

NEW PATENTS

METAL AND ALLOYS

High Purity Hard Platinum Material

ISHIFUKU KINZOKU KOGYO K.K.

Japanese Appl. 7/310,132

High purity hard Pt material with at least 99.9% purity is obtained by adding 0.01–0.1 wt.% of Nb, Eu and Er, and one or more of Be, Ca, B and Si, to Pt of high purity. This Pt material is used for making jewellery, such as rings, necklaces and tie-pins.

CHEMICAL COMPOUNDS

Tris(acetylacetonate)iridium (III)

TANAKA KIKINZOKU KOGYO K.K.

Japanese Appl. 7/316,176

In the preparation of tris(acetylacetonate)iridium (III) (1), Ir(III) chloride is dissolved in H₂O and reacted with acetylacetonate to give a reactant solution. The solution is controlled so as to be alkaline, and reacted, extracted by benzene, condensed, washed and dried. The preparation takes place in one step, under stable conditions at 100°C and with high yield.

ELECTROCHEMISTRY

Electrolytic Reduction of Disulphide

PERMELEC ELECTRODE LTD.

British Appl. 2,291,887A

The electrolytic reduction of disulphide in the cathode chamber of a bath partitioned by a diaphragm uses a metallic cathode composed of Ti, Ta or Zr as an electrode-active surface or an alloy of two or more of Pd, Ti, Ta, Nb, Zr, Ag, etc., and a corrosion-resistant anode composed of Ti, Ta, Nb or Zr or their alloy, coated with Ir oxide as the active material. In an example, the Ti or Zr anode is coated with ≥ 20 wt.% Ir oxide. Cystine can be reduced to cysteine with high efficiency over long periods.

Electrode Manufacture

TOYO KOHAN CO. LTD.

Japanese Appl. 7/268,695

An electrode is made by repeating a series of the following processes at least once: applying a catalyst coating solution containing SiO₂ sol and Pt group metal compounds on a corrosion resistant valve metal matrix, drying and firing the dried coating. The electrode is used for electrolysis, as an insoluble electrode.

Platinum-Tantalum Electrodes

TDK CORP.

Japanese Appl. 7/313,980

An electrode comprises a conductive substrate coated with 85–97 mole % Pt and 3–15 mole % Ta and is used both as an anode and a cathode. After coating the substrate with Pt and Ta components, it is heated in an acidic atmosphere. The electrode, which is used to ionise H₂O, has a longer life, even when the polarity of the electrodes is frequently changed.

Retention of Drinking Water Quality

TDK CORP.

Japanese Appl. 7/313,985

The quality of drinking H₂O is retained by electrolysis using insoluble electrodes coated with Pt, Ir oxide and Ta oxide containing 1–50 mole% of Pt, 40–80 mole% of Ir and 10–50 mole% of Ta. The polarity of the electrodes is changed to prevent scale adsorption on the equipment. The electrodes have longer life, even with the changing polarity.

Electrode for Oxygen Generation

FURUKAWA ELECTRIC CO. LTD.

Japanese Appl. 7/331,494

The structure of an electrode for O₂ generation has a base of Ti or a Ti alloy, upon which is a Ti single layer and an intermediate mixed oxide layer, comprising non-Pt metal oxides, and a mixed oxide catalytic layer mainly of a Pt group metal oxide. The electrode is used in electroplating, electrolytic refining, electrolytic organic synthesis and cathodic protection.

ELECTRODEPOSITION AND SURFACE COATINGS

Aqueous Ammoniacal Bath

W. C. HERAEUS G.m.b.H.

European Appl. 693,579A

An aqueous ammoniacal bath for the electrolytic deposition of Pd-Ag alloys contains: 5–50 g/l Pd as a Pd ammine complex, 2–40 g/l Ag as an Ag compound, 30–150 g/l conductive salt, 5–100 g/l aliphatic polyamines with 2–10 amino groups and 2–50 g/l mercaptoalkane carboxylic and/or sulphonic acid and/or salts thereof, adjusted to pH 7.0–10.0 with NH₄OH. The bath is used for electroplating small components, strips and wires with Pd-Ag alloys in the form of shiny, ductile, non-porous and crack-free coatings.

