

NEW PATENTS

PROPERTIES

Corrosion Resistant Pt Alloys

TOKURIKI HONTEN K.K.

Japanese Publ. Appl. 61/76,634

A high melting point, corrosion- and oxidation-resistant Pt alloy consists of Pt, Ru, Fe, Cr and Co. It is used in electrodes, nozzles and medical equipment.

Magnetic Powder for Recording

HITACHI MAXELL *Japanese Publ. Appl. 61/105,806*

Ru, Rh, Pd, Ir, Pt and/or Cu are added to γ -ferric oxide to produce a magnetic powder which is used as a magnetic recording medium. The noble metal acts as a catalyst for a H reduction reaction to increase the reduction speed.

Opto-Magnetic Recording Medium

NEC CORP. *Japanese Publ. Appl. 61/107,555*

The medium has an axis of easy magnetisation perpendicular to the film surface, and has a recording layer of a magnetic alloy containing a rare earth metal, an Fe group transition metal and Pt.

Magnetic Recording Medium

HITACHI METAL K.K. *Japanese Publ. Appl. 61/142,525*

A magnetic recording medium comprises a substrate, a middle layer of Ni-P and a magnetic Co-Ni-Pt alloy layer which has a C protective layer on it of 1000Å thickness.

CHEMICAL COMPOUNDS

Luminescent Chelate Labels

HYPERION CATALYSIS *World Patent Appl. 86/2,734A*

A new chemical moiety containing Ru or Os can be induced to emit electromagnetic radiation by exposing it to chemical or electrochemical energy. It may be used for rapid, efficient and sensitive determination of chemical, biochemical and biological materials, and act as a chelate label.

Palladium Co-ordination Complexes

RESEARCH CORP. *U.S. Patent 4,598,073*

New polycyclo-Pd(II)-bipyridine complexes are claimed. They can be used as anti-tumour agents and are useful as homogeneous or heterogeneous catalysts and as intermediates in organic syntheses.

Iridium Hexafluoride Production

A. S. SIBE. INORG. CHEM. *Russian Patent 1,203,021*

The pure Ir(V) hexafluoride complex is produced from Ir powder by boiling with B trifluoride, followed by the addition of KCl.

ELECTROCHEMISTRY

Electrochemical Electrode

ORONZIO DE NORA IMPIANTI

European Appl. 183,100A

An electrode for electrolytic production of H₂ and alkali metal hydroxide comprises a conductive inert metal substrate, a pre-coating of ceramic particles in a metal matrix of Fe, Ni, Ag, etc., and an electrocatalytic ceramic coating of one or more of Pt, Pd, Rh, Ir, Ru, Ti, Zr, Hf, etc.

Electrode for Electrochemical Cell

ORONZIO DE NORA IMPIANTI

World Patent Appl. 86/3,790A

An electrode resistant to Fe and Hg poisoning, comprises an electroconductive support coated with (a) metal alloy dispersed electrocatalytic material (b) platinum group metal alloy in homogeneous phase. The electrocatalytic material in (a) can be a platinum group metal, Ti, Zr, Tb as oxides, borides, etc., but is preferably Ru oxides, and for (b) RuCl₃.

Polymer-Modified Electrode

JOHNSON MATTHEY P.L.C.

World Patent Appl. 86/4,364A

The manufacture of a PTFE modified electrode with a Pt, Pd, Ru, or Rh electrocatalyst, and a metal substrate is claimed. The electrode has reduced overpotential and is especially used as a chloralkali cathode. The process does not require the polymer to be fused, and the electrocatalyst is more effective.

Ruthenium Electrolysis Electrode

L. I. YURKOV

U.S. Patent 4,589,969

An electrode for electrolysis consists of a substrate of passivated metal, with a mixed oxide coating of Ru, Ti and Sn. The electrode is useful in chloralkali cells, in a Hg cathode electrolyser, in chlorate production and in waste water treatment. It has low resistance, and is simply made.

Amorphous Alloy Electrode

DAIKI GUM KOGYO K.K.

Japanese Publ. Appl. 61/67,732

A surface activated amorphous alloy for solution electrolysis consists of P, Si, and/or B, at least one of Ru, Rh, Ir and/or Pt and at least one of Co, Ni and/or Cu, etc. The alloy is used for electrolysis metal halide solution; it has long life, and can save energy.

Gas Diffusion Electrode

ASAHI GLASS K.K. *Japanese Publ. Appl. 61/130,497*

The electrode has an electrically conductive porous base body of powdered C black with a metal colloid of platinum group metal or alloy, or Ag. It has improved durability and lower overvoltage.

