COOPERATIVE PATENT CLASSIFICATION

B  PERFORMING OPERATIONS; TRANSPORTING
(NOTES omitted)

SEPARATING; MIXING

B01  PHYSICAL OR CHEMICAL PROCESSES OR APPARATUS IN GENERAL

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

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, trademarks that are often found in scientific and patent literature have been used in order to define precisely the scope of the groups.

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   - B01J 37/025 covered by B01J 37/02
   - B01J 32/00 covered by B01J 21/00 - B01J 29/90, B01J 33/00 - B01J 38/74

2. In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

2/00  Processes or devices for granulating materials {, e.g. fertilisers} in general; Rendering particulate materials free flowing in general, e.g. making them hydrophobic

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

   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))

   2/02  . by dividing the liquid material into drops, e.g. by spraying, and solidifying the drops

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

   2/06  . . in a liquid medium

   2/08  . . . Gelation of a colloidal solution

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

   2/12  . in rotating drums

   2/14  . in rotating dishes or pans

   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

   2/18  . using a vibrating apparatus

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

   2/22  . by pressing in moulds or between rollers

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

   2/26  . on endless conveyor belts

   2/28  . using special binding agents

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

3/00  Processes of utilising sub-atmospheric or super-atmospheric pressure to effect chemical or physical change of matter; Apparatus therefor 

   {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}  

   3/002  . [Sight-glasses therefor (see also G02B)]

   3/004  . {Processes utilising sub-atmospheric pressure; Apparatus therefor}
conducted in the presence of fluids and solid
Chemical or physical processes in general,
under pressure F42B 3/04
gas F02C 7/26

in "air bags" on vehicles B60R 21/26
gases, see
gas mixtures B01J 19/14
Apparatus for generating gases
; for generating specific
the relevant subclasses, e.g. C01B
, C10J
; blasting cartridges for producing gas

Pyrolysis
Heat treatments such as
Calcining; Fusing
(Pyrolysis (furnaces F27D))

[Calcining]
[using rotating drums]
[using hot gas streams in which the material is moved]

[Fusing]
[in crucibles]
[Pyrolysis reactions of hydrocarbons C10G 9/00]
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 5/04)

by wet methods

Chemical or physical processes in general,
conducted in the presence of fluids and solid
particles: Apparatus for such processes

Catalytic processes under superatmospheric
pressure (non-catalytic processes B01J 3/00)

Controlling catalytic processes (B01J 8/1809 takes precedence)
Feed of the particles in the reactor; Evacuation of
the particles out of the reactor
(with a moving instrument)
(by an ascending fluid)
(in a downward flow)
(Periodical feeding or evacuation)
(by means of a nozzle)
(by means of a rotary device in the flow channel)
Separating solid material from the gas/liquid
stream (separation processes per se B01D)
using cyclones
(by filtration)
by impingement against stationary members
(by sedimentation)
(by electrostatic precipitation)
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)
promoting uninterrupted fluid flow, e.g. by
filtering out particles in front of the catalyst
layer
Membranes, e.g. feeding or removing reagents
or products to or from the catalyst bed through a
membrane
in which two different types of particles react
with each other
with stationary particles, e.g. in fixed beds
the fluid flow within the bed being
predominantly horizontal
in a cylindrical annular shaped bed
in a cylindrical shaped bed (B01J 8/0214 takes
precedence)
in a conically shaped bed
in a spiral shaped bed
the fluid flow within the bed being
predominantly vertical
in a cylindrical shaped bed
in a cylindrical annular shaped bed
in a conically shaped bed
in a spiral shaped bed
Feeding reactive fluids (for solid material
B01J 8/0015)
Heating or cooling the reactor (for tubular
reactors in furnaces B01J 8/062)
with stationary packing material in the bed, e.g.
bricks, wire rings, baffles
the fluid passing successively through two or
more beds
the fluid flow within the beds being
predominantly horizontal
through two or more cylindrical annular
shaped beds
the beds being concentric
the beds being superimposed one above
the other (B01J 8/0434 takes precedence)
the beds being placed in separate
reactors
through two or more otherwise shaped
beds
8/026 . . . . . [the beds being superimposed one above the other]
8/043 . . . . . [in combination with one cylindrical annular shaped bed]
8/0434 . . . . . [in combination with two or more cylindrical annular shaped beds]
8/0438 . . . . . [the beds being placed next to each other]
8/0442 . . . . . [the beds being placed in separate reactors]
8/0446 . . . . . [the flow within the beds being predominantly vertical]
8/0449 . . . . . [in two or more cylindrical beds]
8/0453 . . . . . [the beds being superimposed one above the other]
8/0457 . . . . . [the beds being placed in separate reactors]
8/0461 . . . . . [in two or more cylindrical annular shaped beds]
8/0465 . . . . . [the beds being concentric]
8/0469 . . . . . [the beds being superimposed one above the other]
8/0473 . . . . . [the beds being placed in separate reactors]
8/0476 . . . . . [in two or more otherwise shaped beds]
8/0478 . . . . . [the beds being superimposed one above the other]
8/0484 . . . . . [the beds being placed next to each other]
8/0488 . . . . . [the beds being placed in separate reactors]
8/0492 . . . . . [Feeding reactive fluids (for solid material, see B01J 8/0015)]
8/0496 . . . . . [Heating or cooling the reactor]
8/06 . . . . . . in tube reactors; the solid particles being arranged in tubes
8/062 . . . . . . [being installed in a furnace]
8/065 . . . . . . [Feeding reactive fluids]
8/067 . . . . . . [Heating or cooling the reactor (B01J 8/062 takes precedence)]
8/08 . . with moving particles (with fluidised particles B01J 8/18)
8/082 . . . . . . [Controlling processes]
8/085 . . . . . . [Feeding reactive fluids (for solid material, see B01J 8/0015)]
8/087 . . . . . . [Heating or cooling the reactor]
8/10 . . . . . . moved by stirrers or by rotary drums or rotary receptacles [or endless belts]
8/12 . . . . . . moved by gravity in a downward flow
8/125 . . . . . . [with multiple sections one above the other separated by distribution aids, e.g. reaction and regeneration sections]
8/14 . . . . . . [moving in free vortex flow apparatus]
8/16 . . . . . . with particles being subjected to vibrations or pulsations (B01J 8/40 takes precedence)
8/18 . . . with fluidised particles [(combustion apparatus with fluidised bed in general F23C 10/00; furnaces with fluidised bed F27B 15/00)]
8/1809 . . . . . [Controlling processes]
8/1818 . . . . . [Feeding of the fluidising gas (B01J 8/44 takes precedence)]
8/1827 . . . . . [the fluidising gas being a reactant]
8/1836 . . . . . [Heating and cooling the reactor (B01J 8/42 takes precedence)]
8/1845 . . . . . [with particles moving upwards while fluidised]
8/1854 . . . . . [followed by a downward movement inside the reactor to form a loop]
8/1863 . . . . . [followed by a downward movement outside the reactor and subsequently re-entering it]
8/1872 . . . . . [Details of the fluidised bed reactor (B01J 8/1836 takes precedence)]
8/1881 . . . . . [with particles moving downwards while fluidised]
8/189 . . . . . . [moving downwards in a zig-zag manner]
8/20 . . . . . . with liquid as a fluidising medium
8/22 . . . . . . gas being introduced into the liquid
8/222 . . . . . . [in the presence of a rotating device only]
8/224 . . . . . . [the particles being subject to a circulatory movement (B01J 8/222 takes precedence)]
8/226 . . . . . . [internally, i.e. the particles rotate within the vessel]
8/228 . . . . . . [externally, i.e. the particles leaving the vessel and subsequently re-entering it]
8/24 . . . . . . according to “fluidised-bed” technique (B01J 8/20 takes precedence)
8/245 . . . . . . [Spouted-bed technique]
8/26 . . . . . . with two or more fluidised beds, e.g. reactor and regeneration installations
8/28 . . . . . . the one above the other
8/30 . . . . . . the edge of a lower bed projecting beyond the edge of the superjacent bed
8/32 . . . . . . with introduction into the fluidised bed of more than one kind of moving particles
8/34 . . . . . . with stationary packing material in the fluidised bed, e.g. bricks, wire rings, baffles
8/36 . . . . . . with fluidised bed through which there is an essentially horizontal flow of particles
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]
8/382 . . . . . . [with a rotatable device only]
8/384 . . . . . . [being subject to a circulatory movement only (B01J 8/382 takes precedence)]
8/386 . . . . . . [internally, i.e. the particles rotate within the vessel]
8/388 . . . . . . [externally, i.e. the particles leaving the vessel and subsequently re-entering it]
8/40 . . . . . . with fluidised bed subjected to vibrations or pulsations
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]
8/44 . . . . . . [Fluidisation grids]
8/46 . . . . . . for treatment of endless filamentary, band or sheet material
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)]
10/002 . . . [carried out in foam, aerosol or bubbles]
10/005 . . . [carried out at high temperatures in the presence of a molten material]
10/007 . . . [in the presence of catalytically active bodies, e.g. porous plates]
10/02 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) .

10/02 . . . . (carried out in the plasma state (generating or handling plasma H05H 1/00))

10/05 . . . . (carried out at high temperatures, e.g. by pyrolysis)

10/07 . . . . in the presence of catalytically active bodies, e.g. porous plates

10/02 . . . . for obtaining at least one reaction product which, at normal temperature, is in the solid state

13/00 Colloid chemistry, e.g. the production of colloidal materials or their solutions, not otherwise provided for; Making microcapsules or microballoons

13/0004 . . . . (Preparation of sols (by physical processes B01J 13/0086, aerosols B01J 13/0095))

13/0008 . . . . [Sols of inorganic materials in water]

13/0013 . . . . {from a precipitate]

13/0017 . . . . [by extraction of ions from aqueous solutions]

13/0021 . . . . [containing a solid organic phase]

13/0026 . . . . [containing a liquid organic phase]

13/003 . . . . . [Preparation from aqueous sols]

13/0034 . . . . . {Additives, e.g. in view of promoting stabilisation or peptisation]

13/0039 . . . . . [Post treatment]

13/0043 . . . . . [containing elemental metal (for medical or diagnostic purposes A61K G01N)]

13/0047 . . . . . [containing a metal oxide]

13/0052 . . . . . [Preparation of gels]

13/0056 . . . . . [containing inorganic material and water]

13/006 . . . . . [by precipitation, coagulation, hydrolyse coacervation]

13/0065 . . . . . [containing an organic phase]

13/0069 . . . . . [Post treatment]

13/0073 . . . . . [Preparation of non-Newtonian sols, e.g. thixotropic solutions]

13/0078 . . . . . [containing inorganic material and water]

13/0082 . . . . . [containing an organic phase]

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

13/0091 . . . . . [Preparation of aerogels, e.g. xerogels]

13/0095 . . . . . [Preparation of aerols]

13/02 . . . . . Making microcapsules or microballoons {{for medical preparations A61K 9/50}}

13/025 . . . . . {Applications of microcapsules not provided for in other subclasses}

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

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

13/046 . . . . . [combined with gelification or coagulation]

13/06 . . . . . by phase separation

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

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

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

13/125 . . . . . [by evaporation of the solvent (apparatus therefor B01J 13/043)]
19/0093  .  [Microreactors, e.g. miniaturised or microfabricated reactors (laboratory containers with capillary fluid transport in microfabricated channels or chambers B01L 3/0207)]
19/02  .  Apparatus characterised by being constructed of material selected for its chemically-resistant properties
19/06  .  Solidifying liquids (making microcapsules B01J 13/02)
19/08  .  Processes employing the direct application of electric or wave energy, or particle radiation; Apparatus therefor (application of shock waves B01J 3/08)
19/081  .  [employing particle radiation or gamma-radiation]
19/082  .  [Gamma-radiation only]
19/084  .  [Neutron beams only]
19/085  .  [Electron beams only]
19/087  .  [employing electric or magnetic energy]
19/088  .  [giving rise to electric discharges (for heating purposes H05B 7/00; for the production of ozone C01B 13/11, H01T 19/00)]
19/10  .  employing sonic or ultrasonic vibrations
19/12  .  employing electromagnetic waves
19/121  .  [Coherent waves, e.g. laser beams (lasers per se H01S 3/00)]
19/122  .  [Incoherent waves (gamma-radiation B01J 19/082)]
19/123  .  [Ultra-violet light]
19/124  .  [generated by microwave irradiation]
19/125  .  [X-rays]
19/126  .  [Microwaves]
19/127  .  [Sunlight; Visible light]
19/128  .  [Infra-red light]
19/129  .  [Radiofrequency]
19/14  .  Production of inert gas mixtures; Use of inert gases in general
19/16  .  Preventing evaporation or oxidation of non-metallic liquids by applying a floating layer, e.g. of microballoons (in storage tanks B65D 90/42)
19/18  .  Stationary reactors having moving elements inside (B01J 19/08, B01J 19/26 take precedence)
19/1806  .  [resulting in a turbulent flow of the reactants, such as in centrifugal-type reactors, or having a high Reynolds-number]
19/1812  .  [Tubular reactors]
19/1818  .  [in series]
19/1825  .  [in parallel]
19/1831  .  [spirally, concentrically or zigzag wound]
19/1837  .  [Loop-type reactors]
19/1843  .  [Concentric tube]
19/185  .  [of the pulsating type]
19/1856  .  [placed in parallel]
19/1862  .  [placed in series]
19/1868  .  [resulting in a loop-type movement]
19/1875  .  [internally, i.e. the mixture circulating inside the vessel such that the upwards stream is separated physically from the downwards stream(s)]
19/1881  .  [externally, i.e. the mixture leaving the vessel and subsequently re-entering it]
19/1887  .  [forming a thin film]
19/1893  .  [Membrane reactors (membranes B01D 71/00; catalytic membranes B01J 35/065)]
19/20  .  in the form of helices, e.g. screw reactors
19/22  .  in the form of endless belts
19/24  .  Stationary reactors without moving elements inside (B01J 19/08, B01J 19/26 take precedence; with stationary particles B01J 8/02)
19/2405  .  [provoking a turbulent flow of the reactants, such as in cyclones, or having a high Reynolds-number]
19/241  .  [of the pulsating type]
19/2415  .  [Tubular reactors]
19/242  .  [in series]
19/2425  .  [in parallel]
19/243  .  [spirally, concentrically or zigzag wound]
19/2435  .  [Loop-type reactors]
19/244  .  [Concentric tubes]
19/2445  .  [placed in parallel]
19/245  .  [placed in series]
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)]
19/246  .  [internally, i.e. the mixture circulating inside the vessel such that the upward stream is separated physically from the downward stream(s)]
19/2465  .  [externally, i.e. the mixture leaving the vessel and subsequently re-entering it]
19/247  .  [Suitied for forming thin films]
19/2475  .  [Membrane reactors]
19/248  .  [Reactors comprising multiple separated flow channels]
19/2485  .  [Monolithic reactors]
19/249  .  [Plate-type reactors]
19/2495  .  [Net-type reactors]
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
19/28  .  Moving reactors, e.g. rotary drums (B01J 19/08 takes precedence)
19/285  .  [Shaking or vibrating reactors; reactions under the influence of low-frequency vibrations or pulsations (for sonic and ultrasonic vibrations B01J 19/10)]
19/30  .  Loose or shaped packing elements, e.g. Raschig rings or Berl saddles, for pouring into the apparatus for mass or heat transfer
19/305  .  [Supporting elements therefor, e.g. grids, perforated plates]
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
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 33/00 } - 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:
   a. "catalyst" covers also a carrier-forming part of the catalyst.]

