

NEW PATENTS

METALS AND ALLOYS

Permanent Magnet Materials with Improved Properties

SCM K.K. *Japanese Appl.* 62/156,247/48

Permanent magnet materials consist of Fe, a rare earth metal, more than one of B, C, N, Si and P, and Co, and more than one of Rh, Ir, Os, Re and Au; or Pt and/or Ru. In the first case the precious group metal improves oxidation resistance of the magnet material, and in the second the Pt and/or Ru component improves the anisotropic magnetic field, saturated magnetism, etc.

Platinum-Iron Alloy for Engineering or Dental Purposes

TANAKA KIKINZOKU KOGYO

Japanese Appl. 62/170,453

A Pt-Fe alloy has excellent workability and good shape memory effects in irregular atomic configuration—heat treatment is not needed to order the configuration of particular atoms. It is used for piping joints, machine parts, and medical material such as wire for correcting a dental arch.

Preparation of Ultrafine Platinum Particles

SHINGIJUTSU KAIHATSU *Japanese Appl.* 62/180,745

Ultrafine Pt particle precursors are incorporated into Langmuir-Blodgett membranes, and then converted—for example electrolytically—into ultrafine Pt particles with a uniform size less than 0.1 μm . Preferably the catalyst is Pt; especially one used for fuel cell electrodes.

ELECTROCHEMISTRY

Methanol Oxidation Electrode

NATIONAL RES. DEV. CORP. *World Appl.* 87/5,445A

An electrode for oxidising methanol has a catalyst of 1–15 wt.% Pt, and TiO₂, and/or Ru on a substrate which is an electronic conductor, capable of reducing O₂ to water, and is preferably porous C. The claimed electrode has a better performance at higher temperatures and high current densities, and shows a decrease in the rise in overpotential.

Platinum-Containing Anode for Dehydrator

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 62/197,115

The anode of an electro-osmosis type dehydrator consists of a Ti plate with welded expanded Ti net, plated with Pt, and electrically coated with PbO₂ particles. The electrode has little elution loss, and gives long operation of the dehydrator for use in removing water from waste soil produced in sewage treatment, or in industrial muddy water treatment.

ELECTRODEPOSITION AND SURFACE COATINGS

Selective Electroless Plating of Vias

AMERICAN TEL. & TELEG. CO.

European Appl. 236,034A

High aspect ratio vias are electrolessly plated to form high quality conductive plugs in an I.C. device dielectric layer. This is achieved by deposition of an active layer in the via bottom, preferably of a metal silicide selected from Pt, Pd, Co, Ni, Cu or Al, and immersing the wafer in a Ni or Co plating solution.

Electroless Palladium Plating Solution

ISHIHARA YAKUHIN K.K. *Japanese Appl.* 62/124,280

An electroless plating solution for Pd deposition contains 0.0001–0.5 mol/l of a Pd compound, an ammonium and/or an amine compound, an organic S compound, and a hypophosphite. Plating over Cu plate gives a well adhered surface film without cracks, over which solder can be applied.

Improved Silver-Palladium Composite Plating

NIPPON ELECTROPLATI. *Japanese Appl.* 62/151,598

A composite Ag-Pd plating is produced using a non-cyanide Ag plating solution in which fine Pd powder is suspended. High quality Ag-Pd composite coatings are obtained, having improved resistance to corrosion, wear, and heat, with lubricity, brightness and excellent adherence. The coatings are used for electrical contacts as well as decorative applications.

Silver-Palladium Alloy Electroplating Bath

DURRWACHTER FA. DODUCO *German Offen.* 3,609,309

An Ag-Pd alloy electroplating bath for deposition of Ag-Pd alloys from soluble compounds contains 0.5–15 g/l Ag as a Ag succinimide complex, and 1–25 g/l Pd as Pd di- and/or poly-phosphate. The bath is aqueous, weakly alkaline, and free from cyanide and NH₃, and the resultant plating is ductile, flawless, and has a silky lustre.

APPARATUS AND TECHNIQUE

Ion-Sensitive Membrane for Enzyme Sensor

TERUMO CORP.

European Appl. 235,024A

An enzyme sensor with good sensitivity consists of an ion-selective field-effect transistor having an ion-sensitive membrane of Ir oxide or Pd oxide, and an enzyme-fixed membrane, 3–100 μm thick. The concentration of a substance in a liquid specimen can be measured quickly, reliably, and with excellent selectivity using the sensor.

Platinum Coated Element for Drug Detection Apparatus

MDS HEALTH GRP. LTD. *European Appl.* 236,047A

A lightweight fine mesh of phosphor bronze electroplated with Pt, Ni or Zn to form a rough fissure filled surface, forms one element in an apparatus for collecting trace substances for analysis. The apparatus is used for detecting drugs or explosives.

