NEW PATENTS

METALS AND ALLOYS

Solid Solution Preparation

DU PONT DE NEMOURS CO. *U.S. Patent* 4,678,505

Solid solutions of metals such as Pd/Ag, Rh/Ag, Pd/Cu, Pd/Pt, Pd/Ni, Pt/Ag and Cu/Ag, or of oxides such as ruthenates, can be prepared reliably and economically, with finely divided, uniform particles, by an ionic reaction and simultaneous precipitation process. The products are useful for monolithic capacitors, thick film resistors and conductor pastes.

Magnetic Thin Film Containing Ruthenium

SONY CORP. *Japanese Appls.* 62/104,107/110/11

A soft magnetic thin film contains 0.1–10 at.% Ru, and Fe, Al and Ge, or Fe, Co, Si, and optionally Al. The soft magnetic thin film is used for magnetic head core materials, having improved wear resistance and corrosion resistance compared with thin film containing no Ru.

Soft Magnetic Thin Film

TOHOKU METAL IND. LTD. *Japanese Appl.* 62/120,459

Material for a soft magnetic thin film consists of 0.3–5 wt.% platinum group elements, 2–8 wt.% Si, 0.5–2.5 wt.% Al, 0.01–2 wt.% rare earth elements, and balance Fe. The material has excellent magnetic properties, and a film of high permeability and strength can be obtained for use in thin film magnetic heads and sensors.

Palladium Alloy for Electrical Contacts

DEGUSSA A.G. *German Appl.* 3,624,149

Electrical plug contacts used for very small voltages and currents in electronic devices, are made from a Pd alloy containing 0–2 wt.% of one or more of Ir, Os, Ru, or Rh, 4–20 wt.% Bi and/or Sb, and balance Pd. The alloy has a recrystallisation temperature of about 650°C, is wear resistant, resistant to aggressive conditions, can be processed to thin layers and is Au-free.

ELECTROCHEMISTRY

Composite Noble Metal Electrode Material

COMMONWEALTH SCIENT. ORG. *World Appl.* 87/2,715A

A composite electrode material for use in solid elecrolyte devices has a noble metal selected from Pt, Pd, Ir, Rh, Au, Ag, or alloys or mixtures of these, and a p- or n-type semiconducting metal oxide. The electrodes have superior properties, and are used in oxygen pumps, fuel cells, electrochemical reactors, and oxygen sensors, which may operate at temperatures as low as 300°C.

pH Electrode for Hot Water in Nuclear Reactor

TOSHIBA K.K. *Japanese Appl.* 62/75,249

A pH electrode is provided with a semiconductor of TiO_2, Fe_2O_3 or $SrTiO_3$; the surface of which has a H_2 sensor layer of Pd, Ta_2O_5 or Al_2O_3. It has low internal impedance and is used to measure the pH of high-temperature and high-pressure water in a boiling water nuclear reactor, simply and quickly.

Corrosion Resistant Electrode for Electrolytic Plating

TANAKA KIKINZOKU KOGYO *Japanese Appl.* 62/80,297

An insoluble electrode for use in electrolytic Zn or Sn plating is produced by plating a Pd, Rh, Ir, Au or Ag layer, at least 0.1 μm thick, onto a roughened metal substrate. A solder alloy plating layer, and a hot dip plating layer of Pb, Sn or Pb-Sn alloy are then applied. The electrode shows excellent corrosion resistance and durability.

Needle-Type Electrode for Biological Use

LENGD. HOSPITAL *Russian Patent* 1,266,546

A needle-type electrode has a working part made of Pt, a stainless steel body, and the cavity can be filled with an epoxy resin. It is suitable for medical research units, especially for use with biological objects. An advantage is that three parameters can be recorded simultaneously: an electromyogram, a polar diagram and temperature.

Halogen Production Using Iridium Based Alloy Anodes

STANDARD OIL CO. (OHIO) *South African Patent* 86/6,508

An anode consists of a substrate with a coating of an Ir based amorphous metal alloy, which may also contain one or more of Ru, Rh, Pt or Pd. The anodes are used in the production of halogens, chlorates, or perchlorates by electrolysis of halide solutions. The alloy is very corrosion resistant, and is substantially 100% selective to chlorine.

