

NEW PATENTS

METALS AND ALLOYS

Nickel-Palladium Alloy

ZH. DENKI JIKI *Japanese Appl. 63/179,935*
A Ni-Pd alloy comprising 18–85wt.% Ni and 82–15wt.% Pd is made by melting at 1300–1500°C, making an ingot, hot or cold working the ingot, heat treating, and cooling. The alloy is used for elements for magnetostriction sensors or for a magnetostriction vibration body for generation of ultrasonic waves or magnetostriction bimetals.

ELECTROCHEMISTRY

Photocatalytic Decomposition of Water

COUNCIL SCIE. IND. RES. *European Appl. 281,696A*
A semiconductor loaded with a noble metal and a transition metal oxide is suspended in an aqueous solution of an Ru-O₂ complex and irradiated with light under an inert atmosphere to photocatalytically decompose H₂O into H₂ and O₂. Using this method H₂ and O₂ are formed simultaneously using solar energy, and without consuming fossil fuel, EDTA or electrical energy.

Chemically Modified Electrodes for Carbon Dioxide Reduction

GAS RES. INST. *U.S. Patent 4,756,807*
Electrodes for electrocatalytic reduction of CO₂ to CO are coated with a polymeric or copolymeric film formed by potential cycling a Pt or glassy C electrode in a solution containing Re or, Re and Ru complexes, MeCN and electrolyte. In this way efficient electrolysis is obtained using small amounts of catalyst, and enhanced reactivities can be obtained by blocking normal solution deactivation pathways.

Hypochlorite Decomposition Catalyst

PERMELEC ELECTRODE LTD. *Japanese Appl. 63/130,141*
A catalyst consisting of oxides of Pt, Pd, Rh, Ir or Ru is used to decompose hypochlorite produced as a by-product in NaCl electrolysis, or remaining in drinking or waste H₂O. The metal oxides are easy to produce by thermal decomposition of a metal salt solution at 300–600°C in an oxidising atmosphere, are quite stable and have good corrosion resistance.

Anode for Sodium Hypochlorite Production

JAPAN CARLIT K.K. *Japanese Appl. 63/143,277*
An anode consists of Ti or Ti-alloy coated with (a) a mixture containing 3–42 wt.% Pt, 3–34 wt.% of oxidised Pd and 42–94 wt.% of RuO₂, and (b) a mixture containing TiO₂ in 2–40 wt.% of the mixture (a), and can achieve an anode current density of 10–20 A/dm². The device is compact, and is used for production of Na hypochlorite in food sanitation.

Insoluble Anode for Electrolysis

KAMIOKA KOGYO K.K. *Japanese Appl. 63/157,893*
An insoluble anode is manufactured by coating a valve metal substrate with a layer of Pt, Pd, Ir or Ru, then a layer of PbO₂, and a surface layer of PbO₂ and Mn oxides and/or Pd oxides. The anode is used for electrolysis of sulphates, electroplating, and organic- and etching-electrolysis.

Electrode for Rare Earth Metals Manufacture

ASAHI CHEMICAL IND. K.K. *Japanese Appl. 63/166,987*
A non-consumable anode used in rare earth metals manufacture consists of metallic Pt or Pt physically or chemically attached to the surface of a metal with melting point 600°C or higher. The process involves electrolytic decomposition of rare earth compounds in a fused salt to continuously form rare earth metals or alloys under the cathode, and allows economical manufacture of Ce, Pr, Nd and Sm.

Platinum Electrode with Added Gold to Improve Corrosion Resistance

FUJIKURA CABLE WORKS K.K. *Japanese Appl. 63/212,854*
The corrosion resistance of a Pt electrode for use in an O₂ sensor is improved by adding a slight amount of Au, enabling the electrode to resist deterioration by harmful gases such as SO₂ or H₂S. The addition of Au to the Pt electrode also protects the boundary part between the Pt electrode and the ion-conductive plate.

Improved Anodes with Sublayer Containing Platinum

APPLD. PHYS. PROBLEM *Russian Patent 1,381,199*
Anodes used in various electrochemical processes are prepared more efficiently using an easily passivated metal support, which is first coated with a sublayer of 0.18–20 at.% Pt by ionic implantation, and then with a layer of MnO₂ as an active conducting oxide. The anodes have much improved electrochemical characteristics, and use lower amounts of noble metal.

ELECTRODEPOSITION AND SURFACE COATINGS

Method for Reliable Partial Plating

SANKYO KASEI K.K. *Japanese Appl. 63/130,778*
A plastic containing article for partial plating has the surface of any required portion roughened and exposed to a catalytic substance such as Pd and/or Au before plating. The method allows partially plated articles to be produced reliably at lower cost and can be used for articles in which filler has been mixed.

Non-Electrolytic Plating of Plastic

NEC CORP. *Japanese Appl.* 63/130,779

A process for non-electrolytic plating of plastic involves making the plastic surface hydrophilic, coating with a Cu colloid film and cleaning, contacting with an aqueous solution of Pd^{2+} ions, and dipping the heated plastic in the non-electrolytic plating solution which is self-catalysing.