Reliable Activity Measurements for Palladium-Tin Catalyst

IBM CORP. *European Appl.* 236,875A

The activity of a Pd-Sn colloidal catalyst used in electrodeless plating of metals such as Cu and Ni, is determined by measuring the cyclic voltammetric peak, and comparing it with that for a reference Pd-Sn colloidal catalyst. Consistent and reliable measurements of the catalyst activity are obtained by this method.

Thick-Film Gas-Sensitive Element with Rhodium Catalyst

NGK SPARK PLUG K.K. *European Appl.* 238,081A

A laminar gas-sensitive thick-film has a ceramic semiconductor, and an outer Rh catalyst layer of larger grain size than an inner Rh catalyst layer. The thick-film is part of a gas-sensitive element which is used as a gas sensor, for example an O₂ sensor for engine exhaust.

Curable Composition for Optically Transparent Elastomers

DOW CORNING CORP. *European Appl.* 240,162A

Curable compositions for polyorganosiloxane elastomers are obtained by blending polydiorgano siloxanes, a resinous copolymer, an organohydrogen siloxane curing agent, a diorgano hydrogen siloxane, and a Pt-containing hydrosilation curing catalyst. The compositions cure to flexible, tough, resilient, optically transparent elastomers.

Apparatus to Measure Gas Content in Molten Metal

ALUMINUM CO. AMERICA *U.S. Patent* 4,685,325

A Pt wire is used in apparatus for measuring the gas content in molten metal. A carrier gas entrains H₂ molecules dissolved in the molten metal, the two gases are then directed to a catharometer cell, and the Pt wire is cooled which decreases its electrical resistance. The voltage drop across the wire is proportional to the H₂ content.

Measuring Plating Layer Thickness Using Platinum Electrodes

IBIDEN CO. LTD. *Japanese Appl.* 62/147,304

Two Pt electrode plates are connected to a controller rectifying circuit, and to pieces for plating by a non-electrolytic method. After plating has occurred, the layer on the Pt electrode plates is electrolysed, and current-time measurements are used to calculate the change in plating layer thickness with time.

Platinum Combustible-Gas Detector Element

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 62/148,847

A contact-burning-type gas sensor for combustible gases has a gas-detector element consisting of a spirally wound 20 μm thick Pt wire, covered with an Al₂O₃ carrier, on which Pt or Pt and Pd are deposited. The performance of the element is consistent, and a gas sensor of low alcohol sensitivity can be produced.

Oxygen Sensor with Improved Life

JAPAN ELEC. CONTROL SYS.

Japanese Appl. 62/187,245

A sensor for measuring O₂ in exhaust gas has Pt electrodes installed on the inner and outer surfaces of a closed end ceramic tube, and a catalyst layer, a protective layer and a lead trap layer, successively stacked on the outer Pt electrode. Covering of the catalyst layer with Pb from the exhaust is prevented.

Platinum-Zirconia Electrodes Resistant to Thermal Stress

FIGARO GIKEN K.K. *Japanese Appl.* 62/195,551

An exhaust gas sensor has a pair of electrodes consisting mainly of Pt with ZrO₂ deposited on its crystal boundaries, connected to a metal oxide semiconductor containing Ti and/or Nb. The electrodes have improved durability at high temperature.

Thin Film Gallium-Arsenide Sensor

SCHOTT GLASWERKE *German Appl.* 3,604,594

A sensor for detecting trace substances in carrier gases consists of a substrate with a basis-layer, preferably In oxide doped with one or more elements such as Pt, Rh, Ru, Ag, Au, W, Cd; and at least one activating layer which can contain elements such as Os, Pd, Ir, Ni or Ag.

JOINING

Brazing Filler Metal Containing Palladium

TANAKA KIKINZOKU KOGYO

Japanese Appl. 62/151,291

A brazing filler metal consists of 1-30wt.% Pd, 1-30wt.% Au, 0.5-5wt.% B, 0.5-15wt.% Cr, 0.5-10wt.% Si, and balance Ni. The filler metal can be in fine wire or powder form and is used for brazing, especially stainless steel or Ni-alloy.

Improved Brazing Using Palladium Covering in Joint

G.G. DERKACH

Russian Patent 1,279,767

Contact brazing telescopic steel and Cu cylinders involves heating Cu and Ag layers in the joint to 150-230°C. The mechanical properties of the joint are improved by introducing a Pd covering, which raises the solder liquidus temperature, to prevent shrinkage cavities and cooling cracks.

HETEROGENEOUS CATALYSIS

Palladium Catalyst for Aldose Oxidation

ROQUETTE FRERES S.A. *European Appl.* 233,816A
A Group IV, V and/or VI metal, or a promoter, is added to a catalyst of Pd on an inert support for use in the oxidation of aldoses in alkaline medium, particularly glucose, to aldonic acids. The catalyst is highly stable, can be regenerated, has longer service life than known catalysts; and achieves aldose conversions of >95% with high selectivity.

