

NEW PATENTS

METALS AND ALLOYS

Stable Monoatomic Forms of Precious Metals

CONCORD RES. CORP. *British Appl. 2,219,995A*

Stable non-metallic orbitally rearranged monoatomic forms of Pt, Pd, Rh, Ir, Os, Ru, Au, Ag, Co, Ni or Cu exist, having a 'd' orbital hole sharing energy with an electron or electrons, and prepared by exhaustively solubilising and evaporating a metallic salt. The materials have high temperature superconductivity.

Alloy Containing Ruthenium for Jet Engine Components

GENERAL ELECTRIC CO. *European Appl. 347,614A*

Alloys used to manufacture structural components for jet engines preferably contain 10–16 at.% Ru, 15–20 at.% Cr, 20–30 at.% Al, 0–0.2 at.% Y, and balance Fe. The alloys have high strength, good ductility and good resistance to oxidation at high temperatures, and have use at temperatures of 2300°F and above.

Shape Memory Alloys with High Transition Temperatures

ARMADA CORP. *U.S. Patent 4,865,663*

Shape memory alloys have compositions within the limits 20.0–35 at.% Pd, 49.8–50.7 at.% Ti, 14.12–29.27 at.% Ni, and 0.01–0.6 at.% B. The alloys show shape memory due to thermoelectric martensitic phase transformation on passing through a transition temperature, which in some cases exceeds 300°F. Pd raises the transition temperature.

ELECTROCHEMISTRY

Oxygen Generating Electrode

TDK CORP. *European Appl. 334,378A*

An electrode used for O₂-generating electrolysis has a metallic substrate with a 0.1 mg/cm² (Ir) coating of 40–90 mol % Ir as Ir oxide, 50–10 mol % Ta as Ta oxide and 0.1–30 mol % Pt; with a 0.02–5 mg/cm² (Ir) overcoat of Ir oxide or >50 mol % Ir oxide/Ta oxide. The coating has good substrate adhesion and corrosion resistance, does not contaminate the electrolyte, and can be used at high current densities.

Anodes for Electrolytic Reduction of Aromatic Carboxylic Acids

MITSUI TOATSU CHEM. INC. *European Appl. 348,094A*

Anode materials having low O₂ overvoltage for O₂ generation are used in the electrolytic reduction of aromatic carboxylic acids to the corresponding benzyl alcohols in aqueous acidic solution. Suitable electrodes are metal oxides stable in the acid, such as those of Pt, Pd, Rh, Ir, Os, Ru, Sn, Ta, Co and their mixtures. Benzyl alcohols are used as intermediates for agricultural and pharmaceutical chemicals.

Lead Dioxide Electrode for Chromium Plating

JAPAN CARLIT K.K. *Japanese Appl. 1/275,797*

A PbO₂ electrode has an Fe (alloy) matrix, a first intermediate layer of valve metal oxide, a second intermediate layer of Pt group metals, their alloys or their oxides applied by a pyrolytic method, and an electrodeposited layer of PbO₂. The electrode has good durability, is obtained at low cost and is used for electrolytic production of Cr, electrolysis of organic substances, and for electroplating.

Noble Metal Electrolyte Preparation Unit

AUTOMATION DES. TECH. *Russian Patent 1,475,989*

An electrolyte preparation unit including an upper reservoir containing replaceable cassettes with Rh plates is used for preparation of electrochemical solutions of the noble metals and alloys, employed in computer magnetic memory discs. The electrolyte quality and operation reliability are increased by plates with slots placed at an angle on two opposite walls of the sections forming zig-zag channels.

ELECTRODEPOSITION AND SURFACE COATINGS

Palladium Organosol for Electroless Metal Plating

TODA KOGYO K.K. *Japanese Appl. 1/255,673*

Preparation of a Pd organosol involves mixing a Pd hydrosol with an electrolyte to coagulate the Pd colloid, washing, carrying in a filter, and sealing within a pack material. The pack is thrown into an organic solvent and mechanically treated to prepare the Pd organosol, which is applied as catalyst to a substrate for electroless metal plating.

Electroless Palladium Plating Liquid

ISHIHARA YAKUHIN K.K. *Japanese Appl. 1/268,877*

An electroless Pd plating liquid is an aqueous solution containing 0.0001–0.5 mol/l of a Pd compound, 0.001–8 mol/l of NH₃ and/or an amine compound, 1–500 mol/l of a divalent S-containing organic compound, and 0.005–2 mol/l of a phosphorus acid and/or phosphite. The electroless Pd plating liquid provides good stability in electronics.