ELECTRODEPOSITION AND SURFACE COATINGS

Plating Apparatus with Platinum Mesh Anode

ELECTROPLATING ENG. *European Appl.* 222,232A

A Pt mesh anode is immersed in a plating solution, and is connected to a strip drive roller, also connected to a cathode power source. These are part of equipment used for continuous plating of connector terminal tips, by drawing the tips over a meshed solution retainer. The method applies solution to a precise target area, thus saving precious metals normally used for this.

Stable Electrolyte for Palladium Electroplating

LEARONAL INC. *European Appl.* 225,422A

A stable, aqueous, alkaline electrolyte for Pd electroplating consists of a soluble Pd compound, and an organic complexing agent. The deposits produced are semi-bright with suitable ductility, wearability, corrosion resistance and low contact resistance. The process may provide a substitute for Au electrical contacts and connectors.

Electrocatalytic Metal Deposition in Solid Matrices

DU PONT DE NEMOURS CO. *U.S. Patent* 4,668,354

Continuous, thin interlayers of Pd, Pt, Au, Ag or other metals are deposited in a controlled manner inside a solid matrix by contacting it with an electron transfer agent, a source of electrons, and reducible metal ions. Complex metal patterns may be deposited, potentially useful for conductive circuit patterns or metallised images. Other uses include reflectors and heat-shielding coatings.

Palladium Electroplating Solution

TECHNIC INC. *U.S. Patent* 4,673,472

An electroplating solution for Pd and Pd alloys contains the reaction product of Pd diaminodinitrile with an acid, and a nitrile scavenging agent. The electroplating solution has a pH of 1.5–4.0, and is free of organic polyamine complexing agents. Ductile, crack-free Pd electrodeposits can be plated at high rates, with current efficiencies approaching 100%.

Whisker Reinforced Aluminium Alloy Composite

KOBE STEEL K.K. *Japanese Appl.* 62/93,323

A composite consists of Al or its alloy powder coated with Pd, Cu, Zn or Ni by electroless plating, bonded together with SiC, Si_3N_4 or Al_2O_3 whiskers which are light, strong, elastic and heat resistant. The composite is used for spacecrafts, automobiles or sports goods, and has excellent bonding strength between the Al alloy powder and the whiskers.

Electric Circuit Substrate Manufacture

KANTO SEIKI K.K. *Japanese Appl.* 62/109,393

A photocatalyst consisting of semiconductor powder is deposited on a circuit pattern form on an insulating substrate. The substrate is then immersed in a Pt ion solution and u.v. irradiated to precipitate Pt, to make the electric circuit pattern.

Technique for Attractive Noble Metal Plating

VICTORIA K.K. *Japanese Appl.* 62/120,493

A Ti based material is plated with noble metals after first treating with a fluoride-containing solution, and then applying Pd strike plating. This method is used to provide a more aesthetic appearance to the material, which can be used for glass frames.

APPARATUS AND TECHNIQUE

Electrochemical Gas Sensor

ALLIED CORP. *European Appl.* 221,381A

Apparatus for detecting selected compounds in a gas has a sensing electrode of Pt alloyed with Ru, Os, Rh, Ir and/or Pd, a reference electrode, a control circuit, and an electrolyte of H_2O, a halide and optionally ethylene glycol. Low levels (2ppm) of alkyl sulphides, mustard gas and Lewisite can be detected with little interference.

Luminescent Metal Complexes for Labelling

R. S. DAVIDSON *World Appl.* 87/4,523A

A time-resolved luminescence binding assay method involves luminescent complexes of Ru, Ir, Os or Cr, for labelling the binding partner. The complexes can be used with binding partners such as antigenic compounds, antibodies or antibody fragments. They have acceptable half-lives of emission, and Ir complexes are suitable for laser excitation.

Platinum Crucible for Single Crystal Growth

OSAKA SODA K.K. *Japanese Appl.* 62/78,196

A Pt crucible is used for the preparation of single crystals of Li niobate by the Czochralski method. A Li niobate block is used as the raw material for crystal growth, and is charged to fill 90% of the crucible volume. This results in improved yield and readiness for obtaining a long-size crystal, and about four-times longer service life of the Pt crucible.

Selective Hydrogen-Halide Gas Sensor

SHIN COSMOS DENKI K. *Japanese Appl.* 62/88,955

A H-halide-gas-selective gas sensor has a reference electrode and counter electrode, each composed of gas permeable thin film with a thin inside layer of fine powder Pt, Pd, Rh, Ir, Au or their alloys.