Ruthenium-Cerium Conversion Catalyst

BRITISH PETROLEUM P.L.C. *World Appl.* 87/4,085A
A catalyst composition having high activity and long life consists of a Ru-Ce mixed oxide and optionally an alkali metal. After reductive activation, it is used at 190–400°C for conversion of synthesis gas, especially to aliphatic hydrocarbons in the gasoline boiling range, and has low selectivity to CH₄ and CO₂.

Platinum Coated Metal Strip for Exhaust Gas Purification

GEBELIUS S.R.V. *World Appl.* 87/5,357A
A jointless exhaust pipe with alternate smooth and corrugated portions has a lengthwise insert which can be used for catalytic cleaning of the exhaust gas, (in which case a zigzag metal strip coated with Pt or Pt-Rh is used) or as a muffling device. The exhaust pipe has no conventional separate silencer, and can be fitted to many makes of vehicle.

Novel Hydrocarbon Conversion Catalyst with Dual Function

UOP INC. *U.S. Patent* 4,677,094
A catalyst consists of 0.05–1wt.% uniformly dispersed Pt, 0.1–2wt.% Sn, 0.05–1wt.% surface-impregnated Rh, Ru, Ir, Co and/or Ni, and a halogen component, on a refractory support. The catalyst has exceptional activity and resistance to deactivation, having hydrogenation-dehydrogenation and cracking activity, and is especially useful for naphtha reforming to a high octane reformat.

Sulphur-Tolerant Reforming Catalysts

CHEVRON RESEARCH CO. *U.S. Patent* 4,680,280
Reforming catalysts of 0.1–5wt.% of Pd, Ir or especially Pt, zeolite L in K, Na, Rb or Cs form, and at least one desulphurising metal, especially Mo. The latter component improves the S tolerance of the catalysts without increasing hydrocracking activity.

Molybdenum Based Catalyst for CO Hydrogenation

AMERICAN CYANAMID CO. *U.S. Patent* 4,687,784
A catalyst of particulate C having a specified pore size distribution supporting Mo/Pd, Mo/Rh or Mo, is used for the reaction of CO and H₂ at 180–400°C, total pressure 1–4 atm, and GHSV 200–2500. The catalyst has outstanding activity for CO hydrogenation.

Sulphur-Tolerant Catalyst for Steam Reforming

INT. FUEL CELLS CORP. *U.S. Patent* 4,693,882
An active, S-tolerant catalyst for converting hydrocarbons to H₂, consists of Pt, Ir or Pd supported on La stabilised Al₂O₃, optionally promoted by Mg. The catalyst is used at high temperatures for steam reforming S-containing fuels, and in fuel cells.

Ruthenium Catalyst for Improved Selectivity Ketone Preparation

IDEMITSU PETROCHEM. K.K. *Japanese Appl.* 62/123,142
An amine is contacted with a strong oxidising agent and a Ru catalyst, using one or more additives selected from water, alkali metal or alkaline earth metal compounds, to prepare ketones. Amine conversion is approximately 100%, and selectivity to the ketone is as high as 99 mol.%.

Ruthenium Catalyst for Cycloolefin Preparation

SUMITOMO CHEM. IND. K.K. *Japanese Appl.* 62/142,126
Cycloolefin preparation comprises partial hydrogenation of aromatic hydrocarbons with H₂ in the presence of a Ru catalyst. The Ru is supported on a carrier of P and oxoacid salts at 0.01–20wt.%, and uses at least one phosphorus oxoacid alkali metal salt as additive.

Strongly Supported Platinum Group Metal Catalyst

TANAKA KIKINZOKU KOGYO *Japanese Appl.* 62/144,750
A platinum group metal oxide catalyst is produced by fusion coating the platinum group element onto a porous metal support; preferably of a Ni alloy such as Ni-Cr alloy. A catalyst is produced with the platinum group metal strongly supported, and pretreatment or after-treatment are not needed.

Styrene Purification Using Selective Hydrogenation Catalyst

MITSUBISHI PETROCH. K.K. *Japanese Appl.* 62/149,634
Purification of styrene is achieved by selective hydrogenation of higher unsaturated impurities with H₂, at 60–120°C, over a hydrogenating catalyst of 0.1–1wt.% supported Pt. Impurities such as acetylenes, phenylacetylene and/or diolefins are removed efficiently, without loss of styrene.

Improved Low Temperature Exhaust Catalyst

NIPPON SHOKUBAI KAGAKU *Japanese Appl.* 62/152,540
A monolithic waste gas purification catalyst has a honeycomb shaped support, a refractory inorganic oxide coating, fixed Rh, and fixed Pt and/or Pd, with the high contents metals supported homogeneously.

