

NEW PATENTS

METALS AND ALLOYS

Gold Coloured Alloy for Dentistry and Jewellery

D. DAVITZ *U.S. Patent 4,865,809*

A gold coloured alloy which is Cu-free contains 22–28 wt. % Pd, 22–26 wt. % In, 8–20 wt. % Au, and balance Ag, and may have a specific gravity of $9.35 \pm 0.5 \text{ g/cm}^3$. The alloy has improved tarnish resistance and good corrosion resistance.

Production of Magnetic Ornament from Gold and Platinum-Cobalt Alloy

CITIZEN WATCH K.K. *Japanese Appl. 2/54,783*

Raw material which is in a dual phase dispersion state of Au and Pt-Co alloy is heated in an atmosphere containing O_2 to form a surface layer of Co oxide, which is removed. Further heating disperses the remaining segregated Pt, so that a single Au-Pt phase is present in the uppermost surface. This method is used to form an ornament or accessory.

Palladium-Gold Alloy for Jewellery Use

FORSCHINST. EDELMET. *German Appl. 3,826,607*

A Au alloy for use as jewellery contains Pd, Au and Ga, and may also contain Ag, Cu and Zn. An example of a composition for an 18 carat Au alloy is 75% Au, 19% Pd, 5% Cu, and 1% Ga. The Ga increases the strength and hardness of the alloy without requiring the replacement of some Pd by Ni, which tends to produce an embrittling effect, poor colour and may have an allergy effect on the skin.

CHEMICAL COMPOUNDS

Preparation of High Purity Hexamine Iridium Chloride

TANAKA KIKINZOKU KOGYO *Japanese Appl. 2/38,320*

Higher purity hexamine Ir chloride of formula $(\text{Ir}(\text{NH}_3)_6)\text{Cl}_3$ is prepared by reaction of a solution containing Ir(III) chloride with NH_3 , addition of HCl to form precipitates, dissolving the precipitates in aqueous NH_3 at 100–150°C under pressure, filtering, and adding acetone to effect crystallisation.

Layered Structured Transition Metal Chalcogenide

HAHN-MEITNER-INST. *German Appl. 3,826,281*

A new layer structure chalcogenide is of formula MX_2 , where M is Rh, Ir, Os, Ru, Mo, W or Re, and X is S, Se or Te, and has a particle diameter of several hundred nm down to a few nm. Ultrasound is used to obtain the chalcogenide as a colloidal solution, which is very stable and suitable for further processing. The MX_2 is used as a lubricant, a corrosion inhibitor, and for production of material layers with photochemical or electrochemical properties.

ELECTROCHEMISTRY

Composite Platinum Electrode for Galvanic Coils

PEROXID-CHEMIE G.m.b.H. *European Appl. 350,895A*

A 5–100 μm thick Pt foil and a refractory metal electrode of 0.1–10 mm thick Ti or Ta sheet, are bonded by hot isostatic pressing at 650–900°C, at a pressure of 100–1200 bar, for 0.5–3 hours. The Pt foil and the electrode are surrounded by layers of inert separation foils. High quality Pt coated electrodes for use in galvanic coils are produced, with good contact between Pt and the base metal, which gives increased efficiency.

Platinum Black Air Cathode

ELTECH SYST. CORP. *European Appl. 357,077A*

A Pt black air cathode consists of a conductive, porous, hydrophobic support layer which is a mixture of C particles and a hydrophobic polymer, and an electrolyte porous active layer of finely divided Pt catalyst particles blended with a halogenated polymer binder. Expensive active ingredients are economically used, and the electrode is used in metal-air batteries, acid and alkaline fuel cells, and ozone generators.

Corrosion Resistant Electrode for Electrolysis

JAPAN CARLIT K.K. *Japanese Appl. 1/298,189*

An electrode consists of a valve metal substrate; an ion-irradiated intermediate layer of at least one of Pt, Pd, Rh, Ir, Os, Ru, Ti, Ta, Nb or others, or an oxide; with a coating of a Pt group metal and/or oxide. An electrode having longer life is obtained, since the corrosion resistance of the intermediate barrier layer is improved compared with those formed by conventional methods.

Electrode Manufacture for Electrolysis

TANAKA KIKINZOKU KOGYO *Japanese Appl. 1/301,877*

An electrode is made by plating an electroconductive substrate of Ti, Ta, Nb or Zr with a precious metal selected from Pt, Pd, Rh, Ir, Os, Ru, Au, Ag, and alloys thereof, followed by heat treatment and rolling. The electrode has a coating of uniform thickness, without pinholes, and is widely used in electrolysis of alkali halides and organic materials, and for electrochemical processes.

Electrolytic Manufacture of Ozone

SASAKURA KIKAI SEIS. *Japanese Appl. 1/312,092*

A porous electrode has a 5–100 μm thick Pt layer on one side, to which a perfluorosulphonic acid type cationic exchange resin is pressure-adhered. This electrode is used as the anode in the manufacture of ozone by electrolysis of water, giving 0.05–0.5 wt. % of high purity ozone, at reduced cost. Ozone suitable for commercial use in food and healthcare is obtained.

Anodes Electroplated from Melts Containing Noble Metal Salts

BAYER A.G.

