This Class 502 is considered to be an integral part of Class 252 (see the Class 252 schedule for the position of this Class in schedule hierarchy). This Class retains all pertinent definitions and class lines of Class 252.

1. **HAVING FOREIGN OR DIVERSE FUNCTION (E.G., PREVENT CORROSION, ETC.)**

2. With structure having utility in addition to support or carrier

3. TO BE USED AS A MELT IN FORM OF A MEMBRANE

4. IRRADICATION BY, OR APPLICATION OF, ELECTRICAL, MAGNETIC OR WAVE ENERGY

5. CONTROL RESPONSIVE TO SENSED CONDITION

6. BIOSPECIFIC MATERIAL, OR PRODUCED BY ENZYME OR MICROORGANISM

7. FORMING OR TREATING A SPHERE, PROCESS ONLY

8. Forming other than by liquid immersion

9. Treating preformed sphere only

10. INCLUDING ION EXCHANGING, EXCEPT ZEOLITES OR PRODUCT THEREOF

11. For regenerating or rehabilitating catalyst or sorbent

12. REGENERATING OR REHABILITATING CATALYST OR SORBENT

13. Including segregation of diverse particles

14. Treating with a liquid or treating in a liquid phase, including dissolved or suspended

15. "Wet air combustion" oxidation of material submerged in liquid

16. Including intended dissolution or precipitation of a substantial amount of an ingredient of the ultimate composition

17. Using salt or alkaline substance

18. Ammonia or derivative thereof

19. Using acid

20. Organic liquid

21. And gas addition thereto

22. Hydrocarbon

23. Halogen containing

24. Oxygen containing

25. Gas or vapor treating

26. Using halogen containing substance including liquids vaporizable upon contacting spent catalyst or sorbent

27. Fluorine containing

28. Simultaneously or subsequently adding free oxygen or use of oxyhalogen compound

29. Treating with free oxygen containing gas

30. And forming useful by-product

31. And adding heat by admixing solid heat carrier

32. In gaseous suspension (e.g., fluidized bed, etc.)

33. And substantially complete oxidation of carbon monoxide to carbon dioxide within regeneration zone

34. Plural distinct serial combustion stages

35. Indirectly heating or cooling spent material within regeneration zone or prior to entry into regeneration zone

36. Moving bed (e.g., vertically or horizontally, etc., moving bulk material)

37. Generally concurrent flow of oxygen containing gas and material

38. Generally countercurrent flow of oxygen containing gas and material

39. Generally transverse (i.e., lateral) flow of oxygen containing gas relative to material

40. Plural distinct oxidation stages

41. Reactive gas treating after oxidation

42. Oxidation gas comprises essentially steam and oxygen

43. With control of oxygen content in oxidation gas

44. Elemental hydrogen
502 - 2 CLASS 502 CATALYST, SOLID SORBENT, OR SUPPORT THEREFOR: PRODUCT OR PROCESS OF MAKING

54 ..Ammonia or derivative thereof
55 ..Steam
56 .By heat
60 ZEOLITE OR CLAY, INCLUDING GALLIUM ANALOGS
61 .Gallium containing
62 .Including organic component
63 .And additional AL or Si containing component
64 .Zeolite
65 ...And rare earth metal (Sc, Y or Lanthanide) containing
66 ...And Group VIII (Iron Group or Platinum Group) metal containing
67 ...Mixed zeolites
68 ...Mixed with clay
69 ...Heterogeneous arrangement
70 ...Gelling in presence of zeolite
71 ...ZSM Type
72 ...Mixed clays
73 .And Group III or rare earth metal (Al, Ga, In, Tl, Sc, Y) or Lanthanide containing
74 .And Group VIII (Iron Group or Platinum Group) containing
75 .Including chemical reduction of exchanged cation
76 .Coprecipitation
77 .ZSM type
78 .Mordenite type
79 .Faujasite type (e.g., X or Y, etc.)
80 .Clay
81 .Acid treating
82 ...Plural acid treatment
83 ...Sulfuric or hydrochloric acid
84 ...And metal, metal oxide, or metal hydroxide
85 .Activating treatment
86 .Utilizing ammonium ions
87 .Support per se