Ammonia Detecting Element with Improved Sensitivity

KHARKOV POLY. *Russian Patent* 1,259,169

Gaseous NH_3 is detected by a spiral Pt element coated with a mixture of Al oxide, Al nitrate, Sn oxide, and aqueous NH_3, followed by drying and impregnation with Pd chloride. The element has a well defined composition, containing 1–4% Pd chloride, and is more sensitive than previous elements.

Automatic Galvanic Coating Thickness Measurement

V. R. PYALANIS *Russian Patent* 1,260,419

An automatic monitoring system has a coating thickness sensor of two Pt resistors, and for all metals except Pt the sensor measures resistance as metal builds up on a thin 10 μm Pt film or wire. The system incorporates a control computer and is used in electrochemistry for application of galvanic coatings.

Determination of Hydrogen Contact with Metals or Alloys

LATV. STATE UNIV. *Russian Patent* 1,267,233

A thin layer of Pd is applied to one side of a test metal plate, followed by a transition metal oxide layer, and colour changes in the oxide are observed. The presence of H_2 can be determined by this non-destructive test method, which is used in instrument-making, building and chemical industries.

Rhodium Standard Solution for Instrument Calibration

NOVOS UNIV. *Russian Patent* 1,272,149

A standard solution for calibrating spectrophotometric procedures comprises a rhodium salt dissolved in warm, concentrated acid. Production of the standard solution is simplified and accelerated if rhodium tris(acetylacetonate) is used. Results obtained using the standard solution agree well with those obtained gravimetrically.

JOINING

High Quality Wire Interconnections

OLIN CORP. *U.S. Patent* 4,674,671

One end of a wire formed from a Pd base material is formed into a ball, which is used to make an interconnection between two electrical components. Using this method high quality wire interconnections can be made in semiconductor devices by controlling stage temperatures.

Palladium-Containing Alloy for Soldering

MITSUBISHI METAL K.K. *Japanese Appl.* 62/24,893

A Cu-Ag series alloy for soldering contains by weight 25–65% Ag, 0.5–25% Pd, 0.25–6.5% Si, 0.001–0.8% B and/or Li, and Cu. The soldering material had good wettability, low melting point, and gives a base material with no cracks. It is used for soldering electronic tubes and vacuum apparatus.

Palladium Activator for Chromium Powder Sintering

TOYO SODA MFG. K.K. *Japanese Appl.* 62/124,243

An activator of Pd salt or boric acid is added to metal Cr powder above 99.0% purity, and the mixture is compacted, filled into a glass container, evacuated, heated and then sintered at 1000–1400°C. The metal Cr can be sintered to any shape by this process.

Brazing Filler Material Containing Palladium

TANAKA KIKINZOKU KOGYO *Japanese Appl.* 62/144,897

A brazing filler contains 0.5–40% Pd, 0.5–5% B, 0.5–15% Cr, 0.5–10% Si, and balance Ni, and optionally contains 0.5–7% Fe and/or Co by weight. The material is of thin plate, fine wire, or powdery form, used for brazing stainless steel or Ni alloy.

HETEROGENEOUS CATALYSIS

Terephthalic Acid Purification

AMOCO CORP. *European Appl.* 222,500A

A layered noble metal catalyst bed is used for purification of crude terephthalic acid solution by hydrogenation, at 100–350°C. The catalyst bed has a first layer of Group VIII metal/active C, a second layer of Pd/active C and an optional third layer of Rh/active C. Up to 10,000ppm of impurity is removed, and terephthalic acid of high purity is obtained.

Ruthenium Catalyst for Diisopropylcarbinol Production

CHISSO CORP. *European Appl.* 227,250A

A catalyst containing Ru is used for diisopropylcarbinol preparation by hydrogenation of diisopropyl ketone. Preferably reaction is effected at 20–200°C, under a pressure of 1 atmosphere–100 kg/cm^2.

Waste Explosive Hydrogenation Catalyst

U.S. SEC. OF THE ARMY *U.S. Patent* 4,661,179

Liquor from the production of organic explosives is treated to destroy waste explosive by contacting with H_2 in the presence of a heterogeneous catalyst. Preferably hydrogenation occurs at 50–120°C and 50–200 psig using a Pt, Pd, Ni or Raney Ni catalyst. The process is simple, economic and effective, and produces a material suitable for disposal.