German Appl. 3,829,119

Dimensionally stable valve metal anodes are activated by electroplating with noble metals and/or their compounds, preferably with Pt, Ir or their compounds or alloys, from melts containing noble metal salts. The anodes are used in the economical production of alkali dichromates and chromic acid by electrolysis of alkali mono- or dichromate solutions.

Dimensionally Stable Anode for Chlor-Alkali Electrolysis

HUMBOLDT-UNIV. BERLIN

East German Patent 272,315

A dimensionally stable anode for electrochemical processes consists of a Ti substrate, an intermediate layer and an electrochemically active layer based on $\text{RuO}_2/\text{TiO}_2$ or $\text{RuO}_2/\text{IrO}_2/\text{TiO}_2$. The intermediate layer is precious metal-free, and has high electrical conductivity and good adhesion; consisting of TiN_x (x is 0.1–1.2) up to 100 μm thick. The anode is used especially in chlor-alkali electrolysis.

ELECTRODEPOSITION AND SURFACE COATINGS

Platinum or Platinum Alloy Plating Bath

JOHNSON MATTHEY P.L.C. *European Appl.* 358,375A

A Pt or Pt alloy electroplating bath used for providing conducting parts in electrical circuits contains an alkaline aqueous solution of a complex Pt(II) salt. The Pt salt is preferably complexed with NH_3 or primary or secondary amines, and the anionic component is $-\text{SO}_4$, $-\text{NO}_3$, $-\text{CO}_3$, benzoate, citrate or others. The bath is more efficient and stable than known baths, is versatile and easy to use.

Platinum Colloid Pretreatment Solution

NIPPON ELECTROPLAT. *Japanese Appl.* 1/319,683

A Pt colloid solution contains 0.01–30 g/l of a Pt salt, 0.1–100 g/l of a polysaccharide as a protective colloid agent, and 0.1–100 g/l of a reducing sugar as a reducing agent. The Pt colloid solution is best suited for pretreating material for electroless Pt plating, since Pt particles are adsorbed uniformly and in high purity.

Platinum Plating Niobium or Tantalum Substrates

TANAKA KIKINZOKU KOGYO

Japanese Appls. 2/11,785 and 2/11,794

A process for Pt plating Nb or Ta substrates involves: (a) mechanically roughening the substrate surface, for example by sand blasting, (b) electrolytic polishing to etch the surface, or chemical etching of the roughened surface, (c) effecting activation treatment, and Pt plating, preferably by electroplating. The pretreatment provides tightly adhered Pt plated films, useful in manufacturing electrodes which consume Pt with time, as the Pt may be re-coated using this process.

Non-Toxic Palladium Plating Solution

NIPPON ELECTROPLAT.

Japanese Appl. 2/43,393

A Pd plating solution consists of 1–50 g/l (in Pd base) of palladous amine chloride, 0.5–30 g/l of pyridinesulphonic acid or its salt, and 0.1–100 ppm in metal base of a soluble salt of a lanthanide metal, for example Ce. This non-toxic Pd plating solution has advantageous handling, and gives Pd precipitates which have excellent lustre and low stress, improved adhesibility and elongation, and resistance to crack generation on repeated bending.

Ruthenium Plating Solution for Electrical Contacts

NIPPON MINING K.K.

Japanese Appl. 2/54,792

A plating solution contains 3–10 g/l Ru as an inorganic Ru salt, 6–20 g/l of acid, and a Group III metal salt preferably of In, Sc, Y, or Ga, at 0.5–3 g/l of metal. The solution is capable of forming platings of 2 μm or more in thickness, which are free from cracks. The plating solution is useful for electrical contacts, giving excellent brightness and reliability.

APPARATUS AND TECHNIQUE

Humidity Resisting Gas Sensor

TOSHIBA K.K.

Japanese Appl. 1/316,650

A fired SnO_2 type semiconductor gas sensor consists of an insulating base plate of for example Al, a pair of thin film Au conductor electrodes, and a gas sensing membrane, on which is a catalyser membrane of porous metal oxide of 38–152 μm particle size, produced by firing Al powder, chloroplatinic acid and Rh chloride. The gas sensor is stable for a long period, has good humidity resistance, and good selectivity for gases, for example methanol.

Measuring Formaldehyde Concentration

TOA DENPA KOGYO K.K.

Japanese Appl. 2/1,542

A cell for measuring formaldehyde concentration has a Pt anode and a Ag cathode, with the area of cathode contacting the sample liquid set at 20 times that of the anode, and with each electrode covered with a thin membrane permeable to formaldehyde but not larger molecules. The cell measures current from the anodic oxidation of formaldehyde, the concentration of which can be simply and speedily measured with high accuracy, without being influenced by metallic ions.

Oxygen Sensor for Internal Combustion Engine Exhaust Gas

JAPAN ELEC. CONTROL SYS. *Japanese Appl.* 2/47,546

An O_2 sensor has an electrode formed on both sides of a solid electrolyte, with one side in contact with standard air and the other in contact with exhaust gas; the latter side having a Pt oxidation catalyst layer, a SiO_2 decomposition-adsorption layer on the catalyst layer, and a porous Al_2O_3 protective layer. The sensor detects the O_2 concentration in engine exhaust gas to determine the air:fuel ratio.

Gas Sensor with Noble Metal Catalyst Layer

TOSHIBA K.K.