6. [Classification of the:
   • 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 35/00 for such forms or physical properties;
     - B01J 37/00 for such preparation or activation;
     - B01J 38/00 for such regeneration or reactivation.]

20/00 Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Processes for preparing, regenerating or reactivating thereof

20/02 . . . comprising inorganic material

20/0203 . . . {comprising compounds of metals not provided for in B01J 20004 (oxides or hydroxides thereof B01J 20006)}

NOTE
Compounds classified in group B01J 20/0203 and subgroups are also classified in B01J 20/0274 according to the type of anion

20/0207 . . . {Compounds of Sc, Y or Lanthanides}
20/0211 . . . {Compounds of Ti, Zr, Hf}
20/0214 . . . {Compounds of V, Nb, Ta}
20/0218 . . . {Compounds of Cr, Mo, W}
20/0222 . . . {Compounds of Mn, Re}
20/0225 . . . {Compounds of Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt}
20/0229 . . . {Compounds of Fe}
20/0233 . . . {Compounds of Cu, Ag, Au}
20/0237 . . . {Compounds of Cu}
20/024 . . . {Compounds of Zn, Cd, Hg}
20/0244 . . . {Compounds of Zn}
20/0248 . . . {Compounds of B, Al, Ga, In, Ti (B01J 20/08 takes precedence)}
20/0251 . . . {Compounds of Si, Ge, Sn, Pb (B01J 20/10 takes precedence)}
20/0255 . . . {Compounds of Pb}
20/0259 . . . {Compounds of N, P, As, Sb, Bi}
20/0262 . . . {Compounds of O, S, Se, Te}
20/0266 . . . {Compounds of S}
20/027 . . . {Compounds of F, Cl, Br, I}
20/0274 . . . {characterised by the type of anion}
20/0277 . . . {Carbonates of compounds other than those provided for in B01J 20/043}
Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Catalysts

{ 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) }

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

{ modified or post-treated polymers (polymer carriers or substrates subjected to further impregnating or coating B01J 20/2308) }

{ Cross-linked polymers }

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

characterised by their form or physical properties

{ characterised by their physical properties }

{ Surface area, e.g. B.E.T specific surface area }

{ characteristic by their surface properties or }

{ characteristic by their physical properties }

characterised by their form or physical properties

{ characterised by their physical properties }

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

{ Magnetic properties }

{ Other properties, e.g. density, crush strength }

{ characterised by their form }

{ Particle form }

{ Spherical, ellipsoidal or cylindrical }

{ Hollow particles, e.g. hollow spheres, microspheres or cenospheres }

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

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

{ Particles immobilised within fibres or filaments }

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

{ Membrane, sheet, cloth, pad, lamellar or mat }

{ with more than one layer, e.g. laminates, separated sheets }

{ Membranes or mats made from fibres or filaments }

{ Sheets with a specific shape, e.g. corrugated, folded, pleated, helical }

{ Shaped bodies; Monolithic structures }

{ Honeycomb or cellular structures; Solid foams or sponges }

{ Gels }

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

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

{ characterised by their surface properties or porosity }

{ Surface area, e.g. B.E.T specific surface area }

{ being less than 100 m2/g }

{ being in the range 100-500 m2/g }

{ being in the range 500-1000 m2/g }

{ being more than 1000 m2/g }

{ Pore volume, e.g. total pore volume, mesopore volume, micropore volume }

{ being less than 0.5 ml/g }

{ being in the range 0.5-1.0 ml/g }

{ being more than 1.0 ml/g }

{ Pore diameter }

{ being less than 2 nm, i.e. micropores or nanopores }

{ being in the range 2-50 nm, i.e. mesopores }

{ being more than 50 nm, i.e. macropores }

{ Pore-size distribution }

{ Monomodal or narrow distribution, uniform pores }

{ Bimodal, polynodal, different types of pores or different pore size distributions in different parts of the sorbent }

{ Shape or type of pores, voids, channels, ducts }

{ being coated, filled or plugged with specific compounds }

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

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

based on silica

based on alumina

based on polymers

Phases chemically bonded to a substrate, e.g. to silica or to polymers

Non-polar phases; Reversed phases

Polar phases

bonded via a spacer

Chiral phases

Gel sorbents

Liquid sorbents

Processes for preparing, regenerating, or reactivating

Moulding, shaping or extruding

{ Kneading }

Milling, crushing or grinding

(Granulating, agglomerating or aggregating)

Compressing

Use of binding agents; addition of materials ameliorating the mechanical properties of the produced sorbent

Addition of material, later completely removed, e.g. as result of heat treatment, leaching or washing, e.g. for forming pores

{ 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 }

Addition of pore forming agents, e.g. pore inducing or porogenic agents

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

20/321 . . . . . . . [consisting of a polymer obtained by reactions involving only carbon to carbon unsaturated bonds]

20/3212 . . . . . . . [consisting of a polymer obtained by reactions otherwise than involving only carbon to carbon unsaturated bonds]

20/3214 . . . . . . . [characterised by the carrier, support or substrate used for impregnation or coating]

20/3223 . . . . . . . [by means of an adhesive agent]

20/3225 . . . . . . . [involving a post-treatment of the coated or impregnated product]

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

20/3229 . . . . . . . [for preventing leaching, leaking of attached functional or ligand groups]

20/3231 . . . . . . . [characterised by the coating or impregnating layer]

20/3234 . . . . . . . [Inorganic material layers]

20/3236 . . . . . . . [containing metal, other than zeolites, e.g. oxides, hydroxides, sulphides or salts]

20/3238 . . . . . . . [containing any type of zeolite]

20/324 . . . . . . . [containing free carbon, e.g. activated carbon]

20/3242 . . . . . . . [Layers with a functional group, e.g. an affinity material, a ligand, a reactant or a complexing group]

20/3244 . . . . . . . [Non-macromolecular compounds]

20/3246 . . . . . . . [having a well defined chemical structure]

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)

20/3251 . . . . . . . (comprising at least two different types of heteroatoms selected from nitrogen, oxygen or sulphur)
Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Catalysts

20/34 . . . Regenerating or reactivating
20/3408 . . . [of aluminosilicate molecular sieves]
20/3416 . . . [of sorbents or filter aids comprising free carbon, e.g. activated carbon]
20/3425 . . . [of sorbents or filter aids comprising organic materials]
20/3433 . . . [of sorbents or filter aids other than those covered by B01J 20/3408 - B01J 20/3425]
20/3441 . . . [Regeneration or reactivation by electric current, ultrasound or irradiation, e.g. electromagnetic radiation such as X-rays, UV, light, microwaves]
20/345 . . . [using a particular desorbing compound or mixture (elution or regeneration of stationary phases in liquid chromatography B01D 15/08)]
20/3458 . . . . . . [in the gas phase]
20/3466 . . . . . . [with steam]
20/3475 . . . . . . [in the liquid phase]
20/3483 . . . . . . [by thermal treatment not covered by groups B01J 20/3441 - B01J 20/3475, e.g. by heating or cooling]
20/3491 . . . . . . [by pressure treatment]

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

WARNING
Groups B01J 21/00 - B01J 21/20 are incomplete pending reclassification of documents from group B01J 32/00.

All groups listed in this warning should be considered in order to perform a complete search.

21/005 . . . [Spinels]
21/02 . . . Boron or aluminium; Oxides or hydroxides thereof
21/04 . . . Alumina
21/06 . . . Silicon, titanium, zirconium or hafnium; Oxides or hydroxides thereof
21/063 . . . [Titanium; Oxides or hydroxides thereof]
21/066 . . . [Zirconium or hafnium; Oxides or hydroxides thereof]
21/08 . . . Silica
21/10 . . . Magnesium; Oxides or hydroxides thereof
21/12 . . . Silica and alumina
21/14 . . . Silica and magnesia
21/16 . . . Clays or other mineral silicates
21/18 . . . Carbon
21/185 . . . [Carbon nanotubes (carbon nanotubes per se C01B 32/15)]
21/20 . . . Regeneration or reactivation

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

WARNING
Groups B01J 23/00 - B01J 23/96 are incomplete pending reclassification of documents from group B01J 32/00.

All groups listed in this warning should be considered in order to perform a complete search.

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 MoO₃V₂Te₂O₇ is classified as (B01J 2523/00, B01J 2523/55, B01J 2523/64, B01J 2523/68).
Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Catalysts

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23/64 . . . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
23/644 . . . . Arsenic, antimony or bismuth
23/6442 { Arsenic
23/6445 { Antimony
23/6447 { Bismuth
23/648 . . . . Vanadium, niobium or tantalum { or polonium
23/6482 { Vanadium
23/6484 { Niobium
23/6486 { Tantalum
23/6488 { Polonium
23/652 . . . . Chromium, molybdenum or tungsten
23/6522 { Chromium
23/6525 { Molybdenum
23/6527 { Tungsten
23/656 . . . . Manganese, technetium or rhenium
23/6562 { Manganese
23/6565 { Technetium
23/6567 { Rhenium
23/66 . . . . Silver or gold
23/68 . . . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
23/681 . . . . [ with arsenic, antimony or bismuth
23/682 . . . . [ with vanadium, niobium, tantalum or polonium
23/683 . . . . [ with chromium, molybdenum or tungsten
23/685 . . . . [ with chromium
23/686 . . . . [ with molybdenum
23/687 . . . . [ with tungsten
23/688 . . . . [ with manganese, technetium or rhenium
23/70 . . . . of the iron group metals or copper
23/72 . . . . Copper
23/74 . . . . Iron group metals
23/745 . . . . Iron
23/75 . . . . Cobalt
23/755 . . . . Nickel
23/76 . . . . combined with metals, oxides or hydroxides provided for in groups B01J 23/02 - B01J 23/36
23/78 . . . . with alkali- or alkaline earth metals
23/80 . . . . with zinc, cadmium or mercury
23/825 . . . . with gallium, indium or thallium
23/83 . . . . with rare earths or actinides
23/835 . . . . with germanium, tin or lead
23/84 . . . . with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
23/843 . . . . Arsenic, antimony or bismuth
23/8432 { Arsenic
23/8435 { Antimony
23/8437 { Bismuth
23/847 . . . . Vanadium, niobium or tantalum { or polonium
23/8472 { Vanadium
23/8474 { Niobium
23/8476 { Tantalum

23/8478 . . . . [Polonium
23/85 . . . . Chromium, molybdenum or tungsten
23/86 . . . . Chromium
23/862 . . . . [Iron and chromium
23/864 . . . . [Cobalt and chromium
23/866 . . . . [Nickel and chromium
23/868 . . . . [copper and chromium
23/88 . . . . Molybdenum
23/881 . . . . and iron
23/882 . . . . and cobalt
23/883 . . . . and nickel
23/885 . . . . and copper
23/887 . . . . containing in addition other metals, oxides or hydroxides provided for in groups B01J 23/02 - B01J 23/36
23/8871 . . . . [Rare earth metals or actinides
23/8872 . . . . [Alkali or alkaline earth metals
23/8873 . . . . [Zinc, cadmium or mercury
23/8874 . . . . [Gallium, indium or thallium
23/8875 . . . . [Germanium, tin or lead
23/8876 . . . . [Arsenic, antimony or bismuth
23/8877 . . . . [Vanadium, tantalum, niobium or polonium
23/8878 . . . . [Chromium
23/888 . . . . Tungsten
23/8885 . . . . [containing also molybdenum
23/889 . . . . Manganese, technetium or rhenium
23/8892 . . . . [Manganese
23/8894 . . . . [Technetium
23/8896 . . . . [Rhenium
23/8898 . . . . [containing also molybdenum
23/89 . . . . combined with noble metals
23/8906 . . . . [Iron and noble metals
23/8913 . . . . [Cobalt and noble metals
23/892 . . . . [Nickel and noble metals
23/8926 . . . . [Copper and noble metals
23/8933 . . . . [also combined with metals, or metal oxides or hydroxides provided for in groups B01J 23/02 - B01J 23/36
23/894 . . . . [with rare earths or actinides
23/8946 . . . . [with alkali or alkaline earth metals
23/8953 . . . . [with zinc, cadmium or mercury
23/896 . . . . [with gallium, indium or thallium
23/8966 . . . . [with germanium, tin or lead
23/8973 . . . . [with arsenic, antimony or bismuth
23/898 . . . . [with vanadium, tantalum, niobium or polonium
23/8986 . . . . [with manganese, technetium or rhenium
23/8993 . . . . [with chromium, molybdenum or tungsten
23/90 . . . . Regeneration or reactivation
23/92 . . . . of catalysts comprising metals, oxides or hydroxides provided for in groups B01J 23/02 - B01J 23/36
23/94 . . . . of catalysts comprising metals, oxides or hydroxides of the iron group metals or copper
23/96 . . . . of catalysts comprising metals, oxides or hydroxides of the noble metals
Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Catalysts

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27/00 Catalysts of the Raney type

**WARNING**

Groups **B01J 25/00 - B01J 25/04** are incomplete pending reclassification of documents from group **B01J 32/00**.

