohols or phenols}

B01J 31/0204 . . . {Ethers}

B01J 31/0205 . . . {comprising carbonyl groups or oxygen-containing derivatives, e.g. acetals, ketals, cyclic peroxides}

B01J 31/0207 . . . . {Aldehydes or acetals}

B01J 31/0208 . . . . {Ketones or ketals}
B01J 31/0209 . . . {Esters of carboxylic or carbonic acids}
B01J 31/0211 . . . {with a metal-oxygen link}
B01J 31/0212 . . . . {Alkoxylates}
B01J 31/0214 . . . . {Aryloxylates, e.g. phenolates}
B01J 31/0215 . . {Sulfur-containing compounds}
B01J 31/0217 . . . {Mercaptans or thiols}
B01J 31/0218 . . . {Sulfides}
B01J 31/022 . . . . {Disulfides}
B01J 31/0221 . . . . {Polysulfides}
B01J 31/0222 . . . {comprising sulfonyl groups}
B01J 31/0224 . . . . {being perfluorinated, i.e. comprising at least one perfluorinated moiety as substructure in case of polyfunctional compounds}
B01J 31/0225 . . . {comprising sulfonic acid groups or the corresponding salts}
B01J 31/0227 . . . . {being perfluorinated, i.e. comprising at least one perfluorinated moiety as substructure in case of polyfunctional compounds}
B01J 31/0228 . . . {with a metal-sulfur link, e.g. mercaptides}
B01J 31/0229 . . . {also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0214}
B01J 31/0231 . . {Halogen-containing compounds}
B01J 31/0232 . . . {also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0228 (perfluorinated sulfonyl compounds or moieties B01J 31/0224; perfluorosulfonic acids B01J 31/0227)}
B01J 31/0234 . . {Nitrogen-, phosphorus-, arsenic- or antimony-containing compounds}
B01J 31/0235 . . . {Nitrogen containing compounds}
B01J 31/0237 . . . . {Amines}
B01J 31/0238 . . . . . {with a primary amino group}
B01J 31/0239 . . . . {Quaternary ammonium compounds}
B01J 31/0241 . . . . {Imines or enamines}
B01J 31/0242 . . . . . {Enamines}
B01J 31/0244 . . . . {with nitrogen contained as ring member in aromatic compounds or moieties, e.g. pyridine}
B01J 31/0245 . . . . {being derivatives of carboxylic or carbonic acids}
B01J 31/0247 . . . . . {Imides, amides or imidates (R-C=NR(OR))}
B01J 31/0248 . . . . . {Nitriles}
B01J 31/0249 . . . . . {Ureas (R2N-C(=O)-NR2)}
B01J 31/0251 . . . . . {Guanidides (R2N-C(=NR)-NR2)}
B01J 31/0252 . . . . {with a metal-nitrogen link, e.g. metal amides, metal guanidides}
B01J 31/0254 . . . . {on mineral substrates}
B01J 31/0255 . . . {Phosphorus containing compounds}
B01J 31/0257 . . . . {Phosphorus acids or phosphorus acid esters}

B01J 31/0258 . . . . . {Phosphoric acid mono-, di- or triesters ((RO)(R'O)2P=O), i.e. R= C, R'= C, H}

B01J 31/0259 . . . . . {comprising phosphorous acid (-ester) groups ((RO)P(OR')2) or the isomeric phosphonic acid (-ester) groups (R(R'O)2P=O), i.e. R= C, R'= C, H}

B01J 31/0261 . . . . . {comprising phosphonous acid (-ester) groups (RP(OR')2) or the isomeric phosphinic acid (-ester) groups (R2(R'O)P=O), i.e. R= C, R'= C, H}

B01J 31/0262 . . . . . {comprising phosphinous acid (-ester) groups (R2P(OR')) or the isomeric phosphine oxide groups (R3P=O) , i.e. R= C, R'= C, H}

B01J 31/0264 . . . . {Phosphorus acid amides}

B01J 31/0265 . . . . . {Phosphazenes, oligomers thereof or the corresponding phosphazenium salts (polyphosphazenes per se C07F 9/067)}

B01J 31/0267 . . . . {Phosphines or phosphonium compounds, i.e. phosphorus bonded to at least one carbon atom, including sp2-hybridised phosphorus compounds such as phosphabenzene, the other atoms bonded to phosphorus being either carbon or hydrogen}

B01J 31/0268 . . . . . {Phosphonium compounds, i.e. phosphine with an additional hydrogen or carbon atom bonded to phosphorous so as to result in a formal positive charge on phosphorous}

B01J 31/0269 . . . . {on mineral substrates}

B01J 31/0271 . . . {also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0231}

B01J 31/0272 . . {containing elements other than those covered by B01J 31/0201 - B01J 31/0255}

B01J 31/0274 . . . {containing silicon (ligands in coordination complexes B01J 31/1608)}

B01J 31/0275 . . . {also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0269}

B01J 31/0277 . . {comprising ionic liquids, as components in catalyst systems or catalysts per se, the ionic liquid compounds being used in the molten state at the respective reaction temperature}

B01J 31/0278 . . . {containing nitrogen as cationic centre}

B01J 31/0279 . . . . {the cationic portion being acyclic or nitrogen being a substituent on a ring}

B01J 31/0281 . . . . {the nitrogen being a ring member}

B01J 31/0282 . . . . . {of an aliphatic ring, e.g. morpholinium}

B01J 31/0284 . . . . . {of an aromatic ring, e.g. pyridinium}

B01J 31/0285 . . . . {also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0274}

B01J 31/0287 . . . {containing atoms other than nitrogen as cationic centre}

B01J 31/0288 . . . . {Phosphorus}

B01J 31/0289 . . . . {Sulfur}

B01J 31/0291 . . . . {also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0274}

B01J 31/0292 . . . {immobilised on a substrate}

B01J 31/0294 . . . . {by polar or ionic interaction with the substrate, e.g. glass}

B01J 31/0295 . . . . {by covalent attachment to the substrate, e.g. silica}

B01J 31/0297 . . . . . {the substrate being a soluble polymer, dendrimer or oligomer of characteristic microstructure of groups B01J 31/061 - B01J 31/068}

B01J 31/0298 . . . {the ionic liquids being characterised by the counter-anions}

B01J 31/04 . . containing carboxylic acids or their salts {(B01J 31/0277 - B01J 31/0298 take precedence; multi-metal carboxylate complexes like Pd (II) acetate, i.e. Pd3 (OAc) 6 or Cr(II)acetate, i.e. $Cr_2(OAc)_4$ B01J 31/2226)}

B01J 31/06 . . containing polymers {(organometallic polymers B01J 31/123; polymer-bound organometallic complexes B01J 31/165; coordination polymers B01J 31/1691)}

B01J 31/061 . . . {Chiral polymers}

B01J 31/062 . . . . {Polymeric amino acids}

B01J 31/063 . . . {Polymers comprising a characteristic microstructure}

B01J 31/064 . . . . {Dendrimers}

B01J 31/065 . . . . {Cyclodextrins}

B01J 31/066 . . . . {Calixarenes and hetero-analogues, e.g. thiacalixarenes}

B01J 31/067 . . . . {Molecularly imprinted polymers (catalytic antibodies C12N 9/0002)}

B01J 31/068 . . . {Polyalkylene glycols}

B01J 31/069 . . . {Hybrid organic-inorganic polymers, e.g. silica derivatized with organic groups (nitrogen containing groups on mineral substrates B01J 31/0254; organometallic polymers B01J 31/123; coordination complexes immobilised on an inorganic support B01J 31/1616; coordination polymers, e.g. metal-organic frameworks B01J 31/1691)}

B01J 31/08 . . . Ion-exchange resins

B01J 31/10 . . . . sulfonated

B01J 31/12 . . containing organo-metallic compounds or metal hydrides

B01J 31/121 . . . {Metal hydrides}

B01J 31/122 . . . {Metal aryl or alkyl compounds}

B01J 31/123 . . . {Organometallic polymers, e.g. comprising C-Si bonds in the main chain or in subunits grafted to the main chain (B01J 31/064, B01J 31/066, B01J 31/067, B01J 31/08 and B01J 31/10 take precedence; polymer-bound organometallic complexes B01J 31/165; coordination polymers B01J 31/1691; catalysts for the preparation of polysiloxanes, e.g. Karstedt catalysts C08G 77/08)}

B01J 31/124 . . . . {Silicones or siloxanes or comprising such units}

B01J 31/125 . . . . . {Cyclic siloxanes}

B01J 31/126 . . . . . {the siloxanes or siloxane units, cyclic or not, comprising an additional Si-H bond, e.g. polyhydromethylsiloxane [PHMS]}

B01J 31/127 . . . . . {the siloxane units, e.g. silsesquioxane units, being grafted onto other polymers or inorganic supports, e.g. via an organic linker}

B01J 31/128 . . . {Mixtures of organometallic compounds}

B01J 31/14 . . . of aluminium or boron

B01J 31/143 . . . . {of aluminium}

B01J 31/146 . . . . {of boron}

B01J 31/16 . containing coordination complexes

B01J 31/1608 . . {the ligands containing silicon}

B01J 31/1616 . . {Coordination complexes, e.g. organometallic complexes, immobilised on an inorganic support, e.g. ship-in-a-bottle type catalysts (catalysts comprising molecular sieves B01J 29/00)}

B01J 31/1625 . . . {immobilised by covalent linkages, i.e. pendant complexes with optional linking groups}

B01J 31/1633 . . . . {covalent linkages via silicon containing groups}

B01J 31/1641 . . . . . {established via a metathesis reaction using a silicon-containing olefin}

B01J 31/165 . . {Polymer immobilised coordination complexes, e.g.organometallic complexes}

B01J 31/1658 . . . {immobilised by covalent linkages, i.e. pendant complexes with optional linking groups, e.g. on Wang or Merrifield resins}

B01J 31/1666 . . . . {the linkage established via an olefin metathesis reaction}

B01J 31/1675 . . . . {the linkage being to an organometallic polymer covered by groups B01J 31/123 - B01J 31/127, e.g. polyhydrosiloxanes}

B01J 31/1683 . . . . {the linkage being to a soluble polymer, e.g. PEG or dendrimer, i.e. molecular weight enlarged complexes}

B01J 31/1691 . . {Coordination polymers, e.g. metal-organic frameworks [MOF] (preparation of metal complexes containing carboxylic acid moieties C07C 51/418; MOF's per se C07F)}

B01J 31/18 . . containing nitrogen, phosphorus, arsenic or antimony {as complexing atoms, e.g. in pyridine ligands, or in resonance therewith, e.g. in isocyanide ligands C=N-R or as complexed central atoms (double metal cyanides B01J 27/26; N-heterocyclic carbenes B01J 31/2265)}

B01J 31/1805 . . . {the ligands containing nitrogen}

B01J 31/181 . . . . {Cyclic ligands, including non-condensed polycyclic ligands, comprising at least one complexing nitrogen atom as ring member, e.g. pyridine}

B01J 31/1815 . . . . . {with more than one complexing nitrogen atom, e.g. bipyridyl, 2-aminopyridine}

B01J 31/182 . . . . . {comprising aliphatic or saturated rings}

B01J 31/1825 . . . . . {Ligands comprising condensed ring systems, e.g. acridine, carbazole}

B01J 31/183 . . . . . {with more than one complexing nitrogen atom, e.g. phenanthroline}

B01J 31/1835 . . . . . {comprising aliphatic or saturated rings}

B01J 31/184 . . . . . {mixed aromatic/aliphatic ring systems, e.g. indoline}

B01J 31/1845 . . . {the ligands containing phosphorus (phosphines B01J 31/24)}

B01J 31/185 . . . . {Phosphites ((RO)3P) , their isomeric phosphonates (R(RO)2P=O) and RO-substitution derivatives thereof}

B01J 31/1855 . . . . . {Triamide derivatives thereof}

B01J 31/186 . . . . . {Mono- or diamide derivatives thereof}

B01J 31/1865 . . . . {Phosphonites (RP(OR)2) , their isomeric phosphinates (R2(RO)P=O) and RO-substitution derivatives thereof}

B01J 31/187 . . . . . {Amide derivatives thereof}

B01J 31/1875 . . . . {Phosphinites (R2P(OR), their isomeric phosphine oxides (R3P=O) and RO-substitution derivatives thereof)}

B01J 31/188 . . . . . {Amide derivatives thereof}

B01J 31/1885 . . . . {Ligands comprising two different formal oxidation states of phosphorus in one at least bidentate ligand, e.g.phosphite/ phosphinite}

B01J 31/189 . . . {containing both nitrogen and phosphorus as complexing atoms, including phosphino moieties, in one at least bidentate ligand}

B01J 31/1895 . . . {the ligands containing arsenic or antimony}

B01J 31/20 . . Carbonyls

B01J 31/22 . . Organic complexes

B01J 31/2204 . . . {the ligands containing oxygen or sulfur as complexing atoms}

B01J 31/2208 . . . . {Oxygen, e.g. acetylacetonates}

B01J 31/2213 . . . . . {At least two complexing oxygen atoms present in an at least bidentate or bridging ligand}

B01J 31/2217 . . . . . {At least one oxygen and one nitrogen atom present as complexing atoms in an at least bidentate or bridging ligand}

B01J 31/2221 . . . . . {At least one oxygen and one phosphorous atom present as complexing atoms in an at least bidentate or bridging ligand}

B01J 31/2226 . . . . . {Anionic ligands, i.e. the overall ligand carries at least one formal negative charge}

B01J 31/223 . . . . . {At least two oxygen atoms present in one at least bidentate or bridging ligand}

B01J 31/2234 . . . . . {Beta-dicarbonyl ligands, e.g. acetylacetonates}

B01J 31/2239 . . . . . {Bridging ligands, e.g. OAc in $Cr_2(OAc)_4$, $Pt_4(OAc)_8$ or dicarboxylate ligands}

B01J 31/2243 . . . . . {At least one oxygen and one nitrogen atom present as complexing atoms in an at least bidentate or bridging ligand}

B01J 31/2247 . . . . . {At least one oxygen and one phosphorous atom present as complexing atoms in an at least bidentate or bridging ligand}

B01J 31/2252 . . . . . {Sulfonate ligands}

B01J 31/2256 . . . . . {being perfluorinated, i.e. comprising at least one perfluorinated moiety as substructure in case of polyfunctional ligands}

B01J 31/226 . . . . {Sulfur, e.g. thiocarbamates}

B01J 31/2265 . . . {Carbenes or carbynes, i.e.(image)}

B01J 31/2269 . . . . {Heterocyclic carbenes}

B01J 31/2273 . . . . . {with only nitrogen as heteroatomic ring members, e.g. 1,3-diarylimidazoline-2-ylidenes}

B01J 31/2278 . . . . {Complexes comprising two carbene ligands differing from each other, e.g. Grubbs second generation catalysts}