Palladium Catalyst for Hydrogen Peroxide Production

HALCON S. D. GROUP INC. *U.S. Patent* 4,661,337

A catalyst, preferably of 2–5 wt.% Pd/C or SiO_2, is suspended in acidic aqueous solution to form a medium up to 2mm thick, for reacting H_2 and O_2 to form H_2O_2. No organic solvents, special catalysts or catalyst pretreatments are required, and solutions of increased H_2O_2 concentration are obtained.

Ruthenium Fischer-Tropsch Catalyst

DOW CHEMICAL CO. *U.S. Patent* 4,666,881

A catalyst for producing hydrocarbons by contacting CO and H_2 in a Fischer-Tropsch process, consists of 0.1–10 wt.% Ru, supported on an oxide of Ta, Nb and/or V containing no crystalline metal oxide, and with a surface area >10 m^2/g. CH_4 is produced selectively, in high yield, using relatively low H_2:CO ratios, and without high pressures.

Multi-Zone Catalytic Reforming of Naphtha

AMOCO CORP. *U.S. Patent* 4,663,020

Catalytic reforming of naphtha occurs in two zones: (1) having a catalyst of supported platinum group metal(s) and Sn, preferably 0.05–1 wt.% Pt and Sn; and (2) comprising supported platinum group metal(s), preferably 0.05–1 wt.% Pt and Re. This catalyst combination gives improved BTX (benzene, toluene, xylene) yields and increased 5C+ yields.

Naphtha Isomerisation Catalyst

UOP INC. *U.S. Patent* 4,665,273

An isomerisation catalyst which is effective with feeds containing S has a Group VIII noble metal, preferably Pt at 0.15–0.5 wt.%, a hydrogen form mordenite, Al_2O_3, and has a surface area of at least 580 m^2/g. It is contacted with a hydrocarbon feed containing especially 4–7C normal paraffins, which are converted to isoparaffins for use in gasoline.

Palladium-Copper Catalyst for Diester Production

TEXACO INC. *U.S. Patent* 4,667,053

A catalyst of Pd and Cu on a polymer support, or a mixture of Pd/C and Cu/polymer support, is used for oxidative carbonylation of a 2–20C α-olefin using O_2 and CO, at 50°C and 500 psi (minimum). Aliphatic dicarboxylic esters are produced, especially diester precursors of 1,4-butanediol and acrylic acid. The process shows improved selectivity and efficient, easy, product separation.

Palladium Hydrogenation Catalyst

CHEVRON RES. CO. *U.S. Patent* 4,673,487

A process for stabilising lubricating oil to u.v. radiation involves catalytic hydrogenation of the hydrocracked feedstock. Addition of 0.03–1.0 wt.% of Pd to a catalyst of Ni, Sn, and a siliceous matrix, improves hydrogenation activity, and makes activation by H_2 reduction easier; preferably being effected at 500–800°F instead of 700–800°F.

Palladium Catalyst for Hydrogen Peroxide Manufacture

DU PONT DE NEMOURS CO. *U.S. Patent* 4,681,751

A catalyst of Pd on adsorbent C is used in the manufacture of H_2O_2 by reaction of O_2 with H_2 at 200–4000 psig. Reaction occurs with 0.05–1 wt.% catalyst in an aqueous medium containing no more than 2 wt.% of organic components. The product is obtained in greater concentrations, the process is safe, and catalyst deactivation is avoided.

Noble Metal Catalyst Exploder

NIPPON SHOKUBAI KAGAKU *Japanese Appl.* 62/72,587

A catalyst containing a noble metal such as Pt, Pd or Rh on a support mainly of active Al_2O_3, is kept in contact with, or close to, a liquid having low boiling point fuel as a main component, jelly or solid fuel. The exploder burns the fuel without a flame.

Palladium-Copper Catalyst for Anhydride Preparation

SAGAMI CHEM. RES. CENTRE *Japanese Appl.* 62/77,351

A Pd-Cu catalyst is used in the preparation of mixed β-acyloxycarboxylic anhydrides from carboxylic anhydrides, olefins, CO and O_2. The product anhydrides can be prepared by a one step reaction, in high yield, under mild conditions.