CATALYST OR PRECURSOR THEREFOR

100 .Making catalytic electrode, process only

102 .Plural component system comprising A - Group I to IV metal hydride or organometallic compound - and B - Group IV to VIII metal, lanthanide or actinide compound - (i.e., alkali metal, Ag, Au, Cu, alkaline earth metal, Be, Mg, Zn, Cd, Hg, Sc, Y, Al, Ga, In, Tl, Ti, Zn, Hf, Ge, Sn or Pb hydride or organometallic compound and Ti, Zr, Hf, Ge, Sn, Pb, V, Nb, Ta, As, Sb, Bi, Cr, Mo, W, Po, Mn, Tc, Re, iron group, platinum group, atomic number 57 to 71 inclusive or atomic number 89 or higher compound)

103 ...Component A metal is Group IA, IIA or IIA and component B metal is Group IVB to VIIB or VII (i.e., alkali metal, alkaline earth Metal, Be, Mg, Al, Ga, In or Tl and Ti, Zr, Hf, V, Nb, Ta, Cr, Mo, W, Mn, Tc, Re, iron Group or platinum group) (e.g., Ziegler Catalyst, etc.)

104 ...Preparing catalyst or precursor
105 ....Including comminuting (e.g., milling, grinding, etc.)
106 ....Fluidized bed feature
107 ....Including heating to higher temperature
108 ....Utilizing hydrocarbon containing unsaturation not part of benzene ring
109 ....Utilizing high molecular weight synthetic polymer
110 ....Including plural additions of Component A
111 ....Utilizing water or compound containing hydroxy bonded to carbon

112 ...Containing iodine
113 ...Containing two or more different Component B metals
114 ...Containing hydrides or organometallic of two or more different Component A metals
115 ....Magnesium containing
116 .....And compound containing Silicon-Hydrogen or Silicon-Carbon bond
...Component B metal is other than titanium or vanadium...Component B metal is other than titanium or vanadium

...And a third component C (i.e., an additive other than a saturated hydrocarbon or an aromatic hydrocarbon free of aliphatic or cycloaliphatic unsaturation)...And a third component C (i.e., an additive other than a saturated hydrocarbon or an aromatic hydrocarbon free of aliphatic or cycloaliphatic unsaturation)

....Non-metallic inorganic halogen containing....Non-metallic inorganic halogen containing

....Elemental oxygen or non-metallic inorganic oxygen-containing material, other than water....Elemental oxygen or non-metallic inorganic oxygen-containing material, other than water

....Non-metallic organic phosphorus containing....Non-metallic organic phosphorus containing

....Non-metallic organic sulfur containing....Non-metallic organic sulfur containing

....Non-metallic organic nitrogen containing....Non-metallic organic nitrogen containing

....Including element in addition to carbon, hydrogen, and nitrogen (e.g., nitro, etc.)....Including element in addition to carbon, hydrogen, and nitrogen (e.g., nitro, etc.)

....Non-metallic organic oxygen containing....Non-metallic organic oxygen containing

.....Ether.....Ether

.....Ester.....Ester

....Non-metallic organic halide....Non-metallic organic halide

....Metal compound other than which could be produced in situ by reaction of a Group IA, IIA, or Group IIIA metal compound present with a titanium or vanadium compound present....Metal compound other than which could be produced in situ by reaction of a Group IA, IIA, or Group IIIA metal compound present with a titanium or vanadium compound present

.....Lead compound.....Lead compound

.....Tin compound.....Tin compound

.....Aluminum compound.....Aluminum compound

.....Magnesium compound.....Magnesium compound

......Halogen containing......Halogen containing

.....Organic compound containing.....Organic compound containing

.....Method of making including comminuting of solid material (e.g., grinding, crushing, etc.).....Method of making including comminuting of solid material (e.g., grinding, crushing, etc.)