Japanese Appl. 2/54,157

A gas sensor consists of a pair of opposite electrodes on an insulating substrate, and a metallic oxide semiconductor gas-responsive film, covered with a catalyst layer consisting of 0.2–3.0 mol% of at least one of Pt, Pd and Rh carried on Al_2O_3 . Catalyst deterioration can be effectively prevented.

Determination of Volatile Ruthenium Tetroxide

ISHIKAWAJIMA-HARIMA JUKO *Japanese Appl.* 2/69,658

Volatile RuO_4 is measured by passing sample gas through a first filter to capture RuO_2 , reducing RuO_4 in the sample gas to RuO_2 , passing the reduced gas through a second filter to capture RuO_2 , and measuring this amount of RuO_2 using a Geiger counter or scintillation counter to determine the amount of RuO_4 present.

Determination of Ruthenium in Solutions

MOSCOW LOMONOSOV. UNIV. *Russian Patent* 1,495,713

A more efficient determination of Ru in solutions is by treating the sample with 1,10-phenanthroline, hydroxylamine hydrochloride, NaCl, and NaOH, to pH 5.5–8.0, adding siliceous sulphocationite, shaking, cooling, decanting, drying and then determining Ru by luminescence spectroscopy. Using this method the time of determination is reduced.

JOINING

Brazing Alloy Containing Palladium and Gold

GTE PRODUCTS CORP.

U.S. Patent 4,903,890

A brazing alloy consisting of 15–35 wt.% Pd, 5–30 wt.% Au, 10–30 wt.% Ni, 20–48 wt.% Cu and 5–25 wt.% Mn has a solidus temperature above 1000°C and a liquidus temperature above 1018°C. The alloy is used for brazing metal parts made of a superalloy having a solution heat treating temperature of 1025–1080°C, to form a uniform fillet at the joint. The alloy has good gap-filling and good high temperature properties.

HETEROGENEOUS CATALYSIS

Dehydrogenation Catalysts for Production of Alkenes

BRITISH PETROLEUM P.L.C.

European Appls. 351,066–67A

Dehydrogenation catalysts for converting 2–10C paraffins to alkenes consist of (a) up to 10 wt.% of Pt (preferred), Pd, Rh, Ir or Ru, and 0.05–20 wt.% Zn on a support having a silicalite structure, the framework of the support being mainly Si and O atoms, or Si, Zn and O atoms; or (b) a Pt group metal and Sn on a silicalite support.

Ruthenium Catalyst for Production of Cyclohexylamines

BAYER A.G.

European Appl. 351,661A

A Ru catalyst having improved service life is produced by adding a total of 0.05–8 wt.% of rare earth metal compounds, preferably Ce or La, and Mn compounds to an Al_2O_3 support, heating to 200–450°C, and applying 0.05–5 wt.% Ru. The catalyst is used for production of cyclohexylamines and dicyclohexylamines by hydrogenation of anilines at 80–240°C under elevated pressure, and enables the products to be formed in a desired ratio.

Solventless Preparation of Acetoxyphenylmethylcarbinol

HOECHST CELANESE CO. *European Appl.* 353,898A

Preparation of 4-acetoxyphenylmethylcarbinol is effected by heating 4-acetoxyacetophenone at 54–120°C with H_2 , in the presence of a Pd/C or activated Ni catalyst, but using no solvent. Poly(4-hydroxystyrene) can be prepared from the carbinol compound, and is used in adhesives, coating compositions, and photoresists. Problems caused by solvents used in previous hydrogenation methods are eliminated with this solventless preparation.

Platinum-Lanthanum Catalyst for Oxidation of Carbon Monoxide

W.R. GRACE CO.

European Appl. 354,525A

A catalyst for CO oxidation contains 50–1000 ppm Pt and 4–30 wt.% lanthana on an Al_2O_3 substrate of surface area 45–450 m^2/g . The catalyst may be used to control CO emissions from a variety of sources, especially by adding to a cracking catalyst to reduce CO emissions from the regenerator stack. It remains active for a long time when subjected to multiple regenerations.

Palladium-Charcoal Hydrogenation Catalyst

BEECHAM GROUP P.L.C.

European Appl. 355,986A

Preparation of 2-aminopurine is by catalytic hydrogenation of 2-amino-6-chloropurine using Pd on charcoal as the catalyst, in aqueous solution, in the presence of a base, at 50°C and 70 kPa. The process is a simple and inexpensive method of preparing 2-aminopurine, which is used in the preparation of 6-deoxy guanine nucleoside anti-viral agents.

Palladium Catalyst for Waste Gas Purification from Alcohol Engines

DEGUSSA A.G.

European Appl. 358,123A

A catalyst for purification of waste gases from internal combustion engines driven mainly with alcohol, consists of 0.03–3 wt.% Pd, 0.5–70 wt.% of rare earth metal oxides, and 0.5–30 wt.% of $MoSi_2$, an Al_2O_3 carrier, and optionally a monolithic or honeycomb support. The catalyst is used for removal of aldehydes, alcohols, CO, NO_x and hydrocarbons from the waste gases, having low initial reaction temperature, high conversion and better ageing.

Waste Gas Purification Catalyst for Reduced Hydrogen Sulphide Emission

DEGUSSA A.G.