Noble Metal Coated Metal Powder Substrates

M. J. OSTOLSKI

U.S. Patent 5,476,688

Noble metal is coated onto a substrate of Cu, Ni, Al, Ti, Zr, etc., or a mixture of one of these seeded with a second, by using a starter plating solution of ionic Pt, Pd, Rh, Ir, Os, Ru, Au or Ag to obtain a coating weight of 2–60 wt.% of the wholly coated product. The substrate is immersed into one bath at 20–100°C until the bath is depleted of noble metal ion before transferring to another bath. The coatings are uniform, with good corrosion resistance and electrical conductivity.

Electromagnetic Wave Shield Coating

KOREA MACHINERY RES. INST.

Korean Appl. 94/4,054

An electromagnetic wave shield coating for a plastic surface is made by mixing a solution of 0.5–100 g/l Pd chloride and 0.5–100 g/l Sn chloride with acetone, tetrahydrofuran, methylethyl ketone, etc., as the solvent. The solution is coated onto the resin surface and then dipped into an electroless plating liquid.

APPARATUS AND TECHNIQUE

Platinum Container

TANAKA KIKINZOKU KOGYO K.K.

Japanese Appl. 8/1,017

A Pt container, for scientific use and manufacturing processes, has good mechanical strength, softens less under heating, and can prevent crystals growing. The container is composed of a deposited layer produced by electroforming. The Pt containers have good heat resistance and a long service life.

Water-Tight Plug Seal Composition

SHINETSU CHEM. CO. LTD. *German Appl.* 1/95/28,232

A water-tight plug seal composition, with short moulding time, contains organopolysiloxane, organohydrogenopolysiloxane, finely-divided SiO₂ filler, a catalytic amount of a Pt catalyst, and sulphide and triazine peroxide compounds. The composition is easily fixed to the plug housing to reduce the resistance to plugging in and maintains H₂O tightness. The seal has excellent resistance to heat, cold and oil.

HETEROGENEOUS CATALYSIS

Palladium and Silver Containing Catalyst

PHILLIPS PETROLEUM CO. *European Appl.* 689,872A

The preparation of a Pd and Ag-containing catalyst involves contacting a solid composition of Pd, Ag and an inorganic support material with a liquid composition comprising at least one reducing agent at ≤ 60°C. The contacting conditions are effective at enhancing the selectivity of the solid composition to C₂H₄, when it is used as a catalyst for hydrogenating C₂H₂ to produce C₂H₄, which is also claimed. The catalyst has good activity.

Dehydrocyclisation in Naphtha Reforming

EXXON RES. & ENG. CO. *European Appl.* 690,119A

A catalyst composition comprises a halogen and catalytically active amounts of Zn, and non-alloyed Pt, Pd, Ir, Os, Rh, Re and/or Ru, preferably Pt, on an Al₂O₃ support. No Co or Ni is present. The catalyst is used during naphtha reforming, giving enhanced 5+C selectivity and dehydrocyclisation of at least part of the naphtha feed stream on contact with the above catalyst. The catalyst is stable and suppresses undesirable hydrogenolysis reactions, thus increasing the product yield and minimising undesirable light gas. H₂ yields are increased.

Purification of Engine Exhaust Gas

CATALER IND. CO. LTD *European Appl.* 692,302A

The purification of CO, hydrocarbons and NO_x at the stoichiometric point or in exhaust gases in O₂-rich atmospheres involves contacting with a catalyst comprising: a porous support on which is a Pt group metal selected from Pt, Pd and/or Rh; and one NO_x adsorbent loaded on the support and selected from alkali metals, alkaline earth metals, etc., and of average particle diameter 0.1–20 μm. The catalyst provides good performance and high temperature durability.

Diesel Engines Exhaust Gas Catalyst

JOHNSON MATTHEY P.L.C. *European Appl.* 694,332A

A catalyst for treating exhaust gas from diesel engines comprises a Pt group metal on a ceramic support which is a mixture of TiO₂, SiO₂, Al₂O₃ and ZrO₂. The catalyst is prepared by impregnating the support with a solution of the compounds of the Pt group metal, followed by calcination. The catalyst has enhanced CO oxidation, NO_x reduction and reduced SO₂ oxidation and is more resistant to high temperatures.