.....Organic compound including carbon-metal bond.....Organic compound including carbon-metal bond

...Diverse metals bonded to carbon...Diverse metals bonded to carbon

...Including metal compound containing different metal than that bonded to carbon...Including metal compound containing different metal than that bonded to carbon

...Including phosphorus or sulfur or compound containing nitrogen or phosphorus or sulfur...Including phosphorus or sulfur or compound containing nitrogen or phosphorus or sulfur

...Including alcohol, phenol, or ether...Including alcohol, phenol, or ether

...Alkali metal bonded to carbon...Alkali metal bonded to carbon

...Compound with silicon-hydrogen bond or organic compound with silicon-carbon bond...Compound with silicon-hydrogen bond or organic compound with silicon-carbon bond

...Resin, natural or synthetic, polysaccharide or polypeptide...Resin, natural or synthetic, polysaccharide or polypeptide

...Peroxyn compound containing...Peroxyn compound containing

...With metal carbonyl or carbon monoxide complex...With metal carbonyl or carbon monoxide complex

...Organic phosphorus or nitrogen, except the ammonium ion...Organic phosphorus or nitrogen, except the ammonium ion

....Phthalocyanine....Phthalocyanine

....Quaternary ammonium or phosphonium....Quaternary ammonium or phosphonium

....Copper containing....Copper containing

....Rhodium containing....Rhodium containing

....Organic nitrogen containing....Organic nitrogen containing

....Organic sulfur compound....Organic sulfur compound

....With metal halide....With metal halide

....With metal carboxylate or metal compound and carboxylic acid or anhydride....With metal carboxylate or metal compound and carboxylic acid or anhydride

....Alcohol, phenol, ether, aldehyde or ketone....Alcohol, phenol, ether, aldehyde or ketone

....Elemental metal in organic dispersing medium....Elemental metal in organic dispersing medium

....Inorganic carbon containing....Inorganic carbon containing

....Cyanide....Cyanide

....Hydroxycarbonate....Hydroxycarbonate

....Carbide....Carbide

....Silicon carbide....Silicon carbide

....Group VA (N, P, As, Sb, Bi) containing....Group VA (N, P, As, Sb, Bi) containing

....Elemental carbon....Elemental carbon

....And halogen containing....And halogen containing

....And metal, metal oxide, or metal hydroxide....And metal, metal oxide, or metal hydroxide

....Of Group II (i.e., alkaline earth, Be, Mg, Zn, Cd or Hg)....Of Group II (i.e., alkaline earth, Be, Mg, Zn, Cd or Hg)

....Of Group I (i.e., alkali, Ag, Au or Cu)....Of Group I (i.e., alkali, Ag, Au or Cu)

....Of Group VIII (i.e., iron or platinum group)....Of Group VIII (i.e., iron or platinum group)

....Nitrate....Nitrate

....Boron or compound containing same....Boron or compound containing same
Class 502 Catalyst, Solid Sorbent, or Support Therefor: Product or Process of Making