Ruthenium-Lanthanum Catalyst for Methanol Reforming

TOYOKU GAS K.K. *Japanese Appl.* 62/156,196
Gas containing a high concentration of CH_4 is efficiently prepared by catalytically reforming CH_3OH and optionally water in the presence of a supported catalyst containing 0.1–5wt.% Ru, and 0.1–4wt.% La. There is no C deposition on the catalyst, and it has sufficient activity at lower temperatures.

Exhaust Catalyst with Organic Coating to Separate Metals

TOYOTA JIDOSHA K.K. *Japanese Appl.* 62/163,748
A catalyst for cleaning engine exhaust has a base material with a layer of activated Al_2O_3 on which Pd is deposited. An organic coating of PVA, urea resin or unsaturated polyester is then applied, followed by a second activated Al_2O_3 layer with Pt. Separation of the metals by the organic coating prevents alloying, and maintains their catalytic properties.

Platinum Catalyst Preparation Using Protective Colloid

FUJI ELECTRIC MFG. K.K. *Japanese Appls.* 62/168,545/46

A Pt catalyst is prepared by contacting a hydrophilic support such as acetylene black with a Pt salt, adding an agent such as H_2O_2 to make a protective colloid in solution, and then reducing the Pt salt at 40–90°C in alkaline medium. A catalyst with uniformly dispersed Pt particles is obtained safely, in a short time, and without sintering.

Engine Exhaust Catalyst with Reduced Noble Metal Content

CATALER KOGYO K.K. *Japanese Appl.* 62/176,544
A new catalyst for purification of internal combustion engine exhaust consists of an Al_2O_3 layer containing Pd, Pt and Rh, Pt and Rh, or Pd, Rh and Pt, coating a base element selected from Mo, Co, Fe, Ni, Cu or Ce on a porous inorganic support.

Catalyst for Methane Synthesis from Methanol

MITSUBISHI HEAVY IND. K.K. *Japanese Appl.* 62/180,752
A catalyst for methane synthesis from methanol consists of more than 0.01 (0.1–10) wt.% Ru and/or Rh on a support containing alkali and rare earth metal oxide(s). The catalyst has high activity.

Diesel Exhaust Catalyst Containing Palladium and/or Rhodium

NIPPON SHOKUBAI KAGAKU *Japanese Appl.* 62/193,648
A catalyst for diesel exhaust purification consists of an inorganic support with a fire-resistant metal oxide containing more than 20 g/l of V oxide, and Pd and/or Rh. Superfine particles of C and C compounds in the diesel engine exhaust gas can be effectively burnt by contact with the catalyst.

Exhaust Catalyst with Improved Capacity and Durability

TOYOTA JIDOSHA K.K. *Japanese Appl.* 62/201,647
A monolithic catalyst for exhaust gas purification consists of a substrate, a first catalyst layer containing Al_2O_3 and preferably Pt, and a second catalyst layer containing Rh and oxides of La, Nd or Sm and their mixtures. Rh oxidation, and formation of solid solution of Rh and Al_2O_3 , are prevented, resulting in improved purifying capacity and durability of the catalyst.

Graphite-Ruthenium Catalyst for Low Temperature Nitrogen Production

PHYS. CHEM. INST. *Russian Patent* 940,443
A catalyst of a lamellar graphite-Ru compound of formula C_xRu , is used at 120–180°C, for selective oxidation of NH_3 to N_2 . The process is simpler than others, and gives good yields of N_2 , with high conversion and selectivity. The N_2 is used for processing products of active organisms in sealed systems, such as space and submarine environments.

Twin Layer Lattice Catalyst for Ammonia Oxidation

MENNITSA PANSTVOVA *Russian Patent* 1,271,365
A catalyst used for NH_3 oxidation during HNO_3 manufacture has a twin layer lattice, where lattice 1 contains Pt, Rh, and optionally Pd, Ru; and lattice 2 contains Pd, Au, and optionally Pt, Rh, Ir, Co, and/or Ag. Less overall Pt is required for this catalyst structure, and loss of noble metal during use is reduced by 65% with hardly any effect on NH_3 conversion.

HOMOGENEOUS CATALYSIS

Ester Production Using Rhodium Carbonyl Catalyst

BRITISH PETROLEUM P.L.C. *European Appl.* 233,759A
Mixtures of acrylate and propionate esters are produced by contacting C_2H_4 , C_2H_2 , an alcohol, and CO with a Rh carbonyl catalyst, at 50–110°C, under anhydrous conditions. The process can be operated using a $\text{C}_2\text{H}_4/\text{C}_2\text{H}_2/\text{CO}$ mixture produced by partial oxidation of saturated hydrocarbons such as natural gas.