Low Stress Rhodium Electroplating Solution

NIPPON MINING K.K. *Japanese Appl. 1/290,788*

A low stress Rh electroplating solution contains a Rh salt, a free acid and additionally S or a S containing substance. The solution is used for electroplating a thick Rh plate, free from cracks, and with high corrosion resistance; giving a plated product with increased reliability. The surface is glossy even when the Rh plate is thick, and therefore has a high reflectivity.

Electrolyte for Precipitating Palladium Alloy

VEB. BERGBAU FUNK A. *East German Patent* 269,635
An economic electrolyte for precipitation coating with a Pd alloy contains 5–25 g/l Pd as a carbonate, 0.5–25 g/l Ni or 0.1–5 g/l Co, and conductor and buffer salts, and is used at 40–80°C at a pH of 6.5–7.5. A 100 µm thick coating (minimum) is produced which has a bright finish, is wear resistant, and is pore and crack-free. The electrolyte is used in the electronic industries and for decorative purposes.

Uniform Coating of Moving Films from a Slotted Caster

VEB. FILMFAB WOLFEN *East German Patent* 269,661
When moving films are to be coated from a slotted caster the uniformity of the deposit thickness is checked by measuring the volumetric flow rate of a model liquid in a dummy run. A hot foil transducer with a sensor point of vapour-deposited Pt is used; flow rate is calculated from the resistance of the Pt layer, and corrections to the gap width are made if necessary. This method saves time, labour and materials.

Active Coating for Electrode for Chlorine Production

V.I. MARCHENKO *Russian Patent* 1,481,269
An electrode used for production of chlorine, alkali and chlorates consists of a substrate with an active coating of oxides of Ti and W, Nb, Mo, or Ta; plus Cr and/or Co oxides; plus Ru oxide, with a molar relationship of other oxides to RuO₂ of 4–24:1. All of the components are added to the rutile phase as a mixed composition. The coating with a low RuO₂ content has increased electrocatalytic activity.

APPARATUS AND TECHNIQUE

Schottky Barrier Infrared Detector

MASSACHUSETTS INST. TECH. *U.S. Patent* 4,864,378
Ir silicide Schottky barrier IR detectors consist of a *p*-type Si substrate with an etched SiO₂ layer, a double layer of a thin film of Pt (about 5 Å) and a thin film of Ir (about 10–20 Å). The Ir/Pt film is dry etched and the structure heat treated to form an Ir/Pt silicide disc-like region. The procedure is used for large scale fabrication of high performance IR detector arrays, giving high reproducibility and improved detector wavelength response.

Quantitative Determination of Methane

FORD MOTOR CO. *U.S. Patent* 4,870,025
Selective determination of CH₄ in an O₂-containing gas stream involves passing the gas over two interconnected electrode catalysts, one of Pt and one of Pd, coated on thermistors, and heated at 350–450°C. The CH₄ is oxidised only by the Pd catalyst, while other components are oxidised by both catalysts, so comparative readings give the % of CH₄ in the gas stream without interference from other hydrocarbons.

Extended-Gate FET Ion Sensor

SHINGIJUTSU KAIHATSU *Japanese Appl.* 1/213,563
An FET ion sensor having an extended gate electrode and a micro-heater to heat the extended part, is used for analysing H₂ containing compounds such as NH₃ or H₂S. The gate electrode is of Pt or Pd film which may have a multilayer structure, with a SiO₂ membrane covering the surface to prevent escape of diffusing hydrogen ions into the atmosphere, and its activity can be controlled by varying the micro-heater temperature.

Combustible Gas Sensor with Improved Selectivity

FIGARO GIKEN K.K. *Japanese Appl.* 1/227,951
A sensor to detect combustible gases, especially CO, has a metal oxide semiconductor (MOS) gas responsive body, with a zeolite coating layer containing catalytic metal ions. In an example Au electrodes are formed on SnO₂ containing 0.2 wt.% Pt and 0.5 wt.% Pd; the electrode surface of the MOS body is coated with zeolite, and sintered. Coating with zeolite minimises sensitivity to vaporised organic solvents, improving selectivity to CO.

Production of Semiconductor Type Gas Sensor

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 1/227,954
A sintered semiconductor type gas sensor is produced by coating an *n*-type oxide semiconductor powder on an insulating substrate, baking to form a gas sensitive layer, impregnating with Pd chloride or chloroplatinic acid solution, and pyrolysing. A gas sensor is produced with improved stability and high sensitivity.