Metal Coating Carbon Material

JAPAN EXLAN K.K. *Japanese Appl.* 63/145,794

A Pd colloid, optionally stabilised with cationic or non-ionic surfactant, is applied to a C material which is then electroplated. The technique is used for coating C fibres for reinforcing metal and plastics, with the treated C fibre having increased resistivity.

Bright Rhodium Plating Solution

ISHIFUKU KINZOKU KO.

Japanese Appls. 63/206,492-93

A Rh sulphate plating solution contains a brightener which can consist of 0.1 mg/l-200 g/l of alcohol-modified, epoxy-polyether modified or polyether-modified silicone oil, and 0.1 mg/l-100 g/l of the anion and/or cation type fluorine-base surfactant. The Rh plating solutions provide a hard, abrasion and corrosion resistant plating for electric contacts.

Non-Electrolytic Plating Using Palladium Solution Catalyser

MASAMITSU URUSHIBAR *Japanese Appl.* 63/213,679

A metal skin is formed on the outer surface of wire shaped or rod shaped sections using a catalyser consisting of Pd solution for promotion of reaction, and a reducing agent. The procedure can be used for metal plating paper, cloth, and hf coaxial cable, for which good shielding from electric waves and noise can be attained, and visual appearance is enhanced.

APPARATUS AND TECHNIQUE

Antistat Layer for Cathode Ray Tube

TOSHIBA K.K. *European Appl.* 276,459A

An antistat film consists mainly of SiO_2 with 0.01-5.0 wt.% of at least one particulate metal selected from Pt, Pd, Au, Ag and Sn, having mean size of 0.01 μm . The film is easily formed on the outer surface of the front panel of a cathode ray tube.

Vapochromic Monitoring Devices

MINNESOTA MINING MFG. CO.

European Appl. 277,033A

Visual or instrumental monitoring of organic vapours uses devices (such as personal or badge monitors) which also contain complex salts, with tetraarenylnitrile-Pt cations and tetracyano-Pd anions, with both cation and anion of square-planar configuration. These salts are stable, show changes in colour, fluorescence and/or refractive index on contact with a wide range of organic vapours.

Palladium Membrane for Hydrogen Pump

LUZ. IND. ISRAEL LTD. *European Appl.* 286,281A

A H_2 pump for vacuum insulation jackets has a Pd or Pd alloy membrane which allows H_2 to flow from the vacuum into the atmosphere. The membrane has an open end passing through the jacket wall to the oxidising atmosphere, and may be formed as a tube extending into the vacuum space in the jacket. The pump is used in vacuum insulated solar collectors, eliminating the need to replace getters, sintered filters or purifiers.

Dissolved Oxygen Sensor

BECKMAN IND. CORP. *World Appl.* 88/6,729A

A sensor for dissolved O_2 contains an electrolyte, a thin polymer membrane, a concentric Pt anode and Rh cathode, and a noble metal screen, preferably a Pt (alloy) screen of 50-1000 mesh coated with Pt black, spot welded to the working surface of the anode. The anode screen is claimed to minimise loss of electrode activity, and maintain a high ratio of anode to cathode area for a long period of time.

Carbon Monoxide Gas Sensor

FIGARO GIKEN K.K. *Japanese Appl.* 63/121,744

A gas sensor is composed of a metal oxide semiconductor element (such as SnO_2) doped with PdO as catalyst to accelerate response to CO. The element is coated with a 0.1-0.5mm thick NO_x reducing catalyst layer such as Rh or RuO_3 supported on SnO_2 , to exclude the influence of NO_x without causing a response time lag. The sensor is used to detect CO using resistance changes of the metal oxide semiconductor.

Determination of Ozone Concentration in a Gas

H. ISHIMORI *Japanese Appl.* 63/150,654

Ozone concentration in a gas can be determined with high accuracy by passing through a first chamber containing an inert filler, and then through a second chamber containing an O_3 decomposition catalyst consisting of a molecular sieve which may contain a noble metal such as Pt. The O_3 concentration is found by measuring the electromotive force generated by the temperature difference between the chambers.

Platinum Cathode for Combustion Control Sensor

DODENSEI MURIKAGOBU

Japanese Appls. 63/158,451-52

A fuel combustion control sensor uses a Pt cathode, an O^{2-} conductive solid electrolyte, and a perovskite type complex oxide anode which contains one of the platinum group elements. The perovskite complex oxides have good catalytic activity to electrochemical reduction, are thermally stable and are used for long periods. The sensor measures the O_2 concentration of exhaust gas and detects the air to fuel ratio.

Catalytic Combustion Gas Sensor

MATSUSHITA ELEC. IND. K.K.

Japanese Appl. 63/169,547

A catalytic combustion type gas sensor includes temperature detecting resistors which have electrodes on both ends, with a Pt or Pd catalyst coating on every other resistor. The gas sensor detects CO generated when a small amount of a combustion gas such as CH₄ is contaminated with exhaust gas.