Exhaust Gas Purification Catalyst

MITSUBISHI JUKOGYO K.K. *European Appl.* 696,470A

A catalyst for cleaning exhaust gases comprises a first catalyst layer of Pt, Rh and/or Pd on a support and a layer of Ir catalyst overlaying the first layer. The carrier for carrying the Ir in the second layer is a crystalline silicate, containing preferably Al₂O₃, SiO₂, ZrO₂, TiO₂, or a zeolite. The catalyst operates at high temperatures, is durable and stable. Deterioration of the catalyst by heat, H₂O and excess O₂ is alleviated.

Attrition-Resistant Catalyst

ENGELHARD CORP.

World Appl. 96/612A

An attrition-resistant catalyst as CO promoter, used especially in fluid catalytic cracking, comprises Pt supported on transition Al₂O₃ particles which have been impregnated with 3–8 wt.% CeO₂ and 2 wt.% La₂O₃, followed by calcination at ≥ 1000°C, prior to Pt addition. Also claimed are: microspheres of the above bodies; and CO catalysts for use in a fluid catalytic cracking process. The attrition-resistant catalyst has high catalytic activity, long durability and better retention in a cracking unit.

Dehydrogenation of Hydrocarbons

AMOCO CORP.

World Appl. 96/1,239A

The dehydrogenation of a hydrocarbon feedstock and production of an olefinic product involves contacting the feedstock under dehydrogenation conditions with 0.01–5 wt.% of a Pt group metal and 0.02–10 wt.% Zn catalyst supported on a borosilicate molecular sieve and an alkali metal. The catalyst provides higher performance without the need for regeneration. It has an extended operating cycle life with or without the addition of H₂ and increases paraffin conversion, olefin selectivity and olefin yield. The olefinic products are used especially as oxygenates for gasoline blending and for chemical industry feedstocks.

Catalyst for Production of *p*-Xylene

CHEVRON CHEM. CO.

World Appl. 96/3,209A

A catalyst for the production of *p*-xylene from paraffins or olefins by reforming or aromatisation comprises an intermediate pore size molecular sieve support, Pt and one of Ga, Zn, In, Fe, Sn or B. The catalyst has an activity sufficient to produce a yield of ≥ 30% of benzene-toluene-xylene-ethyl benzene from a 5–9C paraffinic or olefinic feedstock. 8C aromatics are obtained, which are enriched to above equilibrium levels in *p*-xylene. The shape selective catalyst produces high yields of xylenes rich in *p*-xylene from feed, which does not contain aromatics.

2,2-Dichlorohexafluoropropane Hydrogenolysis

E.I. DU PONT DE NEMOURS & CO.

U.S. Patent 5,481,051

Monohydrogenolysis of 2,2-dichlorohexafluoropropane (1) to 2-chloro-2-hydrohexafluoropropane (2) is effected by reacting with N_2 at $\leq 150^\circ C$ in the presence of Pd/Cr₂O₃ catalyst, and HCl or HF acid or mixtures of these, to give (2) with a selectivity of $> 70\%$ based on the amount of (1) converted. (2) is a valuable intermediate for the synthesis of other F-containing materials, such as CF₃CHFCF₃, which is useful as a fire extinguishing agent.

Catalytic Reforming Process

EXXON RES. & ENG. CO.

U.S. Patent 5,482,615

A catalytic reforming process with enhanced 5C+ selectivity, including dehydrocyclisation of at least a portion of a naphtha feedstream comprises: contacting the feedstream with the catalyst composition which consists of a halogen and a catalytically active amount of non-alloyed Pt and Zn on an Al₂O₃ support in the absence of Co and Ni. The catalyst suppresses undesirable hydrogenolysis reactions, and therefore decreases the yield of undesirable light gas made during dehydrocyclisation of the feedstream.

Controlled Decomposition Process

OLIN CORP.

U.S. Patent 5,485,722

A controlled decomposition process for a liquid monopropellant composition, containing hydroxylammonium nitrate, involves contacting the liquid with a solid catalyst of Pt and/or transition metal groups, thus producing a gaseous propellant of steam, CO₂ and N₂. The decomposition process is used for wastes, which contain hydroxylammonium nitrate, and provides a method for the continuous production of gaseous propellant. The waste treatment and decomposition processes produce innocuous and environmentally acceptable gaseous products.

Catalyst Composition

PHILLIPS PETROLEUM CO.