European Appl. 358,125A

A catalyst for purification of waste gases from internal combustion engines consists of a honeycomb support with an Al_2O_3 carrier having 0.01–3 wt.% of Pt, Pd and/or Rh with wt. ratio of Pt and/or Pd:Rh of 2–30:1, 2–70 wt.% CeO_2 , 0–20 wt.% ZrO_2 , 0.2–25 wt.% B_2O_3 , and optionally oxides of Fe, alkaline earths and/or rare earths. Using this catalyst, which is free from Ni, emission of H_2S and accumulation of S oxides are reduced.

Selective Preparation of Glycols

GAF CORP.

U.S. Patent 4,795,733

A new hydrogenation catalyst consists of 0.05–5 wt.% Pd and/or Rh, 10–90 wt.% Ni, and 0.03–10 wt.% metallic Re on a support in fluted extended form, which has 5–90 wt.% of Al_2O_3 . The catalyst can be used for hydrogenation reactions, in particular 1,4-butyne diol and 1,4-butenediol to 1,4-butanediol, having higher activity and selectivity to the product. Glycols such as 1,4-butanediol are useful as monomers for thermoplastics, and in the pharmaceutical industry.

Palladium Hydrogenation Catalyst for Butanediol Preparation

GAF CORP.

U.S. Patent 4,797,382

A new hydrogenation catalyst consists of 0.05–5 wt.% Pd or a mixture of Pd with another metal having defined properties, 8–40 wt.% Cu, and 1.5–10 wt.% of an alkali metal or alkaline earth metal on a magnesium silicate support at 45–97% of the total composition. The catalyst is used for preparation of 1,4-butanediol from γ -butyrolactone in high yield and selectivity.

Catalyst Composite for Hydrocarbon Dehydrogenation

UOP

U.S. Patent 4,880,764

A catalyst composite consists of 0.1–2.0 wt.% Pt, modifiers of: 0.1–5.0 wt.% Li, 0.1–2.0 wt.% Ir, and 0.1–5.0 wt.% Sn; all on an Al_2O_3 support of nominal diameter 850–2500 μm . The Ir is surface impregnated on the catalyst, while the Pt, Li and Sn components are uniformly impregnated. The catalyst composite is used for conversion of hydrocarbons, especially for dehydrogenation of 2–15C paraffins or olefins.

Naphtha Reforming Catalyst

MOBIL OIL CORP.

U.S. Patent 4,882,040

A naphtha feedstock of low octane value is reformed to give a high octane value and aromatics content by contacting with a catalyst consisting of a Group VIII metal, especially 0.1–10 wt.% Pt, in combination with a zeolite containing 0.1–10 wt.% Tl or Pb. Selectivity for aromatics is high, and for hydrogenolysis low; and aromatic gasoline is obtained in good yield.

Palladium Hydrogenation Catalysts

GAF CORP.

U.S. Patents 4,885,410–11

Supported catalysts consisting of (a) 0.05–5 wt.% Pd, 8–40 wt.% Cu, and 1.5–10 wt.% alkali(ne earth) metal; or (b) 0.05–5 wt.% Pd, 10–90 wt.% Ni, and 0.03–10 wt.% Re, are used for hydrogenation of (a) lactones to diols or (b) unsaturated/carbonyl group containing organic compounds to alkanediol products. In case (a) products such as 1,4-butanediol and 1,6-hexanediol which are useful as monomers are obtained with improved selectivity, and in (b) the products are useful for pharmaceuticals and cosmetics.

Efficient Method for Regenerating Sintered Catalysts

DOW CHEMICAL CO.

U.S. Patent 4,891,346

Redispersing and reducing a deactivated Pd, Rh, Os or Ru catalyst on a refractory support is achieved by contact with a reducing agent to partially reduce the catalyst, Cl_2 or Br_2 to redisperse the metal, and a reducing agent to complete the reduction. After regeneration the catalyst has at least 110% of its original activity for converting 2-chloroprene, CH_3OH and CO to methylmethacrylate and chloromethane. This is a simple, cheap and efficient method of regenerating sintered catalysts.

Palladium Catalyst for Olefin Isomerisation

SHELL OIL CO.

U.S. Patent 4,895,997

A double bond isomerisation process for conversion of an α -olefin feedstock to internal olefins uses a catalyst which incorporates 0.01–10 wt.% Pd into an Al_2O_3 hydrogel, to give a surface area of at least 275 m^2/g and a specified pore structure. The catalyst shows diminished dimerisation reactions.

Novel Catalyst for Production of Polymethylenes

BROOKHAVEN NAT. LAB.

U.S. Appl. 7,175,781

A novel catalyst of Fe, together with Pt and/or Pd optionally on an inorganic refractory oxide support, is used for the synthesis of long chain hydrocarbons from mixtures of CO and H_2 and/or H_2O . Polymethylenes are produced which could substitute for commercial HD polyethylene. The novel catalysts are less expensive than prior-art Ru catalysts, can be used at moderate pressures, are stable, and can be used in slurry type reactors.

Palladium Catalyst for Allyl Acetate Preparation

DAICEL CHEM. IND. K.K.