B01J 31/2282 . . . {Unsaturated compounds used as ligands}

B01J 31/2286 . . . . {Alkynes, e.g. acetylides}

B01J 31/2291 . . . . {Olefins}

B01J 31/2295 . . . . {Cyclic compounds, e.g. cyclopentadienyls}

B01J 31/24 . . Phosphines {i.e. phosphorus bonded to only carbon atoms, or to both carbon and hydrogen atoms, including sp2-hybridised phosphorus compounds such as phosphabenzene, phosphole or anionic phospholide ligands (complexes with parent phosphine PH_3 B01J 31/1845)}

B01J 31/2404 . . . {Cyclic ligands, including non-condensed polycyclic ligands, the phosphine-P atom being a ring member or a substituent on the ring}

B01J 31/2409 . . . . {with more than one complexing phosphine-P atom}

B01J 31/2414 . . . . . {comprising aliphatic or saturated rings}

B01J 31/2419 . . . . {comprising P as ring member}

B01J 31/2423 . . . . . {comprising aliphatic or saturated rings}

B01J 31/2428 . . . . . {with more than one complexing phosphine-P atom}

B01J 31/2433 . . . . . {comprising aliphatic or saturated rings}

B01J 31/2438 . . . . . {and further hetero atoms as ring members, excluding the positions adjacent to P}

B01J 31/2442 . . . . {comprising condensed ring systems}

B01J 31/2447 . . . . . {and phosphine-P atoms as substituents on a ring of the condensed system or on a further attached ring}

B01J 31/2452 . . . . . {with more than one complexing phosphine-P atom}

B01J 31/2457 . . . . . {comprising aliphatic or saturated rings, e.g. Xantphos}

B01J 31/2461 . . . . . {and phosphine-P atoms as ring members in the condensed ring system or in a further ring}

B01J 31/2466 . . . . . {comprising aliphatic or saturated rings}

B01J 31/2471 . . . . . {with more than one complexing phosphine-P atom}

B01J 31/2476 . . . . . {comprising aliphatic or saturated rings}

B01J 31/248 . . . . . {Bridged ring systems, e.g. 9-phosphabicyclononane}

B01J 31/2485 . . . . . {Tricyclic systems, e.g. phosphaadamantanes and hetero analogues}

B01J 31/249 . . . . . {Spiro-condensed ring systems}

B01J 31/2495 . . . {Ligands comprising a phosphine-P atom and one or more further complexing phosphorus atoms covered by groups B01J 31/1845 - B01J 31/1885, e.g. phosphine/phosphinate or phospholyl/phosphonate ligands}

B01J 31/26 . containing in addition, inorganic metal compounds not provided for in groups B01J 31/02 - B01J 31/24

B01J 31/28 . . of the platinum group metals, iron group metals or copper

B01J 31/30 . . . Halides

B01J 31/32 . . of manganese, technetium or rhenium

B01J 31/34 . . of chromium, molybdenum or tungsten

B01J 31/36 . . of vanadium, niobium or tantalum

B01J 31/38 . . of titanium, zirconium or hafnium

B01J 31/40 . Regeneration or reactivation

B01J 31/4007 . . {of catalysts containing polymers}

B01J 31/4015 . . {of catalysts containing metals}

B01J 31/4023 . . . {containing iron group metals, noble metals or copper}
B01J 31/403 . . . . {containing iron group metals or copper}
B01J 31/4038 . . . . {containing noble metals}
B01J 31/4046 . . . . . {containing rhodium}
B01J 31/4053 . . . {with recovery of phosphorous catalyst system constituents}
B01J 31/4061 . . . {involving membrane separation}
B01J 31/4069 . . . {involving extraction with coordinating ionic liquids or supercritical fluids, e.g. CO_2}
B01J 31/4076 . . . {involving electrochemical processes}
B01J 31/4084 . . . {involving electromagnetic wave energy, e.g. UV or visible light}
B01J 31/4092 . . . {involving a stripping step, with stripping gas or solvent}

B01J 32/00 **Catalyst carriers in general**

B01J 33/00 **Protection of catalysts, e.g. by coating**

B01J 35/00 **Catalysts, in general, characterised by their form or physical properties**
B01J 35/0006 . {Catalysts containing parts with different compositions}
B01J 35/0013 . {Colloids}
B01J 35/002 . {Catalysts characterised by their physical properties}
B01J 35/0026 . . {Density}
B01J 35/0033 . . {Electric or magnetic properties}
B01J 35/004 . . {Photocatalysts}

WARNING

Groups B01J 35/0046 - B01J 35/0093 are not complete, see also B01J 35/002

B01J 35/0046 . . {Physical properties of the active metal ingredient}
B01J 35/0053 . . . {metal surface area}
B01J 35/006 . . . {metal crystallite size}
B01J 35/0066 . . . {metal dispersion value, e.g. percentage or fraction}
B01J 35/0073 . . {Distribution of the active metal ingredient}
B01J 35/008 . . . {egg-shell like}
B01J 35/0086 . . . {egg-yolk like}
B01J 35/0093 . . . {homogeneous throughout the support particle}
B01J 35/02 . Solids
B01J 35/023 . . {Catalysts characterised by dimensions, e.g. grain size}
B01J 35/026 . . {Form of the solid particles (B01J 35/08 takes precedence)}
B01J 35/04 . . Foraminous structures, sieves, grids, honeycombs
B01J 35/06 . . Fabrics or filaments
B01J 35/065 . . . {Membranes}
B01J 35/08 . . Spheres

B01J 35/10 . . characterised by their surface properties or porosity

WARNING

Groups B01J 35/1004 - B01J 35/1095 are not complete, see also B01J 35/10

B01J 35/1004 . . . {Surface area}
B01J 35/1009 . . . . {less than 10 m2/g}
B01J 35/1014 . . . . {10-100 m2/g}
B01J 35/1019 . . . . {100-500 m2/g}
B01J 35/1023 . . . . {500-1000 m2/g}
B01J 35/1028 . . . . {more than 1000 m2/g}
B01J 35/1033 . . . {Pore volume}
B01J 35/1038 . . . . {less than 0.5 ml/g}
B01J 35/1042 . . . . {0.5-1.0 ml/g}
B01J 35/1047 . . . . {more than 1.0 ml/g}
B01J 35/1052 . . . {Pore diameter}
B01J 35/1057 . . . . {less than 2 nm}
B01J 35/1061 . . . . {2-50 nm}
B01J 35/1066 . . . . {50-500 nm}
B01J 35/1071 . . . . {500-1000 nm}
B01J 35/1076 . . . . {larger than 1000 nm}
B01J 35/108 . . . {Pore distribution}
B01J 35/1085 . . . . {monomodal}
B01J 35/109 . . . . {bimodal}
B01J 35/1095 . . . . {polymodal}
B01J 35/12 . Liquids or melts

B01J 37/00 **Processes, in general, for preparing catalysts; Processes, in general, for activation of catalysts**

B01J 37/0009 . {Use of binding agents; Moulding; Pressing; Powdering; Granulating; Addition of materials ameliorating the mechanical properties of the product catalyst}
B01J 37/0018 . . {Addition of a binding agent or of material, later completely removed among others as result of heat treatment, leaching or washing,(e.g. forming of pores; protective layer, desintegrating by heat)}
B01J 37/0027 . . {Powdering}
B01J 37/0036 . . . {Grinding}
B01J 37/0045 . . . {Drying a slurry, e.g. spray drying}
B01J 37/0054 . . . {Drying of aerosols}
B01J 37/0063 . . {Granulating}
B01J 37/0072 . {Preparation of particles, e.g. dispersion of droplets in an oil bath}
B01J 37/0081 . {Preparation by melting}
B01J 37/009 . {Preparation by separation, e.g. by filtration, decantation, screening}

B01J 37/02 . Impregnation, coating or precipitation ({B01J 37/0009 and B01J 37/0018 take precedence } ; protection by coating B01J 33/00)

B01J 37/0201 . . {Impregnation}

B01J 37/0203 . . . {the impregnation liquid containing organic compounds}

B01J 37/0205 . . . {in several steps}

B01J 37/0207 . . . {Pretreatment of the support}

B01J 37/0209 . . . {involving a reaction between the support and a fluid}

B01J 37/0211 . . . {using a colloidal suspension}

B01J 37/0213 . . . {Preparation of the impregnating solution}

B01J 37/0215 . . {Coating}

B01J 37/0217 . . . {Pretreatment of the substrate before coating}

B01J 37/0219 . . . {the coating containing organic compounds}

B01J 37/0221 . . . {of particles}

B01J 37/0223 . . . . {by rotation}

B01J 37/0225 . . . {of metal substrates}

B01J 37/0226 . . . . {Oxidation of the substrate, e.g. anodisation}

B01J 37/0228 . . . {in several steps}

B01J 37/023 . . . {using molten compounds}

B01J 37/0232 . . . {by pulverisation}

B01J 37/0234 . . {Impregnation and coating simultaneously}

B01J 37/0236 . . {Drying, e.g. preparing a suspension, adding a soluble salt and drying}

B01J 37/0238 . . {via the gaseous phase-sublimation}

B01J 37/024 . . {Multiple impregnation or coating}

B01J 37/0242 . . . {Coating followed by impregnation}

B01J 37/0244 . . . {Coatings comprising several layers}

B01J 37/0246 . . . {Coatings comprising a zeolite}

B01J 37/0248 . . . {Coatings comprising impregnated particles}

B01J 37/03 . . Precipitation; Co-precipitation

B01J 37/031 . . . {Precipitation}

B01J 37/033 . . . . {Using Hydrolysis}

B01J 37/035 . . . . {Precipitation on carriers}

B01J 37/036 . . . {to form a gel or a cogel}

B01J 37/038 . . . {to form slurries or suspensions, e.g. a washcoat}

B01J 37/04 . Mixing {(B01J 37/0009, B01J 37/0018 take precedence)}

B01J 37/06 . Washing {(B01J 37/0009, B01J 37/0018 take precedence)}

B01J 37/08 . Heat treatment {(B01J 37/0009, B01J 37/0018 take precedence)}

B01J 37/082 . . {Decomposition and pyrolysis}

B01J 37/084 . . . {Decomposition of carbon-containing compounds into carbon}

B01J 37/086 . . . {Decomposition of an organometallic compound, a metal complex or a metal salt of a carboxylic acid}

B01J 37/088 . . . {Decomposition of a metal salt}
B01J 37/10 . . in the presence of water, e.g. steam
B01J 37/105 . . . {Hydropyrolysis}
B01J 37/12 . Oxidising
B01J 37/14 . . with gases containing free oxygen
B01J 37/16 . Reducing
B01J 37/18 . . with gases containing free hydrogen
B01J 37/20 . Sulfiding
B01J 37/22 . Halogenating
B01J 37/24 . . Chlorinating
B01J 37/26 . . Fluorinating
B01J 37/28 . Phosphorising
B01J 37/30 . Ion-exchange
B01J 37/32 . Freeze drying, i.e. lyophilisation
B01J 37/34 . Irradiation by, or application of, electric, magnetic or wave energy, e.g. ultrasonic waves; {Ionic sputtering; Flame or plasma spraying; Particle radiation}
B01J 37/341 . . {making use of electric or magnetic fields, wave energy or particle radiation (use of flames, plasma or lasers B01J 37/349)}
B01J 37/342 . . . {of electric, magnetic or electromagnetic fields, e.g. for magnetic separation}
B01J 37/343 . . . {of ultrasonic wave energy}
B01J 37/344 . . . {of electromagnetic wave energy}
B01J 37/345 . . . . {of ultraviolet wave energy}
B01J 37/346 . . . . {of microwave energy}
B01J 37/347 . . . {Ionic or cathodic spraying; Electric discharge}
B01J 37/348 . . {Electrochemical processes, e.g. electrochemical deposition or anodisation}
B01J 37/349 . . {making use of flames, plasmas or lasers}
B01J 37/36 . Biochemical methods

B01J 38/00 **Regeneration or reactivation of catalysts, in general**
B01J 2038/005 . {involving supercritical treatment}
B01J 38/02 . Heat treatment
B01J 38/04 . Gas or vapour treating; Treating by using liquids vaporisable upon contacting spent catalyst
B01J 38/06 . . using steam
B01J 38/08 . . using ammonia or derivatives thereof
B01J 38/10 . . using elemental hydrogen
B01J 38/12 . . Treating with free oxygen-containing gas
B01J 38/14 . . . with control of oxygen content in oxidation gas
B01J 38/16 . . . Oxidation gas comprising essentially steam and oxygen
B01J 38/18 . . . with subsequent reactive gas treating

B01J 38/20 . . . Plural distinct oxidation stages

B01J 38/22 . . . Moving bed, e.g. vertically or horizontally moving bulk

B01J 38/24 . . . . having mainly transverse, i.e. lateral, flow of oxygen-containing gas and material

B01J 38/26 . . . . having mainly counter-current flow of oxygen-containing gas and material

B01J 38/28 . . . . having mainly concurrent flow of oxygen-containing gas and material

B01J 38/30 . . . in gaseous suspension, e.g. fluidised bed

B01J 38/32 . . . . Indirectly heating or cooling material within regeneration zone or prior to entry into regeneration zone

B01J 38/34 . . . . with plural distinct serial combustion stages

B01J 38/36 . . . . and with substantially complete oxidation of carbon monoxide to carbon dioxide within regeneration zone

B01J 38/38 . . . and adding heat by solid heat carrier

B01J 38/40 . . . and forming useful by-products

B01J 38/42 . . using halogen-containing material

B01J 38/44 . . . and adding simultaneously or subsequently free oxygen; using oxyhalogen compound

B01J 38/46 . . . fluorine-containing

B01J 38/48 . Liquid treating or treating in liquid phase, e.g. dissolved or suspended

B01J 38/485 . . {Impregnating or reimpregnating with, or deposition of metal compounds or catalytically active elements}

B01J 38/50 . . using organic liquids

B01J 38/52 . . . oxygen-containing

B01J 38/54 . . . halogen-containing

B01J 38/56 . . . Hydrocarbons

B01J 38/58 . . . and gas addition thereto

B01J 38/60 . . using acids

B01J 38/62 . . . organic

B01J 38/64 . . using alkaline material; using salts

B01J 38/66 . . . using ammonia or derivatives thereof

B01J 38/68 . . including substantial dissolution or chemical precipitation of a catalyst component in the ultimate reconstitution of the catalyst

B01J 38/70 . . Wet oxidation of material submerged in liquid

B01J 38/72 . including segregation of divers particles

B01J 38/74 . utilising ion-exchange

Ion-exchange (treatment of milk A23C 9/14; separation by liquid ion-exchangers B01D, e.g. B01D 11/00; separation of isotopes B01D 59/00; compounds er se, see the relevant classes, e.g. C01, C07, C08; treatment of water C02F 1/42; refining of hydrocarbon oils, in the absence of hydrogen, with solid sorbents C10G 25/00; purification of sugar juices C13B 20/14; extraction of sugar from molasses C13B 35/06; extraction of metal compounds from ores or concentrates by wet processes C22B 3/00; using ion-exchange for investigating or analysing materials G01N 30/96; treating radioactively contaminated material G21F 9/12)