Monocyclic Cycloolefin Preparation

ASAHI CHEMICAL IND. K.K. *Japanese Appl.* 62/81,331

A catalyst comprising Ru and Zn (preferably 2–20 wt.%), or Ru and Fe (especially 0.1–20 wt.%), is used to prepare monocyclic cycloolefins by partial hydrogenation of monocyclic aromatic hydrocarbons.

Monolithic Catalyst with Partial α-Alumina Coating

TOYOTA JIDOSHA K.K. *Japanese Appl.* 62/83,038

Pt, Pd or Rh are deposited on a monolithic support coated with a layer partially composed of α-Al_2O_3. This is formed by applying an activated Al_2O_3 coating, loading metal components which facilitate the transformation to α-Al_2O_3 onto the preferred part, and calcining at 800–1000°C.

Hydrogen-Oxygen Recombination Catalyst

HITACHI K.K. *Japanese Appl.* 62/83,301

Nuclear reactor waste gas containing H_2, O_2, superheated steam and a trace amount of air is passed through a reactor containing a catalyst of 0.1–5.0 g/l Pt or Pd, supported on spongy metal with 0.5–6.0 mm pore diameter, with Al_2O_3 as a binder. O_2 and H_2 are recombined; thus safely treating gas generated by radiative decomposition in nuclear reactors.

Olefinic Hydrocarbon Preparation Using Ruthenium Catalyst

SHIN-NENRYOYU KAIHA *Japanese Appl.* 62/106,030

A catalyst containing Ru is used in the preparation of hydrocarbons by reaction of H_2 with CO. The catalyst comprises 0.05–20 wt.% Ru, and Nb oxide or Ta oxide at 4–99.95 wt.%, preferably with an oxide:Ru ratio of 10:500. Aliphatic 5–12C hydrocarbons, especially olefinic hydrocarbons, can be obtained over a wide temperature range.

Improved Palladium-Cobalt Hydrogenation Catalyst

MITSUBISHI CHEM. IND. K.K. *Japanese Appl.* 62/111,974

A solid catalyst of 1–6 wt.% Pd and 5–50 wt.% Co supported on diatomaceous earth is used in the production of γ-butyllactone by hydrogenation of maleic acid, succinic acid and/or their anhydrides. The process provides γ-butyllactone by suspension-phase, fixed bed, with high selectivity and yield.

Platinum, Palladium or Rhodium Combustion Catalyst

NIPPON SHOKUBAI KAGAKU *Japanese Appl.* 62/114,650

A combustion catalyst giving heat radiation rich in far i.r. rays, consists of an inorganic fibre support loaded with Pt, Pd or Rh, at > 0.1 wt.%, and ZrO_2, at 0.1–30 wt.%. The catalyst is used for a combustor in which gaseous fuels or gasified liquid fuels are completely burnt at low temperatures, without flame.

Palladium Catalyst with Stable Support

MATSUSHITA ELEC. IND. K.K.

Japanese Appl. 62/117,629

A waste gas purification catalyst consists of Pd on a porous support containing Ca aluminate. Loss of specific surface areas of the catalyst is minimised: after 100 hours heating at 1000°C, the surface area decreased from 30 to 25 m^2/g. The catalyst has improved durability for high temperature operation.

Palladium Catalyst for Benzaldehyde Synthesis

SHOWA DENKO K.K. *Japanese Appl.* 62/121,645

A catalyst of supported Pd (0.01–30 wt.%) and one or more of Bi, Sb and Te (at 0.01–90 wt.%), is used for liquid phase synthesis of benzaldehyde from styrene, acetic acid, O_2 or O_2-containing gas. The catalyst shows high selectivity for benzaldehyde.

Exhaust Catalyst with Two Types of Support

TOYOTA JIDOSHA K.K. *Japanese Appls.* 62/125,855/56

A new monolith catalyst is divided into two regions: an upstream area where Rh and optionally Pt, Pd, Ir, Ru, and Os are supported on α-Al_2O_3, or one or both of TiO_2 or ZrO_2, and a downstream area with one or more of Rh, Pt, or Pd supported on activated alumina(s). The catalyst has high activity.

Palladium-Yttrium-(Zirconium) Oxidation-Reduction Catalyst

MATSUSHITA ELEC. IND. K.K.