Air:Fuel Ratio Detector with Platinum Electrodes

HITACHI K.K. *Japanese Appl.* 1/227,955
An air:fuel ratio detector of high credibility has porous thin membrane type Pt electrodes on front and back surfaces of an oxygen ion conductive zirconia solid electrolyte element. The electrode on the front is coated with a gas diffusion resistor layer made of a crude particle layer with large porosity and a super-microparticle layer which fills the voids. The air:fuel ratio can be continuously detected in the lean-rich range.

Oxygen Sensor Device with Electrode Protective Layers

NGK SPARK PLUG K.K. *Japanese Appl.* 1/232,253
An O₂ sensor device includes a measuring electrode having three porous protective layers; the second of Rh or Pd on TiO₂ (for NO_x reduction), and the third of Pt on Al₂O₃, spinel or magnesia (for CO, HC oxidation). The layers protect the electrode without decreasing permeability, provide good sensor response and maintain high precision air:fuel ratio control, so the device can be used for purifying internal combustion engine exhaust gas.

Black Pearl Containing Platinum Group Metal Colloid

T. SHIMURA

Japanese Appl. 1/244,704

Colouring a pearl without damage involves alternately penetrating a Pt group metal amine complex salt solution and a basic reducing agent solution into the pearl, which grows a stable, high purity Pt group metal colloid black in the pearl with temperature operation. Providing the Pt group metal thin film in the pearl increases light interference colour, and the pearl has high light fastness, blackness and gloss.

Catalyst Membranes for Gas Sensors

TOSHIBA K.K.

Japanese Appls. 1/250,851-52

Gas sensors having improved selectivity to paraffin type gases such as CH₄, or good long term sensitivity include a catalyst membrane on the gas sensitive membrane. The catalyst membrane consists of (a) the sintered product of a paste containing a Pt group metal compound, a ceramic adhesive agent, and metal oxides, or (b) the sintered material of a paste containing a supporting substance powder and a resin acid salt of a Pt group element. The catalyst membrane can be formed simply, quality control is easy, and the product has less dispersion.

Signal-Taking Out Structure for Air:Fuel Ratio Sensor

HITACHI K.K.

Japanese Appl. 1/257,256

A critical current type air:fuel ratio sensor has porous Pt electrodes on the inner and outer surfaces of a tubular solid electrolyte, and a metallic member for taking out signal from the detecting element, using noble metal paste to weld to inner and outer electrodes and Pt paste coated with sealing glass. Corrosion of the signal-taking out portion can be prevented, so air:fuel ratio can be measured within a wide range with high reliability.

Detection of Hydrogen in Mixed Gases

TOKUYAMA SODA K.K.

Japanese Appl. 1/262,456

H₂ is detected by a sensor using a proton conducting solid electrolyte containing crystalline water as the detector. The sensor includes a reference electrode of Au, Ag or C, a detection electrode of Pt, Pd, Rh and so on, and is heated to 70-110°C by a Pt coil heater or a printed paste heater. The sensitivity for H₂ detection is good, and the sensor is used for accurate detection of H₂ in mixed gases.

Biosensor Oxygen Detector with Platinum Cathode

FUJI ELECTRIC MFG. K.K.

Japanese Appl. 1/265,150

A biosensor has a flow cell with a stationary film holding microorganisms or enzymes in contact with a sample on one side and a buffer solution on the other, and a detector to detect the amount of O₂ consumed by the reaction. The detector includes an anode and a Pt cathode which contacts the buffer solution through a gas permeable membrane. Running costs can be reduced, and stabilised measurements can be made for a long time.

Device for Measuring Nitrogen Oxides Concentration

NGK INSULATORS K.K.

Japanese Appl. 1/277,751

A device for measuring the concentration of nitrogen oxides in exhaust gases has a solid electrolyte and an electrochemical cell with at least two electrodes. An NO_x decomposition catalyst of Pt, Pd or Rh is set near the first electrode which is connected to the sample gas. The structure of the device is simple and low cost production is possible.

Coated Clad Container

TANAKA KIKINZOKU KOGYO

Japanese Appls. 1/279,777-78

A clad container has inner and outer surfaces coated by dispersed materials containing nitride, carbide or boride materials, with Pt, Pt alloy, Rh or Rh alloy as the major component. The containers are used in high temperature environments, for melting metal oxides, high melting point metals or high melting point glass, and have long life.

Partial Electroplating Device

HITACHI K.K.

Japanese Appl. 1/294,887

A partial electroplating device has Pt plated Ti thin wires attached to both sides of the plating liquid blowing-out mouth. Liquid flowing near the wires becomes more active, and uniform thick partial plating is obtained on a metal plate fixed with masking tapes.

Gas Detector with Ruthenium Oxide Exothermic Resistor

FUJI ELECTRIC MFG. K.K.