Oxide Film Formation

HITACHI K.K. *German Offen.* 3,600,575
A process for oxide film formation on Pt, Pd, Ir, Rh or Ru for pH electrodes involves ion implantation with O ions.

Electrochemical Cell

J.G.BROWN & ASSOC. INC. *Swiss Patent Appl.* 655,615
Platinised porous Ti is used on tubular electrodes, made from austenitic stainless steel, in an electrochemical cell which has a solid plastomer electrolyte.

ELECTRODEPOSITION AND SURFACE COATINGS

Electroless Plating

SHIPLEY CO. INC. *European Appl.* 187,962A
High activity electroless deposition catalysts of platinum group metals are produced by reducing solutions of the platinum metals with an organic suspending agent which forms a complex with the metal.

Coated Metal Carbide Boring Tools

SMITH INTERNATIONAL INC. *Japanese Publ. Appl.* 61/82,959
Steel tools for boring underground have hard tips of improved durability of metal carbide buried in the steel. The tips are coated with Rh, Ir, Os, Ni, Ti, W, Nb, Mo or Cr and their alloys.

Palladium Deposition

SIEMENS A. G. *German Offen.* 3,443,420
A quick precipitating electrolytic bath for producing bright crack-free coatings of Pd alloys does not contain a brightening agent, S or C, which leads to a lower contact resistance. There is little increase in resistance after corrosion or tempering. The coatings have good ductility.

Palladium Electrodeposition Bath

OMI INT. CORP. *German Offen.* 3,601,698
A Pd or Pd alloy electrodeposition bath contains a Pd source, oxalate ions and optionally a source for an alloying element, especially Ni, Co or Ag. The Pd salt is preferably Pd di- or tetraammino-oxalate or Pd dioxalate salt.

LABORATORY APPARATUS AND TECHNIQUE

Gas Flow Measurement

NIPPON SOKEN K.K. *U.S. Patent* 4,587,843
A gas flow apparatus with no hot wires and with high resistance to vibration has a sensing circuit with a mica plate on which thin Pt and Pt-Rh deposits are formed by vacuum deposition.

Oxygen Sensor

NISSAN MOTOR K.K. *Japanese Publ. Appl.* 61/79,155
An O₂ sensor has a catalyst of 1-3:1 of γ -Al₂O₃ and Ce oxide on which at least two of Pt, Pd and Rh are deposited. The sensor is used for controlling air: fuel ratios for I.C.E.; it has improved high temperature durability and the effect of Pb is minimised.

Multilayer Crucible

TOKURIKI HONTEN *Japanese Patent* 86/23,472
A multilayer crucible for furnaces is made by draw-forming, thin sheets of laminated Pt-Au.

Impurity Detector for Water

V. E. KAZARINOV *Russian Patent* 1,157,940
Inorganic impurities in industrial water are measured by passing rectangular pulses from a Pt electrode held at a potential through the water in an electrochemical cell. The impurity content is measured from the difference between the quantity of electricity between a first measured pulse and a second.

Conductimetric Detector Cell

V. E. STEPANENKO *Russian Patent* 1,203,425
A cell for chromatography has two sections with plastic spacers to form the measuring channel, and electrodes covered with Pt black; electrolyte passes through the channel and the current through it is measured. Gas or liquid can be analysed by this.

JOINING

Laminated Composite Solder

TANAKA KIKINZOKU KOGYO *Japanese Publ. Appl.* 61/82,996
A laminated composite solder material comprises Ti strip coated with Pt, Pd, Au or Ag and lapped with and bonded to a brazing strip. The coating protects the Ti from oxidation; it is used for brazing ceramic to ceramic or ceramic to metal.

Joining Ceramics

NGK SPARK PLUG K.K. *Japanese Publ. Appl.* 61/127,676
Ceramics are joined together or to metal in metallised joining places using a composition of ceramic and Pt, Ir, Rh, Pd or their alloys as metal powder for burning in oxidative atmospheres; or Pt, Ir, Rh, Pd, Ru, Os, W, Mo, Fe, etc., or their alloys for joining in vacuum or in a reductive atmosphere.

HETEROGENEOUS CATALYSIS

Exhaust Catalyst

PRO-CATALYSE *European Appl.* 181,802A
A Pt catalyst for I.C.E. exhaust purification has at least 50wt.% of its filler and binder as Al₂O₃. After 30 minutes use <1% of the catalyst has been lost.

Deuterated Methyl Methacrylate

MITSUBISHI RAYON K.K. *European Appl.* 186,106A

Deuterated methyl (meth)acrylate is produced by direct substitution of D for H present, in the presence of preferably a platinum group metal element or compound, using D₂O or D₂. The deuterated products are used for optical fibre manufacture and give a major improvement in the light transmitting ability.