Humidity Sensitive Ceramics

MURATA MFG. CO.

Japanese Appl. 63/194,306

Humidity sensitive ceramics consist of a complex metal oxide with the improvement that they also contain up to 10wt.% of at least one of Pt, Pd, Rh and Ir. Excellent humidity sensitivity is shown over a wide temperature range, with high reliability for absolute humidity detection above 150°C, and the ceramics are suitable for use as humidity sensors.

Platinum Chip Resistance Elements for Air Flow Measurement

PIERREL SPA.

German Appl. 3,710,224

Air flow in a combustion engine induction system is measured using Pt chip resistance elements which are electrically heated to a raised temperature. The heating is interrupted and the time taken for the elements to cool between defined temperature thresholds is used as a measure of the air flow. Accurate and reliable measurement is achieved.

Neutron Defect Identification

JOINT NUCL. RES. INST. *Russian Patent 1,363,038*

A method for neutron defect identification in thin objects of light materials involves radiographic exposure to an isotropic neutron field in a moderator. Activation screens of Ir, sensitive to neutrons of 1.3eV energy, can be used to give selective control over detection of light elements by absorption filtering. The method ensures better contrast sensitivity.

JOINING

Titanium Alloy Welding Rod

NIPPON MINING K.K.

Japanese Appl. 63/144,892

A welding rod with improved corrosion resistance consists of a Ti base alloy containing 0.01–2.0wt.% Pd and/or Ru, and 0.2–5wt.% Ni. The rod is used for welding Ti or Ti-alloy members.

Hard Gold Alloy for Brazing

MITSUBISHI METAL K.K. *Japanese Appl. 63/165,097*

A Au alloy is composed of 1–10wt.% Pd, 30–55wt.% Au, 12–25wt.% Ag, 8–20wt.% Cu, 4–15 wt.% In and 8–15 wt.% Ga. The alloy has high hardness, low melting point, good wetting properties, and is used for brazing rings, brooches, or other ornaments made of Au-Pt-Pd, Ag-Pd or similar alloys. The brazed zone exhibits high bonding strength, high surface scratch resistance and silvery white colour tone.

HETEROGENEOUS CATALYSIS

Gas Purification Catalysts

NIPPON SHOKUBAI KAGAKU *European Appl. 275,620A*

Catalysts for gas purification consist of 0–10 parts wt. (calculated as oxide) of Pt, Pd and/or Rh, or 0–150 of Ag, Mn, Fe, Co and/or Ni, and 100 parts wt. of a mixed oxide. The catalysts have high activity at low temperatures and long service life.

Ammonia Oxidation Catalyst Pack

JOHNSON MATTHEY P.L.C. *European Appl. 275,681A*

A catalyst pack contains perforated layers of elongate elements such as wires, filaments or fibres of at least one of Pt, Pd, Rh or its alloys, and layers of perforated ceramic material coated with at least one of Pt, Pd, Rh or its alloys. The catalyst pack uses smaller amounts of platinum group metals, and gives better efficiency for NH₃ oxidation to NO, which can be converted to HNO₃.

Ruthenium Hydrogenolysis Catalyst for Alcohol Preparation

INST. FRANCAIS DU PETROLE

European Appl. 282,409A

A catalyst containing 0.1–5wt.% Ru and 0.1–20wt.% Sn, Ge and/or Pb on a support is used in the preparation of alcohols by treating a carboxylic acid ester with H₂. Using the catalyst the selectivity to alcohol is relatively high when the temperature increases.

Platinum Catalyst for Ammonia Oxidation

SHELL OIL CO.

U.S. Patent 4,755,282

A catalyst preferably consisting of Pt on Al₂O₃ with a particle size range of 16–32μm is used for decomposition of NH₃ to H₂O vapour and N₂. This is useful within a fluid catalytic cracking process for production of gasoline or gas oil, where the regeneration zone is operated in a partial mode of combustion.

Catalytic Carbon Foams

U.S. DEPT. OF ENERGY

U.S. Patent 4,756,898

Finely powdered catalyst material such as Pt, Pd or Ni can be incorporated with NaCl particles to produce C foams with catalytic properties. The process involves pyrolysing microporous NaCl impregnated with phenolic resin, H₂O-leaching out the NaCl, and freeze-drying to provide a structurally stable low density C foam.

Catalytic Filter for Reducing Diesel Soot Ignition Temperature

ALLIED-SIGNAL INC.

U.S. Patent 4,759,918

One or more of Pt, Pd and Rh are deposited on S-resistant inorganic oxide(s) chosen from TiO₂, ZrO₂, and Al₂O₃ treated with TiO₂ or ZrO₂, deposited on a particulate filter. This is used to reduce the diesel soot ignition temperature in I.C. diesel engine exhaust gas containing CO, hydrocarbons, NO_x, particulate soot and S oxides.