Japanese Appl. 1/299,253

A Pd catalyst is used in the preparation of allyl acetate by reaction of propylene with acetic acid and O_2 , in the vapour phase at 100–300°C. The catalyst contains 0.1–5 wt.% Pd with a specific surface area of 50–150 m^2/g and alkali metal acetate(s), supported on SiO_2 of specific surface area 20–200 m^2/g with defined pore characteristics. The catalyst has an improved life span and gives improved yield.

Palladium-Perovskite Waste Gas Purification Catalyst

MATSUSHITA ELEC. IND. K.K.

Japanese Appl. 1/307,453

A waste gas purifying catalyst consists of a honeycomb support having an Al_2O_3 coating loaded with Pd, then perovskite type double oxide fine powders of formula ABO_3 , where A is a rare earth/alkaline earth metal and B is a transition metal. The embedded Pd is protected from poisoning, and the catalyst maintains higher activity over a long time for purification of combustion exhaust from cars, or industrial or domestic combustors.

Palladium Catalyst for Preparation of Aromatic Chlorides

KUREHA CHEM. IND. K.K. *Japanese Appl.* 1/311,032

Aromatic chlorides are prepared by trans-chlorination of polychlorinated aromatic compounds at 200–500°C over a catalyst consisting of 0.01–30% Pd chloride and rare earth metal chlorides on active C. The chlorides are preferably one or more of Y, La and Ce chlorides, with a molar ratio of other chlorides: Pd chloride of 0.01–100. Useful aromatic chlorides can be prepared efficiently, in high yield, using this method.

Selective Preparation of Benzene

NIPPON KOKAN K.K. *Japanese Appl.* 1/311,033

Benzene is prepared by reaction of alkylbenzenes with CO_2 over a catalyst of 0.01–50 wt.% Pd and 0.1–50 wt.% of one or more oxides from alkaline earth and rare earth metal oxides, on an Al_2O_3 support. The preferred catalytic component is Pd/CeO₂, Pd/Y₂O₃, Pd/La₂O₃, Pd/MgO with atomic ratio of Pd/metal oxides of 0.5–50. Benzene and useful CO and H₂ are prepared using this method, with high selectivity to benzene.

Exhaust Purification Catalyst Preparation

NIPPON SHOKUBAI KAGAKU *Japanese Appl.* 1/315,340

A monolithic honeycomb carrier is coated with 0.1–10 g/l total of Pt and/or Pd, and Rh, 1–150 g/l CeO₂, and 20–200 g/l activated Al_2O_3 , dipped into an aqueous Sn solution, and dried and/or sintered to give 0.01–50 g/l SnO₂. The catalyst can be used for simultaneous removal of hydrocarbons, CO and nitrogen oxides from internal combustion engine exhaust at lower temperatures.

Domestic Stove Exhaust Purification Catalysts

MATSUSHITA ELEC. IND. K.K. *Japanese Appl.* 2/9,452

A curved plane with honeycomb structure is prepared from a mixture of Al_2O_3 , fused SiO_2 , K salts or fibrous K titanate, cellulose ether, a surface active agent and water, and is impregnated with Pt group elements. It is used for catalysts for purifying exhaust gases from various combustion devices, especially domestic kerosene or gas stoves. The curved honeycomb catalyst can be assembled to form a tubular catalyst with large surface area.

HOMOGENEOUS CATALYSIS

Oxidative Carbonylation to Prepare Organic Carbonates

GENERAL ELECTRIC CO.

European Appls. 350,697A and 350,700A

Organic carbonates are prepared by reaction of an organic hydroxy composition, CO and O₂ at 70–150°C, in the presence of a catalyst consisting of Pd, Co or di/trivalent Mn, tetraalkylammonium halide(s), and a quinone and/or aromatic diol reduction product. The organic carbonates produced are used to prepare polycarbonates. This reaction does not require bases, drying agents or solvents, so catalyst recycle is more practical.

Ruthenium Catalyst for Transvinylation

UNION CARBIDE CORP. *European Appl.* 351,603A

A new process for the transvinylation of a vinyl derivative of a Bronsted acid, for example vinyl acetate, with a different Bronsted acid, involves mixing in the liquid phase at 50–200°C, in the presence of CO and 30,000–0.5 ppm of a Ru carbonyl carboxylate catalyst, to produce the vinyl derivative of the different Bronsted acid. The Ru catalysts are non-volatile, thermally stable, exhibit high activity only at elevated temperatures, are not toxic, and allow a high yield of product to be obtained.

Palladium-Phosphine Complex Catalyst for Hydrogenolysis

RHÔNE-POULENC CHIMI. *European Appl.* 352,164A

A chloroaromatic derivative such as chlorobenzene is hydrogenolysed with H₂ in the presence of a catalyst based on Pd and a phosphine having a pKa of at least 6. The process takes place in the homogeneous liquid phase.

Palladium-Phosphine Complex for Carbonylation Reactions

RHÔNE-POULENC CHIMI.

European Appls. 352,166–67A

Alkoxy carbonylation or hydrocarbonylation of chlorinated aromatic compounds are effected by contacting with a Pd based catalyst and a phosphine, in the presence of a base, an alcohol or H₂, CO, and a solvent, at 100–200°C and 10–100 bars pressure. Prior-art processes start with bromo- and iodo-compounds, while this process allows alkoxy carbonylation or hydrocarbonylation of aromatic chloro-compounds using a Pd-phosphine complex in the presence of an amine.