U.S. Patent 5,489,565

A catalyst composition, for the selective hydrogenation of 4–10C diolefins to their corresponding monoolefins, contains 0.01–2 wt.% Pd and/or its oxide; 0.02–10 wt.% Ag and/or its oxide; 0.05–10 wt.% alkali metal fluoride; and an inorganic support comprising Al₂O₃, SiO₂, TiO₂, ZrO₂, etc. It is prepared by contacting a starting material containing Pd, Ag and support material with an alkali metal fluoride solution, then drying and calcining at 300–600°C for 0.2–20 h. The catalyst is stable and can be regenerated.

Catalyst for Exhaust Gas Cleaning

BABCOCK-HITACHI K.K.

Japanese Appl. 7/256,105

A catalyst is supported on a composite oxide carrier comprising SiO₂, TiO₂ and CeO₂. At least 1 wt.% of Pd or Pd/Pt is dispersed and carried in the carrier. The catalyst has improved resistance to steam and S. It is used for cleaning exhaust gas which contains a combustible malodorous or poisonous component, for example, hydrocarbon and CO from engines and industrial facilities.

Production of 2-Phenylbenzotriazoles

KYODO YAKUHIN K.K.

Japanese Appl. 7/258,229

2-Phenylbenzotriazoles (1) are produced by the catalytic hydrogenation of azo compounds in the presence of a 0.1–10 wt.% Pt catalyst, preferably supported on active C, and inorganic bases in amounts of ≥ 0.3 times mole per azo compounds in organic solvents. Azo compounds are prepared by diazotising *o*-nitroanilines with nitrous acid and HCl and coupling the diazonium salts formed with phenols. (1) are used as UV absorbers for polymeric coatings, etc.

Exhaust Gas Purification Catalyst

MATSUDA K.K.

Japanese Appl. 7/265,706

Silicate slurry containing metal, such as Pt, is coated repeatedly onto a monolith support by a wash coat method to form a purification catalyst for NO_x, where the slurry viscosity is controlled by adding H₂O. The apparatus used is also claimed. The purification catalyst has uniform loading of the active component.

Promotion of Oil Combustion

K. SATO

Japanese Appl. 7/277,812

Ceramics used to promote combustion of oil and to reduce combustion exhaust are produced by mixing natural zeolite powder, Pt, Au, Cu, Ca and Al₂O₃ powder and moulding the mixture into a spherical shape, followed by firing at 750°C for 6 h, and further heating at 880°C for 12 h. The ceramics reduce CO₂, NO_x and unburnt HC in the exhaust. The amount of O₂ needed for combustion can be reduced by 20%.

NO_x Purification Catalyst

TOYOTA CHUO KENKYUSHO K.K.

Japanese Appl. 7/289,895

A catalyst for purifying NO_x consists of at least one alkali metal and Pt on a porous support with the mole ratio of the supported alkali metal:Pt of 20–100:1. With this catalyst, NO_x emissions from automotive internal combustion engines can be reduced over a wide range of temperatures in excess O₂ atmospheres.

Catalysts for NH₃ Decomposition

NIPPON SHOKUBAI CO. LTD. *Japanese Appl. 7/289,897*

A catalyst for decomposing NH₃ comprises at least one binary or ternary compound oxide(s) selected from Ti and Si, binary compound oxides containing Ti and Zr, and ternary compound oxides of Ti, Si and Zr; a catalytic component of an oxide of V, W and Mo, and at least one of Pt, Pd, Rh, Ru and Ir. The catalyst is used for oxidising and decomposing NH₃ emitted from coke ovens, etc., to N₂ and H₂O.

Catalysts for Purifying Exhaust Gases

NISSAN MOTOR CO. LTD. *Japanese Appl. 7/289,904*

Catalysts for purifying exhaust gases are multi-component compound oxides of formula: Pd_aMo_bNi_cAl_dO_g, where a = 0.01–5 wt.%; b, c and d = atomic ratio of each element; and when b = 10, c = 0.1–11 and d = 30–200, and g = number of O atoms required. The catalysts are effective over a wide temperature range and are durable. They can efficiently remove NO_x from atmospheres containing excess O₂.