NOTES

1. In groups B01J 39/00 - B01J 49/00:
   - Ion-exchange covers all processes whereby ions are exchanged between the solid exchanger and the liquid to be treated and wherein the exchanger is not soluble in the liquid to be treated
   - Ion-exchange processes cover also ion-exchange in combination with complex or chelate forming reactions.
2. In groups B01J 39/00 - B01J 49/00, the last place priority rule is applied, i.e. at each hierarchical level, in the absence of an indication to the contrary, classification is made in the last appropriate place.
3. {In groups B01J 39/00 - B01J 49/00, it is desirable to classify other constituents by using Combination sets with symbols chosen from B01J 39/00 and subgroups and B01J 41/00 and subgroups.}

B01J 39/00	**Cation exchange; Use of material as cation exchangers; Treatment of material for improving the cation exchange properties** (cation exchange chromatography processes B01D 15/362)
B01J 39/02	. Processes using inorganic exchangers
B01J 39/04	. Processes using organic exchangers
B01J 39/043	. . {in the strongly acidic form}
B01J 39/046	. . {in the weakly acidic form}
B01J 39/08	. Use of material as cation exchangers; Treatment of material for improving the cation exchange properties
B01J 39/085	. . {Inorganic material}
B01J 39/10	. . Oxides or hydroxides
B01J 39/12	. . Compounds containing phosphorus
B01J 39/14	. . Base exchange silicates, e.g. zeolites
B01J 39/16	. . Organic material
B01J 39/165	. . . {containing also inorganic materials, e.g. inert material coated with an ion-exchange resin}
B01J 39/18	. . . Macromolecular compounds {(B01J 39/165 takes precedence)}
B01J 39/185	. . . . {obtained otherwise than by reactions only involving unsaturated carbon-to-carbon bonds}
B01J 39/20	. . . . Macromolecular compounds obtained by reactions only involving unsaturated carbon-to-carbon bonds
B01J 39/22	. . . . Cellulose or wood; Derivatives thereof
B01J 39/24	. . Carbon, coal or tar
B01J 39/26	. Cation exchangers for chromatographic processes

B01J 41/00 **Anion exchange; Use of material as anion exchangers; Treatment of material for improving the anion exchange properties** (anion exchange chromatography processes B01D 15/363)

B01J 41/02 . Processes using inorganic exchangers

B01J 41/04 . Processes using organic exchangers

B01J 41/043 . . {in the strongly basic form}

B01J 41/046 . . {in the weakly basic form}

B01J 41/08 . Use of material as anion exchangers; Treatment of material for improving the anion exchange properties

B01J 41/085 . . {Organic material (macromolecular compounds B01J 41/12)}

B01J 41/10 . . Inorganic material (carbon, coal or tar B01J 41/18)

B01J 41/12 . . Macromolecular compounds

B01J 41/125 . . . {obtained otherwise than by reactions only involving unsaturated carbon-to-carbon bonds}

B01J 41/14 . . . Macromolecular compounds obtained by reactions only involving unsaturated carbon-to-carbon bonds

B01J 41/16 . . . Cellulose or wood; Derivatives thereof

B01J 41/18 . . Carbon, coal or tar

B01J 41/20 . Anion exchangers for chromatographic processes

B01J 43/00 **Amphoteric ion-exchange, i.e. using ion-exchangers having cationic and anionic groups; Use of material as amphoteric ion-exchangers; Treatment of material for improving their amphoteric ion-exchange properties** (ion-exchange chromatography processes B01D 15/36)

B01J 45/00 **Ion-exchange in which a complex or a chelate is formed; Use of material as complex or chelate forming ion-exchangers; Treatment of material for improving the complex or chelate forming ion-exchange properties** (ion-exchange chromatography processes B01D 15/36)

B01J 47/00 **Ion-exchange processes in general; Apparatus therefor** (ion-exchange chromatography processes or apparatus B01D 15/08)

B01J 47/001 . {using batch processes}

B01J 47/002 . {using portable ion-exchanging apparatus}

B01J 47/003 . {in which the adsorbent properties of the ion-exchanger are involved, e.g. recovery of high molecular compounds (proteins)}

B01J 47/005 . {electron-exchangers}

B01J 47/006 . {Modification or after-treatment of ion-exchangers}

B01J 47/007 . {Granulation, incorporation of ion-exchangers in a matrix, mixing with inert materials}

B01J 47/008 . . {mixture in form of tablets}

B01J 47/02 . Column or bed processes

B01J 47/022 . . {characterised by the construction of the column or container}

B01J 47/024 . . . {where the ion-exchangers are in a removable cartridge}

B01J 47/026 . . {using more than one column or more than one bed in series}

B01J 47/028	. . . {with alternately cationic and anionic exchangers}
B01J 47/04	. . Mixed-bed processes
B01J 47/06	. . during which the ion-exchange material is subjected to a physical treatment, e.g. heat, electric current, irradiation, vibration (electrodialysis, electro-osmosis B01D 61/42)
B01J 47/08	. . . subjected to a direct electric current
B01J 47/10	. with moving ion-exchange material; with ion-exchange material in suspension or in fluidised-bed form
B01J 47/105	. . {in rotating beds}
B01J 47/12	. characterised by the use of ion-exchange material in the form of sheets, ribbons or filaments, e.g. membranes (electrodialysis, electro-osmosis B01D 61/42)
B01J 47/123	. . {Use of materials in the form of filaments or fibres}
B01J 47/126	. . {Precoat filters}
B01J 47/14	. Controlling or regulating (controlling or regulating in general G05)
B01J 47/145	. . {for obtaining a solution having a fixed pH}
B01J 49/00	**Regeneration or reactivation of ion-exchangers; Apparatus therefor** (ion-exchange chromatography processes or apparatus B01D 15/08)
B01J 49/0004	. {of fixed beds}
B01J 49/0008	. . {containing cationic exchangers}
B01J 49/0013	. . {containing anionic exchangers}
B01J 49/0017	. . {containing cationic and anionic exchangers in separated beds}
B01J 49/0021	. . {of mixed beds}
B01J 49/0026	. {of moving beds}
B01J 49/003	. . {containing cationic exchangers}
B01J 49/0034	. . {containing anionic exchangers}
B01J 49/0039	. . {containing cationic and anionic exchangers in separated beds}
B01J 49/0043	. . {of mixed beds}
B01J 49/0047	. {of membranes}
B01J 49/0052	. {electrical regeneration}
B01J 49/0056	. {thermal regeneration}
B01J 49/006	. . {of amphoteric ion-exchangers ("Sirotherm process")}
B01J 49/0065	. {characterised by the regeneration reagents}
B01J 49/0069	. . {for cationic exchangers}
B01J 49/0073	. . {for anionic exchangers}
B01J 49/0078	. {Cleaning or rinsing ion-exchange beds}
B01J 49/0082	. {Process involving a plant}
B01J 49/0086	. . {of water softeners}
B01J 49/0091	. {Automatic regeneration}
B01J 49/0095	. . {Controlling or regulating devices therefor}
B01J 49/02	. having devices which prevent back-flow of the ion-exchange mass during regenerating

B01J 2203/00	**Processes utilising sub- or super atmospheric pressure**
B01J 2203/06	. High pressure synthesis
B01J 2203/0605	. . Composition of the material to be processed
B01J 2203/061	. . . Graphite
B01J 2203/0615	. . . Fullerene
B01J 2203/062	. . . Diamond
B01J 2203/0625	. . . Carbon
B01J 2203/063	. . . Carbides
B01J 2203/0635	. . . . Silicon carbide
B01J 2203/064	. . . Carbonates
B01J 2203/0645	. . . Boronitrides
B01J 2203/065	. . Composition of the material produced
B01J 2203/0655	. . . Diamond
B01J 2203/066	. . . Boronitrides
B01J 2203/0665	. . . Gallium nitrides
B01J 2203/067	. . . Aluminium nitrides
B01J 2203/0675	. . Structural or physico-chemical features of the materials processed
B01J 2203/068	. . . Crystal growth
B01J 2203/0685	. . . Crystal sintering
B01J 2203/069	. . . Recrystallisation
B01J 2203/0695	. . . Colour change
B01J 2204/00	**Aspects relating to feed or outlet devices; Regulating devices for feed or outlet devices**
B01J 2204/002	. the feeding side being of particular interest
B01J 2204/005	. the outlet side being of particular interest
B01J 2204/007	. Aspects relating to the heat-exchange of the feed or outlet devices
B01J 2208/00	**Processes carried out in the presence of solid particles; Reactors therefor**
B01J 2208/00008	. Controlling the process
B01J 2208/00017	. . Controlling the temperature
B01J 2208/00026	. . . Controlling or regulating the heat exchange system
B01J 2208/00035	. . . . involving measured parameters
B01J 2208/00044	. . . . . Temperature measurement
B01J 2208/00053	. . . . . . of the heat exchange medium
B01J 2208/00061	. . . . . . of the reactants
B01J 2208/0007	. . . . . Pressure measurement
B01J 2208/00079	. . . . . Fluid level measurement
B01J 2208/00088	. . . . . Flow rate measurement
B01J 2208/00097	. . . . . Mathematical modelling

B01J 2208/00106 . . . by indirect heat exchange
B01J 2208/00115 . . . . with heat exchange elements inside the bed of solid particles
B01J 2208/00123 . . . . . Fingers
B01J 2208/00132 . . . . . Tubes
B01J 2208/00141 . . . . . Coils
B01J 2208/0015 . . . . . Plates; Cylinders
B01J 2208/00159 . . . . . Radially arranged plates
B01J 2208/00168 . . . . with heat exchange elements outside the bed of solid particles
B01J 2208/00176 . . . . . outside the reactor
B01J 2208/00185 . . . . . Fingers
B01J 2208/00194 . . . . . Tubes
B01J 2208/00203 . . . . . Coils
B01J 2208/00212 . . . . . Plates; Jackets; Cylinders
B01J 2208/00221 . . . . . comprising baffles for guiding the flow of the heat exchange medium
B01J 2208/0023 . . . . . with some catalyst tubes being empty, e.g. dummy tubes or flow-adjusting rods
B01J 2208/00238 . . . . . Adjusting the heat-exchange profile by adapting catalyst tubes or the distribution thereof, e.g. by using inserts in some of the tubes or adding external fins
B01J 2208/00247 . . . . . Reflux columns
B01J 2208/00256 . . . . . in a heat exchanger for the heat exchange medium separate from the reactor
B01J 2208/00265 . . . . Part of all of the reactants being heated or cooled outside the reactor while recycling
B01J 2208/00274 . . . . . involving reactant vapours
B01J 2208/00283 . . . . . involving reactant liquids
B01J 2208/00292 . . . . . involving reactant solids
B01J 2208/003 . . . . . involving reactant slurries
B01J 2208/00309 . . . . with two or more reactions in heat exchange with each other, such as an endothermic reaction in heat exchange with an exothermic reaction
B01J 2208/00318 . . . . Heat exchange inside a feeding nozzle or nozzle reactor
B01J 2208/00327 . . . by direct heat exchange
B01J 2208/00336 . . . . adding a temperature modifying medium to the reactants
B01J 2208/00345 . . . . . Cryogenic coolants
B01J 2208/00353 . . . . . Non-cryogenic fluids
B01J 2208/00362 . . . . . Liquid
B01J 2208/00371 . . . . . gaseous
B01J 2208/0038 . . . . . Solids
B01J 2208/00389 . . . using electric heating or cooling elements
B01J 2208/00398 . . . . inside the reactor bed
B01J 2208/00407 . . . . outside the reactor bed

B01J 2208/00415 . . . . electric resistance heaters
B01J 2208/00424 . . . . Peltier cooling elements
B01J 2208/00433 . . . using electromagnetic heating
B01J 2208/00442 . . . . Microwaves
B01J 2208/00451 . . . . Sunlight; Visible light
B01J 2208/0046 . . . . Infrared radiation
B01J 2208/00469 . . . . Radiofrequency
B01J 2208/00477 . . . by thermal insulation means
B01J 2208/00486 . . . . Vacuum spaces
B01J 2208/00495 . . . . using insulating materials or refractories
B01J 2208/00504 . . . by means of a burner
B01J 2208/00513 . . . using inert heat absorbing solids in the bed
B01J 2208/00522 . . . using inert heat absorbing solids outside the bed
B01J 2208/0053 . . . Controlling multiple zones along the direction of flow, e.g. pre-heating and after-cooling
B01J 2208/00539 . . Pressure
B01J 2208/00548 . . Flow
B01J 2208/00557 . . . controlling the residence time inside the reactor vessel
B01J 2208/00566 . . . Pulsated flow
B01J 2208/00575 . . Controlling the viscosity
B01J 2208/00584 . . Controlling the density
B01J 2208/00592 . . Controlling the pH
B01J 2208/00601 . . Controlling the conductivity
B01J 2208/0061 . . Controlling the level
B01J 2208/00619 . . Controlling the weight
B01J 2208/00628 . . Controlling the composition of the reactive mixture
B01J 2208/00637 . . . Means for stopping or slowing down the reaction
B01J 2208/00646 . . . Means for starting up the reaction
B01J 2208/00654 . . by measures relating to the particulate material
B01J 2208/00663 . . . Concentration
B01J 2208/00672 . . . Particle size selection
B01J 2208/00681 . . . Agglomeration
B01J 2208/0069 . . . Attrition
B01J 2208/00699 . . . Moisture content regulation
B01J 2208/00707 . . . Fouling
B01J 2208/00716 . . Means for reactor start-up
B01J 2208/00725 . . Mathematical modelling
B01J 2208/00734 . . Controlling static charge
B01J 2208/00743 . Feeding or discharging of solids
B01J 2208/00752 . . Feeding

B01J 2208/00761 . . Discharging
B01J 2208/00769 . . Details of feeding or discharging
B01J 2208/00778 . . . Kinetic energy reducing devices in the flow channel
B01J 2208/00787 . . . Bringing the solid in the form of a slurry before feeding it to the reactor
B01J 2208/00796 . Details of the reactor or of the particulate material
B01J 2208/00805 . . Details of the particulate material
B01J 2208/00814 . . . the particulate material being provides in prefilled containers
B01J 2208/00823 . . Mixing elements
B01J 2208/00831 . . . Stationary elements
B01J 2208/0084 . . . . inside the bed, e.g. baffles
B01J 2208/00849 . . . . outside the bed, e.g. baffles
B01J 2208/00858 . . . Moving elements
B01J 2208/00867 . . . . inside the bed, e.g. rotary mixer
B01J 2208/00876 . . . . outside the bed, e.g. rotary mixer
B01J 2208/00884 . . Means for supporting the bed of particles, e.g. grids, bars, perforated plates
B01J 2208/00893 . . Feeding means for the reactants
B01J 2208/00902 . . . Nozzle-type feeding elements
B01J 2208/00911 . . . Sparger-type feeding elements
B01J 2208/0092 . . . Perforated plates
B01J 2208/00929 . . . Provided with baffles
B01J 2208/00938 . . Flow distribution elements
B01J 2208/00946 . . Features relating to the reactants or products
B01J 2208/00955 . . . Sampling of the particulate material, the reactants or the products
B01J 2208/00964 . . . . Reactants
B01J 2208/00973 . . . . Products
B01J 2208/00982 . . . . Particulate material
B01J 2208/00991 . . Disengagement zone in fluidised-bed reactors
B01J 2208/02 . with stationary particles
B01J 2208/021 . . comprising a plurality of beds with flow of reactants in parallel
B01J 2208/022 . . . Plate-type reactors filled with granular catalyst
B01J 2208/023 . . Details
B01J 2208/024 . . . Particulate material
B01J 2208/025 . . . . Two or more types of catalyst
B01J 2208/026 . . . . comprising nanocatalysts
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B01J 2208/06 . Details of tube reactors containing solid particles
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B01J 2219/00 Chemical, physical or physico-chemical processes in general; Their relevant apparatus