Catalytic Composite for Exhaust Gas Treatment

ALLIED-SIGNAL INC. *U.S. Patent 4,760,044*
A catalytic composite contains: (a) rare earth oxides dispersed on an oxide support, (b) metal oxides which form stable sulphides dispersed on ZrO_2 , TiO_2 , CeO_2 , SiO_2 , MgO or zeolites, and (c) at least one of Pt, Pd, Rh, Ir and Ru deposited on it. The catalyst is used to treat hot I.C. engine exhaust gas, minimising the amount of H_2S formed and having less interaction between the noble metal and metal oxides present.

Ruthenium-Platinum Catalyst for Chloronitrobenzene Reduction

DU PONT DE NEMOURS CO. *U.S. Patent 4,760,187*
A supported catalyst consisting of 0.1–5.0wt.% Ru with Pt in the wt. ratio 75–30:1, is used to catalyse the reduction of chloronitrobenzenes with H_2 to the corresponding chloranilines. Using Pt with the Ru increases the rate of reaction without reducing the selectivity, and limits the production of chlorazobenzene. Also dechlorination suppressors are not required.

Washcoat Containing a Platinum Group Metal

GRANEL FRERES ANC. ETAB. *U.S. Patent 4,762,567*
A washcoat consisting of an Al_2O_3 suspension plus Pt, Pd or Rh as catalyst is applied to a honeycomb metal support, in a single step, for use in automobile catalytic convertors. The washcoat has a high solids content, low viscosity and dries to a smooth tightly adherent coating without cracks, with a high dispersion of the metal catalyst on the Al_2O_3 .

Rhenium-Platinum Catalyst for Naptha Reforming

CHEVRON RESEARCH CO. *U.S. Patent 4,764,267*
A multi-stage naptha reforming process uses a first catalyst of Re and Pt in wt. ratio at least 1.7 in one or more reforming stages, and a last stage catalyst having 0.2–2.0wt.% Pt and at least 0.5wt.% Re above that needed for a Re:Pt wt. ratio of 1.7. The high Re content in the catalyst and "excess" Re in the last catalyst give a lower fouling rate for the process which is used to upgrade naptha to higher octane gasoline products.

Storage Stable Organosiloxane Composition

DOW CORNING CORP. *U.S. Patent 4,766,176*
A heat curable organosiloxane composition consists of a suitable unsaturated polyorganosiloxane or organohydrogensiloxane with encapsulated Pt-containing catalyst, which promotes curing at 70°C and above. The catalyst is present as finely divided particles or droplets enveloped in a thermoplastic organic polymer to form microcapsules <500µm in diameter. Encapsulation of the catalyst gives storage stability in a one-pack composition.

Promoted Zeolite Catalyst for Ethane Conversion

STANDARD OIL CO. (OHIO) *U.S. Patent 4,766,265*
Conversion of ethane to aromatics is effected at 500–700°C using a catalyst consisting of a Ga-modified HZSM-5 or HZSM-11 zeolite promoted with Re and a metal selected from Pt, Pd, Rh, Ir and Ni. Using this catalyst aromatic yields above 25% can be achieved.

Catalyst Filter for Particulate Combustion

CALALER KOGYO K.K. *Japanese Appl. 63/140,810*
A catalyst filter consists of Pd and/or Rh, a Ce compound and a Cu compound supported on a ceramic honeycomb support. The catalyst filter is especially for combusting/removing particulates from diesel exhaust gas, and has a high particle capturing efficiency, a high combustion rate, and can ignite in lower temperature regions.

Catalytic Filter for Particulate Combustion

TOYOTA JIDOSHA K.K. *Japanese Appl. 63/147,912*
A catalytic filter consists of a fire-proof blinded type honeycomb structure with an inorganic oxide film, a Ce oxide layer, a Cu plating layer, and a catalyst layer of at least one of Pd and Rh. The catalytic filter can efficiently burn off particulates in engine waste gases with a high burning rate at low temperatures.

Exhaust Purification Catalyst with Admixed Silicon

TOYOTA JIDOSHA K.K. *Japanese Appl. 63/158,129*
A combustion exhaust purification catalyst is produced by coating a monolithic support with Al_2O_3 , exposing to Si compound vapour, firing, and loading with precious metals such as 1.0 g/l Pt and 0.2 g/l Rh. Using this method Si can be uniformly admixed with the Al_2O_3 coating without using a solvent.

Durable Palladium/Alumina Combustion Catalyst

JGC CORP. *Japanese Appl. 63/162,042*
A combustion catalyst consists of Pd loaded uniformly on Al_2O_3 supports with their surfaces to internally. In an example a catalyst of 0.5wt.% Pd on 5 mm diameter Al_2O_3 spheres was used for oxidation of CH_4 . The catalyst has good high temperature resistance and long life.

Metal-Supported Exhaust Purification Catalyst

TOYOTA JIDOSHA K.K. *Japanese Appl. 63/162,045*
Flat or corrugated Fe-Cr-Al alloy plates coated with activated Al_2O_3 are loaded with catalysts such as Pt, Pd or Rh, and then the metal plate is rolled up to form the catalyst. The desired concentration distribution of catalytic metals can be formed and two different catalyst metals can be loaded separately.