Exhaust Gas Purification

MATSUDA K.K. *Japanese Appl.* 7/299,365

A catalyst for purifying exhaust gases contains Pt and at least one metal selected from Ir and Groups IIB and IVB elements supported on base materials. Exhaust gas can be purified in an atmosphere with excess O₂ at low temperatures. It is used for the effective removal of CO, HC and NO₂ from exhaust gases.

Purification Catalyst for NOx

TOKYO GAS CO. LTD. *Japanese Appl.* 7/303,838

A Pd salt solution, such as Pd nitrate and Pd acetate is supported on mordenite by immersion or ion exchange with the coexistence of NH₄⁺ ions and acetic acid, to form a NOx purification catalyst. Pd supported on mordenite (SiO₂:Al₂O₃, ratio of 10:30) is denatured with acidic Fe salt solution or Mg. The catalyst removes NOx efficiently and is used in the presence of a hydrocarbon reducing agent, such as CH₄.

Catalyst for Purification of Exhaust Gases

DAIHATSU MOTOR CO. LTD. *Japanese Appl.* 7/308,578

A catalyst for exhaust gas purification, especially of NOx, comprises a perovskite type double oxide powder, La_{0.8}Ce_{0.1}NiO, which carries 0.04 wt.% of Rh, and is obtained by mixing and drying a mixture of La_{0.8}Ce_{0.1}NiO, and Rh. With this catalyst, NOx can be removed at lean range conditions.

Polymetal Multi-Gradient Reforming Catalyst

UOP *Japanese Appl.* 7/308,582

A hydrocarbon conversion catalyst comprises: a Group VIII Pt group metal, preferably made of homogeneously dispersed Pt and a surface metal other than Pt (preferably Pd), in a catalytically effective amount; and a non-acidic macro hole molecular sieve, such as L-zeolite, containing an inorganic oxide binding agent. The surface density of the metal is preferably twice that of the centre of the catalyst. The catalyst is useful for reforming hydrocarbons for producing gasoline of high octane value. The catalyst has high catalytic activity and good stability.

Hydrogenation of Edible Fat and Oil

CHIYODA CORP. *Japanese Appl.* 7/316,585

A Pt catalyst is used for the hydrogenation of edible fat and oil to obtain a product with a low content of *trans* acids. Preferably, the catalyst consists of a support of specific surface area of ≥ 10 m²/g with a porosity of ≥ 0.1 ml/g, supporting 0.1–10 wt.% of Pt catalyst(s). The method controls the formation of *trans* acids and allows less severe hydrogenation conditions.

Purification of Contaminated Soil

EBARA CORP. *Japanese Appl.* 7/328,595

A purification process for contaminated soil involves heating the soil to 300–500°C and evaporating any aromatic halogens it contains by contacting with a catalyst at 250–400°C in the presence of > 5% O₂. The catalyst contains more than one of Pt, Pd, Cu, Co, Mn, V or their oxides supported on Al₂O₃ or SiO₂:Al₂O₃. The process can purify soil contaminated by aromatic halogen without addition of any reagents.

Catalyst for Ozone Decomposition

NE CHEMCAT K.K. *Japanese Appl.* 8/10,619

An ozone decomposition catalyst contains amorphous Mn oxide and Pd oxide, carried on SiO₂-B₂O₃-Al₂O₃ composite oxide, and also contains at least one of Ir, Ag, La, Ce, Fe, Ni, Y and Sm. The catalyst can decompose ozone efficiently from gases containing S compounds and/or H₂O.

Purifying Diesel Engine Exhaust Gas

MAN NUTZFAHRZEUGE A.G. *German Appl.* 4,424,235

A sorption-oxidation catalyst for combined sorptive and oxidative purification of diesel engine exhaust gas comprises a solid acid system doped with Pt metal oxide(s) to increase barrier activity, especially after cold start, and reduce odour emission. The catalyst also has satisfactory CO oxidation activity, avoids partial oxidation to odorous substances and increases the highly volatile organic components' sorption activity under load, especially after cold start.

Hydrogen Peroxide Production Catalyst

BASF A.G. *German Appl.* 4,425,672

An oxidation catalyst (1) used in the preparation of epoxide or H₂O₂ is based on Ti or V silicates with zeolite structure and contains 0.01–20 wt.% Ru, Rh, Pd, Os, Ir and/or Pt. The novelty is that each Pt metal is present in ≥ 2 different energy states. (1) is used as a heterogeneous catalyst in the production of propylene oxide, from olefins, H₂ and O₂, and of H₂O₂ from H₂ and O₂. It can be regenerated by controlled combustion of C deposits and reactivated, preferably with H₂ or simply by washing.