Carboxylic Acid Production

DU PONT DE NEMOURS CO. *European Appl.* 188,209A

Linear saturated carboxylic acids are produced with high selectivity from unsaturated monocarboxylic acid with CO and H₂O in the presence of Rh.

Hydrocarbon Production

SHELL INT. RES. Mij. B.V. *European Appl.* 188,304A

Hydrocarbons are produced by passing a CO/H₂ mixture with a hydrocarbon liquid, especially a residue from hydrocracking, over a Co-Ru catalyst optionally containing Zr, Ti or Cr.

Catalytic Dewaxing of Hydrocarbons

MOBIL OIL CORP. *European Appl.* 198,898A

Hydrocarbon feeds are catalytically dewaxed in 2 stages, each with catalysts, which preferably contain a Group VIII metal, especially Pt or a Group VI, VII and/or VIII non-noble metal, but on different zeolites.

Production of Higher Carbonyls

BRITISH PETROLEUM CO.

World Patent Appl. 86/4,057A

High carbonyls are prepared by the reaction of 1-8C cyclic alcohols using a supported Ru(oxide). An alcohol with at least one more C than the reactant alcohol is also produced.

Osmium-Cobalt Catalyst

EASTMAN KODAK CO.

U.S. Patent 4,587,364

An Os-Co catalyst with Os:Co = 1-1000:10-1 is used for olefin hydroformylation to aldehydes. The catalyst gives aldehyde products with low normal: branched molecular ratios in high yields and at low catalyst concentrations, without complexing agent.

Hydrogen Generation from Water

CARDINAL E. V.

U.S. Patent 4,588,577

A finely divided catalyst of Pt, Pd, Ni, Co, Fe, Cu, Mg, Mn or their alloys is mixed with H₂O at 60-150°C and a chelating agent to produce H₂. Fossil fuel may be added to the H₂ and the mixture combusted.

Dehydrogenation Catalyst

UOP INC.

U.S. Patent 4,595,673

Li and K are added to a Pt and Sn catalyst on an Al₂O₃ support which also contains a Group IVA element to improve its performance in hydrocarbon conversion processes, especially dehydrogenation.

Selective Hydrogenation Catalyst

PHILLIPS PETROLEUM CO.

U.S. Patent 4,596,783

A catalyst for selective hydrogenation of acetylenic compounds consists of Pd, Pb acetate and an aromatic amine oxide on a CaCO₃ support.

I.C.E. Purification Catalyst

TOYOTA JIDOSHA K.K. *Japanese Publ. Appl.* 61/64,337

A catalyst with improved durability and activity can remove 93%HC, 89%CO and 91%NO_x from engine exhaust. Catalysts Pt, Pd, Ir, Rh, Os, Cr, Ni, V or Cu are loaded onto a monolithic base material having micropores, in water. The catalyst is added via a slurry.

Heat Resistant Catalyst

CATALER KOGYO K.K. *Japanese Publ. Appl.* 61/78,439

An I.C.E. catalyst for noxious gas removal from exhaust gas includes an inner Al₂O₃ layer impregnated with Ce, Y, Nd, etc., and an outer layer impregnated with Ce, etc. The catalyst contains Pd-Rh and has improved heat resistance.

Hydrocyanic Acid Preparation

MITSUBISHI CHEM. IND. K.K.

Japanese Publ. Appl. 61/86,416

HCN acid is prepared over a Pt-Rh alloy catalyst containing 20 wt.% Rh at 500-800°C by reacting acetonitrile with O₂ in the presence of NH₃.

Combustion Catalyst

MATSUSHITA ELEC. IND. K.K.

Japanese Publ. Appl. 61/86,944/5

A catalyst for detoxifying CO and HC in exhaust from combustion furnaces and domestic ovens contains Ca aluminate and delafossite type composite metal oxide which is composed of Pt, Pd, Rh, Ag, Cu, La, Al, Cr, Ga, etc.

Palladium Coke Oven Catalyst

KAWASAKI STEEL K.K. *Japanese Publ. Appl.* 61/89,294

A Pd catalyst containing almost no Cl is used to hydrogenate unsaturated hydrocarbons and O₂ in coke oven gas.

Catalytic Combustion Chamber

TOYOTA JIDOSHA K.K. *Japanese Publ. Appl.* 61/97,031

Part of a catalytic combustion chamber has a heat resistant inorganic material containing one or more transition metals which is coated with a layer of platinum group metal catalyst. The assembly is used in a diesel combustion engine.