All groups listed in this warning should be considered in order to perform a complete search.

25/02 Raney nickel

25/04 Regeneration or reactivation

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

**WARNING**

Groups **B01J 27/00 - B01J 27/32** are incomplete pending reclassification of documents from group **B01J 32/00**.

All groups listed in this warning should be considered in order to perform a complete search.

27/02 Sulfur, selenium or tellurium; Compounds thereof

27/04 Sulfides

27/043 with iron group metals or platinum group metals

27/045 Platinum group metals

27/047 with chromium, molybdenum, tungsten or polonium

27/049 with iron group metals or platinum group metals

27/051 Molybdenum

27/0515 [with iron group metals or platinum group metals]

27/053 Sulfates

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

27/057 Selenium or tellurium; Compounds thereof

27/0573 [Selenium; Compounds thereof]

27/0576 [Tellurium; Compounds thereof]

27/06 Halogens; Compounds thereof

27/08 Halides

27/10 Chlorides

27/12 Fluorides

27/122 of copper

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

27/128 with iron group metals or platinum group metals

27/13 Platinum group metals

27/132 with chromium, molybdenum, tungsten or polonium

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

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

27/14 Phosphorus; Compounds thereof

27/16 containing oxygen {i.e. acids, anhydrides and their derivate 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}

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

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}

27/1804 {with rare earths or actinides}

27/1806 {with alkaline or alkaline earth metals}

27/1808 {with zinc, cadmium or mercury}

27/1811 {with gallium, indium or thallium}

27/1813 {with germanium, tin or lead}

27/1815 {with arsenic, antimony or bismuth}

27/1817 {with copper, silver or gold}

27/182 with silicon

27/185 with iron group metals or platinum group metals

27/1853 {with iron, cobalt or nickel}

27/1856 {with platinum group metals}

27/186 with arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium

27/187 with manganese, technetium or rhenium

27/188 with chromium, molybdenum, tungsten or polonium

27/19 Molybdenum

27/192 with bismuth

27/195 with vanadium, niobium or tantalum

27/198 Vanadium

27/199 with chromium, molybdenum, tungsten or polonium

27/20 Carbon compounds

27/22 Carbides

27/224 Silicon carbide

27/228 with phosphorus, arsenic, antimony or bismuth

27/232 Carbonates

27/236 Hydroxy carbonates

27/24 Nitrogen compounds

27/25 Nitrates

27/26 Cyanides

27/28 Regeneration or reactivation

27/285 {of catalysts comprising compounds of phosphorus}

27/30 of catalysts comprising compounds of sulfur, selenium or tellurium

27/32 of catalysts comprising compounds of halogens

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
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.

**WARNING**

Groups B01J 29/00 - B01J 29/90 are incomplete pending reclassification of documents from group B01J 32/00.

All groups listed in this Warning should be considered in order to perform a complete search.

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 )

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

29/0308 . . [ Mesoporous materials not having base exchange properties, e.g. Si-MCM-41 ]

29/0316 . . [ containing iron group metals, noble metals or copper ]

29/0325 . . . [ Noble metals ]

29/0333 . . . [ Iron group metals or copper ]

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

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

29/0352 . . . [ containing iron group metals, noble metals or copper ]

29/0354 . . . . [ Noble metals ]

29/0356 . . . . [ Iron group metals or copper ]

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

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

29/041 . . . [ Mesoporous materials having base exchange properties, e.g. Si/Al-MCM-41 ]

29/042 . . . [ containing iron group metals, noble metals or copper ]

29/043 . . . . [ Noble metals ]

29/044 . . . . [ Iron group metals or copper ]

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

29/046 . . . [ Chromiasilicates; Aluminochromosilicates ( B01J 29/005 takes precedence )]

29/047 . . . [ Germanosilicates; Aluminogeremosilicates ( B01J 29/005 takes precedence )]

29/048 . . . [ Zincosilicates, Aluminozincosilicates ( B01J 29/005 takes precedence )]

29/049 . . . [ Pillared clays ]

29/06 . . . [ Crystalline aluminosilicate zeolites; Isomorphous compounds thereof ]

29/061 . . . [ containing metallic elements added to the zeolite ]

29/064 . . . [ Mixtures of different aluminosilicates ]

29/068 . . . . [ Iron group metals or copper ]

29/072 . . . . [ Noble metals ]

29/076 . . . . [ containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium ]

29/08 . . . . [ the faujasite type, e.g. type X or Y ]

29/087 . . . . [ X-type faujasite ]

29/088 . . . . [ Y-type faujasite ]

29/10 . . . . [ containing iron group metals, noble metals or copper ]

29/103 . . . . [ X-type faujasite ]

29/106 . . . . [ Y-type faujasite ]

29/12 . . . . [ Noble metals ]

29/123 . . . . . [ X-type faujasite ]

29/126 . . . . . [ Y-type faujasite ]

29/14 . . . . . [ Iron group metals or copper ]

29/143 . . . . . [ X-type faujasite ]

29/146 . . . . . [ Y-type faujasite ]

29/16 . . . . . [ containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium ]

29/163 . . . . . [ X-type faujasite ]

29/166 . . . . . [ Y-type faujasite ]

29/18 . . . . [ of the mordenite type ]

29/185 . . . . . [ containing rare earth elements, titanium, zirconium, hafnium, zinc, cadmium, mercury, gallium, indium, thallium, tin or lead ]

29/20 . . . . . [ containing iron group metals, noble metals or copper ]

29/22 . . . . . [ Noble metals ]

29/24 . . . . . [ Iron group metals or copper ]

29/26 . . . . . [ containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium ]

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 ]

29/405 . . . . [ containing rare earth elements, titanium, zirconium, hafnium, zinc, cadmium, mercury, gallium, indium, thallium, tin or lead ]

29/42 . . . . . [ containing iron group metals, noble metals or copper ]
Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Catalysts

B01J

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

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29/76 . . . . Iron group metals or copper
29/7607 . . . . [A-type]
29/7615 . . . . [Zeolite Beta]
29/7623 . . . . [MAZ-type, e.g. Mazzite, Omega, ZSM-4 or LZ-202]
29/763 . . . . [CHA-type, e.g. Chabazite, LZ-218]
29/7638 . . . . [EMT-type, e.g. EMC-2, ECR-30, CSZ-1, ZSM-3 or ZSM-20]
29/7646 . . . . [EUO-type, e.g. EU-1, TPZ-3 or ZSM-50]
29/7653 . . . . [MFS-type, e.g. ZSM-57]
29/7661 . . . . [MRE-type, e.g. ZSM-48]
29/7669 . . . . [MTW-type, e.g. ZSM-12, NU-13, TPZ-12 or Theta-3]
29/7676 . . . . [MWW-type, e.g. MCM-22, ERB-1, ITQ-1, PSH-3 or SSZ-25]
29/7684 . . . . [TON-type, e.g. Theta-1, ISI-1, KZ-2, NU-10 or ZSM-22]
29/7692 . . . . [MTT-type, e.g. ZSM-23, KZ-1, ISI-4 or EU-13]
29/76 . . . . containing arsenic, antimony, bismuth, vanadium, niobium, tantalum, polonium, chromium, molybdenum, tungsten, manganese, technetium or rhenium
29/7807 . . . . [A-type]
29/7815 . . . . [Zeolite Beta]
29/7823 . . . . [MAZ-type, e.g. Mazzite, Omega, ZSM-4 or LZ-202]
29/783 . . . . [CHA-type, e.g. Chabazite, LZ-218]
29/7838 . . . . [EMT-type, e.g. EMC-2, ECR-30, CSZ-1, ZSM-3 or ZSM-20]
29/7846 . . . . [EUO-type, e.g. EU-1, TPZ-3 or ZSM-50]
29/7853 . . . . [MFS-type, e.g. ZSM-57]
29/7861 . . . . [MRE-type, e.g. ZSM-48]
29/7869 . . . . [MTW-type, e.g. ZSM-12, NU-13, TPZ-12 or Theta-3]
29/7876 . . . . [MWW-type, e.g. MCM-22, ERB-1, ITQ-1, PSH-3 or SSZ-25]
29/7884 . . . . [TON-type, e.g. Theta-1, ISI-1, KZ-2, NU-10 or ZSM-22]
29/7892 . . . . [MTT-type, e.g. ZSM-23, KZ-1, ISI-4 or EU-13]
29/78 . . . . Mixtures of different zeolites
29/82 . . . . Phosphates ([B01J 29/005 takes precedence])
29/83 . . . . Aluminophosphates (APO compounds)
29/84 . . . . Aluminophosphates containing other elements, e.g. metals, boron
29/85 . . . . Silicoaluminophosphates (SAPO compounds)
29/86 . . . . Borosilicates; Alumino borosilicates ([B01J 29/005 takes precedence])
29/87 . . . . Gallosilicates; Aluminogallosilicates; Gallogallosilicates ([B01J 29/005 takes precedence])
29/88 . . . . Ferrosilicates; Ferroaluminosilicates ([B01J 29/005 takes precedence])
29/89 . . . . Silicates, alumino silicates or borosilicates of titanium, zirconium or hafnium ([B01J 29/005 takes precedence])
29/90 . . . . Regeneration or reactivation
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 (HCN),
  cyano gen (NCCN), cyan amide (H2NCN),
  cyanogen halide (HalCN), hydro cyanic acid (HCN) isocyan idic acid (HNC0)
  fullminic acid (HCNO) and metal car bides (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 bond 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(oids) B01J 31/12; oxo acid salts B01J 31/04 - B01J 31/10; other compounds comprising anionic organonitrogen, organooxygen and organosulfur fragments
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.]