203..Boron halide
204..And Group VI metal containing (i.e., Cr, Mo, W or Po)
205..And bismuth containing
206..Molybdenum containing
207..And Group VIII metal containing (i.e., iron or platinum group)
208..Phosphorus or compound containing same
209..And vanadium containing
210..And Group VI metal containing (i.e., Cr, Mo, W or Po)
211..Molybdenum
212..And bismuth containing
213..And Group VIII metal containing (i.e., iron or platinum group)
214..And silicon containing
215..Selenium or tellurium or compound containing same
216..Sulfur or compound containing same
217..Sulfate
218..And Group I metal containing (i.e., alkali, Ag, Au or Cu)
219..And Group VI metal containing (i.e., Cr, Mo, W or Po)
220..Molybdenum containing
221..And Group VIII metal containing (i.e., iron or platinum group)
222..And Group VIII metal containing (i.e., iron or platinum group)
223..Platinum group containing (i.e., Ru, Rh, Pd, Os, Ir, Pt)
224..Halogen or compound containing same
225..Copper halide
226..And Group II metal containing (i.e., alkaline earth, Be, Mg, Zn Cd or Hg)
227..And Group IV metal containing (i.e., Ti, Zr, Hf, Ge, Sn or Pb)
228..And Group VI metal containing (i.e., Cr, Mo, W or Po)
229..And Group VIII metal containing (i.e., iron or platinum group)
230..Platinum group containing (i.e., Ru, Rh, Pd, Os, Ir or Pt)
231..And Group III metal containing (i.e., Sc, Y, Al, Ga, In or Tl)
232..Silicon containing or process of making
233..Forming silica gel
234..Coprecipitating
235..Group III or rare earth metal, metal oxide, or metal hydroxide containing (i.e., Sc, Y, Al, Ga, In, Tl or lanthanide)
236..Group IV metal, metal oxide, or metal hydroxide containing (i.e., Ti, Zr, Hf, Ge, Sn or Pb)
237..Metal, metal oxide, or metal hydroxide containing (i.e., Ti, Zr, Hf, Ge, Sn or Pb)
238..Of Group III metal containing (i.e., Sc, Y, Al, Ga, In or Tl)
239..Of Group IV metal containing (i.e., Ti, Zr, Hf, Ge, Sn or Pb)
240..With metal, metal oxide, or metal hydroxide
241..Of Group VII containing (i.e., Mn, Tc or Re)
242..Of Group IV containing (i.e., Ti, Zr, Hf, Ge, Sn or Pb)
243..Of Group I containing (i.e., Alkali, Ag, Au or Cu)
244..Of copper
245..And Group VIII metal containing (i.e., iron or platinum group)
246..Of Group V containing (i.e., V, Nb, Ta, As, Sb or Bi)
247..Of vanadium
248..And Group VI metal containing (i.e., Cr, Mo, W or Po)
249..Of antimony or bismuth
250..Of Group II containing (i.e., alkaline earth, Be, Mg, Zn, Cd or Hg)
251..Magnesium
252..And Group VIII metal containing (i.e., iron or platinum group)
253..Of zinc, cadmium, or mercury
254..Of Group VI containing (i.e., Cr, Mo, W or Po)
255..Molybdenum
256..Chromium
257..And Group VIII metal containing (i.e., iron or platinum group)
258..Of Group VIII containing (i.e., iron or platinum group)
259..Nickel
260..Cobalt
261..Platinum group containing (i.e., Ru, Rh, Pd, Os, Ir or Pt)
262..Platinum or palladium

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...Of Group III or lanthanide group (i.e., Sc, Y, Al, Ga, In, Tl, or atomic number 57 to 71 inclusive)

Metal, metal oxide or metal hydroxide

Raney type

Of lanthanide series (i.e., atomic number 57 to 71 inclusive)

Lanthanum

Cerium

Of Group VI (i.e., Cr, Mo, W or Po)

And Group II metal containing (i.e., alkaline earth, Be, Mg, Zn, Cd or Hg)

Zinc

And Group IV metal containing (i.e., Ti, Zr, Hf, Ge, Sn or Pb)

Titanium containing

Tin containing

And Group V metal containing (i.e., V, Nb, Ta, As, Sb or Bi)

Vanadium containing

And Group VIII metal containing (i.e., iron or platinum group)

Iron group metal and Group III metal containing (i.e., Fe, Co or Ni and Sc, Y, Al, Ga, In or Tl)

Nickel containing

Iron containing

And Group I containing (i.e., alkali, Ag, Au or Cu)

Copper containing

Of chromium

And Group III metal containing (i.e., Sc, Y, Al, Ga, In or Tl)

Of molybdenum

And Group III metal containing (i.e., Sc, Y, Al, Ga, In or Tl)

Of manganese

And Group VIII (i.e., iron or platinum group)

Of iron group metal and of iron group (i.e., Ru, Rh, Pd, Os, Ir, or Pt and Fe, Co or Ni)
Having specifically intended extraneously added iron group (i.e., Fe, Co, Ni) component

Silicon containing

Acid treated

Quartz

Magnesium silicate (e.g., asbestos, vermiculite, etc.)