Rhodium-Copper Catalyst for Ethanol Preparation

AGENCY OF IND. SCI. TECH.

Japanese Appls. 63/162,637-38

Ethanol is prepared by the reaction of CO with H₂ in the presence of a supported Rh and Cu catalyst having Rh to carrier ratio 0.0001-0.5, and either a Cu catalyst or a Cu, Zn and/or Cr catalyst. One or more of Ir, Li or Mn may be added to the catalyst as accelerator. Ethanol is prepared in higher yield and selectivity from available CO and H₂ by reaction at 150-450°C and 0-350 kg/cm² pressure.

Efficient Combustion Catalyst Containing Palladium

TANAKA KIKINZOKU KOGYO

Japanese Appls. 63/175,638

An oxidation catalyst has Pd and/or PdO dispersed on heat resisting supports coated with a mixed oxide of Al₂O₃ and 2-60wt.% SiO₂. The catalyst provides 100% combustion efficiency for a mixture of O₂ and combustible gases, and has improved durability. Combustion can be changed from higher temperature complete oxidation to lower temperature gas phase oxidation by the action of SiO₂ in the supports.

High Activity Noble Metal Catalyst

AGENCY OF IND. SCI. TECH.

Japanese Appls. 63/178,851

A noble metal hydrosol is contacted with an anion exchange resin containing quaternary ammonium groups, to prepare a catalyst with noble metal colloid grains on the resin surface. The catalyst has large surface area, high activity in liquid and gas phase reactions, and can be recovered easily after use. In an example catalyst beads supporting Rh were used for cyclohexene hydrogenation to cyclohexane.

Ethanol Conversion Catalyst

MITSUBISHI HEAVY IND. K.K.

Japanese Appls. 63/182,033-34

A catalyst consisting of Pt and/or Pd loaded on an Al₂O₃ support containing rare earth metal oxide(s), or Zn and/or Cr oxides is used for converting ethanol into H₂-containing fuel gas. Side reactions which form C, aldehyde or ether are prevented by the action of the oxides, and the catalyst has improved activity, selectivity even at 300-400°C, and works stably at higher temperatures for a long time.

Manufacture of Palladium Catalysts

TANAKA KIKINZOKU KOGYO

Japanese Appls. 63/185,449 and 63/190,641

The catalysts are made by (a) adsorbing a Pd chloride salt on a support, then reducing the salt, or (b) dissolving Pd(NH₃)₂(NO₂)₂ in HNO₃ solution, ageing, applying to metal or activated Al₂O₃ support, and reducing the Pd compounds. Using method (a) strongly supported Pd particles and a high activity catalyst are obtained, while (b) gives a uniform dispersion of Pd particles and a catalyst with improved activity at lower temperatures.

Three-Way Catalyst Containing Platinum and Rhodium

NIPPON SHOKUBAI KAGAKU

Japanese Appls. 63/185,450-51

A honeycomb support is coated with (a) an inorganic oxide supporting Pt and Rh, or (b) an inorganic oxide supporting Pt, and an inorganic oxide supporting Rh. The amounts of Pt and Rh are 5-30 and 1-20wt.% respectively, and the inorganic oxide has average particle size 0.5-20µm. The catalyst is used for simultaneous removal of hydrocarbons, CO and NO_x from car exhaust, and does not deteriorate even when used at high temperature in an oxidising atmosphere.

Platinum-Cobalt-Manganese Exhaust Purification Catalyst

CATALER KOGYO K.K. *Japanese Appls.* 63/185,453

A catalyst for purifying I.C. engine exhaust has a monolithic support with an activated Al₂O₃ film containing Co oxide and Mn oxide, and supporting at least Pt, Pt-Rh, Pt-Ir or Pt-Rh-Ir. The Co and Mn oxides inhibit Pb compounds from reacting directly with Pt, Rh or Ir, but even when the catalyst is poisoned with Pb, the rate of hydrocarbon purification is 10% higher than a conventionally used catalyst.

Palladium Catalyst for Combustion Exhaust Purification

MATSUSHITA ELEC. IND. K.K.

Japanese Appls. 63/185,454

A catalyst for purifying exhaust gas consists of Pd on a heat-resisting porous support of Al₂O₃ cement, fused SiO₂ and TiO₂, which also contains sulphate. The catalyst removes CO, hydrocarbons and NO_x from combustion exhaust gas, and has improved purifying ability for NO_x at room temperature to 500°C.

Combustion Exhaust Purification Catalyst

TOYO KOGYO K.K. *Japanese Appls.* 63/197,546

A catalyst used to remove hydrocarbons, CO and NO_x from engine exhaust is produced by loading Rh on ZrO₂ fine powders of 5,000Å average diameter, mixing the powders with an Al₂O₃ slurry, and then coating a support to give 10-50wt.% of ZrO₂. The support may already have a first Al₂O₃ coating containing Pt. The reaction between Rh and Al₂O₃ is prevented, so the catalyst is hardly degraded.

Double Layered Catalyst for Automobile Exhaust

NISSAN MOTOR K.K.