Ruthenium Catalyst for Epoxy Acid Production

SOC. NAT. ELF. AQUITAINE *World Appl.* 90/0,167A

A Ru salt is used to catalyse the oxidation of epoxy alcohols to epoxy acids using a solid oxidant in a medium containing water and an organic solvent. The process is used for preparation of low molecular weight epoxy acids which are highly water soluble.

Ruthenium Catalyst Composition for Oxidation Reactions

UNIV. OF FLORIDA

U.S. Patent 4,885,377

A new Ru perfluoroalkyl carboxylate composition is used as a catalyst in olefin and alkane oxidations. Other catalytic oxidations involve high temperatures and pressures, but oxidation of cyclohexane and norbornene for example, using the catalyst, can take place at 65°C using O₂ at 40 psi, in acetonitrile.

Preparation of Glycol Monoethers Using Ruthenium Catalysts

SUN REFINING & MARK ET. *U.S. Patent 4,895,987*

Glycol monoethers are prepared by dealkoxyhydroxy-methylation of aldehyde acetals by reaction with syngas in the presence of a novel catalyst system having a phosphonite or phosphinite promoter and a Ru-Co metal cluster compound or a mixture of Co and Ru compounds. The novel catalyst allows reaction under milder conditions, and gives better rates and selectivities. The glycol ethers obtained are useful, for example, as jet fuel additives.

Preparation of α -Keto Esters

AGENCY OF IND. SCI. TECH.

Japanese Appl. 1/305,053

α -Keto esters are prepared by reacting α -hydroxy esters with a bromic acid salt in the presence of a Ru catalyst, an onium salt and Na or K orthophosphate, in a two phase medium, preferably at 0–80°C. The method gives an industrially applicable process for producing a variety of α -keto esters under mild conditions and in high yield; useful as intermediates in the preparation of drugs and agrochemicals.

FUEL CELLS

High Temperature Fuel Cell Reforming Catalyst

JOHNSON MATTHEY P.L.C. *European Appl. 351,123A*

A fuel containing a hydrocarbon is reformed in a high temperature fuel cell by contacting a gas stream containing the fuel with a catalyst consisting of a Pt group metal and/or a noble metal from Pt, Rh, Ru or Au, on a support of rare earth oxide, ZrO₂, CeO₂ or MgO. The catalyst has better corrosion resistance and resistance to deactivation of the electrolyte of a high temperature fuel cell.

Platinum Alloy Electrocatalyst for Acid Fuel Cell

NE. CHEMCAT. CORP. *European Appl. 355,853A*

A supported Pt alloy electrocatalyst used for an electrode for an acid electrolyte fuel cell consists of a conductive C powder carrier and 0.1–30 wt.% of a dispersed ordered Pt-Fe-Cu ternary alloy having 40–60 at.% Pt, 13–40 at.% Fe and 13–40 at.% Cu. The alloy has a face-centred tetragonal or cubic structure, and an average crystallite diameter not above 50 Å. The electrocatalyst has higher activity and longer life.

Platinum-Gallium-Chromium Ternary Fuel Cell Catalyst

UNITED TECHNOLOGIES CORP. *U.S. Patent. 4,806,515*

A ternary metal catalyst contains at least 50 at.% Pt, 5–20 at.% Ga, and one of Cr, Co, Ni or a mixture, preferably Cr or a Co/Cr mixture, on a carbonaceous support. The catalyst has a high mass activity for the electrochemical reduction of O₂, and is useful for fuel cells, showing resistance to sintering and chemical dissolution during use. The operating life of the fuel cell is prolonged, with more stable output voltage.

Ternary Fuel Cell Catalyst Containing Platinum and Gallium

INTER FUEL CELLS CO. *U.S. Patent 4,880,711*

A noble metal ternary alloy catalyst consists of at least 50 at.% Pt, 5–20 at.% Ga, and at least one of Cr, Co, Ni and mixtures, preferably Cr, or Co and Cr; all on a carbonaceous support. A stable, long-life catalyst is obtained for fuel cell electrodes and other catalytic structures. The catalyst resists sintering and chemical dissolution during operation, thus improving the long term use of the fuel cell.

CORROSION PROTECTION

Anode for Cathode Protection

AS. USSR PHYS. CHEM. *Russian Patent 1,497,280*

An anode has an inert support base, and a working part consisting of an electrochemical active element shaped as a strip and made from an amorphous alloy based on Pd. The anode is used for cathode protection, and can be used for metal corrosion protection such as construction in water; giving increased operational efficiency and reduced energy consumption.

CHEMICAL TECHNOLOGY

Removal of Platinum Group Metal Compound from a Liquid

GAF CHEMICALS CORP. *U.S. Patent 4,900,520*

An acidic Pt group metal compound present at 1–5000 ppm is removed from a liquid product mixture by agitating with basic macroporous anion exchange resin particles of size 60–1000 mesh. The process is used to purify organosilanes or silicones derived from the reaction of a hydropolysiloxane.

GLASS TECHNOLOGY

Stirring Rod for Molten Glass

TANAKA KIKINZOKU KOGYU *Japanese Appl. 2/48,422*

A rod for stirring molten glass consists of a hollow support shaft formed so that cooling gas is blown into the rod. There is a Pt or Pt alloy outer surface layer which contacts the molten glass, and the stirring blades are mounted on the shaft. The stirring rod is used for glassware production facilities.