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B01J 2219/00038 . . . Processes in parallel
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B01J 2219/00045 . . . Green chemistry
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B01J 2219/00049 . Controlling or regulating processes
B01J 2219/00051 . . Controlling the temperature
B01J 2219/00054 . . . Controlling or regulating the heat exchange system
B01J 2219/00056 . . . . involving measured parameters
B01J 2219/00058 . . . . . Temperature measurement
B01J 2219/0006 . . . . . of the heat exchange medium
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B01J 2219/00072 . . . . Mathematical modelling
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B01J 2219/00076 . . . . with heat exchange elements inside the reactor
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B01J 2219/00085 . . . . . Plates; Jackets; Cylinders
B01J 2219/00087 . . . . with heat exchange elements outside the reactor
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B01J 2219/00092 . . . . . Tubes
B01J 2219/00094 . . . . . Jackets
B01J 2219/00096 . . . . . Plates
B01J 2219/00099 . . . . . the reactor being immersed in the heat exchange medium
B01J 2219/00101 . . . . . Reflux columns
B01J 2219/00103 . . . . . in a heat exchanger separate from the reactor
B01J 2219/00105 . . . . part or all of the reactants being heated or cooled outside the reactor while recycling
B01J 2219/00108 . . . . . involving reactant vapours
B01J 2219/0011 . . . . . involving reactant liquids
B01J 2219/00112 . . . . . involving reactant solids
B01J 2219/00114 . . . . . involving reactant slurries
B01J 2219/00117 . . . . with two or more reactions in heat exchange with each other, such as an endothermic reaction in heat exchange with an exothermic reaction
B01J 2219/00119 . . . . Heat exchange inside a feeding nozzle or nozzle reactor
B01J 2219/00121 . . . by direct heating or cooling
B01J 2219/00123 . . . . adding a temperature modifying medium to the reactants
B01J 2219/00126 . . . . . Cryogenic coolants
B01J 2219/00128 . . . . by evaporation of reactants
B01J 2219/0013 . . . . by condensation of reactants
B01J 2219/00132 . . . using electric heating or cooling elements
B01J 2219/00135 . . . . Electric resistance heaters
B01J 2219/00137 . . . . Peltier cooling elements
B01J 2219/00139 . . . using electromagnetic heating
B01J 2219/00141 . . . . Microwaves
B01J 2219/00144 . . . . Sunlight; Visible light
B01J 2219/00146 . . . . Infrared radiation
B01J 2219/00148 . . . . Radiofrequency
B01J 2219/0015 . . . by thermal insulation means
B01J 2219/00153 . . . . Vacuum spaces
B01J 2219/00155 . . . . using insulating materials or refractories
B01J 2219/00157 . . . by means of a burner
B01J 2219/00159 . . . controlling multiple zones along the direction of flow, e.g. pre-heating and after-cooling
B01J 2219/00162 . . controlling the pressure
B01J 2219/00164 . . controlling the flow
B01J 2219/00166 . . . controlling the residence time inside the reactor vessel
B01J 2219/00168 . . controlling the viscosity
B01J 2219/00171 . . controlling the density
B01J 2219/00173 . . . Physical density
B01J 2219/00175 . . . Optical density

B01J 2219/00177 . . controlling the pH
B01J 2219/0018 . . controlling the conductivity
B01J 2219/00182 . . controlling the level of reactants in the reactor vessel
B01J 2219/00184 . . controlling the weight of reactants in the reactor vessel
B01J 2219/00186 . . controlling the composition of the reactive mixture
B01J 2219/00189 . . controlling the stirring velocity
B01J 2219/00191 . . Control algorithm
B01J 2219/00193 . . . Sensing a parameter
B01J 2219/00195 . . . . of the reaction system
B01J 2219/00198 . . . . . at the reactor inlet
B01J 2219/002 . . . . . inside the reactor
B01J 2219/00202 . . . . . at the reactor outlet
B01J 2219/00204 . . . . of the heat exchange system
B01J 2219/00207 . . . . other than of the reactor heat exchange system
B01J 2219/00209 . . . transforming a sensed parameter
B01J 2219/00211 . . . comparing a sensed parameter with a pre-set value
B01J 2219/00213 . . . . Fixed parameter value
B01J 2219/00216 . . . . Parameter value calculated by equations
B01J 2219/00218 . . . . Dynamically variable (in-line) parameter values
B01J 2219/0022 . . . . calculating difference
B01J 2219/00222 . . . taking actions
B01J 2219/00225 . . . . stopping the system or generating an alarm
B01J 2219/00227 . . . . modifying the operating conditions
B01J 2219/00229 . . . . . of the reaction system
B01J 2219/00231 . . . . . . at the reactor inlet
B01J 2219/00234 . . . . . . inside the reactor
B01J 2219/00236 . . . . . . at the reactor outlet
B01J 2219/00238 . . . . . of the heat exchange system
B01J 2219/0024 . . . . . other than of the reactor or heat exchange system
B01J 2219/00243 . . Mathematical modelling
B01J 2219/00245 . . Avoiding undesirable reactions or side-effects
B01J 2219/00247 . . . Fouling of the reactor or the process equipment
B01J 2219/0025 . . . Foam formation
B01J 2219/00252 . . . Formation of deposits other than coke
B01J 2219/00254 . . . Formation of unwanted polymer, such as "pop-corn"
B01J 2219/00256 . . . Leakage
B01J 2219/00259 . . . Preventing runaway of the chemical reaction
B01J 2219/00261 . . . . Predicting runaway of the chemical reaction
B01J 2219/00263 . . . . Preventing explosion of the chemical mixture
B01J 2219/00265 . . . . Preventing flame propagation

B01J 2219/00268 . . . Detecting faulty operations
B01J 2219/0027 . . . Pressure relief
B01J 2219/00272 . . . Addition of reaction inhibitor
B01J 2219/00274 . Sequential or parallel reactions; Apparatus and devices for combinatorial chemistry or for making arrays; Chemical library technology
B01J 2219/00277 . . Apparatus
B01J 2219/00279 . . . Features relating to reactor vessels
B01J 2219/00281 . . . . Individual reactor vessels
B01J 2219/00283 . . . . . Reactor vessels with top opening
B01J 2219/00286 . . . . . Reactor vessels with top and bottom openings
B01J 2219/00288 . . . . . in the shape of syringes
B01J 2219/0029 . . . . . with pistons or plungers
B01J 2219/00292 . . . . . in the shape of pipette tips
B01J 2219/00295 . . . . . the reactor vessels having pervious side walls
B01J 2219/00297 . . . . . "Tea bags"
B01J 2219/00299 . . . . . Generally cylindrical reactor vessels
B01J 2219/00301 . . . . . the reactor vessels having impervious side walls
B01J 2219/00304 . . . . . Pouches
B01J 2219/00306 . . . . Reactor vessels in a multiple arrangement
B01J 2219/00308 . . . . . interchangeably mounted in racks or blocks
B01J 2219/0031 . . . . . the racks or blocks being mounted in stacked arrangements
B01J 2219/00313 . . . . . the reactor vessels being formed by arrays of wells in blocks
B01J 2219/00315 . . . . . Microtiter plates
B01J 2219/00317 . . . . . Microwell devices, i.e. having large numbers of wells
B01J 2219/00319 . . . . . the blocks being mounted in stacked arrangements
B01J 2219/00322 . . . . . the individual reactor vessels being arranged serially in stacks
B01J 2219/00324 . . . . . the reactor vessels or wells being arranged in plates moving in parallel to each other
B01J 2219/00326 . . . . . Movement by rotation
B01J 2219/00328 . . . . . Movement by linear translation
B01J 2219/00331 . . . . Details of the reactor vessels
B01J 2219/00333 . . . . . Closures attached to the reactor vessels
B01J 2219/00335 . . . . . Septa
B01J 2219/00337 . . . . . Valves
B01J 2219/0034 . . . . . in the shape of a ball or sphere
B01J 2219/00342 . . . . . rotary
B01J 2219/00344 . . . . . Caps
B01J 2219/00346 . . . . . Screw-caps
B01J 2219/00349 . . . . . Spheres
B01J 2219/00351 . . . Means for dispensing and evacuation of reagents

B01J 2219/00353 . . . . Pumps
B01J 2219/00355 . . . . . peristaltic
B01J 2219/00358 . . . . . electrode driven
B01J 2219/0036 . . . . Nozzles
B01J 2219/00362 . . . . . Acoustic nozzles
B01J 2219/00364 . . . . Pipettes
B01J 2219/00367 . . . . . capillary
B01J 2219/00369 . . . . . in multiple or parallel arrangements
B01J 2219/00371 . . . . . comprising electrodes
B01J 2219/00373 . . . . Hollow needles
B01J 2219/00376 . . . . . in multiple or parallel arrangements
B01J 2219/00378 . . . . Piezo-electric or ink jet dispensers
B01J 2219/0038 . . . . Drawing
B01J 2219/00382 . . . . Stamping
B01J 2219/00385 . . . . Printing
B01J 2219/00387 . . . . Applications using probes
B01J 2219/00389 . . . . Feeding through valves
B01J 2219/00391 . . . . . Rotary valves
B01J 2219/00394 . . . . . in multiple arrangements
B01J 2219/00396 . . . . . Membrane valves
B01J 2219/00398 . . . . . in multiple arrangements
B01J 2219/004 . . . . . Pinch valves
B01J 2219/00403 . . . . . in multiple arrangements
B01J 2219/00405 . . . . . Sliding valves
B01J 2219/00407 . . . . . In multiple arrangements
B01J 2219/00409 . . . . . Solenoids in combination with valves
B01J 2219/00412 . . . . . In multiple arrangements
B01J 2219/00414 . . . . using suction
B01J 2219/00416 . . . . . Vacuum
B01J 2219/00418 . . . . using pressure
B01J 2219/00421 . . . . using centrifugation
B01J 2219/00423 . . . . using filtration, e.g. through porous frits
B01J 2219/00425 . . . . using decantation
B01J 2219/00427 . . . . using masks
B01J 2219/0043 . . . . . for direct application of reagents, e.g. through openings in a shutter
B01J 2219/00432 . . . . . Photolithographic masks
B01J 2219/00434 . . . . . Liquid crystal masks
B01J 2219/00436 . . . . Maskless processes
B01J 2219/00439 . . . . . using micromirror arrays
B01J 2219/00441 . . . . . using lasers

B01J 2219/00443 . . . . . Thin film deposition
B01J 2219/00445 . . . . . Ion implantation
B01J 2219/00448 . . . . . using microlens arrays
B01J 2219/0045 . . . . . using optical fibres
B01J 2219/00452 . . . Means for the recovery of reactants or products
B01J 2219/00454 . . . . by chemical cleavage from the solid support
B01J 2219/00457 . . . Dispensing or evacuation of the solid phase support
B01J 2219/00459 . . . . Beads
B01J 2219/00461 . . . . . Beads and reaction vessel together
B01J 2219/00463 . . . . . Directed sorting
B01J 2219/00466 . . . . . in a slurry
B01J 2219/00468 . . . . . by manipulation of individual beads
B01J 2219/0047 . . . . Pins
B01J 2219/00472 . . . . . Replaceable crowns
B01J 2219/00475 . . . . Sheets
B01J 2219/00477 . . . Means for pressurising the reaction vessels
B01J 2219/00479 . . . Means for mixing reactants or products in the reaction vessels
B01J 2219/00481 . . . . by the use of moving stirrers within the reaction vessels
B01J 2219/00484 . . . . by shaking, vibrating or oscillating of the reaction vessels
B01J 2219/00486 . . . . . by sonication or ultrasonication
B01J 2219/00488 . . . . by rotation of the reaction vessels
B01J 2219/0049 . . . . . by centrifugation
B01J 2219/00493 . . . . by sparging or bubbling with gases
B01J 2219/00495 . . . Means for heating or cooling the reaction vessels
B01J 2219/00497 . . . Features relating to the solid phase supports
B01J 2219/005 . . . . Beads
B01J 2219/00502 . . . . Particles of irregular geometry
B01J 2219/00504 . . . . Pins
B01J 2219/00506 . . . . . with removable crowns
B01J 2219/00509 . . . . . Microcolumns
B01J 2219/00511 . . . . Walls of reactor vessels
B01J 2219/00513 . . . . Essentially linear supports
B01J 2219/00515 . . . . . in the shape of strings
B01J 2219/00518 . . . . . in the shape of tapes
B01J 2219/0052 . . . . . in the shape of elongated tubes
B01J 2219/00522 . . . . . in a multiple parallel arrangement
B01J 2219/00524 . . . . . in the shape of fiber bundles
B01J 2219/00527 . . . . Sheets
B01J 2219/00529 . . . . . DNA chips
B01J 2219/00531 . . . . . essentially square

B01J 2219/00533 . . . . . essentially rectangular
B01J 2219/00536 . . . . . in the shape of disks
B01J 2219/00538 . . . . . in the shape of cylinders
B01J 2219/0054 . . . Means for coding or tagging the apparatus or the reagents
B01J 2219/00542 . . . . Alphanumeric characters
B01J 2219/00545 . . . . Colours
B01J 2219/00547 . . . . Bar codes
B01J 2219/00549 . . . . . 2-dimensional
B01J 2219/00551 . . . . . 3-dimensional
B01J 2219/00554 . . . . Physical means
B01J 2219/00556 . . . . . Perforations
B01J 2219/00558 . . . . . Cuts-out
B01J 2219/0056 . . . . . Raised or sunken areas
B01J 2219/00563 . . . . Magnetic means
B01J 2219/00565 . . . . Electromagnetic means
B01J 2219/00567 . . . . . Transponder chips
B01J 2219/00569 . . . . . EEPROM memory devices
B01J 2219/00572 . . . . Chemical means
B01J 2219/00574 . . . . . radioactive
B01J 2219/00576 . . . . . fluorophore
B01J 2219/00578 . . . . . electrophoric
B01J 2219/00581 . . . . . Mass
B01J 2219/00583 . . Features relative to the processes being carried out
B01J 2219/00585 . . . Parallel processes
B01J 2219/00587 . . . . High throughput processes
B01J 2219/0059 . . . Sequential processes
B01J 2219/00592 . . . Split-and-pool, mix-and-divide processes
B01J 2219/00594 . . . Gas-phase processes
B01J 2219/00596 . . . Solid-phase processes
B01J 2219/00599 . . . Solution-phase processes
B01J 2219/00601 . . . High-pressure processes
B01J 2219/00603 . . . Making arrays on substantially continuous surfaces
B01J 2219/00605 . . . . the compounds being directly bound or immobilised to solid supports
B01J 2219/00608 . . . . . DNA chips
B01J 2219/0061 . . . . . The surface being organic
B01J 2219/00612 . . . . . the surface being inorganic
B01J 2219/00614 . . . . . Delimitation of the attachment areas
B01J 2219/00617 . . . . . by chemical means
B01J 2219/00619 . . . . . using hydrophilic or hydrophobic regions
B01J 2219/00621 . . . . . by physical means, e.g. trenches, raised areas