Japanese Appl. 1/295,151

A gas detector consists of a gas sensitive member of Sn oxide semiconductors on one side of a sensor substrate and a Ru oxide exothermic resistor on the other side. The resistor is heated at a specific temperature in purified air and in sample gas. The gas sensor is small, and a stable output is obtained for a long time.

Oxygen Sensor Device with Inner Platinum Electrode Band

JAPAN ELEC. CONTROL SYS.

Japanese Appl. 1/295,157

An O₂ sensor device consists of a ceramic tube with an inner electrode band of Pt, between which is an interlayer of ceramic material. The capacity of the inner electrode band is improved, and when the sensor device is exposed to excessively high temperatures the inner electrode band is prevented from peeling off.

Oxygen Partial Pressure Measuring Device

BIELER & LANG G.M.B.H.

German Appl. 3,820,881

A device for measuring O₂ partial pressure has a measuring element consisting of a ZrO₂ solid electrolyte plate having Pt surface coatings on each side forming electrodes. The device includes a pressure switch which maintains a constant reference gas pressure to ensure accuracy.

Increased Sensitivity Immunoanalysis

BIOCHEM. INST. *Russian Patent 1,464,089*

Immunoanalysis is carried out more efficiently using phosphorescent metalloporphyrins as markers. A compound such as Pd(++)-caproporphyrin I is covalently bound to the monoclonal antibodies and used in solid phase immunoanalysis, with specific phosphorescence measured at frequencies >620 nm.

Device for Electrochemical Treatment of Mine Waters

DON COAL INST. *Russian Patent 1,470,669*

A device used for the electrochemical treatment of mine waters contains anodes made of graphite or Ti, covered by Ru dioxide, cathodes of graphite or Ti, and diaphragms of acid-alkali-proof material positioned between each anode and cathode. A stable quality of water is obtained.

JOINING

Uniform Molybdenum-Ruthenium Braze Material

GTE PRODUCTS CORP. *U.S. Patent 4,859,236*

A Mo-Ru metal powder mixture containing 35–50 wt.% Ru is produced by forming a slurry of ammonium molybdate and Ru dioxide, crystallising, reducing at 400–600°C for 12–18 h to produce a metallic mixture, heating at 800–1000°C for 1–4 h in a reducing atmosphere to stabilise the particle size at –325 mesh, and cooling. A product of uniform composition is obtained, used as a braze material for Mo components.

Brazing Filler Metal for Bonding Titanium or Its Alloys

COBELCO KAKEN K.K. *Japanese Appl. 1/245,995*

A filler metal of 20–40 wt.% Pd, less than 10 wt.% Au, 60–70 wt.% Ag, and balance incidental impurities is harmless to humans and is used for bonding artificial tooth beds, tooth crowns or similar Ti (alloy) dental articles. It has good wetting properties, articles can be easily bonded without discoloration and without using brazing flux, and the brazed zone of the filler metal exhibits high shearing strength.

HETEROGENEOUS CATALYSIS

Catalyst for Oxidation of Carbon Monoxide to Carbon Dioxide

PHILLIPS PETROLEUM CO. *European Appl. 337,446A*

A catalyst is prepared by contacting a ZrO₂ support with a Pt and/or Pd compound solution, heating to convert to the oxide and/or metal, and activating with H₂ or CO at 100–600°C. Preferably the product contains FeO, Fe₂O₃ and/or Fe₃O₄. CO oxidation can be effected at –50 to 300°C and 1–2000 psi, and the catalyst can be used in breathing masks, to remove CO from engine exhaust, in manufacturing isotopically labelled O₂, and in CO₂ lasers.

Catalytic Exhaust Gas Purifier

COM. NAZ. RIC. ENERG. *European Appl. 340,784A*

An exhaust gas purifier for I.C. engines consists of a hollow casing containing a purifier arrangement which has Pt coated quartz or silica mineral fibres (amorphous or crystalline in structure), with a supporting stainless steel mesh and tubular structure to minimise resistance to gas flow. The purifier provides a simpler construction of reduced cost.

Catalytic Production of Hydrogen Peroxide

DU PONT DE NEMOURS CO. *European Appl. 342,047A*

High yields of H₂O₂ are produced by reaction of H₂ and O₂ using a catalyst of Pt and/or Pd on C, SiO₂ or Al₂O₃, with H⁺ and Br[–] ions each at concentrations of 0.001–0.05M. Reaction is in an aqueous medium containing no more than 2 wt.% of an organic component, which reduces the explosion hazard of high H₂O₂ concentrations and organic solvents. Catalyst deactivation by decomposition products of organic materials is also reduced.