Japanese Appls. 62/136,243/44

A catalyst for waste gas purification is prepared by depositing metallic Pd, yttrium oxide and optionally Zr oxide on a support surface, from a solution containing their precursors and an organic acid. The catalyst can simultaneously convert CO to CO_2, NO_2 to NO, and hydrocarbons to CO_2 and H_2O, in an O_2 containing waste gas atmosphere.

Palladium Catalyst for N_2O Decomposition

BAYER A.G. *German Appl.* 3,543,640

Catalytic decomposition of N_2O into the elements is carried out in the presence of a supported Pd catalyst, preferably with a concentration of 2–5 g/l, and at 450–800°C. The process is useful for converting N_2O into a breathable mixture of O_2 and N_2, and the lighter and smaller apparatus used is of particular interest for space travel.

Platinum Catalyst for Paraffin Aromatisation

A.S. KAZA PETROCHEM. *Russian Patent* 898,648

A catalyst comprising 0.3–0.6 wt.% Pt, 0.001–0.1 wt.% Mo, 0.001–0.1 wt.% B, and balance Al_2O_3, is used in the production of aromatic hydrocarbons from n-paraffins. The catalyst provides a high and stable yield of aromatic products.

HOMOGENEOUS CATALYSIS

Novel Palladium Polymerisation Catalyst

SHELL INT. RES. Mij. B.V. *European Appl.* 222,454A

Novel catalyst compositions containing bisphosphines comprise a Pd, Co or Ni compound, an anion of an acid with pKa<6, and a bidentate ligand. They are useful in the polymerisation of mixtures of CO, ethene, and other unsaturates.

Novel Preparation of Aromatic Urea Compounds

SHELL INT. RES. Mij. B.V. *European Appl.* 225,673A

A catalyst consisting of Ir, Ru, Rh, Pd or Pt, preferably Pd, and an organic ligand, is used in the preparation of N-aromatic N'-acyl urea by reacting an aromatic nitro group with a primary or secondary amide and CO. The product is obtained in a single step, with high selectivity, from readily available starting materials, and can be used as an insecticide.

Catalyst for Methyl Formate Production

ASHLAND OIL INC. *U.S. Patent* 4,661,623

Methyl formate is produced using a catalyst containing Ru, Os, Rh, Ir or other metals for the reaction of an anhydrous solution of at least 15 mol.%CH_3OH with CO. Turnover numbers and selectivity are excellent, and the reaction can be carried out at low pressures using the catalyst, at 1500–2300 psia.

Siloxysilane Compound Preparation

ASAHI GLASS K.K. AND SHIVETSU CHEM. IND. K.K.

Japanese Appl. 62/81,391

A siloxysilane compound is prepared by reacting allyl vinyl ether with a trimethyl-siloxysilane compound, in the presence of a Pt compound such as platinic acid chloride. The product is useful for plastic lenses, sealants, coating agents or adhesives or comonomers for polymers.

Hydrogenolysis Catalyst for N-Alkyl-Lactam Production

MITSUBISHI CHEM. IND. K.K.

Japanese Appl. 62/120,360

A catalyst of Pt, Pd or Ru is used in the production of N-alkyl-lactam by hydrogenolysis of an N-(α-hydroxyalkyl) lactam. The process is effected in aqueous acid medium, at 50–200°C, under a H_2 partial pressure of 10–150 kg/cm^2. Better yields of N-alkyl-lactam are obtained, with higher selectivity than known methods.

Palladium or Platinum Imine Alkenylation Catalyst

SOC. NAT. ELF. AQUITAINE *French Appl.* 2,588,554

Alkenylation of imines is achieved by reaction with an olefinic carbonate, in a base-free solvent, using a Pd or Pt catalyst at moderate temperatures. New imines are obtained which can be used for the production of amine acids, in higher yields.

Noble Metal Catalyst for Anhydride Preparation

ROHM G.m.b.H. *German Appl.* 3,544,765

A catalyst system containing Rh and/or Pd and/or Pt is used in the preparation of unsaturated aliphatic carboxylic acid anhydrides from α-, β-unsaturated carboxylic acid esters and CO. Reaction occurs at 70–350°C, 1–500 bars, with Br and/or I promoter.

Selective Palladium Hydrogenation Catalyst

JENAPHARM V.E.B. *East German Patent* 242,412

Selective catalytic hydrogenation of the 1-double bond of 1,5-diene-3-keto steroids is carried out in a solvent using a Pd or 0.5–20% supported Pd catalyst.