Diesel Exhaust Purification

NIPPON SHOKUBAI KAGAKU

Japanese Publ. Appl. 61/120,640

A catalyst for purifying engine exhaust comprises V or V compounds and Pt, Pd, Rh or their compounds, possibly with other metals or their compounds. The catalyst converts 98%CO and 84% HC at 350°C.

Carbon Monoxide Oxidation

KAWASAKI STEEL K.K. *German Offen.* 3,546,329

A catalyst for oxidising low concentrations of CO in waste gases, e.g. from furnaces, comprises a honeycomb support with a relatively high Pt loading. The catalyst needs regenerating less often.

HOMOGENEOUS CATALYSIS

Production of Palladium-Tin Colloidal Catalyst

I.B.M. INC.

U.S. Patent 4,593,016

A Pd-Sn colloidal catalyst concentrate is produced from stannous chloride dissolution in HCl acid, and then mixing this with PdCl₂ solution.

Hydroformylation Catalyst

UNION CARBIDE CORP.

U.S. Patent 4,594,463

Aldehydes are prepared by reacting a primary alcohol with a CO/H₂ mixture at 100–300°C above atmospheric pressure in the presence of a catalyst of a soluble Rh compound, an I-containing compound and a chelating compound. The catalyst is stable and has high activity and selectivity for aldehydes.

Dimerisation of Aliphatic Olefins

SHELL OIL CO.

U.S. Patent 4,599,476

A catalyst system of a Pd compound and/or a Ru compound in aprotic organic solvent is used to dimerise aliphatic 2–12C mono-olefins to dimers.

Noble Metal Organo Sol

AGENCY OF IND. SCI. TECH.

Japanese Publ. Appl. 61/107,937

Very fine particles of noble metal are uniformly dispersed in organo sol made using Ru, Pd or Pt. The sol has a high catalytic activity for hydrogenation of unsaturated olefins or nitro compounds.

FUEL CELLS

Electricity Generation from Hydrogen

M. EMELOCK

U.S. Patent 4,597,363

Electricity is generated by heating oxalic acid to form HCOOH, which is then heated to form H₂, which is used as a fuel in a fuel cell or I.C.E. The fuel cell uses H₂SO₄ with C electrodes and a Pt catalyst.

CHEMICAL TECHNOLOGY

Catchment Packs

JOHNSON MATTHEY P.L.C.

World Patent Appl. 86/3,479A

An easily installable and removable catchment pack to trap oxidised Pt from an NH₃ oxidation plant comprises Pd and Au alloy getter wires protected by stainless steel gauze supports.

Oxide Production

SANYO ELECTRIC K.K. *Japanese Publ. Appl.* 61/127,865

Platinum group metal oxide film production involves introducing the gaseous metal fluoride and O₂ and/or O compounds into a reaction vessel, followed by plasma CVD. The film forms on the base plate and is used as a solar battery transparent electrode.

GLASS TECHNOLOGY

Optical Glass Forming Die

MATSUSHITA ELEC. IND. K.K.

Japanese Publ. Appl. 61/143,552

An optical glass element press-forming die consists of a composite of at least one of Pt, Ir, Os, Pd, Rh and Ru and zirconia.

ELECTRICAL AND ELECTRONIC ENGINEERING

Electrical Contacts

S.T.C. P.L.C.

British Appl. 2,168,381A

Electrical contacts for printed wiring boards comprise a non-corrodible alloy layer preferably of Pd-Ni, formed on a base metal surface, with a Au outer layer. The Pd-Ni contains 70–85% Pd and is 2µm thick.

Conductive Pastes

ALPS ELECTRIC K.K. *Japanese Publ. Appl.* 61/16,977

Thick film circuit conductive paste for hybrid I.C. is composed of Au resinate, Pt or Au resinate + Pd resinate, and Bi resinate, and Ti or Co resinate mixed with a vehicle.

Printed Circuit Board

HITACHI CHEMICAL K.K.

Japanese Publ. Appl. 61/66,307

A glass printed circuit board contains 0.50–3.00% Pd and/or Pt. The metal transfers the high-frequency signal, and the amount of Pd and Pt is reduced as compared with the conventional method.

Thin Film Manufacture

KUREHA CHEM. IND. K.K.

Japanese Publ. Appl. 61/75,511/77,316

Pt, Mn and Sb are simultaneously, sputtered onto a substrate, to form a thin film. The material is used for recording, reproducing and erasing information by laser. A temperature of 100°C or more improves crystallisation. The thin film is useful as an optomagnetic disc medium.

