

NEW PATENTS

METALS AND ALLOYS

Contact Material

DEGUSSA A.G. *European Appl.* 250,958A

A matrix material containing Ir, Os, Ru and/or Rh and Zn particles has low contact resistance, good corrosion resistance and excellent wear-resistance. It can be recrystallised at 700°C, allowing it to be fixed to a Cu substrate. It is used for low current applications.

Precious Metal Powder Production

GTE PRODUCTS CORP. *U.S. Patent* 4,711,660

Production of spherical precious metal powders less than 20 µm in diameter is effected by high temperature plasma treatment of mechanically reduced particles. Fine spherical powders of for example Pt, Pd, Ru, Os, Au, Ag, and their alloys are useful in electronics, electrical contacts and parts, brazing alloys, and dental alloy applications.

Composite for Absorbing Electronic Waves

NIPPON HYBRID TEC. *Japanese Appl.* 62/232,198

A composite for absorbing electronic waves has a substrate with a metallised layer containing metals and/or rare earth elements, and one or more of Pt, Pd, Ru, Rh, Au, Ag, Fe, Cr, W, etc. Metal alloy parts are brazed to the surface using a brazing filler containing Pd, Au, Ag, Cu, Ni or Co. The composite has high thermal conductivity, and is used in magnetrons, klystrons and travelling-wave tubes.

CHEMICAL COMPOUNDS

Combustion Resistant Compositions

UNION CARBIDE CORP. *U.S. Patent* 4,701,488

Heat-curable amino organo-polysiloxanes contain as combustion inhibitors: Ir, Rh, Cr or Mo compounds or mixtures containing Pt compounds and preferably Ce compounds. The material can be used in thermal and electrical insulators, gaskets, etc. Coated materials can be used as roofs of sports arenas. The material is stable indefinitely in air.

ELECTROCHEMISTRY

Bipolar Electrolytic Cell with Platinum Anodes

PLENTY LTD. *British Appl.* 2,191,508A

A bipolar electrolytic cell has a sealed stack of bipolar electrodes with a thin layer of Pt as the anode, and a thin disc of Ti as the cathode. The cell is flexible and reliable, with electrolyte cross-flow through alternating ports to inhibit scale formation. It is used particularly for the electrolysis of brine or seawater to produce Na hypochlorite.

Immobilised Enzyme Electrode

CAMBRIDGE LIFE SCI. *European Appl.* 247,850A

An enzyme electrode consists of an enzyme immobilised or adsorbed on resin-bonded carbon or graphite particles with platinum group metal particles dispersed throughout the substrate layer. The electrode shows fast response to glucose.

Metal Deposition Using Platinum Electrode

TOSHIBA K.K. *U.S. Patent* 4,696,721

Electron deposition of a metal onto a conductive matrix of Ag coated glass uses an insoluble electrode, preferably of Pt, to set up the voltage potential. Deposition occurs from a sulphamate solution, generating azodisulphonate, which is decomposed by exposure to u.v. irradiation. The process is used in electroforming of Ni stampers.

Corrosion Resistant Oxygen Anodes

STANDARD OIL CO. (OHIO) *U.S. Patent* 4,696,731

Composite O anodes with high corrosion resistance consist of a substrate with an amorphous alloy layer of Pt and P, As, Si, B, Ge, Al or Sb; fused to which is a mixed metal oxide layer containing Ir and Ru. The O anodes are used in electroplating, electrowinning, etching, fuel cells, and organic reactions such as pinacol formation.

Insoluble Electrode for Electrolytic Refining

NIPPON STEEL CORP. *Japanese Appl.* 62/218,592

An insoluble electrode has a surface treated by irradiation of ions mixed with corrosion resistant electroconductive material, and coated with a platinum group metal or alloy. Such electrodes can be used in the production of soda, electrolytic refining, plating, electrolysis of sea water, etc.

Durable Electrode for Electrolytic Cells

OSAKA SODA K.K. *Japanese Appls.* 62/240,780 and 62/243,790

A valve metal substrate has a first coating layer of 20–80 mol.% Pt and 20–80 mol.% Ir oxide, and a second coating of 3–15 mol.% Ir oxide, 5–25 mol.% Ru oxide, and 60–92 mol.% Sn oxide or Ti oxide. It is used as an electrode in electrolytic cells for Cl₂ and/or alkali production, or sea water electrolysis, and shows good durability.

Anode for Electroosmosis Dehydrator

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 62/254,817

An anode is prepared by applying a surface coating layer containing platinum group metals or their oxides, preferably Ir oxide, to a metal plate of Ti or Ta bent into the required shape. The anode is used in an electroosmosis dehydrator to dehydrate sludge.

Metallised Membrane System

BAYER A.G. *German Appl.* 3,615,831
A membrane system has a thin permeable metal layer obtained by electroless wet chemical metallisation of organic polymer membranes after activation with organometallic complex compounds of Pt, Pd, Ag and/or Au. It can be used as cathodes for separating cations or as anodes for separating anions; for the separation of gases or liquids using a heated membrane, for separating biogases, gases, liquids, ions, colloids, for clinical diagnostics and for producing very pure H₂O.

Platinum Electrode for Generation of Oxide Ions

PERM. POLY. *Russian Patent* 1,291,863
Oxide ions are generated by electrochemical reduction of cleaned gaseous O₂ passed over a Pt electrode in a quartz tube. The oxide ions are used for coulometric titrations, and determination of metals in melts, such as MgCl₂ in a eutectic of K, Na and Li chlorides. The process has improved effectiveness, giving a yield on current of 100±1%.