Having extraneously added alkali metal, or alkaline earth metal

Diatomaceous earth

Free carbon containing

Aluminum containing

Alumina (i.e., dialuminate trisilicate)

Free carbon containing

And specified active sorbent material

Process utilizing solid or liquid source carbonizable material, or product thereof

Producing diverse useful byproduct

Temperature vs. time factor

Including recycling product or intermediate thereof to prior stage of process

Including diverting part of source to provide fuel for process

Adding nongaseous inorganic, or inorganic yielding component, prior to or during process

Zinc containing

Phosphorus containing

Acid

Alkali metal, alkaline earth metal, or magnesium containing

Including pelletizing or briquetting and subsequently comminuting

Using carbonaceous binder

Treating with gas

Fluidized bed having specified parameter

Specified atmosphere

Including free oxygen

And subsequent diverse gas

Exposure to hot flue or exhaust gas

Diverse temperatures

Specified source (e.g., peach pit, etc.)

Chemically reducing an oxide or product thereof

MISCELLANEOUS (E.G., CARRIER OR SUPPORT PER SE OR PROCESS OF MAKING, ETC.)

CROSS-REFERENCE ART COLLECTIONS

STABILIZED

METHOD OF MAKING INORGANIC COMPOSITION UTILIZING ORGANIC COMPOUND (EXCEPT FORMIC, ACETIC, OR OXALIC ACID OR SALT THEREOF)

METHOD OF MAKING INORGANIC COMPOSITION UTILIZING ORGANIC COMPOUND (EXCEPT FORMIC, ACETIC, OR OXALIC ACID OR SALT THEREOF)

METHOD OF MAKING INORGANIC COMPOSITION UTILIZING ORGANIC COMPOUND (EXCEPT FORMIC, ACETIC, OR OXALIC ACID OR SALT THEREOF)

METHOD OF MAKING INORGANIC COMPOSITION UTILIZING ORGANIC COMPOUND (EXCEPT FORMIC, ACETIC, OR OXALIC ACID OR SALT THEREOF)

SPECIFIC CONTAMINANT REMOVAL

REAGENT GRADE (E.G., ULTRA PURE)

SUPPRESSED SIDE REACTIONS

METAL CONTAMINANT PASSIVATION

RADIANT OR WAVE ENERGY ACTIVATED

MISCELLANEOUS SPECIFIC TECHNIQUES OF GENERAL APPLICABILITY

SPINEL

PEROVSKITE
SORBENT FOR FLUID STORAGE, OTHER THAN AN ALLOY FOR HYDROGEN STORAGE

527.11 MONOLITH OF PECULIAR STRUCTURE OR PHYSICAL FORM, WITH SPECIFIED HEAT EXCHANGE CAPABILITY

527.12 PLURAL LAYERS ON A SUPPORT, EACH LAYER HAVING A DISTINCT FUNCTION

527.13 More than two overlapping layers

527.14 SPECIFIED SUPPORT PARTICLES OF PECULIAR STRUCTURE OR PHYSICAL FORM (E.G., WHISKERS, FIBER PIECES, ETC.)

527.15 Layered deposition on support particle (i.e., on a carrier particle)

527.16 Specified shape of support particle (e.g., hollow-carrier particle)

527.17 Specified cross-section shape or area of elongated support particles (e.g., tape, with area of cross section stated)

527.18 MONOLITH WITH SPECIFIED GAS FLOW PATTERNS (E.G., TURBULENT FLOW MONOLITH)

527.19 MONOLITH WITH SPECIFIED SHAPE OR DIMENSION OF CELL OPENING (E.G., HONEYCOMB, RINGS, ETC.)

527.2 Cell opening shape and dimensions are determined by the intersection of the woof and the warp of a woven structure (e.g., of a fabric or gauze, etc.)

527.21 Cell openings are quadrilateral or triangular (e.g., pie shaped)

527.22 Cell openings are spiral or corrugated

527.23 SPECIFIED EXTERNAL OR INTERNAL SHAPE OR CONFIGURATION OF CATALYST REACTOR OR OF SORBENT CONVERTER

527.24 PECULIAR STRUCTURE OR PHYSICAL FORM (E.G., FOAM, SPONGE, FOIL, SACK, BAG, FIBER IN A MATRIX, MONOLITH, MICROSTRUCTURE (MICROCRACKING), MICROAGGREGATES, ETC.)