Electrically Conductive Polyester Fibre

NIPPON ESTER K.K. *Japanese Publ. Appl.* 61/89,370

An electrically conductive polyester fibre is prepared for plating, then dipped in aqueous solution containing 0.15–15 ppm Pd and kept at 60–95°C. This activated fibre is then plated with Cu, Co, Cr, Ag, etc.

Sliding Contact Device

TANAKA KIKINZOKU KOGYO

Japanese Publ. Appl. 61/109,277-84

A sliding contact consists of a brush composed of a Au-Pt-Ag-Cu alloy with other elements, and a commutator or slip ring of Ag alloy with Cu, Cd, etc., added. There is little abrasion wear of the brush and slip ring and contact resistance is low and stable. Oxides produced during sliding act as lubricants.

Metallised Glass Fibre

SIEMENS A.G.

German Offen. 3,445,982

A glass fibre for optical data transmission line has solderable metal surface layers of Ti, Pd and Au.

TEMPERATURE MEASUREMENT

Fast Temperature Probe

G. BARKER & CO.

British Appl. 2,167,603A

A fast accurate temperature sensing probe has a Pt resistance coil wound on a ceramic core in a heat conductive compound. The assembly is enclosed in a sealed can, and used in refrigerated display cabinets.

Measuring Temperature Hysteresis

NIPPON TELEG. & TELEPH.

Japanese Publ. Appl. 61/86,623

The temperature hysteresis of a body is measured by laminating a Pt film to part of one surface of it, laminating a Au film to the Pd and then measuring the resistance before and after heating. This can be used at 300–700°C and for fast moving bodies.

MEDICAL USES

Anti-Cancer Agent

JOHNSON MATTHEY P.L.C. *European Appl.* 181,166A

A new 1, 1-cyclobutane-di:carboxylate-di:amine Pt inclusion compound with α -cyclo-dextrin is an anti-cancer compound with greater solubility in H₂O than the parent compound and much lower toxicity than Cisplatin. The side effects are reduced.

New Platinum Complexes

AMERICAN CYANAMID CO. *European Appl.* 185,225A

Pt complexes with aliphatic tri-carboxylic acid compounds are used for inducing regression and/or palliation of leukaemia and related cancers, lung carcinomas and mammary tumours, etc.

Transition Metal Complexes

JOHNSON MATTHEY INC. *European Appl.* 186,363A

A new charged dye transition metal complex with anti-tumour activity and radiosensitising activity contains as the metal preferably a platinum group metal, especially Pt(II). The complex formed between rhodamine-123 and Pt(II) is specifically claimed.

Monomeric Platinum Transferring Complex

R.L. STJERNHOLM

U.S. Patent 4,590,001

A monomeric Pt complex is formed by reacting cis-diammine-dichloroplatinum(II) and Fe-free human transferrin in the presence of cysteine. The complex selectively kills breast cancer cells without damaging normal cells.

New Bone Formation

UNIV. OF CALIFORNIA

U.S. Patent 4,596,574

A biodegradable porous ceramic system for delivering morphogenic protein to induce new bone formation comprises a novel composition containing a cation of Pt, Na, Ag, K, Ca, etc., and an anion of phosphate, sulphate, carbonate, etc.

Biosensor

MATSUSHITA ELEC. IND. K.K.

Japanese Publ. Appl. 61/91,558

A biosensor for analysis of substances in body fluids, comprises a base insulator, a Pt electrode system, a porous support containing redox enzyme and an electron acceptor and filter layer.

Blood Gas Sensor

SUMITOMO ELEC. IND. K.K.

Japanese Publ. Appl. 61/128,945

A sensor for simultaneously and accurately determining O₂ and CO₂ concentrations in the blood comprises a pH, a Ag/AgCl and a Pt or Au electrode.

Platinum Anti-Cancer Agents

CESKOSLOVENSKA AKAD. VED.

German Offen. 3,539,951

New macromolecular Pt complexes are anti-tumour agents which gradually decompose in vivo releasing active low molecular weight complexes which give long lasting levels of Pt in the blood, and low levels in the kidneys, liver, spleen and muscles.

Dental Alloy

K. KORBER

German Offen. 3,447,413

A dental alloy is exclusively made from 0–15%Pt, 1–30% Pd, 0.1–15% Ir, the rest Au. No oxide layer is formed on fixing to ceramic; bonding agents may be melted onto the metal.

Organism Detoxification

A.S. U.S.S.R. ELECTROCHEM. *Russian Patent* 1,194,425

Organisms poisoned by urea, bilirubin, NH₃, ethanol, CO, medicine overdoses, etc., can be detoxified more rapidly than current procedures by injecting a NaOCl solution produced by electrolysis NaCl using Pt-promoted Ti electrodes intravenously, which yields O to oxidise the toxins.

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