PHOTOCONVERSION

Chloride Catalysts for Dehydrogenation and Hydrogenation

AGENCY OF IND. SCI. TECH. *Japanese Appl.* 62/215,544
Saturated hydrocarbons are readily prepared by hydrogenation of C-C unsaturated bonds using 2-propanol as the H source. Dehydrogenation of 2-propanol is effected by light irradiation in the presence of Group VIII metal chloride catalyst, especially Ru, Os or Ir. Chlorides of Rh, Ru, Os or Pt are used for dehydrogenation-hydrogenation.

Polymer Catalyst Containing Platinum

AGENCY OF IND. SCI. TECH. *Japanese Appl.* 62/269,752
A polymer catalyst for the production of reductants and oxidants includes a polymer consisting of Pt, Ni, Zr, O, and alkoxyl groups. A mixture of the catalyst and an electron-donating substance is radiated with visible light, and photoexcited electrons are conducted to the active metal parts such as Pt or Ni, where H₂ is produced from H⁺ ions in the water.

ELECTRODEPOSITION AND SURFACE COATINGS

Thin Metal Film Production

NIPPON ENGELHARD K.K. *Japanese Appl.* 62/207,868
An organometallic compound of Rh, Pd, Ru or Co is evaporated at 0.1 torr or lower and at 300°C or lower temperature; and this vapour is acted upon by heat, plasma and light. The vapour is condensed onto a base. The method is used for forming a Group VIII metal thin film for electronic parts. High deposition rates can be obtained and easily controlled.

Metallised Inorganic Particles with Palladium Layer

AGENCY OF IND. SCI. TECH. *Japanese Appl.* 62/207,875
A surface Pd colloid adsorption layer is applied to inorganic particles by agitating a mixture of the particles with a Pd hydrosol containing surfactant(s). After separation, a surface electroless plating layer is applied which has excellent adhesion strength. The metallised inorganic particles are used as an electromagnetic wave shield, electroconductive ink, etc.

Anodes with a Platinum Group Metal Film

H. KONISHI *Japanese Appl.* 62/218,591
A platinum group metal film is formed on the surface of a metal electrode substrate by coating it with a slurry substance containing the platinum group metal compound, and then heating it by far i.r. Generation of pin holes on film formation and peeling of the coatings during use can be prevented using this method. The electrodes are used as anodes for NaCl electrolysis.

Electroless Metal Plating of Polyamide Fibres or Plastic

HITACHI CHEMICAL K.K. *Japanese Appls.* 62/230,984/85
Surface-roughened plastic or polyamide fibres are immersed in a catalyst liquid of Pd chloride dissolved in solvent, at 15–35°C, for 2–10 minutes, followed by an optional washing stage and electroless plating. The applied Pd chloride may be reduced to Pd metal.

Activating Solution Containing Palladium

NIPPON MINING K.K. *Japanese Appl.* 62/235,473
An alkali catalyst solution for non-electrolytic plating contains a water soluble Pd compound, a water soluble Sn compound, and a stabilising agent, and has a pH of 11 or more. The solution will not corrode the treating facility, which can be used for activation of any board plate which can be oxidised.

Vacuum Vapour Deposition Source Material

TANAKA KIKINZOKU KOGYO *Japanese Appl.* 62/238,362
A source material for vacuum vapour deposition, such as Pt, is coated on the surface of a high melting point metal wire or tape heater. Good adherence to the heater is achieved, and a high quality vapour deposition film is obtained.

Autocatalytic Palladium Plating Solution

V.E.B. BERGBAU FUNK A. *East German Patent* 247,926
A solution suitable for autocatalytic deposition of Pd on metallic and non-metallic materials contains a Pd compound, a reducing agent, a complexing agent, stabilisers, and organic oxime compound(s). The solution does not decompose spontaneously, and gives dense, firmly adherent metallisation.

APPARATUS AND TECHNIQUE

Liquid Metal Ion Source

HUGHES AIRCRAFT CO. *World Appl.* 87/6,407A
A liquid metal ion source consists of an emitter of positively charged elemental ions, and a source for supplying the species to the emitter in the form of a congruently vaporising alloy: preferably As, supplied as an alloy with Pd. The ion source is used especially in ion implantation of semiconductor circuits.

Measuring Total Nitrogen Content in Water

MITSUBISHI CHEM. IND. K.K. *Japanese Appl.* 62/198,758
An oxidation catalyst such as Cu-Ni-Pt is used in a reaction tube, in a heating furnace, preferably with a temperature gradient of 100–300°C at the upper section of the catalyst layer. The catalyst converts N compounds in a sample to NO, which provides a method of determining total N content in water.

Heater for Diamond Growth with Anti-Corrosion Layer

TOSHIBA K.K. *Japanese Appl.* 62/202,896
A heater for the gas-phase growth of pure diamond by pyrolysis of an organic reaction gas, has a surface layer which is corrosion resistant to the organic environment at high temperatures. The anti-corrosion layer consists of Pt, Ir, Os, Pd, Rh, Ru, Pt-Rh alloy, Ir-Ru alloy, SiC, TiN, graphite, etc. The heater is stable and has long service life.

Reliable Sensor Film

TANAKA DENSHI KOGYO *Japanese Appl.* 62/214,601
A sensor film consists of an oxide matrix with 3–90 vol.% of a single metal or alloy of at least one of Pt, Pd, Ir, Os, Rh, Ru, Au, Ag, Pb, In, Sn, Fe, etc., dispersed in the matrix. The sensor film is 0.1–100 μm thick, and can be produced by magnetron sputtering. It is used as a temperature or magnetic sensor, and has good measuring accuracy and reliability.