NOTE

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

31/003 . {containing enzymes}

31/006 . {comprising organic radicals, e.g. TEMPO}
31/002 . containing organic compounds or metal hydrides
31/0201 . . {Oxygen-containing compounds}
31/0202 . . . {Alcohols or phenols}
31/0204 . . . {Ethers}
31/0205 . . . {comprising carbonyl groups or oxygen-containing derivatives, e.g. acetalts, ketals, cyclic peroxides}
31/0207 . . . . {Aldehydes or acetals}
31/0208 . . . . {Ketones or ketals}
31/0209 . . . . {Esters of carboxylic or carbonic acids}
31/0211 . . . . {with a metal-oxygen link}
31/0212 . . . . {Alkoxylates}
31/0214 . . . . {Aryloxylates, e.g. phenolates}
31/0215 . . . . {Sulfur-containing compounds}
31/0217 . . . . {Mercaptans or thiolts}
31/0218 . . . . {Sulfides}
31/022 . . . . {Disulfides}
31/0221 . . . . {Polysulfides}
31/0222 . . . . {comprising sulfonyl groups}
31/0224 . . . . {being perfluorinated, i.e. comprising at least one perfluorinated moiety as substructure in case of polyfunctional compounds}
31/0225 . . . . {comprising sulfonic acid groups or the corresponding salts}
31/0227 . . . . {being perfluorinated, i.e. comprising at least one perfluorinated moiety as substructure in case of polyfunctional compounds}
31/0228 . . . . {with a metal-sulfur link, e.g. mercaptides}
31/0229 . . . . {also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0214}
31/0231 . . . . {Halogen-containing compounds}
31/0232 . . . . {also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0228 (perfluorinated sulfonl compounds or moieties B01J 31/0224; perfluorosulfonic acids B01J 31/0227) }
31/0234 . . . . {Nitrogen-, phosphorus-, arsenic- or antimony-containing compounds}
31/0235 . . . . {Nitrogen containing compounds}
31/0237 . . . . {Amines}
31/0238 . . . . {with a primary amino group}
31/0239 . . . . {Quaternary ammonium compounds}
31/0241 . . . . {Imines or enamines}
31/0242 . . . . {Enamines}
31/0244 . . . . {with nitrogen contained as ring member in aromatic compounds or moieties, e.g. pyridine}
31/0245 . . . . {being derivatives of carboxylic or carbonic acids}
31/0247 . . . . {Imides, amides or imidates (R-C=NR(OR))}
31/0248 . . . . {Nitriles}
31/0249 . . . . {Ureas (R,N-C(=O)-NR2)}
31/0251 . . . . {Guanidines (R,N-C(NR)-NR2)}
31/0252 . . . [with a metal-nitrogen link, e.g. metal amides, metal guanidines]
31/0254 . . . [on mineral substrates]
31/0255 . . . [Phosphorus containing compounds]
31/0257 . . . [Phosphorus acids or phosphorus acid esters]
31/0258 . . . [Phosphoric acid mono-, di- or triesters ((RO)(RO')2P=O), i.e. R= C, R'= C, H]
31/0259 . . . [comprising phosphoric 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]
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]
31/0262 . . . [comprising phosphinous acid (-ester) groups (R2P(OR')2) or the isomeric phosphate oxide groups (R3P=O), i.e. R= C, R'= C, H]
31/0264 . . . [Phosphorus acid amides]
31/0265 . . . [Phosphazenes, oligomers thereof or the corresponding phosphazinium salts (pollyphosphazenes per se C07E 9/067)]
31/0267 . . . [Phosphines or phosphonium compounds, i.e. phosphorus bonded to at least one carbon atom, including e.g. sp2-hybridised phosphorus compounds such as phosphazene, the other atoms bonded to phosphorus being either carbon or hydrogen]
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]
31/0269 . . . [on mineral substrates]
31/0271 . . . [also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0231]
31/0272 . . . [containing elements other than those covered by B01J 31/0201 - B01J 31/0255]
31/0274 . . . [containing silicon (ligands in coordination complexes B01J 31/1609)]
31/0275 . . . [also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0269]
31/0277 . . . [comprising liquidic liquids, as components in catalyst systems or catalysts per se, the liquidic liquid compounds being used in the molten state at the respective reaction temperature]
31/0278 . . . [containing nitrogen as cationic centre]
31/0279 . . . [the cationic portion being acyclic or nitrogen being a substituent on a ring]
31/0281 . . . [the nitrogen being a ring member]
31/0282 . . . [of an aliphatic ring, e.g. morpholinion]
31/0284 . . . [of an aromatic ring, e.g. pyridinium]
31/0285 . . . [also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0274]
31/0287 . . . [containing atoms other than nitrogen as cationic centre]
31/0288 . . . [Phosphorus]
31/0289 . . . [Sulfur]
31/0291 . . . [also containing elements or functional groups covered by B01J 31/0201 - B01J 31/0274]
31/0292 . . . [immobilised on a substrate]
31/0294 . . . [by polar or ionic interaction with the substrate, e.g. glass]
31/0295 . . . [by covalent attachment to the substrate, e.g. silica]
31/0297 . . . [the substrate being a soluble polymer, dendrimer or oligomer of characteristic microstructure of groups B01J 31/061 - B01J 31/068]
31/0298 . . . [the liquidic liquids being characterised by the counter-ions]
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. Cr2(OAc)4, B01J 31/2226)]
31/06 . . . [containing polymers [organometallic polymers B01J 31/123; polymer-bound organometallic complexes B01J 31/165; coordination polymers B01J 31/1691]]
31/061 . . . [Chiral polymers]
31/062 . . . [Polymeric amino acids]
31/063 . . . [Polymers comprising a characteristic microstructure]
31/064 . . . [Dendrimers]
31/065 . . . [Cyclodextrins]
31/066 . . . [Calixarenes and hetero-analogues, e.g. thiacalixarenes]
31/067 . . . [Molecularly imprinted polymers (catalytic antibodies C12N 9/0002)]
31/068 . . . [Polyalkylene glycols]
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)]
31/08 . . . [Ion-exchange resins]
31/10 . . . [sulfonated]
31/12 . . . [containing organo-metallic compounds or metal hydrides]
31/121 . . . [Metal hydrides]
31/122 . . . [Metal aryl or alkyl compounds]
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)]
31/124 . . . [Silicones or siloxanes or comprising such units]
31/125 . . . [Cyclic siloxanes]
31/126 . . . [the siloxanes or siloxane units, cyclic or not, comprising an additional Si-H bond, e.g. polyhydromethylsiloxane (PHMS)]
31/127 . . . [the siloxane units, e.g. silsesquioxane units, being grafted onto other polymers or inorganic supports, e.g. via an organic linker]
Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Catalysts

31/128 . . . . . [Mixtures of organometallic compounds]
31/14 . . . . . of aluminum or boron
31/143 . . . . . . of aluminum]
31/146 . . . . . . of boron]
31/16 . containing coordination complexes
31/1608 . . . . . (the ligands containing silicon]
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)]
31/1625 . . . . . (immobilised by covalent linkages, i.e. pendant complexes with optional linking groups)
31/1633 . . . . . . (covalent linkages via silicon containing groups)
31/1641 . . . . . . (established via a metathesis reaction using a silicon-containing olefin)
31/165 . . . . . . (Polymer immobilised coordination complexes, e.g. organometallic complexes]
31/1658 . . . . . . (immobilised by covalent linkages, i.e. pendant complexes with optional linking groups, e.g. on Wang or Merrifield resins)
31/1666 . . . . . . (the linkage established via an olefin metathesis reaction)
31/1675 . . . . . . (the linkage being to an organometallic polymer covered by groups B01J 31/123 - B01J 31/127, e.g. polyhydrosloxanes)
31/1683 . . . . . . (the linkage being to a soluble polymer, e.g. PEG or dendrimer, i.e. molecular weight enlarged complexes]
31/1691 . . . . . . (Coordination polymers, e.g. metal-organic frameworks [MOF] (preparation of metal complexes containing carboxylic acid moieties C07C 53/418; MOF's per se C07E)]
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)]
31/1805 . . . . . . {the ligands containing nitrogen]
31/181 . . . . . . {Cyclic ligands, including e.g. non-condensed polycyclic ligands, comprising at least one complexing nitrogen atom as ring member, e.g. pyridine]
31/1815 . . . . . . {with more than one complexing nitrogen atom, e.g. bipyrindyl, 2-aminopyridine]
31/182 . . . . . . {comprising aliphatic or saturated rings]
31/1825 . . . . . . {Ligands comprising condensed ring systems, e.g. acridine, carbazole]
31/183 . . . . . . {with more than one complexing nitrogen atom, e.g. phenanthrolone]
31/1835 . . . . . . {comprising aliphatic or saturated rings]
31/184 . . . . . . {mixed aromatic/aliphatic ring systems, e.g. indoline]
31/1845 . . . . . . {the ligands containing phosphorus (phosphines B01J 31/241]
31/185 . . . . . . {Phosphites (R(RO)3P), their isomeric phosphonates (R(RO)2P=O) and RO-substitution derivatives thereof]
31/1855 . . . . . . {Triamide derivatives thereof]}
31/186 . . . . . . {Mono- or diamide derivatives thereof]}
31/1865 . . . . . . {Phosphonites (RP(OR)2), their isomeric phosphonates (R2(RO)P=O) and RO-substitution derivatives thereof]
31/187 . . . . . . {Amide derivatives thereof]
31/1875 . . . . . . {Phosphites (R3P(OR)), their isomeric phosphine oxides (R2P=O) and RO-substitution derivatives thereof]
31/188 . . . . . . {Amide derivatives thereof]
31/1885 . . . . . . {Ligands comprising two different formal oxidation states of phosphorus in one at least bidentate ligand, e.g. phosphite/phosphinite]
31/189 . . . . . . {containing both nitrogen and phosphorus as complexing atoms, including e.g. phosphino moieties, in one at least bidentate or bridging ligand]
31/1895 . . . . . . {the ligands containing arsenic or antimony]
31/20 . . . . . Carbyonyls
31/22 . . . . . Organic complexes
31/2204 . . . . . . {the ligands containing oxygen or sulfur as complexing atoms]
31/2208 . . . . . . {Oxygen, e.g. acetylacetones]
31/2213 . . . . . . {At least two complexing oxygen atoms present in an at least bidentate or bridging ligand]
31/2217 . . . . . . {At least one oxygen and one nitrogen atom present as complexing atoms in an at least bidentate or bridging ligand]
31/2221 . . . . . . {At least one oxygen and one phosphorous atom present as complexing atoms in an at least bidentate or bridging ligand]
31/2226 . . . . . . {Anionic ligands, i.e. the overall ligand carries at least one formal negative charge]
31/223 . . . . . . {At least two oxygen atoms present in one at least bidentate or bridging ligand]
31/2234 . . . . . . {Beta-dicarbonyl ligands, e.g. acetylacetanates]
31/2239 . . . . . . {Bridging ligands, e.g. OAc in Cr(2(OAc)3), P4(OAc)6 or dicarboxylate ligands]
31/2243 . . . . . . {At least one oxygen and one nitrogen atom present as complexing atoms in an at least bidentate or bridging ligand]
31/2247 . . . . . . {At least one oxygen and one phosphorous atom present as complexing atoms in an at least bidentate or bridging ligand]
31/2252 . . . . . . {Sulfonate ligands]
31/2256 . . . . . . {being perfluorinated, i.e. comprising at least one perfluorinated moiety as substructure in case of polyfunctional ligands]
31/226 . . . . . . {Sulfur, e.g. thio carbamates]
31/2265 . . . . . . {Carbenes or carbines, i.e.(image)]
31/2269 . . . . . . {Heterocyclic carbenes]
31/2273 . . . . . . {with only nitrogen as heteroatomic ring members, e.g. 1,3-diarylimidazolines-2-yldene)
31/2278 . . . . . . {Complexes comprising two carbene ligands differing from each other, e.g. Grubbs second generation catalysts]
31/2282 . . . . . . {Unsaturated compounds used as ligands]
31/2286 . . . . . . {Alkynes, e.g. acetyliides]
31/2291 . . . . . . {Olefins]
31/2295 . . . . {Cyclic compounds, e.g. cyclopentadienyls}
31/24 . . . . Phosphines [, i.e. phosphorus bonded to only carbon atoms, or to both carbon and hydrogen atoms, including e.g. sp2-hybridised phosphorus compounds such as phosphabenzene, phosphole or anionic phospholide ligands}
31/2404 . . . {Cyclic ligands, including e.g. non-condensed polycyclic ligands, the phosphine-P atom being a ring member or a substituent on the ring}
31/2409 . . . . {with more than one complexing phosphine-P atom}
31/2414 . . . . {comprising aliphatic or saturated rings}
31/2419 . . . . {comprising P as ring member}
31/2423 . . . . {comprising aliphatic or saturated rings}
31/2428 . . . . {with more than one complexing phosphine-P atom}
31/2433 . . . . {comprising aliphatic or saturated rings}
31/2438 . . . . {and further hetero atoms as ring members, excluding the positions adjacent to P}
31/2442 . . . . {comprising condensed ring systems}
31/2447 . . . . {and phosphine-P atoms as substituents on a ring of the condensed system or on a further attached ring}
31/2452 . . . . {with more than one complexing phosphine-P atom}
31/2457 . . . . . {comprising aliphatic or saturated rings, e.g. Xantphos}
31/2461 . . . . {and phosphine-P atoms as ring members in the condensed ring system or in a further ring}
31/2466 . . . . . {comprising aliphatic or saturated rings}
31/2471 . . . . . {with more than one complexing phosphine-P atom}
31/2476 . . . . . {comprising aliphatic or saturated rings}
31/248 . . . . . {Bridged ring systems, e.g. 9-phosphabicyclononane}
31/2485 . . . . . {Tricyclic systems, e.g. phosphadamanantanes and hetero analogues}
31/249 . . . . . {Spiro-condensed ring systems}
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 phosphine/phosphonate ligands}
31/26 . . . containing in addition, inorganic metal compounds not provided for in groups B01J 31/02 - B01J 31/24
31/28 . . . of the platinum group metals, iron group metals or copper
31/30 . . . . Halides
31/32 . . . . of manganese, technetium or rhenium
31/34 . . . . of chromium, molybdenum or tungsten
31/36 . . . . of vanadium, niobium or tantalum
31/38 . . . . of titanium, zirconium or hafnium
31/40 . . . . Regeneration or reactivation
31/4007 . . . . {of catalysts containing polymers}
31/4015 . . . . {of catalysts containing metals}
31/4023 . . . . {containing iron group metals, noble metals or copper}
31/403 . . . . {containing iron group metals or copper}
31/4038 . . . . {containing noble metals}
31/4046 . . . . . {containing rhodium}
31/4053 . . . . {with recovery of phosphorous catalyst system constituents}
31/4061 . . . . {involving membrane separation}
31/4069 . . . . {involving extraction with coordinating ionic liquids or supercritical fluids, e.g. CO2}
31/4076 . . . . {involving electrochemical processes}
31/4084 . . . . {involving electromagnetic wave energy, e.g. UV or visible light}
31/4092 . . . . {involving a stripping step, with stripping gas or solvent}

32/00 Catalyst carriers in general (Frozen)

WARNING

Group B01J 32/00 is no longer used for the classification of documents as of May 1, 2020.

The content of this group is being reclassified into groups B01J 21/00 - B01J 29/90 and B01J 33/00 - B01J 38/74. Groups B01J 32/00, B01J 21/00 - B01J 29/90, and B01J 33/00 - B01J 38/74 should be considered in order to perform a complete search.

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

WARNING

Group B01J 33/00 is incomplete pending reclassification of documents from group B01J 32/00. Groups B01J 32/00 and B01J 33/00 should be considered in order to perform a complete search.

35/00 Catalysts, in general, characterised by their form or physical properties

WARNING

Groups B01J 35/00 - B01J 35/12 are incomplete pending reclassification of documents from group B01J 32/00. All groups listed in this warning should be considered in order to perform a complete search.