Catalyst Resins for Removing Oxygen from Aqueous Solutions

BAYER A.G. *European Appl. 345,822A*

Catalyst resins consist of Pt or Pd charged macroporous weakly basic anion exchangers. The catalysts are used for reduction of O₂ in aqueous media such as boiler feed water using H₂ or hydrazine, and have high activity giving low residual O₂ contents in treated solutions. They have high thermal, mechanical and osmotic stability, high bonding strength of the metal, and are more easily regenerated.

Ruthenium-Bromine Fischer-Tropsch Catalyst

JOHNSON MATTHEY P.L.C. *European Appl. 347,204A*

A catalyst for Fischer-Tropsch synthesis consists of 0.1–1 wt.% metallic Ru, Br moieties as promoter at a Br:Ru atomic ratio of 1.5:1–4:1, supported on for example γ -Al₂O₃ of surface area 150–300 m²/g. The activity of the catalyst is such that a lower Ru loading may be used; CH₄ formation is less, and conversion efficiency is improved at a relatively low temperature (<300°C).

Catalytic Structures Containing Precious Metals

CORNING INC.

European Appls. 351,036A and 351,057A

Catalytic structures consist of at least one of Pt, Pd, Rh, Ir, Ru, Au or their oxides and/or Cr, Co, Ni, V or W integrally combined with a porous sintered structure (such as a honeycomb) or high surface area agglomerate bodies such as Al₂O₃, SiO₂ or zeolites integral with the structure. The catalytic structures can be used as filter media, for example as a diesel particulate filter, or catalytic converters, and can be used under thermally stressful conditions such as in the exhaust from internal combustion engines.

Reducing Pollutant Emissions by Transient Additional Enrichment

JOHNSON MATTHEY P.L.C. *European Appl.* 351,197A

Pollutant emissions from a lean running internal combustion engine are reduced during acceleration by use of a catalyst in conjunction with an engine management controller to provide transient additional enrichment. The catalyst consists of Pt and Rh on a washcoat with optional inclusion of Fe and/or ceria, and oxidises CO and hydrocarbons while reducing nitrogen oxides in the exhaust to N_2 .

Catalysts for Treating Automotive Exhaust Gas

ALLIED-SIGNAL INC. *U.S. Patents* 4,868,148-49

The catalysts are either (a) a honeycomb carrier coated with Al_2O_3 containing dispersed La oxide, Ce oxide, Pd oxide (<25 Å crystallites), and Rh oxide; or (b) Al_2O_3 pellets or an Al_2O_3 coated honeycomb monolith with dispersed Pt and/or Pd (0.01-4 wt.%) and optionally 0.01-2 wt.% Rh, with an overlayer having for example 2-75 wt.% La and/or Ce oxide, and optionally a further Al_2O_3 layer. Catalyst (a) has improved thermal stability, while (b) has decreased H_2S formation by separating the noble metal and O_2 storage components.

Catalytic Reduction of Nitrogen Oxides in Turbine Exhaust

GRACE W.R. CO. *U.S. Patent* 4,875,436

After NH_3 injection, cooled exhaust gas from a gas turbine generator for electricity production is fed to a low temperature selective catalytic reduction unit for conversion of nitrogen oxides to harmless by-products. The unit is for example stainless steel supporting a Pt, Pd, Rh containing catalyst, and up to 95% NO_x removal can be obtained from the turbine exhaust gas.

Hydroisomerisation Catalyst

MOBIL OIL CORP. *U.S. Patent* 4,877,581

A hydrocarbon feedstock containing nitrogen and wax is hydroisomerised by contact at 400-850°F and 200-2000 psig with a catalyst having 0.1-2.0 wt.% Pt or Pd on ZSM-11 zeolite which has been steamed. The process uses a medium pore catalyst which is more active, gives higher yields, and is more regenerable. The pour point of the feed is reduced at lower operating temperature.

Modified Platinum Dehydrogenation Catalyst

UOP INC. *U.S. Patent* 4,886,928

Dehydrogenation of 2-15C hydrocarbons is effected by contacting the hydrocarbon and steam with a multicomponent catalyst. The catalyst has an Al_2O_3 carrier; a Pt group component, preferably 0.1-1 wt.% Pt; preferred modifiers of 0.1-2.5 wt.% Y, 0.1-15 wt.% Sn and 0.2-2 wt.% Co; and a halogen component, for example 0.01-2 wt.% Cl. The catalyst can be used for example for conversion of propane to propylene.

New Catalyst for Removal of Chlorofluoromethanes

AGENCY OF IND. SCI. TECH.