Palladium Catalyst System for Preparation of Octadienyl Esters

SHELL INT. RES. Mij. B.V. *European Appl.* 234,668A
A catalytic system consisting of Pd and/or a Pd compound, a bidentate ligand, and an amine, is used in the preparation of octadienyl esters of nonatrienoic acids by reaction of 1,3-butadiene with CO_2 . The products are prepared with a selectivity more than twice that to octatrienes, and they are used as intermediates in the preparation of lubricants, additives, plasticisers, etc.

Selective Ruthenium Amination Catalyst

AIR PRODUCTS & CHEM. INC.

European Appl. 239,934A

Amination of ethylene glycol or 1,3-propanediol with a secondary amine is effected by reaction at 100–125°C, in the presence of a dissolved Ru compound or complex, modified by one mole of organic phosphine per g atom of Ru. Selective production of mono-aminated products is possible.

Organic Rhodium Hydrocarbonylation Catalyst

TEXACO INC.

U.S. Patent 4,678,857

Production of 4-hydroxybutanol is effected by reacting allyl alcohol with CO and H₂, at 50–110°C, and 5–100 atm, with a catalyst of RhH(CO)(PPh₃), with excess PPh₃. The product can be separated rapidly from the Rh-containing phase without Rh loss.

Ruthenium Catalyst System for Production of Tertiary-Alkanolamines

AIR PRODUCTS & CHEM. INC. *U.S. Patent* 4,680,393

A Ru compound or complex and an organic phosphine ligand, with a ligand:Ru ratio above 5:1, is the catalyst system used for preparation of tert-alkanolamines. They can be produced in high yield with higher selectivity, from the reaction of secondary amines with alkanediols at 150–200°C.

Rhodium Catalyst System for Carbonylation

MONSANTO CO.

U.S. Patent 4,690,912

A catalyst system for carbonylation by reaction with CO consists of an adduct of a Rh-containing material and CO, and a separately added I-containing promoter. The catalyst system is more reactive, stable and selective, and requires lower catalyst concentration, temperature and pressure than previous systems. Recovery and recycling are facilitated.

Production of Aromatic Dicarboxylic Acids

EASTMAN KODAK CO.

U.S. Patent 4,691,050

Aromatic dicarboxylic acids are prepared in excellent yields, under milder conditions, by carbonylation of aromatic diiodides with CO, in the presence of a soluble homogeneous Rh catalyst. Preferably the catalyst is RhCl₃, used at 0.2–2 millimoles per mole of diiodide, and the reaction is carried out at 80–130°C. The products are useful intermediates in the production of polyesters.

Sorbitol Preparation Using Ruthenium Hydrogenation Catalyst

PFIZER INC.

U.S. Patent 4,694,113

Sorbitol is prepared from hydrolysed starch solutions by a two stage hydrogenation process: first over a Ni catalyst, and then—after acidification—over a Ru catalyst at 100–180°C and 35–140 bar. Two stage hydrogenation allows the Ru catalyst to be recovered and recycled, and complete conversion is obtained.

New Processes for Lignan Lactone Production

TAKASAGO PERFUMERY K.K.

Japanese Appls. 62,142,169/70

Production of lignan lactones can be achieved with 0.01–0.05 mmol of a Ru-phosphine complex as catalyst by (i) hydrogenating acid anhydrides, or (ii) dehydrogenating diol compounds in the presence of a hydrogen acceptor. Lignan lactones exhibit anti-bacterial, anti-tumour, plant growth inhibiting, and insect-feeding inhibiting actions, and can be produced selectively, in high yield, by these new processes.

Rhodium Catalyst System for Preparation of Acetic Acid/Anhydride

DAICEL CHEM. IND. K.K. *Japanese Appl.* 62/145,041

A catalyst system consisting of a Rh catalyst, iodine compound(s), and an accelerator, is used in the simultaneous preparation of acetic acid and acetic anhydride. These products are prepared efficiently under mild conditions by heating methyl formate and methyl acetate under a CO atmosphere, using the catalyst system with 0.1–50 mmol/l of Rh.

Palladium Complex for Indole Preparation

KAWAKEN FINE CHEM. *Japanese Appl.* 62/153,271

Indoles can be prepared in high yield by heating and cyclising an amino-olefin compound in the presence of a Pd complex of Pd acetate and a triphenylphosphine, and triethylamine; in a solvent.

Improved Ethanol Synthesis Using Ruthenium Catalyst

AGENCY OF IND. SCI. TECH.

Japanese Appl. 62/158,229

An improved method for direct synthesis of ethanol uses a catalyst of Ru and halogen compounds in a liquid medium, and a continuous supply of synthetic gas containing CO and H₂.

Palladium Catalyst for Olefin Carbonylation

MITSUBISHI CHEM. IND. K.K.