35/0006 . . . . {Catalysts containing parts with different compositions}
35/0013 . . . . {Colloids}
35/002 . . . . {Catalysts characterised by their physical properties}
35/0026 . . . . {Density}
35/0033 . . . . {Electric or magnetic properties}
35/004 . . . . {Photocatalysts}
35/0046 . . . . {Physical properties of the active metal ingredient}
35/0053 . . . . {metal surface area}
35/006 . . . . {metal crystallite size}
35/0066 . . . . {metal dispersion value, e.g. percentage or fraction}
35/0073 . . . . {Distribution of the active metal ingredient}
35/008 . . . . {egg-shell like}
35/0086 . . . . {egg-yolk like}
35/0093 . . . . {homogeneous throughout the support particle}
35/02 . . . . {Solids}
35/023 . . . . {Catalysts characterised by dimensions, e.g. grain size}
Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Catalysts

**Processes, in general, for preparing catalysts;**
Processes, in general, for activation of catalysts

**WARNING**

Groups B01J 37/00 - B01J 37/36 are incomplete pending reclassification of documents from group B01J 33/00.

All groups listed in this warning should be considered in order to perform a complete search.

**Use of binding agents; Moulding; Pressing; Powdering; Granulating; Addition of materials ameliorating the mechanical properties of the product catalyst**

**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**

**Powdering**

**Grinding**

**Drying a slurry, e.g. spray drying**

**Drying of aerosols**

**Granulating**

**Preparation of particles, e.g. dispersion of droplets in an oil bath**

**Preparation by melting**

**Preparation by separation, e.g. by filtration, decantation, screening**

**Impregnation, coating or precipitation**

**Preparation of the impregnating solution**

**Coating**

**Mixing**

**Washing**

**Heat treatment**

**Decomposition and pyrolysis**

**Decomposition of carbon-containing compounds into carbon**

**Decomposition of an organometallic compound, a metal complex or a metal salt of a carboxylic acid**

**Precipitation; Co-precipitation**

**Precipitation**

**Using Hydrolysis**

**Precipitation on carriers**

**to form a gel or a cogel**

**to form slurries or suspensions, e.g. a washcoat**

**Mixing**

**Washing**

**Heat treatment**

**Decomposition and pyrolysis**

**Decomposition of carbon-containing compounds into carbon**

**Decomposition of an organometallic compound, a metal complex or a metal salt of a carboxylic acid**

**Precipitation of the impregnating solution**

**Coatings comprising impregnated particles**

**Coatings comprising a zeolite**

**Coatings comprising several layers**

**Coatings comprisingimpregnated particles**

**Impregnation and coating simultaneously**

**Drying, e.g. preparing a suspension, adding a soluble salt and drying**

**via the gaseous phase-sublimation**

**Multiple impregnation or coating**

**Coating followed by impregnation**

**Coatings comprising several layers**

**Coatings comprising a zeolite**

**Coatings comprising impregnated particles**

**Precipitation**

**Pretreatment of the support**

**Heat treatment**

**Decomposition and pyrolysis**

**Decomposition of carbon-containing compounds into carbon**

**Decomposition of an organometallic compound, a metal complex or a metal salt of a carboxylic acid**

**Precipitation**

**in the presence of water, e.g. steam**

**Hydropyrolysis**

**Oxidising**

**with gases containing free oxygen**

**Reducing**

**with gases containing free hydrogen**

**Sulphiding**

**Halogenating**

**Chlorinating**

**Fluorinating**

**Phosphorising**

**Iron-exchange**

**Freeze drying, i.e. lyophilisation**
Solid sorbent compositions or filter aid compositions; Sorbents for chromatography; Catalysts

37/34 . Irradiation by, or application of, electric, magnetic or wave energy, e.g. ultrasonic waves \{ Ionic sputtering; Flame or plasma spraying; Particle radiation \}
37/341 . . \{ making use of electric or magnetic fields, wave energy or particle reaction \ (use of flames, plasma or lasers \B01J 37/349 \}
37/342 . . \{ of electric, magnetic or electromagnetic fields, e.g. for magnetic separation \}
37/343 . . \{ of ultrasonic wave energy \}
37/344 . . \{ of electromagnetic wave energy \}
37/345 . . . \{ of ultraviolet wave energy \}
37/346 . . . \{ of microwave energy \}
37/347 . . . \{ Ionic or cathodic spraying; Electric discharge \}
37/348 . . . \{ Electrochemical processes, e.g. electrochemical deposition or anodisation \}
37/349 . . \{ making use of flames, plasmas or lasers \}
37/36 . Biochemical methods

38/00 Regeneration or reactivation of catalysts, in general

WARNING

Groups \B01J 38/00 - B01J 38/74 \ are incomplete pending reclassification of documents from group \B01J 32/00.\n
All groups listed in this warning should be considered in order to perform a complete search.

2038/005 \{ involving supercritical treatment \}
38/02 . Heat treatment
38/04 . Gas or vapour treating; Treating by using liquids vapourisable upon contacting spent catalyst
38/06 . using steam
38/08 . using ammonia or derivatives thereof
38/10 . using elemental hydrogen
38/12 . Treating with free oxygen-containing gas
38/14 . with control of oxygen content in oxidation gas
38/16 . Oxidation gas comprising essentially steam and oxygen
38/18 . with subsequent reactive gas treating
38/20 . . . Plural distinct oxidation stages
38/22 . . . Moving bed, e.g. vertically or horizontally moving bulk
38/24 . . . having mainly transverse, i.e. lateral, flow of oxygen-containing gas and material
38/26 . . . having mainly counter-current flow of oxygen-containing gas and material
38/28 . . . having mainly concurrent flow of oxygen-containing gas and material
38/30 . . in gaseous suspension, e.g. fluidised bed
38/32 . . Indirectly heating or cooling material within regeneration zone or prior to entry into regeneration zone
38/34 . . . with plural distinct serial combustion stages
38/36 . . . and with substantially complete oxidation of carbon monoxide to carbon dioxide within regeneration zone
38/38 . . . and adding heat by solid heat carrier
38/40 . . . and forming useful by-products
38/42 . . using halogen-containing material
38/44 . . . and adding simultaneously or subsequently free oxygen; using oxohalogen compound
38/46 . . . fluorine-containing

38/48 . Liquid treating or treating in liquid phase, e.g. dissolved or suspended
38/485 . . \{ Impregnating or reimpregnating with, or deposition of metal compounds or catalytically active elements \}
38/50 . . using organic liquids
38/52 . . . oxygen-containing
38/54 . . . halogen-containing
38/56 . . . Hydrocarbons
38/58 . . . and gas addition thereto
38/60 . . using acids
38/62 . . . organic
38/64 . . using alkaline material; using salts
38/66 . . . using ammonia or derivatives thereof
38/68 . . . including substantial dissolution or chemical precipitation of a catalyst component in the ultimate reconstitution of the catalyst
38/70 . . . Wet oxidation of material submerged in liquid
38/72 . . . including segregation of diverse particles
38/74 . . utilising ion-exchange

Ion-exchange \( \text{treatment of milk } \A23C 9/14; \text{ separation by liquid \B01JD, e.g. \B01JD 11/00; separation of isotopes \B01D 59/00; compounds etc, see the relevant classes, e.g. \C01, \C07, \C08; treatment of water } \C02F 1/42; \text{ refining of hydrocarbon oils, in the absence of hydrogen, with solid sorbents } \C10G 25/00; \text{ purification of sugar juices } \C13B 20/14; \text{ extraction of sugar from molasses } \C13B 35/06; \text{ extraction of metal compounds from ores or concentrates by wet processes } \C22B 3/00; \text{ using ion-exchange for investigating or analysing materials } \G01N 30/96; \text{ treating radioactively contaminated material } \G21E 9/12. \}

NOTES

1. \text{ In groups } \B01J 39/00 - \B01J 49/00:
   - \text{ 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}
   - \text{ Ion-exchange processes cover also ion-exchange in combination with complex or chelate forming reactions.}
2. \text{ 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. \text{ 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 of \B01J 41/00 and subgroups.}

39/00 Cation exchange; Use of material as cation exchangers; Treatment of material for improving the cation exchange properties \( \text{ion-exchange chromatography processes } \B01D 15/36 \)
39/02 . Processes using inorganic exchangers
39/04 . Processes using organic exchangers
39/05 . . . in the strongly acidic form
39/07 . . . in the weakly acidic form
39/08 . Use of material as cation exchangers; Treatment of material for improving the cation exchange properties
39/09 . . . Inorganic material
39/10 . . Oxides or hydroxides
39/12 . . Compounds containing phosphorus
39/14 . . Base exchange silicates, e.g. zeolites
39/16 . . Organic material
39/17 . . containing also inorganic materials, e.g. inert material coated with an ion-exchange resin
Ion-exchange

41/00 Anion exchange; Use of material as anion exchangers; Treatment of material for improving the anion exchange properties (ion-exchange chromatography processes B01D 15/36)

41/02 Processes using inorganic exchangers

41/04 Processes using organic exchangers

41/05 in the strongly basic form

41/07 in the weakly basic form

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

41/09 Organic material

41/10 Inorganic material

41/12 Macromolecular compounds

41/13 obtained otherwise than by reactions only involving unsaturated carbon-to-carbon bonds

41/14 obtained by reactions only involving unsaturated carbon-to-carbon bonds

41/16 Cellulose or wood; Derivatives thereof

41/18 Carbon, coal or tar

41/20 Anion exchangers for chromatographic processes

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)

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)

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

47/011 using batch processes

47/012 using portable ion-exchange apparatus

47/014 in which the adsorbent properties of the ion-exchanger are involved, e.g. recovery of proteins or other high-molecular compounds

47/015 Electron-exchangers

47/016 Modification or after-treatment of ion-exchangers

47/018 Granulation; Incorporation of ion-exchangers in a matrix; Mixing with inert materials

47/019 Mixtures in form of tablets

47/02 Column or bed processes

47/022 characterised by the construction of the column or container

47/024 where the ion-exchangers are in a removable cartridge

47/026 using columns or beds of different ion exchange materials in series

47/028 with alternately arranged cationic and anionic exchangers

47/04 Mixed-bed processes

47/06 during which the ion-exchange material is subjected to a physical treatment, e.g. heat, electric current, irradiation or vibration (electrodialysis or electro-osmosis B01D 61/42)

47/08 subjected to a direct electric current

47/10 with moving ion-exchange material; with ion-exchange material in suspension or in fluidised-bed form

47/11 in rotating beds

47/12 characterised by the use of ion-exchange material in the form of ribbons, filaments, fibres or sheets, e.g. membranes (electrodialysis or electro-osmosis B01D 61/42)

47/127 in the form of filaments or fibres

47/133 Precoat filters

47/14 Controlling or regulating

47/15 for obtaining a solution having a fixed pH

49/00 Regeneration or reactivation of ion-exchangers; Apparatus therefor (ion-exchange chromatography processes or apparatus B01D 15/08)

49/05 of fixed beds

49/06 containing cationic exchangers

49/07 containing anionic exchangers

49/08 containing cationic and anionic exchangers in separate beds

49/09 of mixed beds

49/10 of moving beds

49/12 containing cationic exchangers

49/14 containing anionic exchangers

49/16 containing cationic and anionic exchangers in separate beds

49/18 of mixed beds

49/20 of membranes

49/30 Electrical regeneration

49/40 Thermal regeneration

49/45 of amphoteric ion-exchangers

49/50 characterised by the regeneration reagents

49/53 for cationic exchangers

49/57 for anionic exchangers

49/60 Cleaning or rinsing ion-exchange beds

49/70 for large scale industrial processes or applications

49/75 of water softeners

49/80 Automatic regeneration

49/85 Controlling or regulating devices therefor

49/90 having devices which prevent back-flow of the ion-exchange mass during regeneration

2203/00 Processes utilising sub- or super atmospheric pressure

2203/06 High pressure synthesis

2203/0605 Composition of the material to be processed

2203/061 Graphite

2203/0615 Fullerene

2203/062 Diamond

2203/0625 Carbon

2203/063 Carbides
2203/0635 . . . Silicon carbide
2203/064 . . . Carbonates
2203/0645 . . . Boronitrides
2203/065 . . . Composition of the material produced
2203/0655 . . . Diamond
2203/066 . . . Boronitrides
2203/0665 . . . Gallium nitrides
2203/067 . . . Aluminium nitrides
2203/0675 . . . Structural or physico-chemical features of the materials processed
2203/068 . . . Crystal growth
2203/0685 . . . Crystal sintering
2203/069 . . . Recrystallisation
2203/0695 . . . Colour change

2204/00 Aspects relating to feed or outlet devices; Regulating devices for feed or outlet devices
2204/002 . . . the feeding side being of particular interest
2204/005 . . . the outlet side being of particular interest
2204/007 . . . Aspects relating to the heat-exchange of the feed or outlet devices