Gas Sensor with Low Alcohol Sensitivity

FIGARO GIKEN K.K. *Japanese Appl.* 62/254,047
A gas sensor with low sensitivity to alcohol is made by moulding SnO₂ system gas sensitive matter, and adding a Rh-Pt complex catalyst to the surface part of the moulding. The total amount of Rh and Pt added is 2.5–250 micromoles/g SnO₂, with a preferred molar ratio of Rh:Pt of 0.4–5. The sensor is useful for detection of H₂, isobutane, CH₄ and CO.

Polymer Combustible Gas Sensor

NIKKO RIKKA K.K. *Japanese Appl.* 62/269,051
A polymer gas sensor is obtained by mixing polyimide resin with 1–10wt.% SnCl₄ and 0.5–7wt.% benzonitrile-Pd complex, and heat treating. The polymer gas sensor can accurately detect the presence of combustible gases such as H₂, CH₄, etc., even at high temperatures.

Polymer Humidity Sensor

NIKKO RIKKA K.K. *Japanese Appl.* 62/269,053
An Al₂O₃ baseplate with a comb-shaped electrode of Pt-Pd screen printing is coated with a treated copolymer, and subjected to an ageing process. The polymer sensor so formed exhibits good sensitivity for humidity, even in wide high temperature regions, owing to its high heat resistance.

Measuring Head for Glucose Determination

CIE GEN. ELECTRICITE *French Appl.* 2,596,155
A measuring head for an electrode is produced easily and reproducibly by successive serigraphic deposition of porous Pt onto an inert support, and then a mixture of SiO₂ with amine functions and PTFE fibres, followed by activation and grafting of an enzyme. The measuring head has good response time, and is used to measure glucose in solution by enzymatic oxidation to H₂O₂.

Platinum Catalyst for Oxygen Measuring Cell

E. STEINMETZ *German Appl.* 3,711,497
An O ion conducting solid electrolyte has both surfaces covered with a gas permeable catalyst such as Pt wool, at the thermocouple contact points. Reference and measuring chambers are positioned on opposite sides of the solid electrolyte, forming a measuring cell for determination of free O₂ content of furnace flue gases.

Microelectrochemical Corrosion Tester

MOSCOW GUBKIN PETROCHEM. *Russian Patent* 1,296,920
An AC resistance meter and Pt electrodes form part of a microelectrochemical tester, which measures the voltage and resistance across part of the test material. The tester is used to measure corrosion in electrolytes, for developing new corrosion-proof materials, and gives improved precision and simplified measurements.

Sensitive Pressure Converter with Platinum Electrode

CHERNOVITS A.S. UKR. *Russian Patent* 1,303,860
A pressure converter consists of a cell with one electrode of Pt wire, and the other of a monocrystalline selenide or telluride, intercalated with an alkali salt. The converter has improved sensitivity, since the structure ensures highly anisotropic mechanical properties, and high sensitivity to internal mechanical forces.

Voltammetric Analysing Electrode

MOSCOW LOMONOSOV UNIV. *Russian Patent* 1,315,884
A voltammetric analysing electrode has a Pt tube containing C paste, and uses a piston to remove the surface layer of paste from the tube after each measurement. The electrode is used for analysis of electrical properties with improved accuracy.

JOINING

Multi-Purpose Brazing Filler Alloy

TANAKA KIKINZOKU KOGYO *Japanese Appl.* 62/275,596
A brazing filler alloy comprises 30–92 wt.% Pt, 0.5–10 wt.% of at least one of Re, Ti, Zr, Hf, V, Y, Cr, etc., and 0.5–69.5 wt.% of at least one of Pd, Au, Ag, Cu and Ni. The alloy is used for joining ceramic to ceramic, graphite, or metal, graphite to metal, and metal to metal, giving high brazing joint strength.

HETEROGENEOUS CATALYSIS

Three-Way Catalyst with Nickel to Reduce Hydrogen Sulphide Emissions

JOHNSON MATTHEY INC. *European Appl.* 244,127A
A three-way catalyst for controlling NO_x, CO and hydrocarbon emissions in automotive exhaust gas consists of a supported platinum group metal and Ni, with a Ni:platinum group metal ratio of 1:1–30:1. The amount of Ni present is sufficient to reduce H₂S emissions when used under fuel-rich conditions.

Catalyst for Deoxygenation of Aqueous Media

BAYER A.G. *European Appl.* 246,533A
Removal of O from aqueous media is effected by catalytic reduction using a catalyst of Pt or Pd on a macroporous weakly basic anion-exchange resin, based on crosslinked polystyrene. The catalysts have improved catalytic metal retention and stability.

Thermally Stable Fluorosilicone Gel

DOW CORNING CORP. *European Appl.* 252,665A
A fluorinated polyorganosiloxane composition containing a Pt catalyst cures to a thermally stable, clear fluorosilicone gel, used to coat PCBs and other substrates on which electronic components are mounted. These gels are resistant to discoloration and hardening at above 100°C, so can be used in vehicle engine compartments.

Higher Activity Naphtha Reforming Catalysts

STANDARD OIL CO. (IND.) *U.S. Patent* 4,703,031
Naphtha reforming catalysts for gasoline production consist of one of Pd and/or Pt, optionally together with Sn or Re, deposited on a porous support. The catalysts have a surface area greater than 300 m²/g, and a defined pore volume distribution. Activity is higher than for prior art catalysts, with equal selectivity for C₅ + gasoline.