Japanese Appl. 62/161,737

Carbonylation of olefins is effected by treating with CO and hydroxyl compounds in the presence of a Pd catalyst, and heteropoly acids. An accelerator is used which is not a halogen compound, so corrosion of the apparatus is avoided. Carboxylic acids, esters or acid anhydrides are prepared from the olefins by a one step reaction.

Palladium Catalyst for Ester Production

ASAHI CHEMICAL IND. K.K.

Japanese Appl. 62/161,745

Diphenyl ether carboxylic acid esters are easily prepared in high yield using inorganic acid salts of Pd at 0.01–10 mol.% as catalyst. Iodinated diphenyl ethers are reacted with CO, in alcohols, with bases present, at 100–180°C, to give product esters.

Catalyst for Recovery of Drugs Intermediates

NIPPON PETROCHEM. K.K.

Japanese Appl. 62/185,041

Recovery of 2-(p-isobutylphenyl)propionic acid (IPA) or its salt in high purity and yield is effected by dehalogenation of its halogenated compound. A mixture of these compounds is contacted with a Pd, Rh or Pt catalyst, at 20–170°C, in the presence of water, in basic conditions. IPA or its salt are useful as intermediates for drugs and other organics.

Palladium Catalyst for Olefin Carbonylation

MITSUBISHI CHEM. IND. K.K.

Japanese Appl. 62/187,424

Olefin carbonylation comprises reacting the olefin with CO and hydroxyl compounds in the presence of a Pd catalyst, an organic phosphine, and cation exchange resin(s) with a sulphonic acid group. Carboxylic acids, esters or acid anhydrides are prepared in high yield, and plant corrosion is minimised by not using halogen compounds and/or strong acids.

Organic Ruthenium Catalyst System for Lactone Preparation

MITSUBISHI CHEM. IND. K.K.

Japanese Appl. 62/195,374

A catalyst system consisting of Ru catalysts, organic phosphines, and accelerators is used in the preparation of lactones by hydrogenation of dicarboxylic acids or their anhydrides or diesters. Lactones are prepared in good and steady yield under mild conditions, and the activity and life of the Ru catalysts are improved greatly by the use of accelerators.

FUEL CELLS

Gas Diffusion Electrode for Fuel Cells

TANAKA KIKINZOKU KOGYO

Japanese Appl. 62/156,287

An electrode consists of a platinum group metal and/or a platinum group metal oxide on a water-repellant gas diffusion layer on an electrode support. The support consists of a vertically sliced block of multiplex sheets, prepared from hydrophilic and hydrophobic C blacks and PTFE. The electrode can be used in a fuel cell, secondary battery or plating cell.

Platinum Alloy Electrodes for Electro-oxidation of Methanol

R. BOSCH G.m.b.H.

German Appl. 1,546,696

Electrodes for the anodic oxidation of methanol, especially in fuel cells, consist of a Raney catalyst of a 2- or poly-component Pt alloy, and an electronically conducting structure. The alloy contains 30–80 atoms Pt and Os, Ru, Ir, Re or Au, and may contain up to 0.5% of Al. The conducting structure may be a ductile metal powder.

Porous Raney Metal Fuel Cell Electrodes

R. BOSCH G.m.b.H.

German Appl. 1,546,698

Porous Raney metal catalyst electrodes are prepared from an activated catalyst of Pd, Pt or a mixture, a thermoplast, a pore-former and optionally substances to increase conductivity. This method avoids difficulties arising during activation by dissolving the Al matrix after electrode formation.

CHEMICAL TECHNOLOGY

Conductive Polymer Mouldings

TOYO KOGYO K.K.

Japanese Appl. 62/149,706

Conductive polymer mouldings are prepared by impregnating a water swellable polymer with an aqueous solution of a metal ion, preferably Pt, Pd, Au, Ag, Ni, Cu, Zn or others. The mouldings have enhanced conductivity and mouldability, and are used for conductivity control, electromagnetic shielding and as anti-bacterial materials.

Platinum Crucible for Single Crystal Preparation

NEC CORP.

Japanese Appl. 62/176,993

A Pt crucible with a reverse-conical bottom is used in the preparation of a manganese-zinc ferrite single crystal free from Pt-containing inclusions.

Palladium Membrane for Deuterium and Tritium Recovery

KERNFORSCHUNGS KARLSRUHE

German Appls. 3,606,316/17

A Pd or Pd-Ag alloy membrane is used for cracking the ammonia present in nuclear fusion reactor waste gas. Deuterium and tritium can be separated and recovered, and loss of these isotopes by permeation, high charging of the hot metal getter material, and NO_x formation, is avoided.

Manufacture of Thermally Stressed Cooling Elements

KERNFORSCHUNGS JULICH

German Appl. 3,630,323

During manufacture of thermally heavily stressed cooling elements, particularly of acceleration grids for fusion reactors, a 0.1 mm thick brazing foil of Ag-Pd alloy, punched with holes, is interposed between the lower cover and base plates.