CH₄ Steam Reforming or Oxidation Catalyst

SUED-CHEMIE A.G. *German Appl.* 4,427,665

A catalyst for auto-thermal steam reforming and/or oxidising CH₄, reactions which proceed in parallel, comprises Pt/Al₂O₃, where the carrier contains 2–12 wt.% Ni and 1–10 wt.% Ce, both calculated as metal and based on the whole catalyst. The catalyst has high activity in both oxidation and steam reforming, and is highly stable mechanically and catalytically at > 850°C. It is used in the production of synthesis gases or H₂ from CH₄, for the production of MeOH, Fischer-Tropsch hydrocarbons, oxo alcohols and NH₃.

HOMOGENEOUS CATALYSIS

Preparation of Optically Active Cyclohex-2-ene-1-one Derivatives

F. HOFFMANN LA ROCHE & CO. A.G.

European Appl. 691,325A

Optically active cyclohex-2-ene-1-one derivatives (1) are prepared by asymmetric hydrogenation of enol derivatives of keto-isophorone using a Rh complex of an optically active diphosphine ligand as catalyst. The Rh complex comprises lower alkyl or lower alkoxy, phosphine, benzyl, etc. (1) are valuable intermediates in the preparation of 3-hydroxy carotenoid derivatives, especially in the preparation of zeaxanthin. The process gives high optical yields.

Hydrosilation Process

DOW CORNING CORP. *U.S. Patent 5,481,016*

A hydrosilation process using an alcohol or silylated alcohol accelerator comprises reacting SiH and the unsaturated reactant in the presence of a Pt catalyst, selected from Pt compounds and Pt complexes. The process is carried out with 0.1–10% stoichiometric excess of SiH with respect to the unsaturated C-C linkages in the unsaturated reactant. The concentration of Pt catalyst provides 1–1000 moles of Pt per 1×10^6 moles of unsaturated C-C bonds. The reaction is carried out at 15–170°C. The accelerators are effective in the presence or absence of O₂, and are used in hydrosilation of unsaturated reactants.

Preparation of 2-Aryl Aliphatic Ester

ALBEMARLE CORP. *U.S. Patent 5,482,596*

2-Aryl aliphatic ester is prepared from styrene derivatives and CO at 1 atm and 25–200°C in the absence of O₂ and in the presence of a catalyst composed of a mixture of Pd(0) or Pd salts, or a mixture of Pd(0), Pd salts and Cu salts; and phosphine or phosphine oxide and a mixture of ligands. The reaction is used particularly for preparation of the drug ibuprofen, and the process does not require a solvent.

4-Methylidene Cinnamic Acid Derivatives

MERCK PATENT G.m.b.H. *German Appl. 4,424,489*

The preparation of substituted 4-methylidene cinnamic acid derivatives (1), with benzylidene camphor substituents, comprises reacting an aryl halide and an acrylic acid derivative in the presence of a Pd catalyst. The derivatives are obtained in fewer stages, with good space/time yield and with little use of additives. They are UV absorbers in cosmetics.

Vinyl Carbamates

BA SF A.G. *German Appl. 4,425,677*

Vinyl carbamates are prepared in high yield and selectivity by reacting secondary amines and CO₂ with acetylenic compounds added during reaction in the presence of a Pt group metal compound, especially a Ru compound. The reaction is carried out in the presence of a tertiary amine. The process gives high yields and/or selectivity and avoids the use of COCl₂ and highly toxic organo-Hg compounds.

FUEL CELLS

Supported Platinum Alloy Catalyst

DEGUSSA A.G. *European Appl. 694,982A*

A Pt alloy catalyst on a conductive C support contains a ternary alloy of Pt, Co and Cr as the catalytically active component. The catalyst is obtained by co-precipitation from an aqueous solution of nitrates of the alloy components onto the suspended support, as their hydroxides; reducing the hydroxides; washing, drying and calcinating at > 800°C to form an ordered alloy. The catalyst is used for making fuel cell electrodes. It has higher activity and stability than other available catalysts and can be produced quickly at lower manufacturing cost.