B01J 2219/00623 . . . . . Immobilisation or binding
B01J 2219/00626 . . . . . Covalent
B01J 2219/00628 . . . . . Ionic
B01J 2219/0063 . . . . . Other, e.g. van der Waals forces, hydrogen bonding
B01J 2219/00632 . . . . . Introduction of reactive groups to the surface
B01J 2219/00635 . . . . . by reactive plasma treatment
B01J 2219/00637 . . . . . by coating it with another layer
B01J 2219/00639 . . . . the compounds being trapped in or bound to a porous medium
B01J 2219/00641 . . . . . the porous medium being continuous, e.g. porous oxide substrates
B01J 2219/00644 . . . . . the porous medium being present in discrete locations, e.g. gel pads
B01J 2219/00646 . . . . the compounds being bound to beads immobilised on the solid supports
B01J 2219/00648 . . . . . by the use of solid beads
B01J 2219/0065 . . . . . by the use of liquid beads
B01J 2219/00653 . . . . the compounds being bound to electrodes embedded in or on the solid supports
B01J 2219/00655 . . . . the compounds being bound to magnets embedded in or on the solid supports
B01J 2219/00657 . . . . One-dimensional arrays
B01J 2219/00659 . . . . Two-dimensional arrays
B01J 2219/00662 . . . . . Two-dimensional arrays within two-dimensional arrays
B01J 2219/00664 . . . . Three-dimensional arrays
B01J 2219/00666 . . . . . One-dimensional arrays within three-dimensional arrays
B01J 2219/00668 . . . . . Two-dimensional arrays within three-dimensional arrays
B01J 2219/00671 . . . . . Three-dimensional arrays within three-dimensional arrays
B01J 2219/00673 . . . . Slice arrays
B01J 2219/00675 . . . . In-situ synthesis on the substrate
B01J 2219/00677 . . . . Ex-situ synthesis followed by deposition on the substrate
B01J 2219/0068 . . Means for controlling the apparatus of the process
B01J 2219/00682 . . . Manual means
B01J 2219/00684 . . . Semi-automatic means
B01J 2219/00686 . . . Automatic
B01J 2219/00689 . . . . using computers
B01J 2219/00691 . . . . using robots
B01J 2219/00693 . . . Means for quality control
B01J 2219/00695 . . . Synthesis control routines, e.g. using computer programs
B01J 2219/00698 . . . Measurement and control of process parameters
B01J 2219/007 . . . Simulation or vitual synthesis
B01J 2219/00702 . . . Processes involving means for analysing and characterising the products
B01J 2219/00704 . . . . integrated with the reactor apparatus

B01J 2219/00707 . . . . separated from the reactor apparatus
B01J 2219/00709 . . Type of synthesis
B01J 2219/00711 . . . Light-directed synthesis
B01J 2219/00713 . . . Electrochemical synthesis
B01J 2219/00716 . . . Heat activated synthesis
B01J 2219/00718 . . Type of compounds synthesised
B01J 2219/0072 . . . Organic compounds
B01J 2219/00722 . . . . Nucleotides
B01J 2219/00725 . . . . Peptides
B01J 2219/00727 . . . . Glycopeptides
B01J 2219/00729 . . . . Peptide nucleic acids [PNA]
B01J 2219/00731 . . . . Saccharides
B01J 2219/00734 . . . . Lipids
B01J 2219/00736 . . . . Non-biologic macromolecules, e.g. polymeric compounds
B01J 2219/00738 . . . . Organic catalysts
B01J 2219/0074 . . . . Biological products
B01J 2219/00743 . . . . . Cells
B01J 2219/00745 . . . Inorganic compounds
B01J 2219/00747 . . . . Catalysts
B01J 2219/0075 . . . . Metal based compounds
B01J 2219/00752 . . . . . Alloys
B01J 2219/00754 . . . . . Metal oxides
B01J 2219/00756 . . . Compositions, e.g. coatings, crystals, formulations
B01J 2219/00759 . . Purification of compounds synthesised
B01J 2219/00761 . Details of the reactor
B01J 2219/00763 . . Baffles
B01J 2219/00765 . . . Baffles attached to the reactor wall
B01J 2219/00768 . . . . vertical
B01J 2219/0077 . . . . inclined
B01J 2219/00772 . . . . . in a helix
B01J 2219/00774 . . . . . in the form of cones
B01J 2219/00777 . . . . horizontal
B01J 2219/00779 . . . Baffles attached to the stirring means
B01J 2219/00781 . Aspects relating to microreactors
B01J 2219/00783 . . Laminate assemblies, i.e. the reactor comprising a stack of plates
B01J 2219/00786 . . . Geometry of the plates
B01J 2219/00788 . . Three-dimensional assemblies, i.e. the reactor comprising a form other than a stack of plates
B01J 2219/0079 . . . Monolith-base structure
B01J 2219/00792 . . . One or more tube-shaped elements

B01J 2219/00795 . . . . Spiral-shaped
B01J 2219/00797 . . . . Concentric tubes
B01J 2219/00799 . . . Cup-shaped
B01J 2219/00801 . . Means to assemble
B01J 2219/00804 . . . Plurality of plates
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B01J 2219/0081 . . . Plurality of modules
B01J 2219/00813 . . . . Fluidic connections
B01J 2219/00815 . . . . Electric connections
B01J 2219/00817 . . . . Support structures
B01J 2219/00819 . . Materials of construction
B01J 2219/00822 . . . Metal
B01J 2219/00824 . . . Ceramic
B01J 2219/00826 . . . . Quartz
B01J 2219/00828 . . . . Silicon wafers or plates
B01J 2219/00831 . . . Glass
B01J 2219/00833 . . . Plastic
B01J 2219/00835 . . . Comprising catalytically active material
B01J 2219/00837 . . . comprising coatings other than catalytically active coatings
B01J 2219/0084 . . . . For changing surface tension
B01J 2219/00842 . . . . For protection channel surface, e. g. corrosion protection
B01J 2219/00844 . . . Comprising porous material
B01J 2219/00846 . . . comprising nano-structures, e. g. nano-tubes
B01J 2219/00849 . . . comprising packing elements, e. g. glass beads
B01J 2219/00851 . . Additional features
B01J 2219/00853 . . . Employing electrode arrangements
B01J 2219/00855 . . . Surface features
B01J 2219/00858 . . . Aspects relating to the size of the reactor
B01J 2219/0086 . . . . Dimensions of the flow channels
B01J 2219/00862 . . . . Dimensions of the reaction cavity itself
B01J 2219/00864 . . . . Channel sizes in the nanometer range, e.g. nanoreactors
B01J 2219/00867 . . . Microreactors placed in series, on the same or on different supports
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B01J 2219/00873 . . Heat exchange
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B01J 2219/0088 . . . Peltier-type elements
B01J 2219/00882 . . . Electromagnetic heating

B01J 2219/00885 . . . Thin film heaters
B01J 2219/00887 . . . Deflection means for heat or irradiation
B01J 2219/00889 . . Mixing (micromixers B01F 13/0059)
B01J 2219/00891 . . Feeding or evacuation
B01J 2219/00894 . . . More than two inlets
B01J 2219/00896 . . . Changing inlet or outlet cross-section, e.g. pressure-drop compensation
B01J 2219/00898 . . . Macro-to-Micro (M2M)
B01J 2219/009 . . . Pulsating flow
B01J 2219/00903 . . . Segmented flow
B01J 2219/00905 . . Separation
B01J 2219/00907 . . . using membranes
B01J 2219/00909 . . . using filters
B01J 2219/00912 . . . by electrophoresis
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B01J 2219/00916 . . . by chromatography
B01J 2219/00918 . . . by adsorption
B01J 2219/00921 . . . by absorption
B01J 2219/00923 . . . by surface tension
B01J 2219/00925 . . Irradiation
B01J 2219/00927 . . . Particle radiation or gamma-radiation
B01J 2219/0093 . . . Electric or magnetic energy
B01J 2219/00932 . . . Sonic or ultrasonic vibrations
B01J 2219/00934 . . . Electromagnetic waves
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B01J 2219/00939 . . . . X-rays
B01J 2219/00941 . . . . Microwaves
B01J 2219/00943 . . . . Visible light, e.g. sunlight
B01J 2219/00945 . . . . Infra-red light
B01J 2219/00948 . . . . Radiofrequency
B01J 2219/0095 . . Control aspects
B01J 2219/00952 . . . Sensing operations
B01J 2219/00954 . . . . Measured properties
B01J 2219/00957 . . . . . Compositions or concentrations
B01J 2219/00959 . . . . . Flow
B01J 2219/00961 . . . . . Temperature
B01J 2219/00963 . . . . . Pressure
B01J 2219/00966 . . . . . pH
B01J 2219/00968 . . . . Type of sensors
B01J 2219/0097 . . . . . Optical sensors
B01J 2219/00972 . . . . . Visible light

B01J 2219/00975 . . . . . Ultraviolet light
B01J 2219/00977 . . . . . Infrared light
B01J 2219/00979 . . . . Acoustic sensors
B01J 2219/00981 . . . . Gas sensors
B01J 2219/00984 . . . Residence time
B01J 2219/00986 . . . Microprocessor
B01J 2219/00988 . . . Leakage
B01J 2219/0099 . . Cleaning
B01J 2219/00993 . . Design aspects
B01J 2219/00995 . . . Mathematical modeling
B01J 2219/00997 . . . Strategical arrangements of multiple microreactor systems
B01J 2219/02 . Apparatus characterised by their chemically-resistant properties
B01J 2219/0204 . . comprising coatings on the surfaces in direct contact with the reactive components
B01J 2219/0209 . . . of glass
B01J 2219/0213 . . . of enamel
B01J 2219/0218 . . . of ceramic
B01J 2219/0222 . . . . of porcelain
B01J 2219/0227 . . . of graphite
B01J 2219/0231 . . . of diamond
B01J 2219/0236 . . . Metal based
B01J 2219/024 . . . . Metal oxides
B01J 2219/0245 . . . of synthetic organic material
B01J 2219/025 . . characterised by the construction materials of the reactor vessel proper
B01J 2219/0254 . . . Glass
B01J 2219/0259 . . . Enamel
B01J 2219/0263 . . . Ceramic
B01J 2219/0268 . . . . Porcelain
B01J 2219/0272 . . . Graphite
B01J 2219/0277 . . . Metal based
B01J 2219/0281 . . . . Metal oxides
B01J 2219/0286 . . . . Steel
B01J 2219/029 . . . . Non-ferrous metals
B01J 2219/0295 . . . Synthetic organic materials
B01J 2219/08 . Processes employing the direct application of electric or wave energy, or particle radiation; Apparatus therefor
B01J 2219/0801 . . Controlling the process
B01J 2219/0803 . . employing electric or magnetic energy
B01J 2219/0805 . . . giving rise to electric discharges
B01J 2219/0807 . . . . involving electrodes

B01J 2219/0809 . . . . . employing two or more electrodes
B01J 2219/0811 . . . . . employing three electrodes
B01J 2219/0813 . . . . . employing four electrodes
B01J 2219/0815 . . . . . involving stationary electrodes
B01J 2219/0816 . . . . . involving moving electrodes
B01J 2219/0818 . . . . . Rotating electrodes
B01J 2219/082 . . . . . Sliding electrodes
B01J 2219/0822 . . . . . The electrode being consumed
B01J 2219/0824 . . . . . Details relating to the shape of the electrodes
B01J 2219/0826 . . . . . essentially linear
B01J 2219/0828 . . . . . Wires
B01J 2219/083 . . . . . cylindrical
B01J 2219/0832 . . . . . essentially toroidal
B01J 2219/0833 . . . . . forming part of a full circle
B01J 2219/0835 . . . . . substantially flat
B01J 2219/0837 . . . . . Details relating to the material of the electrodes
B01J 2219/0839 . . . . . Carbon
B01J 2219/0841 . . . . . Metal
B01J 2219/0843 . . . . . Ceramic
B01J 2219/0845 . . . . Details relating to the type of discharge
B01J 2219/0847 . . . . . Glow discharge
B01J 2219/0849 . . . . . Corona pulse discharge
B01J 2219/085 . . . creating magnetic fields
B01J 2219/0852 . . . . employing permanent magnets
B01J 2219/0854 . . . . employing electromagnets
B01J 2219/0856 . . . . employing a combination of permanent and electromagnets
B01J 2219/0858 . . . . employing moving elements
B01J 2219/086 . . . . . Moving (electro)magnets
B01J 2219/0862 . . . . employing multiple (electro)magnets
B01J 2219/0864 . . . . . Three (electro)magnets
B01J 2219/0866 . . . . . Four (electro)magnets
B01J 2219/0867 . . . . . Six or more (electro)magnets
B01J 2219/0869 . . Feeding or evacuating the reactor
B01J 2219/0871 . . Heating or cooling of the reactor
B01J 2219/0873 . . Materials to be treated
B01J 2219/0875 . . . Gas
B01J 2219/0877 . . . Liquid
B01J 2219/0879 . . . Solid
B01J 2219/0881 . . . Two or more materials
B01J 2219/0883 . . . . Gas-gas