ELECTRICAL AND ELECTRONIC ENGINEERING

Corrosion Resistant Electrical Contact Coating

PLESSEY CO. P.L.C.

British Appl. 2,186,597A

An electrical contact surface coating is formed by depositing sequential layers of: Ni, Au, a Pd/Ni alloy containing a maximum of 50wt.% Ni, and finally a Au layer. Preferably at least one layer is electrodeposited. The contact is corrosion resistant.

Silver-Palladium Alloy Electrode for Semiconductor Device

NIPPON DENSO K.K. *European Appl.* 235,749A

An alloy preferably consisting of 70–80wt.% Ag and 30–20wt.% Pd forms the positive pole electrode in a positive ceramic semiconductor device. Ag migration in the substrate is suppressed, and localised heat generation is prevented.

Iridium Containing Cathode for Microwave Devices

U.S. SEC. OF THE ARMY

U.S. Patent Appl. 07/023,161

A cathode for use with microwave devices is made from a porous billet of W and Ir powders and an activator, which is impregnated with a mixture of BaO₂, SrO and Al₂O₃ by firing in dry H₂ at a temperature at which the impregnant melts. The cathode has long-life, and can provide high current density, typically 18 A/cm² at 1075°C.

Magnetic Recording Medium with Cobalt-Nickel-Platinum Layer

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 62/150,520

A magnetic recording medium has a substrate coated with a non-magnetic material, a W underlayer, a Co-Ni-Pt alloy magnetic layer containing 4–14at.% Pt, and a protective-lubricating layer. The medium is used for magnetic discs, and has improved corrosion resistance, coercivity and durability.

Platinum Electrodes for Printed Circuit Board

MATSUSHITA ELEC. IND. K.K.

Japanese Appl. 62/159,492

Electrodes comprising one or more of Pt, Ag-Pd, Ag, and Au are printed in a desired pattern on a ceramic green sheet containing Al₂O₃, SiO₂, PbO and an organic plastic binder. The circuit board can be manufactured at low temperature firing.

Solid State Electrochromic Element with Iridium Oxide Layer

CANON K.K.

Japanese Appl. 62/166,320

A solid state electrochromic element consists of a pair of electrodes sandwiching: a fine patterned oxidation colour-developing layer, preferably of iridium oxide, an intermediate insulating layer, and a reduction colour-developing layer. A high quality display element of improved colour density is obtained.

Silver-Palladium Wiring Material for Multilayer Board

MATSUSHITA ELEC. IND. K.K.

Japanese Appl. 62/173,797

A ceramic multilayer wiring board used for electronic equipment has a mixed oxide insulation layer, an inner layer of conductor wiring material with (in wt.%) 0–30 Pd and 70–100 Ag, and an outer layer with 5–30 Pd and 70–95 Ag. The board can be fired as low as 900°C with no warpage and deformation.

New Resin for Inner Coating of a Semiconductor

TOMOEGAWA PAPER MFG. K.K.

Japanese Appl. 62/199,661

A new resin composition contains two kinds of polysiloxane compounds, alkenyl containing silane compounds, and a Pt type addition reaction catalyst. It is used for inner coating of a semiconductor, and reduces the maximum thickness of this layer without sacrificing the required properties; thus reducing the total thickness of semiconductor tips.

Thin Film Hybrid Switching Element

STANDARD ELEK. LOREN *German Appl.* 3,605,425

A thin film hybrid switching element has integrated resistors and Au conductors deposited on a substrate. The conductors consist of a lower Au layer, 2–10 μm thick, an alloying barrier layer of 0.3–1 μm thick Pd, and an upper Au layer, 0.1–1.5 μm thick. The hybrid circuits are suitable for high frequency operation, for example in the GHz range, while still allowing wire bonding or soldering.

Composite Material with Intermediate Precious Metal Layers

W.C. HERAEUS G.M.B.H. *German Appl.* 3,635,692

A composite material for plugs or sliding electrical contacts has a Cu-Ni-Zn oxide support layer coated with at least 5 intermediate precious metal layers of Ir, Pt, Rh, Ru, Ag, or Pd, or alloys, with layers of W, Mo or Ta in between. The material can be made economically, has good electrical properties, long life, and is useful in telecommunications.

TEMPERATURE MEASUREMENT

Temperature Sensitive Resistance Element with Palladium Layer

LUCAS ELEC. ELTRN. *European Appl.* 240,206A

A temperature sensitive resistance element has a resistance layer of recrystallised electroplated Pd, on an insulating substrate with an adherent conducting film. The thickness of the layer can be controlled easily, and the temperature coefficient of resistance is constant in the working range. The element is used to monitor air flow in the fuel system of an I.C. engine.

Temperature Sensor with Protective Barrier Layer

ROSEMOUNT INC.