Durable Palladium-Ferrobosilicate Catalyst Composition

NATIONAL DISTILLERS CORP. *U.S. Patent* 4,707,500
A long life catalyst consists of Pd ion exchanged or impregnated onto a crystalline ferrobosilicate composition. Synthesis gas is converted with high selectivity to low molecular weight (2–4C) alkanes.

Ruthenium Fischer-Tropsch Catalyst

EXXON RES. & ENG. CO. *U.S. Patent* 4,711,871
A catalyst for use in Fischer-Tropsch hydrocarbon synthesis reactions consists of 0.2–2wt.% Ru supported on a TiO₂ support surface-modified with 2–10wt.% of an oxide of Nb, V or Ta.

Catalytic Composite for Dehydrogenating Paraffins

UOP INC. *U.S. Patent* 4,716,143
A platinum group metal and a Sn, Ge or Re component as modifier are surface impregnated on a refractory support so that most of the metal is in the outer 100µm layer of the catalyst particle. The catalyst has improved selectivity for dehydrogenating paraffins to olefins compared with a similar catalyst with uniform metal distribution.

Gas Turbine Catalyst with Reduced NO_x Generation

TOKYO ELEC. POWER CO. INC. *Japanese Appl.* 62/216,642

A catalyst for a gas turbine is made by coating a cordierite honeycomb support with γ-Al₂O₃ containing a rare earth element, followed by impregnation with Pt, Pd, Rh, Ru, etc., so that the weight ratio of noble metal:rare earth element is at least unity. The catalyst has excellent low temperature ignition and high temperature durability, and generation of NO_x is reduced.

Catalyst for Carbon Monoxide Removal from Waste Air

T. KAGITANI *Japanese Appl.* 62/221,424
A catalyst of Pd, Rh, Ru, Ag, or their mixtures supported on TiO₂, Ti(OH)₂, or Zn(OH)₂, can be used in the treatment of O-containing waste gas containing CO, by a process of u.v. irradiation in the presence of ozone. The method is useful for removal of CO by oxidation from O-containing waste gases such as air or combustion gas.

Selective Hydrogenation Catalyst

K. SAITO *Japanese Appl.* 62/221,447
A selective catalyst for a H adding reaction to a chain unsaturated hydrocarbon contains at least one of Ru, Rh, Pd, Pt, Os, or Ir, at least one of Y or a rare earth element, and B. The catalyst has excellent ability at low and normal temperatures, is stable in air, tolerant to O₂, and is reproducible.

Selective Hydrogenation Catalyst Containing Palladium

NIPPON ZEON K.K. *Japanese Appl.* 62/230,733
Selective hydrogenation of diolefins to monoolefins is achieved at 0–150°C using a supported catalyst containing Pd and possibly Pt, Rh, Ru, Ir, W, or alkali metals, which has been treated with hydrocarbons at 0–150°C prior to use. This pretreatment gives better control over product formation.

Catalyst for Lower Paraffinic Hydrocarbon Production

MITSUBISHI HEAVY IND. K.K.

Japanese Appl. 62/246,993

A solid super acid catalyst is prepared by impregnating a metal hydroxide or oxide carrier with Pt, Ru, Rh, Pd, Os, Ir, Ni, etc., treating with H_2SO_4 , and calcining. The catalyst is used in the production of paraffinic hydrocarbons containing a maximum of 10C by heat treating high boiling hydrocarbons such as shale oil at 150–350°C and at least 50 atm H_2 .

Tritium Leakage Prevention Device

TOSHIBA K.K.

Japanese Appl. 62/247,294

A T oxidation catalyst consisting of alumina ceramics carried by Pd or Pt is positioned on the outside surface of apparatus containing T. Leakage is prevented perfectly by conversion of monomer penetrating the apparatus to T steam.

One-Step Trifluoroethylene Preparation

NIPPON HARON K.K.

Japanese Appl. 62/252,736

Trifluoroethylene is produced inexpensively in one-step by reacting chlorotrifluoroethylene and H_2 in the presence of a platinum group metal catalyst, at 50–300°C. The catalyst consists of compounds of Pt, Pd, Rh, Ir, Ru or Os supported on active C or Al_2O_3 , at 0.1–5wt.% metal; with Pd or Ru catalysts being preferred to give high yields of product.

Exhaust Gas Purification Catalyst

TOYOTA JIDOSHA K.K.

Japanese Appl. 62/254,848

A monolith catalyst for exhaust gas purification is produced by immersing a substrate with a support layer in a noble metal solution containing Pt, Rh or Pd salts, and applying direct voltage between electrodes inserted in the metal substrate. The noble metal deposits in the deeper parts of the support layer where it is protected from poisons, so high activity is maintained for a long time.

Ruthenium-Copper Partial Hydrogenation Catalyst

FUJI KAGAKU KOGYO

Japanese Appl. 62/255,438

A catalyst of 0.01–50wt.% Ru:carrier and Cu:Ru = 2–20wt.% dispersed in solid obtained from a metal hydroxide colloid is used for partial hydrogenation of aromatic hydrocarbons. The catalyst can be prepared readily and cheaply, and is used to produce cyclomonoolefins in about 30–40% yield.

Catalyst for Preparation of Phenolic Compounds

DAICEL CHEM. IND. K.K.

Japanese Appls. 62/255,443/44

Phenolic compounds are produced by hydrogenating or dehydrogenating cyclic ketones in the presence of a 0.05–15wt.% Pd and/or Pt catalyst, at 150–400°C. The process can give phenolic compounds with high selectivity useful as pharmaceuticals, etc.