B01J 2219/0884 . . . . Gas-liquid
B01J 2219/0886 . . . . Gas-solid
B01J 2219/0888 . . . . Liquid-liquid
B01J 2219/089 . . . . Liquid-solid
B01J 2219/0892 . . . involving catalytically active material
B01J 2219/0894 . . Processes carried out in the presence of a plasma
B01J 2219/0896 . . . Cold plasma
B01J 2219/0898 . . . Hot plasma
B01J 2219/12 . . Processes employing electromagnetic waves
B01J 2219/1203 . . . Incoherent waves
B01J 2219/1206 . . . . Microwaves
B01J 2219/1209 . . . . . Features relating to the reactor or vessel
B01J 2219/1212 . . . . . Arrangements of the reactor or the reactors
B01J 2219/1215 . . . . . Single reactor
B01J 2219/1218 . . . . . Multiple reactors
B01J 2219/1221 . . . . . the reactor per se
B01J 2219/1224 . . . . . Form of the reactor
B01J 2219/1227 . . . . . Reactors comprising tubes with open ends
B01J 2219/123 . . . . . Vessels in the form of a cup
B01J 2219/1233 . . . . . Closure means, such as lids, caps, seals (B01J 3/03 takes precedence; pressure relief systems in the lid, e.g. rupture discs B01J 2219/0027)
B01J 2219/1236 . . . . . Frames for holding the lid in place
B01J 2219/1239 . . . . . Means for feeding and evacuation
B01J 2219/1242 . . . . . Materials of construction
B01J 2219/1245 . . . . . Parts of the reactor being microwave absorbing, dielectric
B01J 2219/1248 . . . . . Features relating to the microwave cavity
B01J 2219/1251 . . . . . Support for the reaction vessel
B01J 2219/1254 . . . . . Static supports
B01J 2219/1257 . . . . . Rotating supports
B01J 2219/126 . . . . . in the form of a closed housing
B01J 2219/1263 . . . . . in the form of a open housing or stand
B01J 2219/1266 . . . . . Microwave deflecting parts
B01J 2219/1269 . . . . . Microwave guides
B01J 2219/1272 . . . . . Materials of construction
B01J 2219/1275 . . . . . Controlling the microwave irradiation variables
B01J 2219/1278 . . . . . Time
B01J 2219/1281 . . . . . Frequency
B01J 2219/1284 . . . . . Intensity
B01J 2219/1287 . . . . . Features relating to the microwave source

B01J 2219/129 . . . . . Arrangements thereof
B01J 2219/1293 . . . . . Single source
B01J 2219/1296 . . . . . Multiple sources
B01J 2219/18 . Details relating to the spatial orientation of the reactor
B01J 2219/182 . . horizontal
B01J 2219/185 . . vertical
B01J 2219/187 . . inclined at an angle to the horizontal or to the vertical plane
B01J 2219/19 . Details relating to the geometry of the reactor
B01J 2219/192 . . polygonal
B01J 2219/1921 . . . triangular
B01J 2219/1923 . . . square or square-derived
B01J 2219/1925 . . . . prismatic
B01J 2219/1926 . . . . pyramidal
B01J 2219/1928 . . . hexagonal
B01J 2219/194 . . round
B01J 2219/1941 . . . circular or disk-shaped
B01J 2219/1942 . . . . spherical
B01J 2219/1943 . . . . cylindrical
B01J 2219/1944 . . . . spiral
B01J 2219/1945 . . . . toroidal
B01J 2219/1946 . . . . conical
B01J 2219/1947 . . . oval or ellipsoidal
B01J 2219/1948 . . . . ovoid or egg-shaped
B01J 2219/24 . Stationary reactors without moving elements inside
B01J 2219/2401 . . Reactors comprising multiple separate flow channels
B01J 2219/2402 . . . Monolithic-type reactors
B01J 2219/2403 . . . . Geometry of the channels
B01J 2219/2404 . . . . . Polygonal
B01J 2219/2406 . . . . . Rectangular
B01J 2219/2407 . . . . . Square
B01J 2219/2408 . . . . . Circular or ellipsoidal
B01J 2219/2409 . . . . Heat exchange aspects
B01J 2219/2411 . . . . . The reactant being in indirect heat exchange with a non reacting heat exchange medium
B01J 2219/2412 . . . . . Independent temperature control in various sections of the monolith
B01J 2219/2413 . . . . . Two reactions in indirect heat exchange
B01J 2219/2414 . . . . . The same reactant stream undergoing different reactions, endothermic or exothermic
B01J 2219/2416 . . . . . Additional heat exchange means, e.g. electric resistance heater, coils

B01J 2219/2417 . . . . . Direct heat exchange
B01J 2219/2418 . . . . Feeding means
B01J 2219/2419 . . . . . for the reactants
B01J 2219/242 . . . . . for the catalysts
B01J 2219/2422 . . . . Mixing means, e.g. fins or baffles attached to the monolith or placed in the channel
B01J 2219/2423 . . . . Separation means, e.g. membrane inside the reactor
B01J 2219/2424 . . . . . Wall-flow filter, e.g. adjacent cells closed alternatively at their end to force the reactant stream through the walls of the monolith
B01J 2219/2425 . . . . Construction materials
B01J 2219/2427 . . . . . Catalysts
B01J 2219/2428 . . . . . Catalysts coated on the surface of the monolith channels
B01J 2219/2429 . . . . . Nanocatalysts
B01J 2219/243 . . . . . Catalyst in granular form in the channels
B01J 2219/2432 . . . . . Monoliths having catalytic activity on its own
B01J 2219/2433 . . . . . of the monoliths
B01J 2219/2434 . . . . . Metals or alloys
B01J 2219/2435 . . . . . Steel
B01J 2219/2437 . . . . . Metal oxides
B01J 2219/2438 . . . . . Ceramics
B01J 2219/2439 . . . . . Glass
B01J 2219/244 . . . . . Plastics
B01J 2219/2441 . . . . Other constructional details
B01J 2219/2443 . . . . . Assembling means of monolith modules
B01J 2219/2444 . . . . . Size aspects
B01J 2219/2445 . . . . . Sizes
B01J 2219/2446 . . . . . Cell density
B01J 2219/2448 . . . . . Additional structures inserted in the channels
B01J 2219/2449 . . . . . Moving elements in the monolith reactor
B01J 2219/245 . . . Plate-type reactors
B01J 2219/2451 . . . . Geometry of the reactor
B01J 2219/2453 . . . . . Plates arranged in parallel
B01J 2219/2454 . . . . . Plates arranged concentrically
B01J 2219/2455 . . . . . Plates arranged radially
B01J 2219/2456 . . . . . Geometry of the plates
B01J 2219/2458 . . . . . Flat plates, i.e. plates which are not corrugated or otherwise structured, e.g. plates with cylindrical shape
B01J 2219/2459 . . . . . Corrugated plates
B01J 2219/246 . . . . . Perforated plates
B01J 2219/2461 . . . . Heat exchange aspects

B01J 2219/2462 . . . . . the reactants being in indirect heat exchange with a non reacting heat exchange medium

B01J 2219/2464 . . . . . Independent temperature control in various sections of the reactor

B01J 2219/2465 . . . . . Two reactions in indirect heat exchange with each other

B01J 2219/2466 . . . . . The same reactant stream undergoing different reactions, endothermic or exothermic

B01J 2219/2467 . . . . . Additional heat exchange means, e.g. electric resistance heaters, coils

B01J 2219/2469 . . . . Feeding means

B01J 2219/247 . . . . . Feeding means for the reactants

B01J 2219/2471 . . . . . Feeding means for the catalyst

B01J 2219/2472 . . . . . the catalyst being exchangeable on inserts other than plates, e.g. in bags

B01J 2219/2474 . . . . Mixing means, e.g. fins or baffles attached to the plates

B01J 2219/2475 . . . . Separation means, e.g. membranes inside the reactor

B01J 2219/2476 . . . . Construction materials

B01J 2219/2477 . . . . . of the catalysts

B01J 2219/2479 . . . . . Catalysts coated on the surface of plates or inserts

B01J 2219/248 . . . . . Nanocatalysts

B01J 2219/2481 . . . . . Catalysts in granular from between plates

B01J 2219/2482 . . . . . Catalytically active foils; Plates having catalytically activity on their own

B01J 2219/2483 . . . . . of the plates

B01J 2219/2485 . . . . . Metals or alloys

B01J 2219/2486 . . . . . Steel

B01J 2219/2487 . . . . . Ceramics

B01J 2219/2488 . . . . . Glass

B01J 2219/249 . . . . . Plastics

B01J 2219/2491 . . . . Other constructional details

B01J 2219/2492 . . . . . Assembling means

B01J 2219/2493 . . . . . Means for assembling plates together, e.g. sealing means, screws, bolts

B01J 2219/2495 . . . . . the plates being assembled interchangeably or in a disposable way

B01J 2219/2496 . . . . . Means for assembling modules together, e.g. casings, holders, fluidic connectors

B01J 2219/2497 . . . . . Size aspects, i.e. concrete sizes are being mentioned in the classified document

B01J 2219/2498 . . . . . Additional structures inserted in the channels, e.g. plates, catalyst holding meshes

B01J 2219/30 . Details relating to random packing elements

B01J 2219/302 . . Basic shape of the elements

B01J 2219/30203 . . . Saddle
B01J 2219/30207 . . . Sphere
B01J 2219/30211 . . . . Egg, ovoid or ellipse
B01J 2219/30215 . . . Toroid or ring
B01J 2219/30219 . . . Disk
B01J 2219/30223 . . . Cylinder
B01J 2219/30226 . . . Cone or truncated cone
B01J 2219/3023 . . . Triangle
B01J 2219/30234 . . . . Hexagon
B01J 2219/30238 . . . Tetrahedron
B01J 2219/30242 . . . Star
B01J 2219/30246 . . . Square or square-derived
B01J 2219/30249 . . . . Cube
B01J 2219/30253 . . . . Pyramid
B01J 2219/30257 . . . Wire
B01J 2219/30261 . . . . twisted
B01J 2219/30265 . . . . Spiral
B01J 2219/30269 . . . Brush
B01J 2219/30273 . . . Cross
B01J 2219/30276 . . . Sheet
B01J 2219/3028 . . . . stretched
B01J 2219/30284 . . . . twisted
B01J 2219/30288 . . . . folded
B01J 2219/30292 . . . . rolled up
B01J 2219/30296 . . . Other shapes
B01J 2219/304 . . Composition or microstructure of the elements
B01J 2219/30408 . . . Metal
B01J 2219/30416 . . . Ceramic
B01J 2219/30425 . . . . Carbon
B01J 2219/30433 . . . Glass
B01J 2219/30441 . . . Wood
B01J 2219/3045 . . . Cork
B01J 2219/30458 . . . Rubber
B01J 2219/30466 . . . Plastics
B01J 2219/30475 . . . comprising catalytically active material
B01J 2219/30483 . . . Fibrous materials
B01J 2219/30491 . . . Foam like materials
B01J 2219/308 . . filling or discharging the elements into or from packed columns
B01J 2219/3081 . . . Orientation of the packing elements within the column or vessel
B01J 2219/3083 . . . . Random or dumped packing elements

B01J 2219/3085 . . . . Ordered or stacked packing elements

B01J 2219/3086 . . . Filling of the packing elements into the column or vessel, e.g. using a tube

B01J 2219/3088 . . . Emptying of the packing elements from the column or vessel, e.g. using a tube

B01J 2219/31 . . Size details

B01J 2219/312 . . . Sizes

B01J 2219/315 . . . Two or more types of packing elements or packing elements of different sizes present in the column

B01J 2219/318 . . Manufacturing aspects

B01J 2219/3181 . . . Pleating

B01J 2219/3183 . . . Molding

B01J 2219/3185 . . . Pressing

B01J 2219/3186 . . . Sintering

B01J 2219/3188 . . . Extruding

B01J 2219/319 . . Mathematical modelling

B01J 2219/32 . Details relating to packing elements in the form of grids or built-up elements for forming a unit of module inside the apparatus for mass or heat transfer

B01J 2219/322 . . Basic shape of the elements

B01J 2219/32203 . . . Sheets

B01J 2219/32206 . . . . Flat sheets

B01J 2219/3221 . . . . Corrugated sheets

B01J 2219/32213 . . . . Plurality of essentially parallel sheets

B01J 2219/32217 . . . . . with sheets having corrugations which intersect at an angle of 90 degrees

B01J 2219/3222 . . . . . with sheets having corrugations which intersect at an angle different from 90 degrees

B01J 2219/32224 . . . . characterised by the orientation of the sheet

B01J 2219/32227 . . . . . Vertical orientation

B01J 2219/32231 . . . . . Horizontal orientation

B01J 2219/32234 . . . . . Inclined orientation

B01J 2219/32237 . . . . Sheets comprising apertures or perforations

B01J 2219/32241 . . . . . Louvres

B01J 2219/32244 . . . . . Essentially circular apertures

B01J 2219/32248 . . . . Sheets comprising areas that are raised or sunken from the plane of the sheet

B01J 2219/32251 . . . . . Dimples, bossages, protrusions

B01J 2219/32255 . . . . Other details of the sheets

B01J 2219/32258 . . . . . Details relating to the extremities of the sheets, such as a change in corrugation geometry or sawtooth edges

B01J 2219/32262 . . . . . Dimensions or size aspects

B01J 2219/32265 . . . . characterised by the orientation of blocks of sheets

B01J 2219/32268 . . . . . relating to blocks in the same horizontal level
B01J 2219/32272 . . . . . relating to blocks in superimposed layers
B01J 2219/32275 . . . . Mounting or joining of the blocks or sheets within the column or vessel
B01J 2219/32279 . . . Tubes or cylinders
B01J 2219/32282 . . . Rods or bars
B01J 2219/32286 . . . Grids or lattices
B01J 2219/32289 . . . . Stretched materials
B01J 2219/32293 . . . Cubes or cubic blocks
B01J 2219/32296 . . . Honeycombs
B01J 2219/324 . . Composition or microstructure of the elements
B01J 2219/32408 . . . Metal
B01J 2219/32416 . . . . fibrous
B01J 2219/32425 . . . Ceramic
B01J 2219/32433 . . . . Carbon
B01J 2219/32441 . . . Glass
B01J 2219/3245 . . . Wood
B01J 2219/32458 . . . Paper
B01J 2219/32466 . . . comprising catalytically active material
B01J 2219/32475 . . . . involving heat exchange
B01J 2219/32483 . . . Plastics
B01J 2219/32491 . . . Woven or knitted materials
B01J 2219/326 . . Mathematical modelling
B01J 2219/328 . . Manufacturing aspects
B01J 2219/3281 . . . Pleating
B01J 2219/3282 . . . Molding
B01J 2219/3284 . . . Pressing
B01J 2219/3285 . . . Sintering
B01J 2219/3287 . . . Extruding
B01J 2219/3288 . . . Punching
B01J 2219/33 . . Details relating to the packing elements in general
B01J 2219/3306 . . . Dimensions or size aspects
B01J 2219/3313 . . . Revamping
B01J 2219/332 . . Details relating to the flow of the phases
B01J 2219/3322 . . . Co-current flow
B01J 2219/3325 . . . Counter-current flow
B01J 2219/3327 . . . Cross-current flow

B01J 2220/00 Aspects relating to sorbent materials

B01J 2220/40 . Aspects relating to the composition of sorbent or filter aid materials
B01J 2220/42 . . Materials comprising a mixture of inorganic materials (materials coated or impregnated on a carrier B01J 20/32)

B01J 2220/44 . . Materials comprising a mixture of organic materials (materials coated or impregnated on a carrier B01J 20/32)