2208/00 Processes carried out in the presence of solid particles; Reactors therefor
2208/00008 . . . Controlling the process
2208/00017 . . . Controlling the temperature
2208/00026 . . . Controlling or regulating the heat exchange system
2208/00035 . . . involving measured parameters
2208/00044 . . . Temperature measurement
2208/00053 . . . of the heat exchange medium
2208/00061 . . . of the reactants
2208/0007 . . . Pressure measurement
2208/00079 . . . Fluid level measurement
2208/00088 . . . Flow rate measurement
2208/00097 . . . Mathematical modelling
2208/00106 . . . by indirect heat exchange
2208/00115 . . . with heat exchange elements inside the bed of solid particles
2208/00123 . . . Fingers
2208/00132 . . . Tubes
2208/00141 . . . Coils
2208/0015 . . . Plates; Cylinders
2208/00159 . . . Radially arranged plates
2208/00168 . . . with heat exchange elements outside the bed of solid particles
2208/00176 . . . outside the reactor
2208/00185 . . . Fingers
2208/00194 . . . Tubes
2208/00203 . . . Coils
2208/00212 . . . Plates; Jackets; Cylinders
2208/00221 . . . comprising baffles for guiding the flow of the heat exchange medium
2208/0023 . . . with some catalyst tubes being empty, e.g. dummy tubes or flow-adjusting rods
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
2208/00247 . . . Reflux columns
2208/00256 . . . in a heat exchanger for the heat exchange medium separate from the reactor
2208/00265 . . . Part of all of the reactants being heated or cooled outside the reactor while recycling
2208/00274 . . . involving reactant vapours
2208/00283 . . . involving reactant liquids
2208/00292 . . . involving reactant solids
2208/003 . . . involving reactant slurries
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
2208/00318 . . . Heat exchange inside a feeding nozzle or nozzle reactor
2208/00327 . . . by direct heat exchange
2208/00336 . . . adding a temperature modifying medium to the reactants
2208/00345 . . . Cryogenic coolants
2208/00353 . . . Non-cryogenic fluids
2208/00362 . . . Liquid
2208/00371 . . . gaseous
2208/0038 . . . Solids
2208/00389 . . . using electric heating or cooling elements
2208/00398 . . . inside the reactor bed
2208/00407 . . . outside the reactor bed
2208/00415 . . . electric resistance heaters
2208/00424 . . . Peltier cooling elements
2208/00433 . . . using electromagnetic heating
2208/00442 . . . Microwaves
2208/00451 . . . Sunlight; Visible light
2208/0046 . . . Infrared radiation
2208/00469 . . . Radiofrequency
2208/00477 . . . by thermal insulation means
2208/00486 . . . Vacuum spaces
2208/00495 . . . using insulating materials or refractories
2208/00504 . . . by means of a burner
2208/00513 . . . using inert heat absorbing solids in the bed
2208/00522 . . . using inert heat absorbing solids outside the bed
2208/0053 . . . Controlling multiple zones along the direction of flow, e.g. pre-heating and after-cooling
2208/00539 . . . Pressure
2208/00548 . . . Flow
2208/00557 . . . controlling the residence time inside the reactor vessel
2208/00566 . . . Pulsated flow
2208/00575 . . . Controlling the viscosity
2208/00584 . . . Controlling the density
2208/00592 . . . Controlling the pH
2208/00601 . . . Controlling the conductivity
2208/0061 . . . Controlling the level
2208/00619 . . . Controlling the weight
2208/00628 . . . Controlling the composition of the reactive mixture
2208/00637 . . . Means for stopping or slowing down the reaction
2208/00646 . . . Means for starting up the reaction
2208/00654 . . . by measures relating to the particulate material
2208/00663 . . . Concentration
2208/00672 . . . Particle size selection
2208/00681 . . . Agglomeration
2208/0069 . . . Attrition
2208/00699 . . . Moisture content regulation
2208/00707 . . . Fouling
Means for reactor start-up
Mathematical modelling
Controlling static charge
Feeding or discharging of solids
Feeding
Discharging
Details of feeding or discharging
Kinetic energy reducing devices in the flow channel
Bringing the solid in the form of a slurry before feeding it to the reactor
Details of the reactor or of the particulate material
Details of the particulate material
the particulate material being provided in prefilled containers
Mixing elements
Stationary elements
inside the bed, e.g. baffles
outside the bed, e.g. baffles
Moving elements
inside the bed, e.g. rotary mixer
outside the bed, e.g. rotary mixer
Means for supporting the bed of particles, e.g.
grids, bars, perforated plates
Feeding means for the reactants
Nozzle-type feeding elements
Sparger-type feeding elements
Perforated plates
Provided with baffles
Flow distribution elements
Features relating to the reactants or products
Sampling of the particulate material, the reactants or the products
Reactants
Products
Particulate material
Disengagement zone in fluidised-bed reactors
with stationary particles
comprising a plurality of beds with flow of reactants in parallel
Plate-type reactors filled with granular catalyst
Details
Particulate material
Two or more types of catalyst
comprising nanocatalysts
Beds
rotating
Details of tube reactors containing solid particles
Heating or cooling the reactor
Chemical, physical or physico-chemical processes in general; Their relevant apparatus
Chemical plants
Scale aspects
Large-scale industrial plants
Pilot-scale plants
Laboratory-scale plants
Miniplants
Scale-up
Construction aspects
Plants assembled from modules joined together
Plants mounted on pallets or skids
Revamping, retrofitting or modernisation of existing plants
Process aspects
Batch processes
Semi-batch or fed-batch processes
Continuous processes
Intermittent processes
Processes in parallel
Processes in series
Features relating to reactants and process fluids
Green chemistry
Ionic liquids
Controlling or regulating processes
Controlling the temperature
Controlling or regulating the heat exchange system
involving measured parameters
Temperature measurement
of the heat exchange medium
of the reactants
Pressure measurement
Liquid level measurement
Flow rate measurement
Mathematical modelling
by indirect heating or cooling employing heat exchange fluids
with heat exchange elements inside the reactor
Fingers
Tubes
Coils
Plates; Jackets; Cylinders
with heat exchange elements outside the reactor
Cylinders
Reflux columns
in a heat exchanger separate from the reactor
part or all of the reactants being heated or cooled outside the reactor while recycling
involving reactant vapours
involving reactant liquids
involving reactant solids
involving reactant slurries
with two or more reactions in heat exchange with each other, such as an endothermic reaction in heat exchange with an exothermic reaction
Heat exchange inside a feeding nozzle or reaction
Heat exchange in heat exchange with an exothermic reaction
by direct heating or cooling
adding a temperature modifying medium to the reactants
Cryogenic coolants
by evaporation of reactants
by condensation of reactants
using electric heating or cooling elements
Avoiding undesirable reactions or side-effects

Mathematical modelling

Control algorithm

controlling the mixture

controlling the composition of the reactive mixture

controlling the residence time inside the reactor vessel

controlling the weight of reactants in the reactor vessel

controlling the viscosity

controlling the density

Physical density

Optical density

controlling the pH

controlling the conductivity

controlling the level of reactants in the reactor vessel

controlling multiple zones along the direction of flow, e.g. pre-heating and after-cooling

controlling the pressure

controlling the flow

controlling the conductivity

controlling the level of reactants in the reactor vessel

controlling the composition of the reactive mixture

controlling the stirring velocity

Control algorithm

Sensing a parameter

of the reaction system

at the reactor inlet

inside the reactor

at the reactor outlet

of the heat exchange system

other than of the reactor heat exchange system

transforming a sensed parameter

comparing a sensed parameter with a pre-set value

Fixed parameter value

Parameter value calculated by equations

Dynamically variable (in-line) parameter values

calculating difference

taking actions

stopping the system or generating an alarm

modifying the operating conditions

of the reaction system

at the reactor inlet

inside the reactor

at the reactor outlet

of the heat exchange system

other than of the reactor or heat exchange system

Mathematical modelling

Avoiding undesirable reactions or side-effects

Fouling of the reactor or the process equipment

Foam formation

Formation of deposits other than coke

Formation of unwanted polymer, such as "popcorn"

Leakage

Preventing runaway of the chemical reaction

Predicting runaway of the chemical reaction

Preventing explosion of the chemical mixture

Preventing flame propagation

Detecting faulty operations

Pressure relief

Addition of reaction inhibitor

Sequential or parallel reactions; Apparatus and devices for combinatorial chemistry or for making arrays; Chemical library technology

Apparatus

Features relating to reactor vessels

Individual reactor vessels

Reactor vessels with top opening

Reactor vessels with top and bottom openings

in the shape of syringes

with pistons or plungers

in the shape of pipette tips

the reactor vessels having pervious side walls

"Tea bags"

Generally cylindrical reactor vessels

the reactor vessels having impervious side walls

Pouches

Reactor vessels in a multiple arrangement

interchangeably mounted in racks or blocks

the racks or blocks being mounted in stacked arrangements

the reactor vessels being formed by arrays of wells in blocks

the blocks being mounted in stacked arrangements

the individual reactor vessels being arranged serially in stacks

the reactor vessels or wells being arranged in plates moving in parallel to each other

Movement by rotation

Movement by linear translation

Details of the reactor vessels

Closures attached to the reactor vessels

Septa

Valves

in the shape of a ball or sphere

rotary

Caps

Screw-caps

Spheres

Means for dispensing and evacuation of reagents

Pumps

peristaltic

electrode driven

Nozzles
Means for pressurising the reaction vessels

Means for the recovery of reactants or products

by rotation of the reaction vessels

by shaking, vibrating or oscillating of the reaction vessels

by sonication or ultrasonication

by chemical means

Features relating to the solid phase supports

DNA chips

essentially square

essentially rectangular

in the shape of disks

in the shape of cylinders

Means for coding or tagging the apparatus or the reagents

Alphanumeric characters

Colours

Bar codes

2-dimensional

3-dimensional

Physical means

Perforations

Cuts-out

Raised or sunken areas

Magnetic means

Electromagnetic means

Transponder chips

EEPROM memory devices

Chemical means

radioactive

fluorophore

electrophoric

Features relative to the processes being carried out

Parallel processes

High throughput processes

Sequential processes

Split-and-pool, mix-and-divide processes

Gas-phase processes

Solid-phase processes

Solution-phase processes

High-pressure processes

Making arrays on substantially continuous surfaces

the compounds being directly bound or immobilised to solid supports

DNA chips

The surface being organic

the surface being inorganic

Delimitation of the attachment areas

by chemical means

Directed sorting

by chemical means

in a slurry

by manipulation of individual beads

Pins

Replaceable crowns

Sheets

Means for pressurising the reaction vessels

Means for mixing reactants or products in the reaction vessels

by the use of moving stirrers within the reaction vessels

by shaking, vibrating or oscillating of the reaction vessels

by sonication or ultrasonication

by rotation of the reaction vessels

Dispensing or evacuation of the solid phase support

by chemical cleavage from the solid support

25
Type of synthesis
Means for controlling the apparatus of the process
Organic compounds
Heat activated synthesis
Light-directed synthesis
characterising the products
Processes involving means for analysing and Simulation or virtual synthesis
Measurement and control of process parameters
Means for quality control
Other, e.g. van der Waals forces, hydrogen bonding
Introduction of reactive groups to the surface
by reactive plasma treatment
by coating it with another layer
the compounds being trapped in or bound to a porous medium
the porous medium being continuous, e.g. porous oxide substrates
the porous medium being present in discrete locations, e.g. gel pads
the compounds being bound to beads immobilised on the solid supports
by the use of solid beads
by the use of liquid beads
the compounds being bound to electrodes embedded in or on the solid supports
the compounds being bound to magnets embedded in or on the solid supports
One-dimensional arrays
Two-dimensional arrays
Four-dimensional arrays
Three-dimensional arrays
One-dimensional arrays within three-dimensional arrays
Two-dimensional arrays within three-dimensional arrays
Three-dimensional arrays within three-dimensional arrays
Slice arrays
In-situ synthesis on the substrate
Ex-situ synthesis followed by deposition on the substrate
Means for controlling the apparatus of the process
Manual means
Semi-automatic means
Automatic
using computers
using robots
Means for quality control
Synthesis control routines, e.g. using computer programs
Measurement and control of process parameters
Simulation or virtual synthesis
Processes involving means for analysing and characterising the products
integrated with the reactor apparatus
separated from the reactor apparatus
Type of synthesis
Light-directed synthesis
Electrochemical synthesis
Heat activated synthesis
Type of compounds synthesised
Organic compounds
Nucleotides
Peptides
Glycopeptides
Peptide nucleic acids [PNA]
Saccharides
Lips
Non-biologic macromolecules, e.g. polymeric compounds
Organic catalysts
Biological products
Cells
Inorganic compounds
Catalysts
Metal based compounds
Alloys
Metal oxides
Compositions, e.g. coatings, crystals, formulations
Purification of compounds synthesised
Details of the reactor
Baffles
Baffles attached to the reactor wall
vertical
inclined
in a helix
in the form of cones
horizontal
Baffles attached to the stirring means
Aspects relating to microreactors
Laminate assemblies, i.e. the reactor comprising a stack of plates
Geometry of the plates
Three-dimensional assemblies, i.e. the reactor comprising a form other than a stack of plates
Monolith-base structure
One or more tube-shaped elements
Spiral-shaped
Concentric tubes
Cup-shaped
Means to assemble
Plurality of modules
Fluidic connections
Electric connections
Support structures
Materials of construction
Metal
Ceramic
Quartz
Silicon wafers or plates
Glass
Plastic
Comprising catalytically active material
comprising coatings other than catalytically active coatings
For changing surface tension
For protection channel surface, e.g. corrosion protection
Comprising porous material
comprising nanostructures, e.g. nanotubes
2219/00849 . . . comprising packing elements, e.g. glass beads
2219/00851 . . . Additional features
2219/00853 . . . Employing electrode arrangements
2219/00855 . . . Surface features
2219/00858 . . . Aspects relating to the size of the reactor
2219/0086 . . . Dimensions of the flow channels
2219/00862 . . . Dimensions of the reaction cavity itself
2219/00864 . . . Channel sizes in the nanometer range, e.g. nanoreactors
2219/00867 . . . Microreactors placed in series, on the same or on different supports
2219/00869 . . . Microreactors placed in parallel, on the same or on different supports
2219/00871 . . . Modular assembly
2219/00873 . . . Heat exchange
2219/00876 . . . Insulation elements
2219/00878 . . . Vacuum spaces
2219/0088 . . . Peltier-type elements
2219/00882 . . . Electromagnetic heating
2219/00885 . . . Thin film heaters
2219/00887 . . . Deflection means for heat or irradiation
2219/00889 . . . Mixing (micromixers B01 F 13/0059)
2219/00891 . . . Feeding or evacuation
2219/00894 . . . More than two inlets
2219/00896 . . . Changing inlet or outlet cross-section, e.g. pressure-drop compensation
2219/00898 . . . Macro-to-Micro (M2M)
2219/009 . . . Pulsating flow
2219/00903 . . . Segmented flow
2219/00905 . . . Separation
2219/00907 . . . using membranes
2219/00909 . . . using filters
2219/00912 . . . by electrophoresis
2219/00914 . . . by dielectrophoresis
2219/00916 . . . by chromatography
2219/00918 . . . by adsorption
2219/00921 . . . by absorption
2219/00923 . . . by surface tension
2219/00925 . . . Irradiation
2219/00927 . . . Particle radiation or gamma-radiation
2219/0093 . . . Electric or magnetic energy
2219/00932 . . . Sonic or ultrasonic vibrations
2219/00934 . . . Electromagnetic waves
2219/00936 . . . UV-radiations
2219/00939 . . . X-rays
2219/00941 . . . Microwaves
2219/00943 . . . Visible light, e.g. sunlight
2219/00945 . . . Infra-red light
2219/00948 . . . Radiofrequency
2219/0095 . . . Control aspects
2219/00952 . . . Sensing operations
2219/00954 . . . Measured properties
2219/00957 . . . Compositions or concentrations
2219/00959 . . . Flow
2219/00961 . . . Temperature
2219/00963 . . . Pressure
2219/00966 . . . pH
2219/00968 . . . Type of sensors
2219/0097 . . . Optical sensors
2219/00972 . . . Visible light
2219/00975 . . . Ultraviolet light
2219/00977 . . . Infrared light