FUEL CELLS

Platinum Alloy Catalyst for Fuel Cell Electrodes

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 62/83,039

A catalyst for fuel cell electrodes has Pt alloy particles which are difficult to aggregate on heat treatment. Preparation involves treating an acetylene black support with aqueous $Fe(NO_3)_3$, heating to partially oxidise, mixing with Pt, and heating in 5% H_2/N_2.

Improved Platinum-Vanadium Fuel Cell Catalyst

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 62/83,040

Preparation of a Pt-V alloy catalyst involves making an aqueous V chloride solution alkaline, reducing the V salt to form a Pt and V mixture, and then heating at 800–950°C. The alloy catalyst is used in cathodes for phosphoric acid fuel cells.

Fuel Cell Platinum-Cobalt-Chromium Cathode Catalyst

UNITED TECHNOLOGIES CORP. *Belgian Patent* 905,999

A ternary alloy catalyst contains a noble metal (Pt, Ir, Rh or Pd), Co, and a transition metal, on a C support. The catalyst preferably comprises 78% Pt, 14% Co, and 8% Cr, and has a structure which is an ordered solid solution. It is used as a fuel cell cathode catalyst, and has activity double that of non-alloyed Pt for electrochemical reduction of O_2.

CHEMICAL TECHNOLOGY

Storage Medium for Hydrogen

SYRACUSE UNIV. *European Appl.* 230,384A

A storage medium for H_2 comprises a high surface area activated C with a transition metal such as Pt, Pd, Ni or Fe; kept below 293°K. The metal is in elemental form, capable of dissociating H_2, and preferably has a particle size of 50–200 Å. Stored H_2 is used as a secondary energy source, and can be fed to a fuel cell or turbine.

Dielectric Single Crystal Production

SUMITOMO ELEC. IND. K.K. *Japanese Appl.* 62/91,487

A frame of Pt, Rh, Ir or an alloy of one of these metals, is heated to a temperature 1–20°C above the solidification point of a melt, and is placed at the mouth to withdraw the single crystal.

GLASS TECHNOLOGY

Continuous Platinum Glass Smelter

TOSHIBA GLASS K.K. *Japanese Appl.* 62/83,322

A vertical continuous glass smelting plant consists of a Pt smelter equipped with high frequency heaters, and upper and lower Pt blades for flow agitation. It is used to smelt continually glass materials having low melting point and to generate easily phase separation of magnetised glass.

ELECTRICAL AND ELECTRONIC ENGINEERING

Dual-Layer I.C. Interconnect Metallisation

TEKTRONIX INC. *European Appl.* 226,385A

Interconnect metallisation on an I.C. chip is formed by depositing two metallisation layers. The first consists of a highly conductive metal layer, preferably Au, and a second metal layer of higher rigidity than the first, perferably Rh. The Rh layer maintains the shape of the first layer during annealing.

Contact Element for Electric Switch Contacts

SIEMENS A.G. *European Appl.* 227,972A

A contact element, especially a contact reed for an electromagnetic relay, has a substrate electroplated with a three-layer contact coating. The bottom layer is a Pd-Ni alloy, 2–10 μm thick, the middle layer is of Ag or Au, <1 μm thick, and the outer layer is Rh, 0.4–1 μm thick.

Liquid Metal Ion Source for Ion Implantation

HUGHES AIRCRAFT CO. *U.S. Patent* 4,670,685

A liquid metal ion source for semiconductor ion implantation processes consists of a Pd alloy, preferably containing about 70 at.% Pd, As, and P and/or B, together with an emission means for positive ions. The apparatus provides a stable emission of multiple ionic species.

Wear Resistant Magnetic Head

HITACHI K.K. *Japanese Appl.* 62/75,918

A thin film magnetic head has a magnetic core comprising a metal film, perferably of Pd, Pt, Rh, Ru, Ir, Os or other metals, and at least one soft magnetic metal film, preferably Fe-Si-Al alloy or an amorphous soft magnetic alloy such as Co-Nb-Zr.

Platinum-Tungsten Conductors for Printed Circuit Board

TOSHIBA K.K. *Japanese Appl.* 62/123,795

A ceramic base printed circuit board has conductors formed by firing a paste containing mainly Pt (perferably 40–90 wt.%), and W. Direct Au wire bonding can be made at a desired patterned portion of the outer board, after firing, or direct Ag brazing without Au or Ni plating can be done.