B01J 2220/445 . . . comprising a mixture of polymers

B01J 2220/46 . . Materials comprising a mixture of inorganic and organic materials (materials coated or impregnated on a carrier B01J 20/32)

B01J 2220/48 . . Sorbents characterised by the starting material used for their preparation

B01J 2220/4806 . . . the starting material being of inorganic character

B01J 2220/4812 . . . the starting material being of organic character

B01J 2220/4818 . . . . Natural rubber

B01J 2220/4825 . . . . Polysaccharides or cellulose materials, e.g. starch, chitin, sawdust, wood, straw, cotton

B01J 2220/4831 . . . . . having been subjected to further processing, e.g. paper, cellulose pulp

B01J 2220/4837 . . . . Lignin

B01J 2220/4843 . . . . Algae, aquatic plants or sea vegetals, e.g. seeweeds, eelgrass

B01J 2220/485 . . . . Plants or land vegetals, e.g. cereals, wheat, corn, rice, sphagnum, peat moss

B01J 2220/4856 . . . . Proteins, DNA

B01J 2220/4862 . . . . Feathers

B01J 2220/4868 . . . . Cells, spores, bacteria

B01J 2220/4875 . . . the starting material being a waste, residue or of undefined composition

B01J 2220/4881 . . . . Residues from shells, e.g. eggshells, mollusk shells

B01J 2220/4887 . . . . Residues, wastes, e.g. garbage, municipal or industrial sludges, compost, animal manure; fly-ashes

B01J 2220/4893 . . . . Residues derived from used synthetic products, e.g. rubber from used tyres

B01J 2220/49 . . Materials comprising an indicator, e.g. colour indicator, pH-indicator

B01J 2220/50 . Aspects relating to the use of sorbent or filter aid materials

B01J 2220/52 . . Sorbents specially adapted for preparative chromatography

B01J 2220/54 . . Sorbents specially adapted for analytical or investigative chromatography

B01J 2220/56 . . Use in the form of a bed

B01J 2220/58 . . Use in a single column

B01J 2220/60 . . Use in several different columns

B01J 2220/603 . . . serially disposed columns

B01J 2220/606 . . . parallel disposed columns

B01J 2220/62 . . In a cartridge

B01J 2220/64 . . In a syringe, pipette, e.g. tip or in a tube, e.g. test-tube or u-shape tube (in columns B01J 2220/58)

B01J 2220/66 . . Other type of housings or containers not covered by B01J 2220/58 - B01J 2220/64

B01J 2220/68 . . Superabsorbents

B01J 2220/80 . Aspects related to sorbents specially adapted for preparative, analytical or investigative chromatography

B01J 2220/82 . . Shaped bodies, e.g. monoliths, plugs, tubes, continuous beds
B01J 2220/825 . . . comprising a cladding or external coating
B01J 2220/84 . . Capillaries
B01J 2220/86 . . Sorbents applied to inner surfaces of columns or capillaries

B01J 2229/00 Aspects of molecular sieve catalysts not covered by B01J 29/00
B01J 2229/10 . After treatment, characterised by the effect to be obtained
B01J 2229/12 . . to alter the outside of the crystallites, e.g. selectivation
B01J 2229/123 . . . in order to deactivate outer surface
B01J 2229/126 . . . in order to reduce the pore-mouth size
B01J 2229/14 . . to alter the inside of the molecular sieve channels
B01J 2229/16 . . to increase the Si/Al ratio; Dealumination
B01J 2229/18 . . to introduce other elements into or onto the molecular sieve itself
B01J 2229/183 . . . in framework positions
B01J 2229/186 . . . not in framework positions
B01J 2229/20 . . to introduce other elements in the catalyst composition comprising the molecular sieve, but not specially in or on the molecular sieve itself
B01J 2229/22 . . to destroy the molecular sieve structure or part thereof
B01J 2229/24 . . to stabilize the molecular sieve structure
B01J 2229/26 . . to stabilize the total catalyst structure
B01J 2229/30 . After treatment, characterised by the means used
B01J 2229/32 . . Reaction with silicon compounds, e.g. TEOS, siliconfluoride
B01J 2229/34 . . Reaction with organic or organometallic compounds (with organo-silicium compounds B01J 2229/32)
B01J 2229/36 . . Steaming
B01J 2229/37 . . Acid treatment
B01J 2229/38 . . Base treatment
B01J 2229/40 . . Special temperature treatment, i.e. other than just for template removal
B01J 2229/42 . . Addition of matrix or binder particles
B01J 2229/60 . Synthesis on support
B01J 2229/62 . . in or on other molecular sieves
B01J 2229/64 . . in or on refractory materials
B01J 2229/66 . . on metal supports

B01J 2231/00 Catalytic reactions performed with catalysts classified in B01J 31/00

NOTE

In this group indexing is done according to the specific catalytic reaction. In case of multiple catalytic activities only those are indexed which are specifically exemplified, i.e. by ways of worked examples, specific claims or explicit alternatives therein.

B01J 2231/005 . General concepts, e.g. reviews, relating to methods of using catalyst systems, the concept being defined by a common method or theory, e.g. microwave heating or multiple stereoselectivity

B01J 2231/10 . Polymerisation reactions involving at least dual use catalysts, e.g. for both oligomerisation and polymerisation

B01J 2231/12 . . Olefin polymerisation or copolymerisation

B01J 2231/122 . . . Cationic (co)polymerisation, e.g. single-site or Ziegler-Natta type

B01J 2231/125 . . . Radical (co)polymerisation, e.g. mediators therefor

B01J 2231/127 . . . Anionic (co)polymerisation

B01J 2231/14 . . Other (co) polymerisation, e.g. of lactides, epoxides ("ROMP", i.e. ring-opening metathesis polymerisation B01J 2231/54)

B01J 2231/20 . Olefin oligomerisation or telomerisation

B01J 2231/30 . Addition reactions at carbon centres, i.e. to either C-C or C-X multiple bonds

B01J 2231/32 . . Addition reactions to C=C or C-C triple bonds

B01J 2231/321 . . . Hydroformylation, metalformylation, carbonylation or hydroaminomethylation

B01J 2231/322 . . . Hydrocyanation

B01J 2231/323 . . . Hydrometalation, e.g. bor-, alumin-, silyl-, zirconation or analoguous reactions like carbometalation, hydrocarbation

B01J 2231/324 . . . Cyclisations via conversion of C-C multiple to single or less multiple bonds, e.g. cycloadditions

B01J 2231/325 . . . . Cyclopropanations

B01J 2231/326 . . . . Diels-Alder or other [4+2] cycloadditions, e.g. hetero-analogues

B01J 2231/327 . . . . Dipolar cycloadditions

B01J 2231/328 . . . . Cycloadditions involving more than 2 components or moieties, e.g. intra-/intermolecualar [2+2+2] or [2+2+1], e.g. Pauson-Khand type

B01J 2231/34 . . Other additions, e.g. Monsanto-type carbonylations, 1,2-C=X1,2-C=X or -C-X triple bonds, 1,4-C=C-C=X or -C-X triple bonds with X= O, S, NH/N or analogues

B01J 2231/341 . . . 1,2-additions, e.g. aldol or Knoevenagel condensations

B01J 2231/342 . . . . Aldol type reactions, i.e. nucleophilic addition of C-H acidic compounds, their R3Si- or metal complex analogues, to aldehydes or ketones

B01J 2231/343 . . . . . to prepare cyanhydrines, e.g. by adding HCN or TMSCN

B01J 2231/344 . . . . . Boronation, e.g. by adding R-B(OR)2

B01J 2231/345 . . . . . with organometallic complexes, e.g. by adding ZnR_2

B01J 2231/346 . . . . Mannich type reactions, i.e. nucleophilic addition of C-H acidic compounds, their R3Si- or metal complex analogues to aldimines or ketimines

B01J 2231/347 . . . . via cationic intermediates, e.g. bisphenol A type processes

B01J 2231/348 . . . 1,4-additions, e.g. conjugate additions

B01J 2231/349 . . . 1,2- or 1,4-additions in combination with further or prior reactions by the same catalyst, i.e. tandem or domino reactions, e.g. hydrogenation or further addition reactions

B01J 2231/40 . Substitution reactions at carbon centres, e.g. C-C or C-X, i.e. carbon-hetero atom, cross-coupling, C-H activation or ring-opening reactions

B01J 2231/42 . . Catalytic cross-coupling, i.e. connection of previously not connected C-atoms or C- and X-atoms without rearrangement

B01J 2231/4205 . . . C-C cross-coupling, e.g. metal catalyzed or Friedel-Crafts type

B01J 2231/4211 . . . . Suzuki-type, i.e. RY + R'B(OR)2, in which R, R' are optionally substituted alkyl, alkenyl, aryl, acyl and Y is the leaving group

B01J 2231/4216 . . . . . with R= alkyl

B01J 2231/4222 . . . . . with R'= alkyl

B01J 2231/4227 . . . . . with Y= Cl

B01J 2231/4233 . . . . Kumada-type, i.e. RY + R'MgZ, in which Ris optionally substituted alkyl, alkenyl, aryl, Y is the leaving group and Z is halide

B01J 2231/4238 . . . . Negishi-type, i.e. RY + R'ZnZ, in hich R, R' is optionally substituted alkyl, alkenyl, alkynyl, aryl, Y is the leaving group and Z is halide or R'

B01J 2231/4244 . . . . . with R= alkyl

B01J 2231/425 . . . . . with R'= alkyl

B01J 2231/4255 . . . . Stille-type, i.e. RY + R'3SnR'', in which R is alkenyl, aryl, R' is alkyl and R'' is alkenyl or aryl

B01J 2231/4261 . . . . Heck-type, i.e. RY + C=C, in which R is aryl

B01J 2231/4266 . . . . Sonogashira-type, i.e. RY + HC-CR' triple bonds, in which R=aryl, alkenyl, alkyl and R'=H, alkyl or aryl

B01J 2231/4272 . . . . via enolates or aza-analogues, added as such or made in-situ, e.g. ArY + R2C=C(OM)Z -> ArR2C-C(O)Z , in which R is H or alkyl, M is Na,K or SiMe3, Y is the leaving group, Z is Ar or OR' and R' is alkyl

B01J 2231/4277 . . . C-X Cross-coupling, e.g. nucleophilic aromatic amination, alkoxylation or analogues

B01J 2231/4283 . . . . using N nucleophiles, e.g. Buchwald-Hartwig amination

B01J 2231/4288 . . . . using O nucleophiles, e.g. alcohols, carboxylates, esters

B01J 2231/4294 . . . . using S nucleophiles, e.g. thiols

B01J 2231/44 . . Allylic alkylation, amination, alkoxylation or analogues

B01J 2231/46 . . C-H or C-C activation

B01J 2231/48 . . Ring-opening reactions

B01J 2231/482 . . . asymmetric reactions, e.g. kinetic resolution of racemates

B01J 2231/485 . . . . kinetic resolution of epoxide racemates

B01J 2231/487 . . . . . by hydrolysis

B01J 2231/49 . . Esterification or transesterification

B01J 2231/50 . Redistribution or isomerisation reactions of C-C, C=C or C-C triple bonds

B01J 2231/52 . . Isomerisation reactions

B01J 2231/54 . . Metathesis reactions, e.g. olefin metathesis

B01J 2231/543 . . . alkene metathesis

B01J 2231/546 . . . alkyne metathesis

B01J 2231/60 . Reduction reactions, e.g. hydrogenation

B01J 2231/62 . . Reductions in general of inorganic substrates, e.g. formal hydrogenation, e.g. of N_2

B01J 2231/625 . . . of CO_2

B01J 2231/64 . . Reductions in general of organic substrates, e.g. hydride reductions or hydrogenations

B01J 2231/641 . . . Hydrogenation of organic substrates, i.e. H_2 or H-transfer hydrogenations, e.g. Fischer-Tropsch processes

B01J 2231/643 . . . . of R2C=O or R2C=NR (R= C, H)

B01J 2231/645 . . . . of C=C or C-C triple bonds

B01J 2231/646 . . . . of aromatic or heteroaromatic rings

B01J 2231/648 . . . . Fischer-Tropsch-type reactions

B01J 2231/70 . Oxidation reactions, e.g. epoxidation, (di)hydroxylation, dehydrogenation and analogues

B01J 2231/72 . . Epoxidation

B01J 2231/74 . . Aziridination

B01J 2231/76 . . Dehydrogenation (transfer-dehydrogenation of CH-XH B01J 2231/641; transfer-dehydrogenation of -CHRCHR- via C-H activation B01J 2231/46)

B01J 2231/763 . . . mof -CH-XH (X= O, NH/N, S) to -C=X or -C-X triple bond species

B01J 2231/766 . . . of -CH-CH- or -C=C- to -C=C- or -C-C- triple bond species

B01J 2523/00 **Constitutive chemical elements of heterogeneous catalysts**

B01J 2523/10 . of Group I (IA or IB) of the Periodic Table

B01J 2523/11 . . Lithium

B01J 2523/12 . . Sodium

B01J 2523/13 . . Potassium

B01J 2523/14 . . Rubidium

B01J 2523/15 . . Caesium

B01J 2523/16 . . Francium

B01J 2523/17 . . Copper

B01J 2523/18 . . Silver

B01J 2523/19 . . Gold

B01J 2523/20 . of Group II (IIA or IIB) of the Periodic Table

B01J 2523/21 . . Beryllium

B01J 2523/22 . . Magnesium

B01J 2523/23 . . Calcium

B01J 2523/24 . . Strontium

B01J 2523/25 . . Barium

B01J 2523/26 . . Radium

B01J 2523/27 . . Zinc

B01J 2523/28 . . Cadmium

B01J 2523/29 . . Mercury

B01J 2523/30 . of Group III (IIIA or IIIB) of the Periodic Table

B01J 2523/305 . . Boron
B01J 2523/31 . . Aluminium
B01J 2523/32 . . Gallium
B01J 2523/33 . . Indium
B01J 2523/34 . . Thallium
B01J 2523/35 . . Scandium
B01J 2523/36 . . Yttrium
B01J 2523/37 . . Lanthanides
B01J 2523/3706 . . . Lanthanum
B01J 2523/3712 . . . Cerium
B01J 2523/3718 . . . Praseodymium
B01J 2523/3725 . . . Neodymium
B01J 2523/3731 . . . Promethium
B01J 2523/3737 . . . Samarium
B01J 2523/3743 . . . Europium
B01J 2523/375 . . . Gadolinium
B01J 2523/3756 . . . Terbium
B01J 2523/3762 . . . Dysprosium
B01J 2523/3768 . . . Holmium
B01J 2523/3775 . . . Erbium
B01J 2523/3781 . . . Thulium
B01J 2523/3787 . . . Ytterbium
B01J 2523/3793 . . . Lutetium
B01J 2523/39 . . Actinides
B01J 2523/392 . . . Actinium
B01J 2523/395 . . . Thorium
B01J 2523/397 . . . Uranium
B01J 2523/40 . of Group IV (IVA or IVB) of the Periodic Table
B01J 2523/41 . . Silicon
B01J 2523/42 . . Germanium
B01J 2523/43 . . Tin
B01J 2523/44 . . Lead
B01J 2523/47 . . Titanium
B01J 2523/48 . . Zirconium
B01J 2523/49 . . Hafnium
B01J 2523/50 . of Group V (VA or VB) of the Periodic Table
B01J 2523/51 . . Phosphorus
B01J 2523/52 . . Arsenic
B01J 2523/53 . . Antimony
B01J 2523/54 . . Bismuth