Japanese Appls. 63/205,141

A catalyst consists of a base material with a first layer of activated Al₂O₃ and rare earth metal oxide supporting Pt or Pt and Rh, and a second layer of activated Al₂O₃, Zr oxide and rare earth metal oxide supporting Pd and Rh. The catalyst is used for efficient removal of hydrocarbons, CO and NO from automobile exhaust gas, and maintains good activity from rich to lean exhaust because of the double layered structure.

Polyethylene Glycolic Acid Preparation

KAWAKEN FINE CHEM. *Japanese Appl.* 63/211,251

Preparation of polyethylene glycolic acid consists of passing a non-alkaline aqueous solution of polyethylene glycol and an O_2 containing gas through a solid bed reaction vessel packed with a granular Pt-Pd/C catalyst. High quality polyethylene glycolic acid can be prepared easily on an industrial scale.

One-Step Hydrocracking of Vegetable Oil

UNIV. CURIE P.M. *French Appl.* 2,607,803

A hydrogenation catalyst consisting of Rh, Ir, Ru, Ni or Co dispersed on a support is used in the one-step hydrocracking of vegetable oils or their fatty acid derivatives. The process is carried out above 350°C, with a H_2 partial pressure of at least 12 MPa, and using at least one wt.% of catalyst compared to the initial charge, giving almost 100% yield of hydrocarbons which are nearly free from acid.

Production of Alkyl Butyl Ethers

HULS A.G. *German Appl.* 3,700,606

A 0.1–1 wt.% Pd on Al_2O_3 catalyst is used in the production of alkyl n-butyl ethers by hydrogenation of 1-alkoxy-but-1-en-3-yne, in the sump or trickling phase, at a H_2 pressure of 1–350 bar and 30–150°C. The products can be produced easily economically and in almost quantitative yields.

Separation of Nitrogen Oxides from Gases

PERM POLY *Russian Patent* 1,369,772

Nitrogen oxides are removed from gases containing H_2 by passing dried gas through a layer of Pd on Al_2O_3 catalyst at 10 l/min, at 120–150°C, then cooling and passing through a deeper Ca zeolite layer. The Pd on Al_2O_3 converts NO and NO_2 to N_2O for absorption in the catalyst, which allows removal of almost 100% of the NO_x present.

HOMOGENEOUS CATALYSIS

Palladium Catalyst for Olefin Carbonylation

SHELL INT. RES. MIJ. B.V. *European Appl.* 274,795A

Carbonylation of olefinically unsaturated compounds with CO is effected in the presence of an OH-containing compound, $Pd(OAc)_2$, an organic phosphine, an acid with a $pK_a < 2$, and a catalyst stabiliser. The last component allows high reaction rates to be maintained for longer than in prior art processes.

Methanol Carbonylation to Acetic Acid

REILLY TAR & CHEM. CORP. *European Appl.* 277,824A

A process for carbonylation of methanol to acetic acid in the presence of 2 wt.% of a Rh salt and an iodide promoter is improved by using an insoluble polymer catalyst support having pendant free base, N oxide and/or quaternised pyridine groups.

New Catalyst Composition for Polymerisation

SHELL INT. RES. MIJ. B.V. *European Appl.* 280,380A

A new catalyst composition for polymerisation of CO with an olefinic monomer consists of a Pd compound, especially Pd acetate, an alkyl or aryl phosphino sulphonic acid compound, and optionally a non-noble transition metal acid salt and a quinone compound. This new composition has high activity.

Improved Ethanol Preparation

AGENCY OF IND. SCI. TECH.

Japanese Appls. 63/145,243-44

Ethanol is prepared by contacting synthesis gas with a catalyst solution containing Ru compounds, halogen compounds and optionally Co compounds, in the presence of CO_2 or CH_4 . Using this method, accumulation of CO_2 or formation of CH_4 is inhibited, so ethanol is prepared more economically.

Ruthenium Catalyst Solution for Ethanol Preparation

AGENCY OF IND. SCI. TECH. *Japanese Appl.* 63/154,634

Ethanol is prepared by contacting synthesis gas with a catalyst solution containing Ru compounds, Co compounds and halogen compounds, at 160–300°C, under high pressure, in a reactor of Mo-containing austenitic stainless steel. The catalyst can be recycled, and ethanol is prepared more economically.

Palladium Catalyst for Aromatic Ester Production

SHOWA DENKO K.K. *Japanese Appl.* 63/174,950

An aromatic ester is produced by the oxidation reaction of a benzene derivative and an organic monoacid with O_2 , in the presence of Pd-X and X compound(s) where X is Bi and/or Pb and the Pd:X ratio is 1:10–10:1. The catalyst is recoverable, and use of the X compounds improves its stability.

Selective Preparation of Biphenyl Derivatives

MITSUBISHI CHEM. IND. K.K.