Anode Catalyst for Fuel Cells

STONEHART ASSOC. INC. *Japanese Appl. 7/299,359*

An anode catalyst for fuel cells contains an alloy of 1–70 at.% Ge and/or Mo and at least one of Pt, Pd and Ru. Poisoning of the catalytic metals by CO contained in fuels is inhibited and the fuel cells can be operated for a longer period. There is no need to purify the fuels to remove CO.

Phosphoric Acid Fuel Cell

FUJI ELECTRIC CO. LTD. *Japanese Appl. 7/307,156*

A phosphoric acid fuel cell has an electrode catalyst layer in which Ru powder-retained C grains are bound together with fluororesin and laminated on a porous C electrode base. The cell prevents a drop in cell voltage and corrosion in the C electrode base, respectively, due to the presence of CO. The cell can be cheaply manufactured.

Hydrogen Containing Gases for Fuel Cells

IDEMITSU KOSAN CO. LTD. *Japanese Appl. 8/2,902*

H₂-containing gases for fuel cells are prepared using a selective oxidation catalyst of Pt/L-type zeolite. The H₂-containing gas is produced by reforming a fuel to a fuel gas, then mixing with an O₂-containing gas, and also with 17–40 vol.% CO₂ and CO. On contact with the Pt/L zeolite catalyst, CO is changed to CO₂. The gases obtained can be used as fuels for fuel cells operated at low temperatures, in for example, phosphoric acid, KOH and polymeric solid electrolyte type fuel cells. The lifetimes of the fuel cells are extended, due to CO being prevented from poisoning the Pt in the fuel cell electrodes.

CHEMICAL TECHNOLOGY

Preparation of 1,2-Butylene Oxide

BA SF A.G. *German Appl. 4,422,046*

1,2-Butylene oxide (1) is prepared by the catalytic hydrogenation of vinyl-oxirane, using a Pd catalyst supported on BaSO₄, ZrO₂ or TiO₂, or a supported Pd catalyst optionally containing Re. (1) is a fuel additive or a stabiliser for chlorohydrocarbons. Improved conversion, yield and selectivity are obtained.

ELECTRICAL AND ELECTRONIC ENGINEERING

Manufacture of PCB

LEARONAL INC. *European Appl. 697,805A*

The manufacture of printed circuit boards (PCB) involves contacting the board with an electroless Pd solution after covering the circuit pattern with a solder mask, thereby protecting Cu from oxidation. The contact time is sufficient to provide a finish layer of Pd (alloy) at the required thickness, to protect the Cu deposits in the holes and on the circuit board from oxide formation. The finish layer is smooth and flat, and gives good solderability. Also claimed is the method which provides the finish layer with good wire bonding capabilities.

High Density Magnetic Recording Medium

A.G. TECHNOLOGY CO. LTD. U.S. Patent 5,478,661

A magnetic recording medium has a magnetic thin film of composition $\text{Co}_{100-a-b-x-y-z}\text{Ni}_a\text{Cr}_b\text{Pt}_x\text{M}_y\text{O}_z$ (where $a = 0-15$, $b = 0-15$, $x = 0-20$, $y = 0-20$, $z = 0-40$ ($x, y, z \neq 0$); $M = \text{Si, B, Zr, Al, P, Ti, Sn}$ and/or In . M may be an oxide, MO_c , where $c = 0-5$ (not zero). The film is deposited by sputtering a target of MO_c incorporated into a base material of CoNiPt , CoCrPt or CoNiCrPt alloy. The film has a coercive squareness of ≥ 0.7 , a coercivity of ≥ 2000 Oe at a remanence of 3.0×10^{-3} emu/cm² and low noise. The medium is used in high density recording.

Opto-Magnetic Recording Medium

TDK CORP. Japanese Appl. 7/272,334

The recording medium has a multilayered structure of layers of PtSb and MnSbPt thin films formed alternately, until the specified thickness is obtained. The layers have NiAs -type crystalline structure. The total thickness of the artificial lattice film is 50–2000 Å. The medium records and reproduces information, and simplifies magnetisation in the vertical direction.