Trichlorosilane Production

MITSUBISHI METAL K.K.

Japanese Appl. 62/256,713

Trichlorosilane is produced by passing a gaseous mixture of $SiCl_4$ and H_2 through a Si layer containing 0.001–20 mol.% of Pd, Ru, Rh, Ir, or their compounds. The yield of trichlorosilane is 2–3 times higher than from conventional methods, and it is produced at the relatively low temperature of 300–700°C, at a pressure above atmospheric.

One-Step Preparation of Methyl Isobutyl Ketone

SUMITOMO CHEM. IND. K.K.

Japanese Appl. 62/258,335

A catalyst consisting of 0.01–5.0wt.% Pd on a support of $\gamma-Al_2O_3$ and one or more of Ca oxide, Mg oxide, and Sr oxide, is used in the preparation of methyl isobutyl ketone from acetone and H_2 at 80–250°C. The catalyst gives high activity and selectivity for a long time, and facilitates preparation of the product by a one-step reaction.

Catalytic Burner with Improved Heat Resistance

MATSUSHITA ELEC. IND. K.K.

Japanese Appl. 62/266,307

A heat resistant catalytic burner selectively carries a catalyst including Pd, Rh, etc., on a heat resistant semiconductor such as Ti oxide, which is on the surface of carrier materials such as SiO_2 and Al_2O_3 . The life of the catalytic burner is improved.

Palladium Catalyst for Tritium Removal

TOSHIBA K.K.

Japanese Appl. 62/268,931

A ventilation air conditioner contains a catalyst of Pd or Pt/ Al_2O_3 in the air conditioner or circulation flow piping, to remove atomic T by conversion to the oxide as steam. A separate T cleaning plant is not required, which saves cost and space.

Oxidation Catalysts Containing Platinum Group Elements

KAO CORP.

Japanese Appls. 62/269,745/46

A catalyst contains 0.1–20wt.% of Pd, Pt, Ru, or Rh, 0.001–20wt.% of a second component which may be Sn, Bi, etc., and 0.01–20wt.% of one or more rare earth elements, on an inorganic support. The catalysts have high activity and selectivity, and are used to produce carboxyl compounds or ketones by oxidising hydroxy compounds or aldehydes, or to produce oxides of saccharide.

Durable Palladium Catalyst for Exhaust Gas Purification

TOYOTA CENT. RES. & DEV.

Japanese Appl. 62/269,747

An exhaust gas purification catalyst consists of 0.06–0.185wt.% Pd in a defective perovskite complex oxide, with 10–50% solid-soluble Pd, and the rest present as PdO or Pd. The catalyst is used for purifying CO, HC and NO_x in the exhaust, has good high temperature durability, and inhibits NH_3 .

Catalyst Composite to Oxidise Saccharides

KAO CORP.

Japanese Appl. 62/269,748

A catalyst composite consists of an inorganic support with 0.1–20wt.% of (i) Pt, Ru, Rh or Pd, (ii) Sn, Bi or Sb, and (iii) Se, Sn or Te. The catalyst is used to produce a higher yield of oxidised saccharides.

Perovskite Complex Oxide Catalyst

TOYOTA JIDOSHA K.K. *Japanese Appl.* 62/282,642

A new catalyst consisting of a perovskite complex oxide with structure ABO_3 , can contain Pt as a skeletal atom, or Pd or a mixture of Pd and Ce as the B-site ion. The catalyst is used for removing CO, hydrocarbons and NO_x from I.C.E. exhaust.

Hydrocarbon Conversion Catalyst with Improved Activity

INST. FRANCAIS DU PETROLE *French Appl.* 2,594,711

A supported hydrocarbon conversion catalyst with improved activity and life contains 0.01–2wt.% of platinum metals, one of these being Pt, one or more of Sn, Ge, Pb, Ga, In, and Tl, and halogen(s). The metals are introduced as organometallic compounds, which give uniform distribution. The catalyst is useful for reforming for gasoline production, isomerisation, hydrodealkylation, etc.

Naphtha Reforming to Naphthene-Rich Products

V.E.B. LEUNA-WERK ULBRICHT

East German Patent 246,486

A reforming catalyst mixture consists of 0.1–1.0wt.% Pt with additional metals such as Re, Ir, Sn, and Cr, on shaped support particles of zeolite mixed with hydrous Al oxide and optionally Al₂O₃. The catalyst is used for production of naphthene-rich engine fuel components with reduced aromatics content.

Fluorine-Modified Platinum Reforming Catalysts

V.E.B. LEUNA-WERK ULBRICHT

East German Patent 247,792

Catalysts for reforming gasoline-range hydrocarbons consist of Y-shaped profile Al₂O₃ extrusions containing 0.1–1.0wt.% Pt, Cl and F, with specified physical characteristics. The catalysts are especially useful in the presence of high water concentrations, for selective production of aromatics-rich fractions, useful as high-octane gasoline components.

Platinum Catalyst for Production of Anthraquinone Derivatives

KAZA UNIV.

Russian Patent 1,310,387

Alpha-sulphonic acids of methyl and/or hydroxy-anthraquinone derivatives are obtained more simply, and without using an autoclave, by treating the corresponding anthraquinone with oleum, at 70–90°C for 6–8 hours, using 0.01–0.1wt.% PtO₂ as catalyst.

HOMOGENEOUS CATALYSIS

Aldehyde Recovery

DAVY MCKEE LONDON

British Appl. 2,192,182A

An optionally substituted 7–17C aldehyde can be recovered from production by hydroformylation using a Rh catalyst, by degassing, evaporating the aldehyde and recycling the catalyst containing liquid stream. By this method the catalyst deactivation is substantially eliminated.