2219/00979 . . . Acoustic sensors
2219/00981 . . . Gas sensors
2219/00984 . . . Residence time
2219/00986 . . . Microprocessor
2219/00988 . . . Leakage
2219/0099 . . . Cleaning
2219/00993 . . . Design aspects
2219/00995 . . . Mathematical modeling
2219/00997 . . . Strategical arrangements of multiple microreactor systems
2219/0092 . . . Apparatus characterised by their chemically-resistant properties
2219/0204 . . . comprising coatings on the surfaces in direct contact with the reactive components
2219/0209 . . . of glass
2219/0213 . . . of enamel
2219/0218 . . . of ceramic
2219/0222 . . . of porcelain
2219/0227 . . . of graphite
2219/0231 . . . of diamond
2219/0236 . . . Metal based
2219/024 . . . Metal oxides
2219/0245 . . . of synthetic organic material
2219/025 . . . characterised by the construction materials of the reactor vessel proper
2219/0254 . . . Glass
2219/0259 . . . Enamel
2219/0263 . . . Ceramic
2219/0268 . . . Porcelain
2219/0272 . . . Graphite
2219/0277 . . . Metal based
2219/0281 . . . Metal oxides
2219/0286 . . . Steel
2219/029 . . . Non-ferrous metals
2219/0295 . . . Synthetic organic materials
2219/0098 . . . Processes employing the direct application of electric or wave energy, or particle radiation; Apparatus therefor
2219/08 . . . Controlling the process
2219/0803 . . . employing electric or magnetic energy
2219/0805 . . . giving rise to electric discharges
2219/0807 . . . involving electrodes
2219/0809 . . . employing two or more electrodes
2219/0811 . . . employing three electrodes
2219/0813 . . . employing four electrodes
2219/0815 . . . involving stationary electrodes
2219/0816 . . . involving moving electrodes
2219/0818 . . . Rotating electrodes
2219/082 . . . Sliding electrodes
2219/0822 . . . The electrode being consumed
2219/0824 . . . Details relating to the shape of the electrodes
2219/0826 . . . essentially linear
2219/0828 . . . Wires
2219/083 . . . cylindrical
2219/0832 . . . essentially toroidal
2219/0833 . . . forming part of a full circle
2219/0835 . . . substantially flat
2219/0837 . . . Details relating to the material of the electrodes
2219/0839 . . . Carbon
2219/0841 . . . Metal
Processes employing electromagnetic waves

Processes carried out in the presence of a plasma

Materials to be treated

Heating or cooling of the reactor

Feeding or evacuating the reactor

Stationary reactors without moving elements inside

Details relating to the geometry of the reactor

Details relating to the spatial orientation of the reactor

Microwave guides

Materials of construction

Controlling the microwave irradiation variables

Time

Frequency

Intensity

Features relating to the microwave source

Arrangements thereof

Single source

Multiple sources

Details relating to the spatial orientation of the reactor

horizontal

vertical

inclined at an angle to the horizontal or to the vertical plane

Details relating to the geometry of the reactor

polygonal

triangular

square or square-derived

prismatic

pyramidal

hexagonal

round

circular or disk-shaped

spherical

cylindrical

spiral

toroidal

conical

oval or ellipsoidal

ovoid or egg-shaped

Stationary reactors without moving elements inside

Reactors comprising multiple separate flow channels

Monolithic-type reactors

Geometry of the channels

Polygonal

Rectangular

Square

Circular or ellipsoidal

Heat exchange aspects

The reactant being in indirect heat exchange with a non reacting heat exchange medium

Independent temperature control in various sections of the monolith

Two reactions in indirect heat exchange

The same reactant stream undergoing different reactions, endothermic or exothermic

Additional heat exchange means, e.g. electric resistance heater, coils

Direct heat exchange

Feeding means

for the reactants

for the catalysts

Mixing means, e.g. fins or baffles attached to the monolith or placed in the channel

Separation means, e.g. membrane inside the reactor
Wall-flow filter, e.g. adjacent cells closed alternatively at their end to force the reactant stream through the walls of the monolith

Construction materials

Catalysts coated on the surface of the monolith channels

Nanocatalysts

Catalyst in granular form in the channels

Monoliths having catalytic activity on its own

of the monoliths

Metals or alloys

Steel

Metal oxides

Ceramics

Glass

Other constructional details

Assembling means of monolith modules

Size aspects

Sizes

Cell density

Additional structures inserted in the channels

Moving elements in the monolith reactor

Plate-type reactors

Geometry of the reactor

Plates arranged in parallel

Plates arranged concentrically

Plates arranged radially

Geometry of the plates

Flat plates, i.e. plates which are not corrugated or otherwise structured, e.g. plates with cylindrical shape

Corrugated plates

Perforated plates

Heat exchange aspects

the reactants being in indirect heat exchange with a non reacting heat exchange medium

Independent temperature control in various sections of the reactor

Two reactions in indirect heat exchange with each other

The same reactant stream undergoing different reactions, endothermic or exothermic

Additional heat exchange means, e.g. electric resistance heaters, coils

Feeding means

Feeding means for the reactants

Feeding means for the catalyst

the catalyst being exchangeable on inserts other than plates, e.g. in bags

Mixing means, e.g. fins or baffles attached to the plates

Separation means, e.g. membranes inside the reactor

Construction materials

of the catalysts

Catalysts coated on the surface of plates or inserts

Nanocatalysts

Catalysts in granular from between plates

Catalytically active foils; Plates having catalytically activity on their own

of the plates

Metals or alloys

Steel

Ceramics

Glass

Plastics

Other constructional details

Assembling means

Means for assembling plates together, e.g. sealing means, screws, bolts

the plates being assembled interchangeably or in a disposable way

Means for assembling modules together, e.g. casings, holders, fluidic connectors

Size aspects, i.e. concrete sizes are being mentioned in the classified document

Additional structures inserted in the channels, e.g. plates, catalyst holding meshes

Details relating to random packing elements

Basic shape of the elements

Saddle

Sphere

Egg, ovoid or ellipse

Toroid or ring

Disk

Cylinder

Cone or truncated cone

Triangle

Hexagon

Tetrahedron

Star

Square or square-derived

Cube

Pyramid

Wire

twisted

Spiral

Brush

Cross

Sheet

stretched

twisted

folded

rolled up

Other shapes

Composition or microstructure of the elements

Metal

Ceramic

Carbon

Glass

Wood

Cork

Rubber
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

Basic shape of the elements

Flat sheets

Corrugated sheets

Plurality of essentially parallel sheets

with sheets having corrugations which intersect at an angle of 90 degrees

with sheets having corrugations which intersect at an angle different from 90 degrees

characterised by the orientation of the sheet

Vertical orientation

Horizontal orientation

Inclined orientation

Sheets comprising apertures or perforations

Louvres

Essentially circular apertures

Sheets comprising areas that are raised or sunken from the plane of the sheet

Dimples, bosses, protrusions

Other details of the sheets

Details relating to the extremities of the sheets, such as a change in corrugation geometry or sawtooth edges

Dimensions or size aspects

characterised by the orientation of blocks of sheets

relating to blocks in the same horizontal level

relating to blocks in superimposed layers

Mounting or joining of the blocks or sheets within the column or vessel

Tubes or cylinders

Materials comprising a mixture of inorganic materials (materials coated or impregnated on a carrier B01J 20/32)

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

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

Sorbents characterised by the starting material used for their preparation

the starting material being of inorganic character

the starting material being of organic character

Natural rubber

Polysaccharides or cellulose materials, e.g. starch, chitin, sawdust, wood, straw, cotton

having been subjected to further processing, e.g. paper, cellulose pulp

Lignin

Algae, aquatic plants or sea vegetals, e.g. seaweeds, eelgrass

Plants or land vegetals, e.g. cereals, wheat, corn, rice, sphagnum, peat moss

Proteins, DNA

Feathers
2229/34 . . . Reaction with organic or organometallic compounds (with organo-silicium compounds B01J 2229/32)
2229/36 . . . Steaming
2229/37 . . . Acid treatment
2229/38 . . . Base treatment
2229/40 . . . Special temperature treatment, i.e. other than just for template removal
2229/42 . . . Addition of matrix or binder particles
2229/60 . . . Synthesis on support
2229/62 . . . in or on other molecular sieves
2229/64 . . . in or on refractory materials
2229/66 . . . on metal supports
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.

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
2231/10 . . . Polymerisation reactions involving at least dual use catalysts, e.g. for both oligomerisation and polymerisation
2231/12 . . . Olefin polymerisation or copolymerisation
2231/122 . . . Cationic (co)polymerisation, e.g. single-site or Ziegler-Natta type
2231/125 . . . Radical (co)polymerisation, e.g. mediators therefor
2231/127 . . . Anionic (co)polymerisation
2231/14 . . . Other (co) polymerisation, e.g. of lactides, epoxides ("ROMP", i.e. ring-opening metathesis polymerisation B01J 2231/54)
2231/20 . . . Olefin oligomerisation or telomerisation
2231/30 . . . Addition reactions at carbon centres, i.e. to either C-C or C-X multiple bonds
2231/32 . . . Addition reactions to C=C or C-C triple bonds
2231/321 . . . Hydroformylation, metalformylation, carbonylation or hydroaminomethylation
2231/322 . . . Hydrocyanation
2231/323 . . . Hydrometalation, e.g. bor-, alumin-, silyl-, zirconation or analogous reactions like carbometalation, hydrocarboration
2231/324 . . . Cyclisations via conversion of C-C multiple to single or less multiple bonds, e.g. cycloadditions
2231/325 . . . Cyclopropanations
2231/326 . . . Diels-Alder or other [4+2] cycloadditions, e.g. hetero-analogues
2231/327 . . . Dipolar cycloadditions
2231/328 . . . Cycloadditions involving more than 2 components or moieties, e.g. intra-/intermolecular [2+2+2] or [2+2+1], e.g. Pauson-Khand type
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2231/34 . . . Other additions, e.g. Monsanto-type carboxylation, addition to 1,2-C=O or 1,2-C-X triplebonds, additions to 1,4-C=C-C=O or 1,4-C=C-X triple bonds with X, e.g. O, S, NH/

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

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

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

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

2231/345 . . . with organometallic complexes, e.g. by adding ZnR2

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

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

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

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

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

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

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

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

2231/4216 . . . with R= alkyl

2231/4222 . . . with R′= alkyl

2231/4227 . . . with Y= Cl

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

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

2231/4244 . . . with R= alkyl

2231/425 . . . with R′= alkyl

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

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

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

2231/4272 . . . via enolates or aza-analogues, added as such or made in-situ, e.g. ARY + R2C=C(O)OMe > AR2C-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

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

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

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

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

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

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

2231/48 . . . Ring-opening reactions

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

2231/485 . . . kinetic resolution of epoxide racemates

2231/487 . . . by hydrolysis

2231/49 . . . Esterification or transesterification

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

2231/52 . . . Isomerisation reactions

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

2231/543 . . . alkenne metathesis

2231/546 . . . alkyne metathesis

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

2231/62 . . . Reductions in general of inorganic substrates, e.g. formal hydrogenation, e.g. of N₂

2231/625 . . . of CO₂

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

2231/641 . . . Hydrogenation of organic substrates, i.e. H₂ or H-transfer hydrogenations, e.g. Fischer-Tropsch processes

2231/643 . . . of R₂CO or R₂C=O (R= C, H)

2231/645 . . . of C≡C or C-C triple bonds

2231/646 . . . of aromatic or heteroaromatic rings

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

2231/70 . . . Oxidation reactions, e.g. epoxidation, (dihydroxylation, dehydrogenation and analogues