Spherical Bump Electrode

NIPPON STEEL CORP. Japanese Appl. 7,283,227

A spherical bump electrode for a semiconductor chip, is made of Au alloy with 0.001–0.05 wt.% Pt and 0.001–0.05 wt.% In, and constitute 0.001–0.05 wt.% of the total composition. Components such as 0.0005–0.01 wt.% Pd, 0.0005–0.005 wt.% Cu and one or more types of 0.001–0.005 wt.% Ag are also added, and also constitute 0.001–0.05 wt.% of the total composition. Anisotropic deformation of the electrode is prevented and damage to the electrode during mounting is minimised. Enhanced manufacturing yield with high reliability is achieved.

Ceramic PWB Resistor

MATSUSHITA ELECTRIC WORKS LTD. Japanese Appl. 7/297,513

A ceramic PWB has a thick film resistor layer (A) and a conduction circuit layer (B) on a ceramic substrate. A connection terminal layer (C) is between (A) and (B), and a protection layer of 0.5–2 µm in thickness is formed on (C) and is produced by baking a paste made from Pd or Pt at 800–900°C. A glass layer hides the resistor layer. The resistor reduces the occurrence of faults.

Semiconductor Memory for DRAM

NIPPON STEEL CORP. Japanese Appl. 7/321,232

A semiconductor memory for DRAM has a multilayered structure. The memory has capacitors formed on the inner wall of contact holes. Both of the electrodes of the capacitor are formed with RuO_2 . The lower electrode is made of dielectric film. There is increased wiring connection reliability and the wiring can be formed by a sputtering method. The value of the capacitance and the integration density are increased. The memory area is reduced and the manufacturing process is simplified.

Manufacture of Polyimide Board

RAYTECH K.K. Japanese Appl. 7/321,457

The surface of a polyimide film is treated with HNO_3 and alkali, and optionally with polyamide acid solution treated with PdCl_2 to produce polyimide board, which has good adhesiveness to metal and good electrical characteristics. The board is heated to $> 200^\circ\text{C}$ and a metal layer is formed by a wet plating process. Reduction of PdCl_2 is achieved after further treatment. Laminated polyimide board is obtained.

Single Crystal Fe-Si-Al Based Alloy

MITSUMI ELECTRIC CO. LTD. Japanese Appl. 7/330,495

A single crystal of an Fe-Si-Al based alloy, used for a magnetic head, consists of: 9.35–9.55 wt.% Si, 10–6.25 wt.% Al, 0.30–0.35 wt.% Ru; and the balance Fe. The plane orientation is the (100) plane. Adding Ru to the alloy reduces rust and enhances corrosion resistance. Ru also enhances magnetic permeability; starting from 47,100, a maximum magnetic permeability of 277,900 was obtained at 5 MHz.

Iridium Thick Film Conductor

SUMITOMO KINZOKU CERAMICS K.K. Japanese Appl. 7/335,782

A ceramic substrate, with a bump for mounting a chip carrier in an external mother board, has a number of wiring layers in and on its surface. The ceramic substrate has a thick film electric conductor made from W and/or Mo (40–90 wt.%) and Ir (60–10 wt.%) which connects the internal wiring layer and a Cu ball. The construction provides reliable junctions which can withstand the effect of the mounting conditions.

MEDICAL USES

Silicone-Based Dental Impression

G.C.CORP. British Appl. 2,292,153A
Silicone-based dental impression compositions for the production of crowns, inlays or dentures, comprise 100 parts by weight of organopolysiloxane (1) with ≥ 2 aliphatic unsaturated groups/molecule; 0.1–30 parts of organohydrogen polysiloxane (2) with ≥ 3 H atoms directly bonded to a Si atom; 10–500 ppm, with respect to (1) and (2) of silicone-soluble Pt compound; 5–500 parts of inorganic filler and 1–200 parts of polyvinyl ether of 1000–50,000 degree of polymerisation. Compositions have good elastic properties.

Dental Impression Material

MINNESOTA MINING & MFG. CO. World Appl. 96/560A
A dental impression material which allows visual core monitoring is claimed. It comprises a curable silicone polymer containing a crosslinker with at least two SiH groups, a hydrosilation catalyst comprising a complex of Pt and an unsaturated organo-Si material, and core-indicating dyes showing a colour change within ~ 10 min at 25°C to indicate gel point or set time.

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