Preparation of Aromatic Carboxylic Acids

EASTMAN KODAK CO.

U.S. Patent 4,705,890

Aromatic carboxylic acids are prepared with high selectivity by carbonylation of aromatic iodides in the presence of CO, a Ru catalyst, a metal iodide, and a base. High yields are obtained under mild reaction conditions. The process is useful for preparation of certain dicarboxylic acids, which are used in the preparation of polyesters.

Preparation of Hydrogen Peroxide from Water

BOC GROUP P.L.C.

U.S. Patent 4,711,772

An improved preparation of H₂O₂ by reaction of CO, O₂ and H₂O is effected in the presence of a soluble Pd compound, an arsine or phosphine ligand, a non-coordinating acid and a solvent. Use of the ligands allows direct oxidation of H₂O to be effected without using additional chemical reactions to trap H₂O₂.

Palladium Catalyst for Aromatic Ester Preparation

ASAHI CHEMICAL IND. K.K. *Japanese Appl.* 62/201,847

Diphenyl ether carboxylic acid esters are prepared by reacting iodinated diphenyl ethers with CO and aromatic alcohols in the presence of 0.01–10 mol.% of a Pd catalyst, and a base. The esters are prepared in high yield without using triphenylphosphine.

Monohydric Alcohol Preparation with Improved Selectivity

AGENCY OF IND. SCI. TECH.

Japanese Appls. 62/209,031/32

Monohydric alcohols are prepared by reacting CO with H₂ using a catalyst system of Ru compounds, H halides, phosphine oxides, and Ti, Al or V compounds. The reaction is carried out in aprotic polar solvents, under elevated pressure, at 150–350°C. Adding Ti, Al or V compounds markedly improves production and selectivity of methanol and ethanol.

Organic Peroxide Preparation

SUMITOMO CHEM. IND. K.K. *Japanese Appl.* 62/212,360

Preparation of an organic peroxide in good yield involves reacting a specified tertiary amine with a hydroperoxide in the presence of a Ru or Rh catalyst, such as RuCl₂(PPh₃)₂. The organic peroxide produced is useful as an intermediate for medicines.

Palladium Catalyst for Aldehyde and Ketone Production

BASF A.G.

German Appl. 1,643,623

Production of aldehydes and ketones in high yield from olefins with one or more double bonds is effected by oxidation with HNO_3 in the presence of a Pd compound. Reaction occurs at 90–200°C in an aqueous medium containing 0.5–1% HNO_3 , 0.8–1.5% $\text{Pd}(\text{NO}_3)_2$, and 5–10% of a Ag compound. The products are useful for production of solvents, pharmaceuticals and plastics.

Glycol Aldehyde Preparation Using Rhodium Catalyst

TOPCHIEV. PETROCHEM. SYNTH.

Russian Patent 1,310,383

A catalyst consisting of Rh chloride and triphenyl phosphine in a ratio of $\text{PPh}_3:\text{Rh}$ of 2–10 mol/g-atom is used in the hydroformylation of formaldehyde. The method is used to prepare glycol aldehyde. The process is simple, and gives both increased productivity and significantly increased selectivity.

FUEL CELLS

Platinum-Copper Electrocatalyst and Fuel Cell Electrode

NIPPON ENGELHARD LTD. *British Appl.* 2,190,537A

An electrocatalyst of enhanced stability and activity comprises a Pt-Cu alloy containing 15–50at.% Cu on a carrier of C black, acetylene black, graphite or WC. The electrode is used in an acid electrolyte fuel cell.

Gas Diffusion Electrode with Improved Performance

TANAKA KIKINZOKU KOGYO

Japanese Appl. 62/208,554

A gas diffusion electrode used for fuel cells, secondary cells, and anodes for plating has a reaction layer with alternately disposed hydrophilic and water repellent parts. The hydrophilic part consists of platinum group metals and/or their oxides, graphite, and PTFE, and the water repellent part consists of C black and PTFE. Greater catalyst-electrolyte contact gives improved performance.

GLASS TECHNOLOGY

Bushing with Coating to Improve Fibre Drawing Properties

NIPPON GLASS SEN-I. *Japanese Appls.* 62/207,736–38

Pt alloy bushing is used for drawing of glass fibres, and has a glass outflow part coated with a substance of improved wettability, contact angle or reduced volatility than the bushing material. The coating substance can be Pt-Au alloy, Pt-Rh-Au alloy, Rh, Au, TiN, AlN, etc. The coating improves fibre drawing properties, and prevents loss of the bushing material by volatilisation.

Platinum Crucible for Glass Production

TOSHIBA GLASS K.K. *Japanese Appl.* 62/212,227

During glass production in a Pt crucible, Mg, Ba, Ca, and Sr nitrates are added to the starting materials to prevent dissolution of Pt into the molten glass and to allow crucible use over long periods.

Platinum Crucible for Single Crystal Production

TOHOKU METAL IND. LTD *Japanese Appl.* 62/230,692

A vertically movable crucible used for single crystal production is made of Pt or Pt alloy, and has an outer wall forming a sealed space around the crucible body. The crucible is heated, and the temperature of the inner wall can be lowered.

Platinum Crucible for Crystalline Oxide Production

SUMITOMO ELEC. IND. K.K. *Japanese Appl.* 62/246,895

The inner surface of a Pt or Pt-Rh alloy crucible is lined with a high melting point material comprising one of the constituents of the oxide crystal to be produced. Crystals of good quality are produced, without discoloration by impurity inclusion from the crucible material.