Japanese Appl. 1/224,337

Disproportionation and decomposition of chlorofluoromethanes is achieved by irradiation with light of less than 400 nm wavelength in the presence of a new catalyst consisting of less than 5 wt.% of Pt, Pd, Rh, Ir, Os or Ru on TiO_2 . The catalyst is useful for removing chlorofluoromethanes.

Composite Catalyst for Fischer-Tropsch Synthesis

SHIN DAIKYOWA SEKIY *Japanese Appls.* 1/228,555-56

A composite catalyst consists of a SiO_2 support loaded with 0.00005-25 wt.% of metallic atom clusters of either Pt, Pd or Fe, or Rh, Ir and Fe. The catalyst is used for the Fischer-Tropsch reaction to prepare O-containing organic compounds or hydrocarbons from a CO- H_2 synthetic gas. The metallic components are hardly lost from the composite, and the catalyst containing it is hardly degraded, providing higher conversion efficiency and selectivity over a long period.

Ruthenium Catalyst for Hydrocarbon Production

NIPPON OIL K.K. *Japanese Appl.* 1/242,147

A 4-10C hydrocarbon is produced from synthetic gas by using a catalyst having 0.1-0.5 wt.% Ru in the form of a Ru component or Ru and Li components impregnated into a montmorillonite stone group mineral interlayer compound. The catalyst has high activity and effectively produces a 4-10C hydrocarbon for gasoline or gasoline mixture.

Catalyst for Removal of Nitrogen Oxides and Carbon Monoxide

HITACHI K.K. *Japanese Appl.* 1/266,849

A catalyst used to remove NO_x and CO simultaneously from boiler or gas turbine exhaust consists of 50-99 at.% Ti oxide, 1-50 at.% Mo, W, V, Ce, Ni, Co or Mn compounds, 0.001-5 at.% Pt, Pd, Rh or Ru, and/or 1-20 at.% Fe, Cr or Cu oxide. The catalyst is contacted with a gas containing NO_x , CO and O_2 in the presence of NH_3 , and reduces NO_x with NH_3 , and oxidises CO with O_2 .

Rhodium Catalysts for Reactions of Synthesis Gas

DAICEL CHEM. IND. K.K.

Japanese Appls. 1/294,640-41 and 1/294,643-44

Oxygenated compounds or unsaturated hydrocarbons are prepared from synthesis gas by reacting a mixture of CO and H_2 and optionally steam in the presence of a catalyst of (a) 0.1-10 wt.% Rh, Mn, alkali metal, and Ag on a SiO_2 support, or (b) a reduced Rh co-catalyst on SiO_2 , or (c) a reduced Rh co-catalyst on SiO_2 , possibly containing Ir, and pretreated with an aqueous acidic solution. The method improves selectivity to (a) acetaldehyde compared with a catalyst without the Ag component, or (b) acetic acid, or (c) unsaturated hydrocarbons.

Durable Exhaust Gas Purification Catalysts

MATSUSHITA ELEC. IND. K.K.

Japanese Appls. 1/304,046 and 1/304,048

Catalysts consisting of a carrier, a layer containing an ABO_3 compound with perovskite type structure (where A is a rare earth or alkaline earth element, and B a transition metal), Ce oxide, and Pt, Pd and Rh, are prepared by applying the ABO_3 layer first and then impregnating with Ce nitrate to give Ce oxide, or vice versa. High activity catalysts with long life and stable running at high temperatures are formed, which are used for purification of exhaust gas from domestic or industrial combustion apparatus or automobile engines.

Double Oxide Catalyst for Removal of Nitrogen Oxides

MATSUSHITA ELEC. IND. K.K. *Japanese Appl.* 1/307,431

A specific catalyst used to remove NO_x from combustion exhaust consists of Pt group metals loaded on a double oxide containing alkaline earth metals, Y or rare earth metals, and Cu group metals; and preferably has 0.25% Pt on a double oxide containing Ba, Y, Cu and Ag. The catalyst converts NO_x into N_2 without reducing agents, lower NO_x concentrations can be removed, all at lower temperatures.

Exhaust Gas Purification Catalysts Containing Rhenium

TOYOTA JIDOSHA K.K. *German Appl.* 3,918,317

Catalysts for exhaust gas purification consist of Re and at least one of Pt, Pd and Rh at a total of 0.01–5 wt.% with a Re:other metal atomic ratio of 0.01–0.5:1, on an inorganic support, especially cordierite coated with a porous inorganic layer. The catalysts are more effective in reducing hydrocarbon, CO and NO_x and have better thermal stability.