World Appl. 87/5,146A

A temperature sensor consists of an insulating substrate, a Pt resistance temperature sensing element, a dielectric layer covering the element, and a barrier layer which resists diffusion of contaminants into the Pt while permitting diffusion of O₂. The sensor can be used in harsh environments, and at high temperatures.

Heat-Resistant Resistor

HITACHI K.K. *Japanese Accepted Appl.* 87/35,245

A heat-resistive resistor is produced by charging a glass powder or rod into an inorganic insulation tube with a surface resistance layer, inserting Pt wires into the tube, and coating the ends of the wires with a paste containing Pt. The resistor is used for thermistors for high temperature use.

Component for a Mantle Thermoelement

W.C. HERAEUS G.M.B.H. *German Appl.* 3,636,468

At least two metal wires, one of Pt and the other of Pt-Rh, form part of a semi-finished component for a mantle thermoelement. The wires are fed into a ceramic body and a metal tube, which is then heated, evacuated and sealed. The process is simple and efficient.

Differential Thermal Analyser with Platinum Body

NON-FERR. METAL HYDR.

Russian Patent 1,286,975

A Pt body and a fireproof body form part of an apparatus for differential thermal analysis of metals. Protective gas flows over the heat sensors, then into the reaction zone between the Pt and fireproof bodies, and then out of the unit with aggressive gaseous reaction products; thereby protecting the sensors.

Triple Function Probe with Platinum-Rhodium Thermocouple

CIA SIDERURGI NAC. *Brazilian Patent* 85/6,504

A probe has a Pt-Pt-13% Rh thermocouple with Cu extension, situated inside the inner of 3 concentric tubes with thermal insulation and water cooling. Two Cr-Al thermocouples are also present, perpendicular to the larger tubes. The probe is used in reheating furnaces, for analysis of gases, temperature and pressure.

MEDICAL USES

New Platinum Complexes with Anti-Tumour Activity

Y. KIDANI

European Appl. 237,450A

New tetravalent Pt complexes are useful as anti-tumour agents. These complexes, such as tetrachloro(cis-1,2-diaminocyclohexane)platinum, are active against murine L-1210 leukaemia for example, at doses of 1.56–400 mg/kg.

Cyclic Platinum Diamine Anti-Tumour Agents

AMERICAN CYANAMID CO. *European Appl.* 237,829A

New platinum cyclic diamine complexes are useful as anti-tumour agents. They can be used for active P388 leukaemia, B16 melanoma, Colon 26 adenocarcinoma, and L1210 leukaemia in mice, at doses of 1.5–100 mg/kg.

Titanium-Palladium-Chromium Dental Alloy

SUMITOMO ELEC. IND. K.K.

European Appl. 239,747A

Addition of up to 20at.% Cr to an equiatomic TiPd memory alloy can lower the temperature of the transformation point. The preferred alloy is 45–55at.% Ti, 0.2–12at.% Cr, and balance Pd; having good corrosion resistance, improved workability, and is used as a dental material or implanting material for orthopaedics.

Cochlear Implant System with Patient Response Matching

COMMONWEALTH AUSTRALIA

European Appl. 241,101A

A cochlear implant consists of a series of guiding and active Pt rings mounted on a common longitudinal axis within the cochlea. The active rings are connected to an internal receiver-stimulator unit, and can be individually excited. A speech processor unit with a programmable memory ensures that the system for excitation gives optimum response to individual needs.

Rhodium Complexes Used in Combination Modality Cancer Therapy

D.H. PICKER

U.S. Patent 4,681,091

Novel pharmaceutical compositions contain Rh(III) co-ordination compounds, and are used as radiosensitisers in combination modality cancer therapy. Despite any inherent or acquired toxicity, the Rh compounds show a net beneficial anti-tumour effect in combination with existing methods of treatment.

Radiation Impermeable Composition for Medical Uses

V.J. FLYNN

Japanese Appl. 62/200,297

A composition used for medical tubes or catheters consists of a resin of a thermoplastic polyurethane and a vinyl halide copolymer, a radiation impermeable agent of iodobenzoate(s), and a platinum hardened silicon mesh polymer. The composition has good formability into a complicated shape, torsion resistance, and heat resistance.

Dental Amalgam Alloy without Mercury Release

G-C DENTAL IND. CORP.

German Appl. 3,709,693

A dental amalgam alloy containing 0.06–5wt.% Se is prepared by adding at least one powder of synthetic PdSe, PdSe₂, PtSe₂, PtSe₃, Au₂Se₃, Ag₂Se, CuSe, Cu₂Se, NiSe, ZnSe, HgSe, In₂Se₃ and/or SnSe to a powder of dental amalgam alloy. The stable selenide used bonds Se in the amalgam and prevents release of Hg; thus eliminating the cyto-toxicity of the Hg.

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