Magnetic Recording Medium Containing Platinum

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 62/141,628

A magnetic recording medium has a substrate, a non-magnetic underlayer, a sputtered magnetic layer of 1–14 at.% Pt, Co, and Ni, and a sputtered protecting layer. The material has improved coercivity and corrosion resistance, and is used for magnetic discs.

Rapid Response Circuit Breaker

CNRS CENT. NAT. RECH. SCI. *French Appl.* 2,589,628

An amorphous alloy selected from Pd-Cu-Si, Ni-Zr, or Ag-Cu-X, is used in wire or strip form for electrical fuses. The alloy has a crystallisation temperature of at least 200–300°C, and electrical resistivity of a few tens to a few hundreds of $\mu\Omega$ cm.

TEMPERATURE MEASUREMENT

Corrosion Resistant Thermocouple

THERMOCOAX ET CIE. *French Appl.* 2,590,980

A thermocouple for use at temperatures above 1200°C consists of a Pt wire and a Pt-Rh alloy wire embedded in a Pt-Rh alloy sheath for protection and earthing. The space within the sheath if filled with compacted refractory powder. Corrosion resistance is ensured and the thermocouple can be used in nuclear reactors, steelworks or chemical plants.

MEDICAL USES

Glucose Measurement in Blood

GAMBRO A.B. *European Appl.* 223,948A

An electrode measuring system for medical use has a central Pt electrode surrounded by an annular Ag-AgCl electrode, a connecting duct, a membrane and a seat. It is used for measuring glucose in the blood of diabetic patients, and gives increased probability of a representative sample because of forced flow.

New Anti-Microbial Platinum Complexes

WARNER-LAMBERT CO. *European Appl.* 228,077A

New square-planar, cis-Pt four co-ordinate complexes are useful as anti-microbials and anti-neoplastic agents. The complexes are active against certain DNA repair deficient strains, and are also useful against solid tumours, leukaemias and lymphomas.

Platinum Anti-Tumour Agents with High Activity

ANDRULIS RES. CORP. *European Appl.* 228,298A

New 1,2-diaminocyclohexane Pt complexes are useful as anti-tumour agents, with high activity, good stability in solution, and higher therapeutic indices than cisplatin. As an example, doses of 3.12–200 mg/kg gave T/C values of 128–357% against L1210 leukaemia in mice.

New Platinum Anti-Tumour Agents

AMERICAN CYANAMID CO. *U.S. Patent* 4,675,336

New Pt complexes of amines with dibasic acids are used as anti-tumour agents at a dosage of 3–200 mg/m^2/day. The complexes are useful to induce palliation and regression of tumours, such as leukaemia, melanomas, adrenocarcinomas and sarcomas.

Glucose Sensor with Iridium Substrate

CARDIAC PACEMAKERS *U.S. Patent* 4,679,562

A sensor for electrical determination of blood glucose concentration has an Ir substrate with a surface oxide layer, carrying a silanised triethoxysilane based film, bonded to a second film of glucose oxidase, and a rubber film. The sensor provides a stable, reliable and rugged system for glucose determination, for use in the diagnosis or treatment of diabetes.

Enzyme Sensor for Measuring Glucose Concentration

NIPPON OIL SEAL IND. *Japanese Appl.* 62/75,346

The sensor has two thin film electrodes of Pt, Au or Ag on an insulating substrate. It is used for measuring glucose concentration in blood or urine.

Platinum Enzyme Electrode

MATSUSHITA ELEC. WORKS *Japanese Appls.* 62/88,952/53

Enzyme electrodes are manufactured by forming an immobilised enzyme membrane on a conductive Pt electrode surface. They can be used for quantitative analysis of glucose by H_2O_2 detection, or for analysing cholesterol, depending on the membrane composition. The membrane can exclude interference by impurities, or improve detection sensitivity.

High Melting Precious Metal Alloys for Dental Use

DEGUSSA A.G. *German Appl.* 3,542,641

Precious metal alloys with melting ranges above 1500°C contain Pt, Pd, Ir, Au, Ag, Ru and Rh. The alloys are useful for construction elements onto which dental alloys are cast and they are non-oxidisable, strong, automatically harden on cooling and are free of bubbles in the bonding zone.

The New Patents abstracts have been prepared from material published by Derwent Publications Limited.