ELECTRICAL AND ELECTRONIC ENGINEERING

Cast Sputtering Target Containing Platinum or Palladium

EASTMAN KODAK CO. *U.S. Patent* 4,885,134

A sputtering target used in the production of magneto-optic recording media is formed of an alloy containing Tb, Fe and Co together with 2.5–15 at.% of Pt, Pd, Cr, Ni, Ta or Hf, and especially contains 21–27 at.% Tb, 70–79 at.% Fe, 6–9 at.% Co, and 5–10 at.% of the fourth metal. Addition of the fourth metal produces fine grained physically sound bodies having uniform composition and structure.

Improved Silicone Gel Encapsulant for Electronic Devices

AMERICAN TEL. & TELEG. CO. *U.S. Patent* 4,888,226

Electronic devices, especially wire-bonded integrated circuits, are encapsulated by a material consisting of 15–30 wt.% silicon gel which contains a Pt catalyst, 50–80 wt.% SiO₂, and 5–20 wt.% of a silicone hydride composition. The uncured encapsulant is capable of flowing to encase an electronic device, and after curing it has appropriate adhesion, thermal, and shock-resistant properties.

Polycrystalline Platinum-Cobalt Magnetic Film

C. F. BRUCKER *U.S. Patent* 4,902,583

A hexagonal polycrystalline magnetic CoPt layer consists of a substrate, a 3000–10,000 Å CoPt film whose c-axis throughout the film thickness is at 29° to the plane of the film, and may include an intermediate layer of Cr or W. A thin usable CoPt film is deposited as a single homogeneous structure, preferably by controlled sputtering process, with a coercivity of 1300–2000 Oe.

Sulphiding Resistant Electrical Contact Alloy

TECHNOPOLICE HAKODA *Japanese Appl.* 1/298,125

A sulphurising resistant contact material consists of a Ag or Ag alloy matrix and 1–40 wt.% RuO₂ particles dispersed in the matrix. The material is produced by pressing a mixture of Ru powder and Ag powder to form a compact, and sintering in an oxidising atmosphere. The sulphurising resistance of the material is improved without reducing the contact properties.

Magnetic Recording Medium Containing Rhodium and/or Ruthenium

HITACHI K.K. *Japanese Appl.* 1/312,724

A magnetic recording medium consists of a non-magnetic base material, an intermediate Cr, Mo or W layer, and a 500 Å magnetic layer made of a thin film of an Fe-Ru system alloy containing 3–10 at.% Ru, an Fe-Rh system alloy containing 3–7 at.% Rh, or an Fe-Ru-Rh alloy. A protective layer may be present. The magnetic layer has high coercive force.

Silver-Palladium Composite Fine Powder

TANAKA KIKINZOKU KOGYO *Japanese Appl.* 1/319,609

A Ag-Pd composite fine powder is made by adding hydrogenated sodium boride to an aqueous solution of a Pd compound, for example Pd nitrate, to form a colloid, adding L-ascorbic acid, then an aqueous solution of a Ag compound. The Ag-Pd composite fine powder is used for electrical conductive paste used in thick film circuitry. The paste has improved characteristics such as no migration of Ag, and no solder cracking.

Magnetic Recording Medium with Palladium Alloy Thin Film

MATSUSHITA ELEC. IND. K.K. *Japanese Appl.* 1/320,619

A magnetic recording medium consists of a high molecular film such as polyethylene terephthalate, a sputtered thin film (150–500 Å) such as Pd, Pd-Ag or Pd-Si with more than 60% Pd in the alloys, a vertically magnetised film of Co-Cr, Co-Mo, Co-Cr-Rh, or others, and a protective film. The medium has good durability for vertical magnetic recording, and high density recording can be performed without being affected by environmental conditions.

Laser Beam Marking of Resin Compositions

FUJI PHOTO FILM K.K. *Japanese Appl.* 2/45,125

Laser beams are used for cutting or marking a resin composition containing Pt, Pd, Ni, Cu or Co; an alkyl, aryl or heterocyclic group; cations, and other components. The method gives a fine finish to cut portions, and is used to engrave model names and manufacture or lot numbers of IC packages, or to accurately cut masking tapes bonded to car bodies for painting.

High Density Storage Magnetic Recording Medium

MATSUSHITA ELEC. IND. K.K. *Japanese Appl.* 2/56,717

A magnetic recording film of oriented magnetisation axis consists of a substrate, an intermediate layer optionally of Pt group elements, Ni, Cu, or others, and a magnetic recording layer which is a ferromagnetic thin film of Fe carbide or Fe oxide. The magnetic recording film has high density storage by raising the rectangular ratio of the medium, which is for example 0.90, and is used for video tapes.

Magnetic Recording Medium Containing Platinum

HITACHI K.K. *Japanese Appl.* 2/58,723

The medium has a non-magnetic base with a magnetic layer containing Co and Pt, at least one of Ni, Cr, Mo and W, at least one of Rh, Ru, Ti, Zr, Hf, Ta and Nb, and at least one of Al and Si. The noise level of high density reproduction and recording can be reduced without loss of magnetic properties of the Co alloy thin film. The medium has good anticorrosion properties, high reliability, and can be used in a magnetic memorising device.