Catalyst System for Selective Hydrogenation

VEB. OTTO GROTEWOHL *East German Patent* 270,440

Selective hydrogenation is used to remove strongly unsaturated compounds from 4C hydrocarbon feeds by passing the liquid trickle over 2–4 different Pd/ Al_2O_3 catalysts, in a H_2 containing atmosphere, at 275–360 K. The catalysts contain 0.1–2 wt.% Pd, up to 1% alkali metal, Al_2O_3 , optionally up to 6% of promoters, and 0.1–20% of Si compounds, and have defined porosity and surface characteristics. The process is simple, efficient, selective, stable and flexible.

Ruthenium Catalyst for Plutonium Reduction

AS. USSR PHYS. CHEM. *Russian Patent* 1,415,666

Plutonium is reduced to the (III) oxidation state by treating a 30 mg/l solution of its nitrate with a 0.1–0.5 mol/l solution of hydrazine in the presence of a Pt group metal catalyst, preferably 1–5% Ru on an inert carrier, at a solid:liquid ratio of 1:10–20. The cost of preparation is reduced.

HOMOGENEOUS CATALYSIS

Rhodium Colloid for Hydrosilylation Catalyst

GENERAL ELECTRIC CO. *European Appl.* 337,197A

A Rh colloid is prepared by reacting 10–100 moles of a Si hydride with each mole of Rh trichloride, where the SiH_4 has a boiling point of at least 25°C at atmospheric pressure. The Rh colloid is used as a hydrosilylation catalyst for Si. Tetraalkyl-substituted silanes are useful as hydraulic fluids and lubricants.

Methyl Acetate Preparation

SOLLAC *World Appl.* 89/10,344A

Methyl acetate is prepared by isomerising methyl formate at 170–220°C in the presence of a Rh catalyst, 0.05–1 mol/l of an iodine compound promoter, and a cyclic N-alkylamide solvent. This method gives improved selectivity for methyl acetate preparation.

Rhodium Catalyst for Preparation of Phenylacetaldehyde

AGENCY OF IND. SCI. TECH. *Japanese Appl.* 1/249,741

Phenylacetaldehyde is prepared by reacting toluene with CO in the presence of a Rh compound, while irradiating with light of above 325 nm wavelength. A Rh compound such as chlorocarbonyl bis(trimethylphosphine) Rh can be used. The product can be obtained industrially both economically and simply, and is useful as an intermediate for drugs and pesticides, or as a raw material for perfume.

Ruthenium Catalyst for One-Step Ester Preparation

SUMITOMO CHEM. IND. K.K.

Japanese Appl. 1/258,641

One-step preparation of esters is by reaction of unsaturated aldehyde(s) with alcohol(s) in the presence of a Ru-containing catalyst (such as a Ru halide) and basic compounds as accelerators, at 100–300°C under 0–100 kg/cm² pressure.

Liquid Phase Olefin Hydroformylation Catalyst

AGENCY OF IND. SCI. TECH.

Japanese Appl. 1/288,341

A solid catalyst consisting of a metallic support loaded with Rh is produced by reacting metallic supports of Cr-Ni alloys and soluble Rh compounds in a solvent in a pressurised synthetic gas atmosphere. The catalyst is used for liquid phase olefin hydroformylation to aldehyde and is easily separated.

Synthesis of Anti-Microbial β -Lactam Compounds

SANKYO K.K.

Japanese Appl. 2/276

Optically active β -lactam compounds are produced by reducing specified β -lactam compounds in the presence of a stereosymmetric Ru compound. This process enables production of optically active intermediates for synthesis of the β -lactam compounds.

Homogeneous Hydrogenation Catalyst

HENKEL KGAA. *German Appl.* 3,841,698

A hydrogenation catalyst contains water soluble Pt, Pd, Rh, Ir, Os, Ru, Co and Fe salts, ligands, and phase transfer compounds. It is especially for homogeneous catalytic hydrogenation of solvent systems, of at least two mutually immiscible solvents, and can be used for aromatics, olefins and alkyl nitriles and for hydrodechlorination of chlorohydrocarbons.

FUEL CELLS

Methanol Fuel Cell Anode

OLLE LINDSTROM AB. *World Appl.* 89/10,009A

A fuel cell anode includes a catalytic mixture of Pt and Ru and a separately added Pb component at 5–10 mg/cm², which may be incorporated by blending a C mass containing reduced Pt and Ru with PbO, and then rolling onto C paper. The anode is used for example as a methanol electrode, in a fuel cell with an acid electrolyte. The presence of Pb enhances the voltage-current curve for a methanol electrode.