Japanese Appl. 63/179,834

Dehalogenating dimerisation of an aromatic compound with at least one halogen bonded to the nucleus uses a supported 0.1–20 wt.% platinum group metal catalyst, a halogen acceptor, CO, and an alcohol, formic acid or a formate. Reaction is carried out at 20–300°C, at up to 200 kg/cm² pressure, giving higher yield and selectivity of the biphenyl derivative.

Ruthenium Catalyst for Production of Polyols

AGENCY OF IND. SCI. TECH. *Japanese Appl.* 63/179,839

A process for production of polyols by reductive condensation of formaldehyde uses a catalyst consisting of a Ru compound and an imidazolium salt in the presence of H_2 or H_2/CO . Polyols, particularly 2–4C polyols such as ethylene glycol, glycerin and erythritol, can be obtained in high yields.

Selective Preparation of Straight Chain Aldehydes

AGENCY OF IND. SCI. TECH. *Japanese Appl.* 63/179,841
A catalyst consisting of a Ru compound and a pyridine compound is used in the reaction of CO, olefin and H₂, or H₂O at 80–180°C and 50–200atm pressure. Straight chain aldehydes can be obtained in high formation activities and high selectivities using the Ru catalyst.

FUEL CELLS

Sulphur-Tolerant Steam Reforming Catalyst

INT. FUEL CELLS CORP. *U.S. Patent* 4,755,498
A S-tolerant, high activity steam reforming catalyst consists of Pt, Pd or Ir supported on La-stabilised Al₂O₃, or on Mg-promoted La-stabilised Al₂O₃. The catalyst is used for steam reforming a hydrocarbon feed with optimum efficiency at minimum conversion temperature, and can be used with S-containing feeds, and for a variety of reactor processes. Applications include fuel cells.

Ternary Alloy Fuel Cell Electrode Catalysts

TANAKA KIKINZOKU KOGYO *Japanese Appls.* 63/190,253-54
A fuel cell electrode catalyst consists of a Pt-Ni-Cr or Pt-Ni-Co alloy, preferably supported on electroconductive C black. Growth of the active metal particles on the catalyst during use is suppressed for a long time, and constant electro-motive force is obtained.

ELECTRICAL AND ELECTRONIC ENGINEERING

Magnetic Medium for Horizontal Recording

IBM CORP. *European Appl.* 275,455A
A magnetic medium consists of a substrate, an optional underlayer of Cr or a Cr-V alloy, and a magnetic alloy layer of Pt, Co and Cr with a Cr concentration greater than 17at.%. The medium has high corrosion resistance, very high signal to noise ratio and minimal time filter, and is especially useful with high linear recording density systems.

Electroconductive Paint Containing Noble Metal

SIEMENS A.G. *European Appl.* 277,325A
A coating composition consists of a nonmetallic granular support coated with 0.01–10wt.% Pt, Pd or a noble metal alloy, preferably with Pb, Zn, Ni, Sn or Cu. The coating is used to produce electroconductive prints, especially wiring tracks, and is useful for laser image transfer in circuit board manufacture. The process is simple, and suitable for making very fine structures with satisfactory adhesion.

Superconducting Wire Manufacture

SUMITOMO ELEC. IND. K.K. *European Appl.* 281,444A
A superconducting wire is made by filling a metal pipe of Pt, Pd, Rh, Ir, Os, Ru, Au, Ag, other metals, or an alloy with compound oxide type ceramic powder having superconductivity, plastically deforming the filled pipe, heating to sinter the ceramic powder, and cooling. The superconducting wire has improved resistance to breakage, higher critical current density and higher critical transition temperature.

Noble Metal Contact Pads

U.S. SEC. OF COMMERCE *U.S. Patent* 7,117,259
A low resistivity contact is made to a high-T_c superconductor by depositing a contact pad of inert or noble metal such as Pt, Pd, Au or Ag by thin-film sputtering onto a non-degraded surface of the superconductor. Contacts of resistivity below 10⁻³Ωcm² are obtained, capable of carrying loads of several hundred amps.

Durable Magnetic Recording Medium

DENKI KAGAKU KOGYO K.K. *Japanese Appl.* 63/136,318
A durable magnetic recording medium has at least two laminated layers on the substrate, each consisting of a magnetic layer and a protective C layer. In an example the magnetic layer was a Co-Pt alloy 1000Å thick, formed by sputtering a Co alloy target containing 18at.% Pt. The intermediate protective layers prevent propagation of defects when head crash occurs on the surface during use.

Platinum-Cobalt Coating for Metallised Substrate

KYOCERA CORP. *Japanese Appl.* 63/137,574
At least two of a Co layer and a Pt layer are used to coat a metallised layer on a ceramic or glass chip carrier. The carrier includes a lid to form an insulative cavity accommodating a semiconductor integrated circuit element, electrically contacted through a wire to the metallised layer.

Soft Magnetic Thin Film

SONY CORP. *Japanese Appl.* 63/146,417
A soft magnetic thin film contains Fe, Co, Ga, Si and 0.5–6 at.% of at least one of Pt, Pd, Ir, Os, Ru, and Re. The thin film shows good soft magnetic characteristics and wear resistance, and is useful as a magnetic head material for high coercive force recording media.