Superconducting Paste for Thick Film Formation

MITSUI MINING & SMELTING *Japanese Appl.* 2/72,510
Superconducting paste consists of sintered powder containing constituent atoms of a superconducting composite oxide of Bi, Pb, Sr, Ca and Cu, and powder of one or more of Pt, Pd, Au, Ag or their oxides. The paste used for forming a superconducting thick film oriented to a specified direction, which is dense and contains a high ratio of a high T_c phase (T_c = 110K).

Improved Magnetic Recording Medium with Cobalt-Platinum Layer

SONY CORP. *Japanese Appl.* 2/73,511
A magnetic recording medium consists of a ground layer having at least one of Pt, Pd, Rh, Ir, Os, Ru, Au, Ag, Sb, Bi or others, with a magnetic thin layer of CoPt or CoPtO containing at least one of Ti, Zr, V, Mo, Cr, Nb, Ta and W, or B. The magnetic characteristics of the medium are improved, and the production cost is reduced.

Irradiation Treatment to Improve Corrosion Resistance of Workpieces

W.C. HERAEUS G.M.B.H. *German Appl.* 3,830,539
The corrosion resistance of workpieces made of Pd, Ag and their alloys is improved by electromagnetic irradiation of their surfaces using a beam of pulsed radiation of wavelength 140–360 nm, and a radiation time of 1 ns to 1 ms. The workpieces are used in the electronic industry as lead frames and contacts.

High Reliability Metal-Ceramic Joint

NGK SPARK PLUG K.K. *German Appl.* 3,931,156
A ceramic is joined to a metal by inserting an intermediate member between them and heating the assembly to form an intermediate layer which consists of 20–70 wt.% Pd, 10–60 wt.% Ni, 1–10 wt.% Ti, and optionally up to 10 wt.% Cu. The joint has high reliability even at high temperatures, and is used for valves, pistons, turbocharger rotors, or turbines, especially between a ceramic turbine wheel and a metallic rotor component.

TEMPERATURE MEASUREMENT

High Temperature Platinum Resistance Thermometer

ISOTHERMAL TECHN. LT. *British Appl.* 2,223,100A
A high temperature Pt resistance thermometer consists of a Pt winding in an elongate quartz tube, with a positive potential offset voltage of 6–10 volts applied to the Pt winding; the measured resistance of which is indicative of the temperature. The thermometer is calibrated using a graphite crucible to which a positive offset voltage is applied. High temperature standard Pt resistance thermometers and high purity freezing point cells are obtained.

MEDICAL USES

New Platinum Anti-Tumour Agents Suitable for Encapsulation

LIPOSOME CO. INC. *European Appl.* 356,332A
New Pt complexes consist of 4-co-ordinate planar Pt²⁺ complexes and 6-co-ordinate octahedral Pt⁴⁺ complexes with neoalkyl carboxylic acids such as 2,2-dimethyloctanoic acid. The complexes are useful as anti-tumour agents, or anti-bacterial agents, especially suitable for encapsulation in liposomes.

Platinum-Diamine Complexes with Anti-Tumour Activity

NEDERLAND ORG. TNO. *European Appls.* 357,108–9A
A Pt(II) diamine complex (TN-56) and a Pt(IV) diamine complex (TNO-40) are both prepared from K₂PtCl₄. The complexes have outstanding anti-tumour activity against diverse types of tumour, and strong activity against cells which have become resistant to *cis*-platinum.

Indium-Free Dental Alloy

ENGELHARD LTD. *European Appl.* 357,335A
A dental alloy consists of 60–85 wt.% Pd, 5–20 wt.% Cu, 3–15 wt.% Ga, 0.5–7 wt.% Au, 1–5 wt.% Sn, 0.2 wt.% Ni, and 0.005–0.02 wt.% of a grain refiner of Ir, Ru, Re or mixtures of these metals. The novel alloy is used for dental restorations by casting and then bonding a ceramic coating to part of the surface. It does not discolour dental ceramics, does not cause bubbling of the porcelain during firing, can undergo cold rolling, and is relatively inexpensive.

Cis-Platinum Complexes for Inhibiting Tumour Growth

UNIV. OF TEXAS SYSTE. *World Appl.* 90/2,131A
Four-co-ordinate *cis*-Pt(II) complexes can be combined with phospholipids to form liposomes which are useful in inhibiting both the growth and metastatic spread of tumours. A typical example of a Pt complex is *cis*-bis-neoheptanoato (ethylenediamine) Pt(II).

Platinum Complexes Used as Carcinostatic Agents

CHUGAI PHARMACEUTICAL K.K. *Japanese Appls.* 2/28,134–35
A dicarboxylate diamine Pt complex or its optically active compound is prepared by reaction of (a) a tetravalent platinum acid salt with 2-aminomethylpyrrolidine and its optically active compound to give tetrahalo(diamine)Pt(IV), followed by treatment with Ag oxalate and the Ca salt of 1,1-cyclobutane dicarboxylic acid, or (b) *cis*-dichloro(2-aminomethylpyrrolidine) Pt(II) or its optically active derivative with the Ag salt of 1,1-cyclobutane dicarboxylic acid.

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