B01J 2523/55 . . Vanadium
B01J 2523/56 . . Niobium
B01J 2523/57 . . Tantalum
B01J 2523/60 . of Group VI (VIA or VIB) of the Periodic Table
B01J 2523/62 . . Sulfur
B01J 2523/63 . . Selenium
B01J 2523/64 . . Tellurium
B01J 2523/65 . . Polonium
B01J 2523/67 . . Chromium
B01J 2523/68 . . Molybdenum
B01J 2523/69 . . Tungsten
B01J 2523/70 . of Group VII (VIIB) of the Periodic Table
B01J 2523/72 . . Manganese
B01J 2523/73 . . Technetium
B01J 2523/74 . . Rhenium
B01J 2523/80 . of Group VIII of the Periodic Table
B01J 2523/82 . . Metals of the platinum group
B01J 2523/821 . . . Ruthenium
B01J 2523/822 . . . Rhodium
B01J 2523/824 . . . Palladium
B01J 2523/825 . . . Osmium
B01J 2523/827 . . . Iridium
B01J 2523/828 . . . Platinum
B01J 2523/84 . . Metals of the iron group
B01J 2523/842 . . . Iron
B01J 2523/845 . . . Cobalt
B01J 2523/847 . . . Nickel

B01J 2531/00 **Additional information regarding catalytic systems classified in B01J 31/00**

NOTE

In this group the term "Metals" refers to the central metal in the coordination complexes (B01J 31/16 - B01J 31/24), as used for the respective catalytic reaction, excluding carboxylates (see B01J 31/04) and other simple salts or organometallic compounds (see B01J 31/12). As to components, only those metals or solvents are indexed which are explicitly mentioned in the claims or the worked examples. As to compositional aspects, only those are provided for in the scheme below and are intended to be indexed, which provide additional information regarding the complexes and/or ligands classified in B01J 31/16 - B01J 31/24; indexing codes B01J 2531/0286 - B01J 2531/0297 are only used if these aspects are described as essential. Indexing codes B01J 2531/0213 - B01J 2531/0277 characterise the complexes on the basis of bond-type (linkage-type) thereby specifying the structural geometry of the complexes, while classification entries B01J 31/16 - B01J 31/24 are purely compositional subdivisions. The individual metals, the compositional aspects

B01J 2531/00
(continued)

of complexes used and the solvents are indexed for each explicit alternative, according to the guideline above

B01J 2531/001 . General concepts, e.g. reviews, relating to catalyst systems and methods of making them, the concept being defined by a common material or method/ theory

NOTE

When indexing in this group, only the focus is indexed in B01J 2531/004 - B01J 2531/007 and only if groups with closely related members are concerned, e.g. N-heterocyclic carbenes (B01J 2531/004), Pd-complexes (B01J 2531/005), added halide (B01J 2531/007). Otherwise the main code B01J 2531/002 is used.

B01J 2531/002 . . Materials

B01J 2531/004 . . . Ligands

B01J 2531/005 . . . Catalytic metals

B01J 2531/007 . . . Promoter-type Additives

B01J 2531/008 . . Methods or theories

B01J 2531/02 . Compositional aspects of complexes used, e.g. polynuclearity

B01J 2531/0202 . . Polynuclearity

B01J 2531/0205 . . . Bi- or polynuclear complexes, i.e. comprising two or more metal coordination centres, without metal-metal bonds, e.g. Cp(Lx)Zr-imidazole-Zr(Lx)Cp

B01J 2531/0208 . . . Bimetallic complexes, i.e. comprising one or more units of two metals, with metal-metal bonds but no all-metal (M)n rings, e.g. $Cr_2(OAc)_4$

B01J 2531/0211 . . . Metal clusters, i.e. complexes comprising 3 to about 1000 metal atoms with metal-metal bonds to provide one or more all-metal (M)n rings, e.g. $Rh_4(CO)_{12}$

B01J 2531/0213 . . Complexes without C-metal linkages

B01J 2531/0216 . . . Bi- or polynuclear complexes, i.e. comprising two or more metal coordination centres, without metal-metal bonds, e.g. Cp(Lx)Zr-imidazole-Zr(Lx)Cp

B01J 2531/0219 . . . Bimetallic complexes, i.e. comprising one or more units of two metals, with metal-metal bonds but no all-metal (M)n rings, e.g. $Cr_2(OAc)_4$

B01J 2531/0222 . . . Metal clusters, i.e. complexes comprising 3 to about 1000 metal atoms with metal-metal bonds to provide one or more all-metal (M)n rings, e.g. $Rh_4(CO)_{12}$

B01J 2531/0225 . . Complexes comprising pentahapto-cyclopentadienyl analogues

B01J 2531/0227 . . . Carbollide ligands, i.e. [nido-CnB(11-n)H11](4-n)- in which n is 1-3

B01J 2531/023 . . . Phospholyl ligands, i.e. [CnP(5-n)Rn]- in which n is 0-4 and R is H or hydrocarbyl, or analogous condensed ring systems

B01J 2531/0233 . . . Aza-Cp ligands, i.e. [CnN(5-n)Rn]- in which n is 0-4 and R is H or hydrocarbyl, or analogous condensed ring systems

B01J 2531/0236 . . . Azaborolyl ligands, e.g. 1,2-azaborolyl

B01J 2531/0238 . . Complexes comprising multidentate ligands, i.e. more than 2 ionic or coordinative bonds from the central metal to the ligand, the latter having at least two donor atoms, e.g. N, O, S, P

B01J 2531/0241 . . . Rigid ligands, e.g. extended sp2-carbon frameworks or geminal di- or trisubstitution

B01J 2531/0244 . . . . Pincer-type complexes, i.e. consisting of a tridentate skeleton bound to a metal, e.g. by one to three metal-carbon sigma-bonds

B01J 2531/0247 . . . . Tripodal ligands, e.g. comprising the tris(pyrazolyl)borate skeleton, "tpz", neutral analogues thereof by CH/BH exchange or anionic analogues of the latter by exchange of one of the pyrazolyl groups for an anionic complexing group such as carboxylate or -R-Cp

B01J 2531/025 . . . . Ligands with a porphyrin ring system or analogues thereof, e.g. phthalocyanines, corroles

B01J 2531/0252 . . . . Salen ligands or analogues, e.g. derived from ethylenediamine and salicylaldehyde

B01J 2531/0255 . . . . Ligands comprising the N2S2 or N2P2 donor atom set, e.g. diiminodithiolates or diiminodiphosphines with complete pi-conjugation between all donor centres

B01J 2531/0258 . . . Flexible ligands, e.g. mainly sp3-carbon framework as exemplified by the "tedicyp" ligand, i.e. cis-cis-cis-1,2,3,4-tetrakis(diphenylphosphinomethyl)cyclopentane

B01J 2531/0261 . . Complexes comprising ligands with non-tetrahedral chirality

B01J 2531/0263 . . . Planar chiral ligands, e.g. derived from donor-substituted paracyclophanes and metallocenes or from substituted arenes

B01J 2531/0266 . . . Axially chiral or atropisomeric ligands, e.g. bulky biaryls such as donor-substituted binaphthalenes, e.g. "BINAP" or "BINOL"

B01J 2531/0269 . . Complexes comprising ligands derived from the natural chiral pool or otherwise having a characteristic structure or geometry

B01J 2531/0272 . . . derived from carbohydrates, including tartrates, e.g. DIOP

B01J 2531/0275 . . . derived from amino acids

B01J 2531/0277 . . . derived from fullerenes and analogues, e.g. buckybowls or Cp5Cp

B01J 2531/028 . . . comprising affinity tags, e.g. for recovery (self-associating or modular catalysts B01J 2531/0291)

B01J 2531/0283 . . . . The bonding to the affinity counterpart occurring via hydrogen bonding

B01J 2531/0286 . . Complexes comprising ligands or other components characterized by their function

B01J 2531/0288 . . . Sterically demanding or shielding ligands

B01J 2531/0291 . . . Ligands adapted to form modular catalysts, e.g. self-associating building blocks as exemplified in the patent document EP-A-1 479 439

B01J 2531/0294 . . . "Non-innocent" or "non-spectator" ligands, i.e. ligands described as, or evidently, taking part in the catalytic reaction beyond merely stabilizing the central metal as spectator or ancilliary ligands, e.g. by electron transfer to or from the central metal or by intra-/intermolecular chemical reactions, e.g. disulfide coupling, H-abstraction

B01J 2531/0297 . . . Non-coordinating anions

B01J 2531/10 . Complexes comprising metals of Group I (IA or IB) as the central metal

B01J 2531/11 . . Lithium

B01J 2531/12 . . Sodium

B01J 2531/13 . . Potassium

B01J 2531/14 . . Rubidium
B01J 2531/15 . . Caesium
B01J 2531/16 . . Copper
B01J 2531/17 . . Silver
B01J 2531/18 . . Gold
B01J 2531/20 . Complexes comprising metals of Group II (IIA or IIB) as the central metal
B01J 2531/21 . . Beryllium
B01J 2531/22 . . Magnesium
B01J 2531/23 . . Calcium
B01J 2531/24 . . Strontium
B01J 2531/25 . . Barium
B01J 2531/26 . . Zinc
B01J 2531/27 . . Cadmium
B01J 2531/28 . . Mercury
B01J 2531/30 . Complexes comprising metals of Group III (IIIA or IIIB) as the central metal
B01J 2531/31 . . Aluminium
B01J 2531/32 . . Gallium
B01J 2531/33 . . Indium
B01J 2531/34 . . Thallium
B01J 2531/35 . . Scandium
B01J 2531/36 . . Yttrium
B01J 2531/37 . . Lanthanum
B01J 2531/38 . . Lanthanides other than lanthanum
B01J 2531/39 . . Actinides
B01J 2531/40 . Complexes comprising metals of Group IV (IVA or IVB) as the central metal
B01J 2531/42 . . Tin
B01J 2531/44 . . Lead
B01J 2531/46 . . Titanium
B01J 2531/48 . . Zirconium
B01J 2531/49 . . Hafnium
B01J 2531/50 . Complexes comprising metals of Group V (VA or VB) as the central metal
B01J 2531/52 . . Antimony
B01J 2531/54 . . Bismuth
B01J 2531/56 . . Vanadium
B01J 2531/57 . . Niobium
B01J 2531/58 . . Tantalum
B01J 2531/60 . Complexes comprising metals of Group VI (VIA or VIB) as the central metal
B01J 2531/62 . . Chromium
B01J 2531/64 . . Molybdenum
B01J 2531/66 . . Tungsten

B01J 2531/70 . Complexes comprising metals of Group VII (VIIB) as the central metal
B01J 2531/72 . . Manganese
B01J 2531/74 . . Rhenium
B01J 2531/80 . Complexes comprising metals of Group VIII as the central metal
B01J 2531/82 . . Metals of the platinum group
B01J 2531/821 . . . Ruthenium
B01J 2531/822 . . . Rhodium
B01J 2531/824 . . . Palladium
B01J 2531/825 . . . Osmium
B01J 2531/827 . . . Iridium
B01J 2531/828 . . . Platinum
B01J 2531/84 . . Metals of the iron group
B01J 2531/842 . . . Iron
B01J 2531/845 . . . Cobalt
B01J 2531/847 . . . Nickel
B01J 2531/90 . Catalytic systems characterized by the solvent or solvent system used
B01J 2531/92 . . Supercritical solvents
B01J 2531/922 . . . Carbon dioxide ($scCO_2$)
B01J 2531/925 . . . Supercritical water (scH_2O)
B01J 2531/927 . . . Mixtures of ionic liquids with supercritical solvents
B01J 2531/94 . . Fluorinated solvents
B01J 2531/96 . . Water
B01J 2531/98 . . Phase-transfer catalysis in a mixed solvent system containing at least 2 immiscible solvents or solvent phases
B01J 2531/985 . . . in a water / organic solvent system

B01J 2540/00 Compositional aspects of coordination complexes or ligands in catalyst systems

B01J 2540/10 . Non-coordinating groups comprising only oxygen beside carbon or hydrogen
B01J 2540/12 . . Carboxylic acid groups
B01J 2540/20 . Non-coordinating groups comprising halogens
B01J 2540/22 . . comprising fluorine, e.g. trifluoroacetate
B01J 2540/225 . . . comprising perfluoroalkyl groups or moieties
B01J 2540/30 . Non-coordinating groups comprising sulfur
B01J 2540/32 . . Sulfonic acid groups or their salts
B01J 2540/325 . . . being perfluorinated, i.e. comprising at least one perfluorinated moiety as substructure in case of polyfunctional groups
B01J 2540/34 . . Sulfonyl groups
B01J 2540/345 . . . being perfluorinated, i.e. comprising at least one perfluorinated moiety as substructure in case of polyfunctional groups
B01J 2540/40 . Non-coordinating groups comprising nitrogen

B01J 2540/42 . . Quaternary ammonium groups

B01J 2540/44 . . being derivatives of carboxylic or carbonic acids, e.g. amide (RC(=O)-NR2, RC(=O)-NR-C(=O)R) , nitrile, urea (R2N-C(=O)-NR2) , guanidino (R2N-C(=NR)-NR2) groups

B01J 2540/442 . . . Amide groups or imidato groups (R-C=NR(OR))

B01J 2540/444 . . . Nitrile groups

B01J 2540/446 . . . Urea groups

B01J 2540/448 . . . Guanidino groups

B01J 2540/50 . Non-coordinating groups comprising phosphorus

B01J 2540/52 . . Phosphorus acid or phosphorus acid ester groups

B01J 2540/522 . . . being phosphoric acid mono-, di- or triester groups ((RO)(R'O)2P=O), i.e. R= C, R'= C, H

B01J 2540/525 . . . being phosphorous acid (-ester) groups ((RO)P(OR')2) or the isomeric phosphonic acid (-ester) groups (R(R'O)2P=O), i.e. R= C, R'= C, H

B01J 2540/527 . . . being phosphonous acid (-ester) groups (RP(OR')2) or the isomeric phosphinic acid (-ester) groups (R2(R'O)P=O), i.e. R= C, R'= C, H

B01J 2540/54 . . Quaternary phosphonium groups

B01J 2540/60 . Groups characterized by their function

B01J 2540/62 . . Activating groups

B01J 2540/64 . . Solubility enhancing groups

B01J 2540/66 . . Linker or spacer groups

B01J 2540/68 . . Associating groups, e.g. with a second ligand or a substrate molecule via non-covalent interactions such as hydrogen bonds