Magneto-Optical Recording Material

INOUE JAPAX RES. INC. *Japanese Appl.* 63/146,254
An optical magnetic recording material has an alloy layer containing Pt and Mn as main components, and at least one of Sb, In, Bi and Sn, as well as a rare earth metal. The magnetic recording material has high signal to noise ratio, and is useful for an optical magnetic recording memory of a light switch.

Non-Planar Ceramic Printed Circuit Board Production

MATSUSHITA ELEC. WORKS *Japanese Appl.* 63/182,887

A circuit is formed on a ceramic green sheet by using at least one of Pd, Au, Ag and Cu as the conductor for the circuit, then press moulding and firing. A ceramic P. C. B. having non-planar shape can be produced using a simple process.

Optical Magnetic Recording Medium

SEIKO DENSHI KOGYO K.K. *Japanese Appl.* 63/183,640

An optical magnetic recording medium consists of an alloy of $(\text{Fe}_{(1-x)}\text{Co}_x)\text{Rh}$ (where x is 0-0.5) which has an axis of easy magnetisation vertical to the membrane. The medium can be used for disc, tape, drum or sheet shaped memory, as well as for hologram or magneto-optical devices.

Printed Circuit Board Manufacture

HITACHI K.K. *Japanese Appl.* 63/200,593

A printed circuit board is made by forming resist patterns, containing metal powder on one side of the board, roughening, conversion treating the surface with Pd, and Cu plating. Using this method the adherence between the resist pattern and electroless plating layer is improved markedly and the accuracy of the resist pattern is improved.

Precious Metal Coating for Magnetic Contacts

I. Z. GUBAIDULLIN *Russian Patent* 1,381,614

A coating used in relays and logic devices consists of a Rh based working layer, and an intermediate layer formed by successive deposition of a 0.05-0.1 μm thick layer of Au, a 0.5-2 μm thick layer of Ni, and a 0.05-1 μm thick layer of Au. The working life of sealed magnetically operated contacts is increased using the coating.

TEMPERATURE MEASUREMENT

Thermal Detector with Precious Metal Coated Electrode

SHIMADZU CORP. *European Appl.* 274,881A

A thermal detector consists of two membrane electrodes formed on a base material, with at least one electrode having a black film coating of precious metal, preferably Pt black, Pd black, Ir black or Au black. The detector has excellent heat absorption efficiency and i.r. detection sensitivity.

Wire Lead Attachment Device

MOTOROLA INC. *U.S. Patent* 4,758,814

In a high temperature transducer the conductive leads are secured to a ceramic sensor using a conductive adhesive and a vapour deposited thin film of Pt, Pd or Ru which is disposed on a film of Ti or Sn. This device for wire lead attachment withstands temperatures up to 600°C.

Temperature Recorder for Platinum Resistance Thermometers

V. A. EFIMOVA *Russian Patent* 1,383,112

A sensitive temperature recorder for use in highly accurate Pt resistance thermometers has a filler of finely dispersed Al oxide powder and a binder of K tetraborate, in the ratio 68-74:26-32%. The temperature recorder will operate for 6000 hours over a life of 10 years, compared to 2000 hours and 7 years for the previous recorders.

MEDICAL USES

High Purity Platinum Anti-Tumour Agents

LACHEMA *European Appl.* 275,559A

A cytostatic agent consists of a cis-diamine-1,1-cyclobutane dicarboxylate Pt(II) complex, with at least 60% of the particles of size no more than 25 μm , and at least 95% no more than 75 μm . The complexes are anti-tumour agents, and are prepared with a purity of at least 98% from cis-diamine dihalogen Pt(II) complexes and 1,1-cyclobutane dicarboxylic acid.

Macromolecular Platinum Compositions for Treating Tumours

JOHNSON MATTHEY INC. *European Appl.* 280,474A

A new Pt-containing macromolecule consists of a macromolecular carrier molecule linked to a Pt compound in either the +2 or +4 oxidation state. The composition is used for detecting, localising and/or treating a tumour or metastases. Attachment of the Pt drug to the carrier may stabilise the drug, increase solubility, and/or give sustained or controlled release.

Platinum Complexes with Anti-Tumour Activity

RESEARCH CORP. *U.S. Patent* 4,758,588

Four co-ordinate square-planar diaminocyclohexane cis-Pt(II) complexes having organic anions are used as anti-tumour agents at a dose of 25-200mg/kg. The complexes are H₂O soluble and less nephrotoxic than cis-platin, and show marked in vitro cytotoxic activity and good in vivo activity as a single injection.

Endoscope for Measuring Gastric Juice Viscosity

SNOW BRAND MILK PRODUCTS

Japanese Appl. 63/214,244

An endoscope for measuring gastric juice viscosity has a heat sensitive element which is thermally contacted with the gastric juice, and lead wires. The element is composed of a thin Pt wire wound around a core, a Pt plate, a disc having a spiral thin Pt wire therein or a ceramic disc having spiral Pt pattern deposited on it.

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