2231/72 . . . Epoxidation

2231/74 . . . Aziridination

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

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

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

2523/00 Constitutive chemical elements of heterogeneous catalysts

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

2523/11 . . . Lithium

2523/12 . . . Sodium

2523/13 . . . Potassium

2523/14 . . . Rubidium

2523/15 . . . Caesium

2523/16 . . . Francium

2523/17 . . . Copper

2523/18 . . . Silver

2523/19 . . . Gold

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

2523/21 . . . Beryllium

2523/22 . . . Magnesium

2523/23 . . . Calcium

2523/24 . . . Strontium

2523/25 . . . Barium
2523/26 . . Radium
2523/27 . . Zinc
2523/28 . . Cadmium
2523/29 . . Mercury
2523/30 . . of Group III (IIIA or IIIB) of the Periodic Table
2523/305 . . Boron
2523/31 . . Aluminium
2523/32 . . Gallium
2523/33 . . Indium
2523/34 . . Thallium
2523/35 . . Scandium
2523/36 . . Yttrium
2523/37 . . Lanthanides
2523/3706 . . Lanthanum
2523/3712 . . Cerium
2523/3718 . . Praseodymium
2523/3725 . . Neodymium
2523/3731 . . Promethium
2523/3737 . . Samarium
2523/3743 . . Europium
2523/375 . . Gadolinium
2523/3756 . . Terbium
2523/3762 . . Dysprosium
2523/3768 . . Holmium
2523/3775 . . Erbium
2523/3781 . . Thulium
2523/3787 . . Ytterbium
2523/3793 . . Lutetium
2523/39 . . Actinides
2523/392 . . Actinium
2523/395 . . Thorium
2523/397 . . Uranium
2523/40 . . of Group IV (IVA or IVB) of the Periodic Table
2523/41 . . Silicon
2523/42 . . Germanium
2523/43 . . Tin
2523/44 . . Lead
2523/47 . . Titanium
2523/48 . . Zirconium
2523/49 . . Hafnium
2523/50 . . of Group V (VA or VB) of the Periodic Table
2523/51 . . Phosphorus
2523/52 . . Arsenic
2523/53 . . Antimony
2523/54 . . Bismuth
2523/55 . . Vanadium
2523/56 . . Niobium
2523/57 . . Tantalum
2523/60 . . of Group VI (VIA or VIB) of the Periodic Table
2523/62 . . Sulfur
2523/63 . . Selenium
2523/64 . . Tellurium
2523/65 . . Polonium
2523/67 . . Chromium
2523/68 . . Molybdenum
2523/69 . . Tungsten
2523/70 . . of Group VII (VIIB) of the Periodic Table
2523/72 . . Manganese
2523/73 . . Technetium
2523/74 . . Rhenum
2523/80 . . of Group VIII of the Periodic Table
2523/82 . . Metals of the platinum group
2523/821 . . Ruthenium
2523/822 . . Rhodium
2523/824 . . Palladium
2523/825 . . Osmium
2523/827 . . Iridium
2523/828 . . Platinum
2523/84 . . Metals of the iron group
2523/842 . . Iron
2523/845 . . Cobalt
2523/847 . . Nickel
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 of complexes used and the solvents are indexed for each explicit alternative, according to the guideline above.

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.

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.

2531/002 . . Materials
2531/004 . . Ligands
2531/005 . . Catalytic metals
2531/007 . . Promoter-type Additives
2531/008 . . Methods or theories
2531/02 . . Compositional aspects of complexes used, e.g. polynuclearity
2531/0202 . . Polynuclearity
Bi- or polynuclear complexes, i.e. comprising two or more metal coordination centres, without metal-metal bonds, e.g. $\text{Cp(Lx)Zr-rimidazolozr(Lx)Cp}$

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. $\text{Cr}_2(\text{OAc})_4$

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. $\text{Rh}_4(\text{CO})_12$

Complexes without C-metal linkages

Bi- or polynuclear complexes, i.e. comprising two or more metal coordination centres, without metal-metal bonds, e.g. $\text{Cp(Lx)Zr-rimidazolozr(Lx)Cp}$

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. $\text{Cr}_2(\text{OAc})_4$

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. $\text{Rh}_4(\text{CO})_12$

Complexes comprising pentahapto-cyclopentadienyl analogues

Carbollide ligands, i.e. [nido-$\text{CnB(11-n)H11}$]$(4-n)$- in which n is 1-3

Phospholyl ligands, i.e. $\text{[CnP(5-n)Rn]}$- in which n is 0-4 and R is $\text{H}$ or hydrocarbyl, or analogous condensed ring systems

Aza-$\text{Cp}$ ligands, i.e. $\text{[CnN(5-n)Rn]}$- in which n is 0-4 and R is $\text{H}$ or hydrocarbyl, or analogous condensed ring systems

Azaborolyl ligands, e.g. 1,2-azaborolyl

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. $\text{N, O, S, P}$

Rigid ligands, e.g. extended sp2-carbon frameworks or geminal di- or trisubstitution

Pincer-type complexes, i.e. consisting of a tridentate skeleton bound to a metal, e.g. by one to three metal-carbon sigma-bonds

Tripodal ligands, i.e. 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 carbonylate or -$\text{RO}_{\text{Cp}}$

Ligands with a porphyrin ring system or analogues thereof, e.g. phthalocyanines, corroles

Salen ligands or analogues, e.g. derived from ethylenediamine and salicylaldehyde

Ligands comprising the N2S2 or N2P2 donor atom set, e.g. dinitromidohalogenides or dinitromidophosphines with complete pi-conjugation between all donor centres

Flexible ligands, e.g. mainly sp3-carbon framework as exemplified by the "tedicyp" ligand, i.e. cis-cis-cis-1,2,3,4-tetakis(diphenylphosphinomethyl)cyclopentane

Complexes comprising ligands with non-tetrahedral chirality

Planar chiral ligands, e.g. derived from donor-substituted paracyclophanes and metalloccenes or from substituted arenes

Axially chiral or atropisomeric ligands, e.g. bulky biaryl such as donor-substituted binaphthalenes, e.g. "BINAP" or "BINOL"

Complexes comprising ligands derived from the natural chiral pool or otherwise having a characteristic structure or geometry

derived from carbohydrates, including e.g. tartrates or DIOP

derived from amino acids

derived from fullerenes and analogues, e.g. buckybowl or Cp5Cp

comprising affinity tags, e.g. for recovery (self-associating or modular catalysts)

The bonding to the affinity counterpart occurring via hydrogen bonding

Complexes comprising ligands or other components characterized by their function

Sterically demanding or shielding ligands

Ligands adapted to form modular catalysts, e.g. self-associating building blocks as exemplified in the patent document EP-A-1 479 439

"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 ancillary ligands, e.g. by electron transfer to or from the central metal or by intra-/intermolecular chemical reactions, e.g. disulfide coupling, H-abstraction

Non-coordinating anions

Complexes comprising metals of Group I (IA or IB) as the central metal

Lithium

Sodium

Potassium

Rubidium

Caesium

Silver

Gold

Complexes comprising metals of Group II (IIA or IIB) as the central metal

Beryllium

Magnesium

Calcium

Strontium

Barium

Zinc

Cadmium

Mercury

Complexes comprising metals of Group III (IIIA or IIB) as the central metal

Aluminium

Gallium

Indium

Thallium

Scandium

Complexes comprising metals of Group IV (IVA or VB) as the central metal

Titanium

Zirconium

Hafnium

Thorium

Actinium

Complexes comprising metals of Group V (VA or VB) as the central metal

Vanadium

Tungsten

Re

Osmium

Iridium

Platinum

Complexes comprising metals of Group VI (VIA or VB) as the central metal

Chromium

Molybdenum

Technetium

Rhenium

Iridium

Platinum

Complexes comprising metals of Group VII (VIIA or VB) as the central metal

Manganese

Ruthenium

Rhodium

Ruthenium

Rhodium

Platinum

Complexes comprising metals of Group VIII (VIII A or VB) as the central metal

Iron

Osmium

Osmium

Osmium

Osmium

Platinum

Complexes comprising metals of Group IX (IXA or VB) as the central metal

Cobalt

Ruthenium

Ruthenium

Ruthenium

Ruthenium

Platinum

Complexes comprising metals of Group X (X A or VB) as the central metal

Nickel

Osmium

Osmium

Osmium

Osmium

Platinum

Complexes comprising metals of Group XI (XI A or VB) as the central metal

Copper

Gold

Gold

Gold

Gold

Gold

Complexes comprising metals of Group XII (XII A or VB) as the central metal

Zinc

Silver

Silver

Silver

Silver

Silver

Complexes comprising metals of Group XIII (XIII A or VB) as the central metal

Lead

Cadmium

Cadmium

Cadmium

Cadmium

Cadmium

Complexes comprising metals of Group XIV (XIV A or VB) as the central metal

Bismuth

Mercury

Mercury

Mercury

Mercury

Mercury

Complexes comprising metals of Group XV (XV A or VB) as the central metal

Antimony

Arsenic

Arsenic

Arsenic

Arsenic

Arsenic

Complexes comprising metals of Group XVI (XVI A or VB) as the central metal

Tellurium

Tellurium

Tellurium

Tellurium

Tellurium

Tellurium

Complexes comprising metals of Group XVII (XVII A or VB) as the central metal

Selenium

Selenium

Selenium

Selenium

Selenium

Selenium

Complexes comprising metals of Group XVIII (XVIII A or VB) as the central metal

Sulphur

Sulphur

Sulphur

Sulphur

Sulphur

Sulphur
B01J

2531/36 . . . Yttrium
2531/37 . . . Lanthanum
2531/38 . . . Lanthanides other than lanthanum
2531/39 . . . Actinides
2531/40 . Complexes comprising metals of Group IV (IVA or IVB) as the central metal
2531/42 . . . Tin
2531/44 . . . Lead
2531/46 . . . Titanium
2531/48 . . . Zirconium
2531/49 . . . Hafnium
2531/50 . Complexes comprising metals of Group V (VA or VB) as the central metal
2531/52 . . . Antimony
2531/54 . . . Bismuth
2531/56 . . . Vanadium
2531/57 . . . Niobium
2531/58 . . . Tantalum
2531/60 . Complexes comprising metals of Group VI (VIA or VIB) as the central metal
2531/62 . . . Chromium
2531/64 . . . Molybdenum
2531/66 . . . Tungsten
2531/70 . Complexes comprising metals of Group VII (VIIIB) as the central metal
2531/72 . . . Manganese
2531/74 . . . Rhodium
2531/80 . Complexes comprising metals of Group VIII as the central metal
2531/82 . . . Metals of the platinum group
2531/821 . . . Ruthenium
2531/822 . . . Rhodium
2531/824 . . . Palladium
2531/825 . . . Osmium
2531/827 . . . Iridium
2531/828 . . . Platinum
2531/84 . . . Metals of the iron group
2531/842 . . . Iron
2531/845 . . . Cobalt
2531/847 . . . Nickel
2531/90 . Catalytic systems characterized by the solvent or solvent system used
2531/92 . . . Supercritical solvents
2531/922 . . . Carbon dioxide (scCO₂)
2531/925 . . . Supercritical water (scH₂O)
2531/927 . . . Mixtures of ionic liquids with supercritical solvents
2531/94 . . . Fluorinated solvents
2531/96 . . . Water
2531/98 . . . Phase-transfer catalysis in a mixed solvent system containing at least 2 immiscible solvents or solvent phases
2531/985 . . . in a water / organic solvent system

2540/00 Compositional aspects of coordination complexes or ligands in catalyst systems
2540/10 . . . Non-coordinating groups comprising only oxygen beside carbon or hydrogen
2540/12 . . . Carboxylic acid groups
2540/20 . . . Non-coordinating groups comprising halogens
2540/22 . . . comprising fluoride, e.g. trifluoroacetate
2540/225 . . . comprising perfluoroalkyl groups or moieties
2540/30 . . . Non-coordinating groups comprising sulfur
2540/32 . . . Sulfonic acid groups or their salts
2540/325 . . . being perfluorinated, i.e. comprising at least one perfluorinated moiety as substructure in case of polyfunctional groups
2540/34 . . . Sulfonyl groups
2540/345 . . . being perfluorinated, i.e. comprising at least one perfluorinated moiety as substructure in case of polyfunctional groups
2540/40 . . . Non-coordinating groups comprising nitrogen
2540/42 . . . Quaternary ammonium groups
2540/44 . . . being derivatives of carboxylic or carboxonic acids, e.g. amide (RC(=O)-NR₂, RC(=O)-NR-C(=O)R₂), nitrile, urea (R₂N-C(=O)-NR₂), guanidino (R₂N-C(=NR)-NR₂) groups
2540/442 . . . Amide groups or imidato groups (R-C=NR(OR))
2540/444 . . . Nitrile groups
2540/446 . . . Urea groups
2540/448 . . . Guanidino groups
2540/50 . . . Non-coordinating groups comprising phosphorus
2540/52 . . . Phosphorus acid or phosphorus acid ester groups
2540/522 . . . being phosphoric acid mono-, di- or triester groups ((RO)(R'O)₂P=O), i.e. R=C, R'=C, H
2540/525 . . . being phosphorous acid (-ester) groups (RP(OR')₂) or the isomeric phosphonic acid (-ester) groups (R₂(R'O)P=O), i.e. R=C, R'=C, H
2540/527 . . . being phosphonous acid (-ester) groups (R₂(R'O)P=O) or the isomeric phosphinic acid (-ester) groups (R₂(R'O)P=O), i.e. R=C, R'=C, H
2540/54 . . . Quaternary phosphonium groups
2540/60 . . . Groups characterized by their function
2540/62 . . . Activating groups
2540/64 . . . Solubility enhancing groups
2540/66 . . . Linker or spacer groups
2540/68 . . . Associating groups, e.g. with a second ligand or a substrate molecule via non-covalent interactions such as hydrogen bonds