ELECTRICAL AND ELECTRONIC ENGINEERING

Spark Plug with Noble Metal Spark Tip

NGK SPARK PLUG K.K. *European Appl.* 243,529A

A spark plug has a 0.1–1.0 mm thin layer of ultrasonically bonded noble metal powder on at least one of the electrode discharge surfaces. Preferably the noble metal powder is Pt, Pd, Ru, Ir, Rh, Au, or alloys, or an alloy with Ni, W or WSi, with a particle size of 10–500 μm . High bond strength between the noble metal tip and electrode is achieved; and noble metal wastage is avoided.

Multilayered Vertical Magnetic Recording Medium

IBM CORP.

European Appl. 243,860A

A magnetic recording medium with enhanced vertical magnetic recording consists of a substrate with multiple magnetic layers, each comprising a non-magnetisable nucleating film, and a magnetisable alloy film. The non-magnetisable film is preferably CoW, and the magnetisable film consists of an alloy of Co and Pt, Pd, Re or Ni, preferably CoPt.

Palladium-Based Layers for Switch Contacts

SIEMENS A.G.

European Appl. 247,541A

A non-noble metal contact spring is galvanically coated with a 3–5 μm thick baselayer of Pd with 10–50wt.% of at least one of Ni, Cu and Co, followed by a 0.1–1 μm thick top layer of Pd with 10–40wt.% Ag or Au. The Pd-based layers form contacts.

Palladium Plated Integrated Circuit Lead Frame

TEXAS INSTRUMENTS INC. *European Appl.* 250,146A
A lead frame comprises Pd or Pd-Ni alloy plated leads and lead ends for connection to a component, and a semiconductor support for contacting an I.C. The lead frame does not require Ag spot plating or solder dipping, and strong thermosonic bonds to the Au wires are formed.

Spark Plug Centre Electrode Manufacture

ALLIED CORP. *U.S. Patent* 4,705,486
Making the central electrode for a spark plug involves striking an Inconel wire having a Pt tip with a force which extends the cylindrical bore, while the Pt flows along the chamfer to completely cover the weld. This method prevents deterioration of the electrical flow path by corrosion, and improves the fuel efficiency and longevity of the spark plug.

Multiple Resistive Layers for Thin-Film Microcircuits

U.S. DEPT. OF ENERGY *U.S. Patent Appl.* 06/894,145
Multiple resistive layers are formed on a dielectric substrate by depositing successive layers of Ta₂N, Ti and Pd, plating a thin Au layer on selected portions of the Pd, and then selectively masking and etching. The resistors produced are temperature stable and laser-trimmable for precise definition, and are used in thin-film microcircuits.

Thermionic Cathode with Osmium Coated Surface

U.S. SEC. OF NAVY *U.S. Patent Appl.* 07/029,514
A thermionic cathode comprises an impregnated porous W matrix body having an electron-emitting surface coated with a thin layer of refractory material such as Os, deposited by CVD. The cathode provides high electron emission density, long life and high substrate adhesion, and is used in high power electron tube devices such as microwave generators.

Long Life Tungsten-Iridium Cathode

U.S. SEC. OF THE ARMY *U.S. Patent Appl.* 07/046,343
A cathode consisting of a 65/34 by weight mixture of W and Ir powder, with 1wt.% Zr hydride, is impregnated with Ba₃Ir₂O₈ to enhance cathode life and current density. The cathode is used especially in microwave devices.

Opto-Magnetic Recording Medium

HITACHI MAXELL *Japanese Appl.* 62/200,552
An opto-magnetic recording medium is produced by sputtering a target alloy consisting of a rare earth metal, a transition metal and a corrosion resistant element. The latter may be Pt, Ru, Rh, Pd, Ir, Nb, Hf, W, Zr, Cr, etc. The sputtering target is easily processed, and production efficiency is improved.

Platinum-Manganese-Antimony Magnetic Thin Film

MITSUBISHI CHEM. IND. K.K. *Japanese Appls.* 62/230,010 and 62/231,440

A magnetic thin film is formed on a substrate and consists of either Pt-Ni-Mn-Sb, or a Pt-Mn-Sb material with a perpendicular magnetisation film preferably made from MnCuBi, or MnBi, on its base. The magnetic film is used in (i) photomagnetic recording media, giving large coercive force and improved Kerr-rotation angle, or (ii) magnetic optical mirrors to polarised beams.

Palladium-Silver Thick Film Paste

TDK CORP. *Japanese Appl.* 62/237,605
A paste for a thick film contains Pd and Ag as major components, a glass component, and a metal hydroxide. The paste can be applied to an Al nitride sintered body substrate, then dried and sintered to metallise the substrate surface.

Ion Exchange Film for Electrochromic Display Element

TOKUYAMA SODA K.K. *Japanese Appl.* 62/238,536
An electrochromic display element includes a bipolar ion exchange film containing cation and anion-exchange layers and a Pt element or compound as catalyst to accelerate the hydrolysis between the layers, or in each layer. In the electrochromic display element, the character or image can be clearly displayed.

Magnetic Recording Medium Containing Platinum

FUJI ELECTRIC MFG. K.K. *Japanese Appls.* 62/239,420/21

A magnetic recording medium includes a magnetic layer of a Co-Ni alloy containing 1-14at.% Pt, and 4-12at.% Sm or 2-7 at.% Gd. Adding Pt and Sm or Gd increases the coercive force of the magnetic layer. The medium is produced with high efficiency, and is used for magnetic discs for magnetic recording devices; giving high output and long life.

Radiation Image Conversion Panel

FUJI PHOTO FILM K.K. *Japanese Appl.* 62/247,298
A radiation image conversion panel consists of a support, a fluorescent layer, and a stimulative fluorescent substance, such as Ru(II)-activated alkaline earth metal halide dispersed in a binder, and a protective resin layer. The material can be used in medical X-ray photodiagnosis, etc.

Cobalt-Platinum Magnetic Thin Film

SEIKO EPSON K.K. *Japanese Appl.* 62/262,414
A multilayer film for use in magnetic recorders is produced by laminating a Co-Pt magnetic thin film with 40-60wt.% Pt, on a Cr thin film on a base plate, and heat treating at 450°C or above. The coercive force of the Co-Pt magnetic thin film can be increased, with reduced variance, by this method.

Amorphous Alloy for Magnetic Heads

ALPS ELECTRIC K.K. *Japanese Appl.* 62/270,741
An amorphous alloy containing 1.5–4.0% Ru, and Fe, Co, Cr, Si and B, is used for magnetic heads, having improved corrosion resistance, wear resistance and saturation magnetic flux density.

Ignition Plug with Noble Metal Catalyst

R. BOSCH G.m.b.H. *German Appl.* 3,616,641
A noble metal, preferably Pt and/or Pd, is doped into the surface of the insulating body of an ignition plug, at least on the side facing the combustion region. The noble metal catalyses the ignition of the fuel and/or the propagation of ignition. The ignition plug is used for a combustion engine.

TEMPERATURE MEASUREMENT

Accurate Temperature Measurement Using Neutron Transmission

ROLLS-ROYCE LTD. *British Appl.* 2,192,055A
The temperature of an object such as a gas turbine engine component is measured by (i) plating various surfaces with a different element, such as Pt, Ir, Re, and (ii) monitoring for each element the thermal Doppler broadening of resonances in the neutron transmission characteristics. Using this method accurate temperature measurements in a number of areas of the object can be made.

Gamma-Thermometer with Platinum Section

SIEMENS A.G. *European Appl.* 243,579A
A gamma-thermometer with high sensitivity and short time constant consists of a rod fitted with an encasing tube and a thermocouple arrangement. The rod has a Pt section fitted as gamma-absorber and thermal link. The gamma-thermometer is used to measure temperature rise from which the absorbed gamma radiation can be derived.

Measuring Resin Temperature for Injection Moulder

DAIWA KOGYO K.K. *Japanese Appl.* 62/204,915
The resin temperature in a mould for an injection moulder is detected by a low cost temperature sensor such as Pt, buried in the tip of an insertion part, an ejector pin, a dummy pin, a core pin, or a sleeve.

MEDICAL USES

Implantable Cochlear Prosthesis

COMMONWEALTH AUSTRALIA *European Appl.* 247,649A
An implantable cochlear prosthesis comprises an electrode array consisting of thirty-two Pt bands moulded with a flexible carrier. Power and data are supplied to the implanted cochlea stimulator across the skin.

Low Toxicity Cis-Platinum Compound

UNIWI. WARSZAWSKI *European Appl.* 252,324A
The preparation of metal cis-dichlorodimethionineplatinato involves addition of a metal salt to the Pt component, where the metal is especially Yb-169. The product has low toxicity, good radionuclide parameters for scintigraphic examinations and for diagnosis of neoplasm.

Bis-Platinum Anti-Tumour Complexes

ANDRULIS RES. CORP. *U.S. Patent* 4,720,504
Pt complexes such as benzene pentacarboxylato bis-(1,2-diaminocyclohexane Pt(II)) are used in the treatment of malignant tumours such as myeloma, leukaemia and carcinoma. The bis-Pt complexes can be tailored to deliver 2 doses of diamino platinum ions at a chosen rate and are readily water soluble and suitable for oral administration.

Electrode for Heart Pacemaker

TANAKA KIKINZOKU KOGYO *Japanese Appls.* 62/204,765–67
Manufacture of an electrode for a heart pacemaker involves applying a surface coating of Pt and IrO₂ or a mixture of Pt and a platinum group metal oxide, to a substrate of Pt, Pt alloy, Ti, or Ti alloy. A coating membrane layer is formed, 0.5 μm or more thick. The properties of the electrode result in prolonged battery life.

Generating Oxygen Gas for a First-Aid Respirator

N. UENO *Japanese Appl.* 62/216,903
A suitable amount of colloidal Pt is added to an aqueous solution of Na₂CO₃ and H₂O₂ adduct, or the solution is added to colloidal Pt, to generate O₂ gas immediately for a first-aid respirator. The colloidal Pt is enclosed in a capsule which is broken to generate a given amount of O₂ when used.

Blood Glucose Sensor

SHINGIJITSU KAIHATSU *Japanese Appl.* 62/261,341
A glucose sensor for use in the body consists of a cylindrical Ag-AgCl cathode system and a Pt anode inserted into the cylindrical cathode. On the anode tip are several films and a fixed glucose oxydase film. The sensor can precisely measure the blood glucose concentration with high sensitivity, for a long time.

Reduced Toxicity Platinum Anti-Tumour Preparation

NIPPON KAYAKU K.K. *Japanese Appl.* 62/292,722
A Pt complex medical preparation contains a Pt complex such as cisplatin, and a water-soluble magnesium salt such as MgCl₂. The medical preparation is effective as an anti-tumour agent, with lower toxicity to the kidneys.

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