Phosphoric Acid Fuel Cell Electrode Catalysts

FUJI ELECTRIC MFG. K.K.

Japanese Appls. 1/227,360–61

Phosphoric acid fuel cell electrode catalysts are either (a) Pt-Ru on C black, prepared by dispersing Pt on C in Ru chloride solution, and heat treating; or (b) Pt on C black, prepared by ultrasonically mixing the support, chloroplatinic acid and water, then reducing. For catalyst (a) the Pt-Ru alloy particulates have good dispersion and are completely alloyed giving a fuel cell anode of superior CO poisoning resistance, and for (b) uniformly distributed small Pt particulates are produced giving increased reliability.

Oxidation Catalyst for Methanol-Air Fuel Cells

MATSUSHITA ELEC. IND. K.K. *Japanese Appl.* 1/266,848

A precious metal catalyst is produced by loading Pt-containing colloid particles on the surface of C particles, then pulverising the C particles while changing the colloid particles into alloys or solid solutions. The C catalyst obtained has highly dispersed precious metals on the C surface and improved oxidation.

CHEMICAL TECHNOLOGY

Regenerating Zinc Sulphate Solution

HOESCH STAHL A.G. *European Appl.* 347,603A

Zn ion enrichment and pH increase in Zn sulphate solutions are effected by contacting them with small pieces of metallic Zn in the presence of Pt. The Pt may be present as platinised Ti vessel walls, or as a platinised Ti grid insert. The solutions are useful as electrolytes in Zn electroplating of steel products using insoluble anodes.

Manufacture of Xenon

KYODO OXYGEN CO. *U.S. Patent* 4,874,592

Xe is concentrated and recovered from vented liquid O₂ by sequential adsorption/desorption stages using adsorbent columns, followed by catalytic removal of hydrocarbons from the Xe product using a Pt/Pd catalyst to convert hydrocarbons to CO₂ plus H₂O. Xe is obtained in 95% yields, and at 99.995% purity. CH₄ build up is avoided, there are no explosion risks, and high pressure equipment is not needed.

Production of Fine Palladium Particles

TANAKA KIKINZOKU KOGYO

Japanese Appls. 1/225,707–10

Isolated fine Pd particles are produced by reducing either a Pd ammonia complex solution or a Pd nitrate solution under controlled temperature and pH conditions using (a) an aromatic compound type reductant with hydroxyl group(s), or (b) L-ascorbic acid or an L-ascorbate group as a reducing agent. The grain size of Pd particles deposited is easily controlled, and fine or ultrafine particles can be obtained.

Carbon Fibre Growth

SHOWA DENKO K.K. *Japanese Appl.* 1/260,019

Carbon fibres are grown in the presence of a catalyst of transition metal microparticles such as Pd, Rh, Ir, Os, Ru, Re or others, grown by pyrolysis from vaporised gas of a transition metal compound or an organic transition metal compound. Ceramic particles are used as a radiation heating medium.

Separation Membrane for Hydrogen

KAGAKU GIJUTSU-CHOKINZ. *Japanese Appl.* 1/262,924

A separation membrane consists of a coating material of Pd or Pd alloy on the surface of an alloy film containing 5–20 at.% Ni and/or Co and balance V. The membrane has high durability and is used for separation of highly purified H₂ from H₂ gas mixtures at lower temperatures such as 200°C, and at high permeability.

Treatment of Organic Waste Water

OSAKA GAS K.K. *Japanese Appl.* 1/262,992

Organic waste H₂O containing nitrate or nitrite is biologically denitrified before wet oxidation at a high temperature and under high pressure, using an oxidising catalyst of 0.05–25 wt.% Pt, Pd, Rh, Ir, Ru, Au, Fe, Mn, Co, Ni, Cu or W or their oxides on a support.

Melt Spinning Nozzle with Platinum or Gold Coating

MITSUI TOATSU CHEM. INC. *Japanese Appl.* 1/282,307

At least one of Pt or Au is deposited on a nozzle face from Pt, Pt alloy, Au or Au alloy by an ion sputtering process to a thickness of at least 50 Å with at least the circumference of the extruding hole. The spinning nozzle is used for melt spinning of polyester resin which is preferably used for medical treatments. The nozzle can be used for a long time, giving improved spinning productivity.

Silver Halide Photosensitive Material Containing Noble Metal

FUJI PHOTO FILM K.K. *Japanese Appl.* 1/285,941

A Ag halide photosensitive material is made by adding a Group VIII noble metal halogen compound to a Ag halide emulsion when the Ag halide particles are prepared. Preferably the noble metal is Pt, Pd, Rh, Ir, Os or Ru and the halogen is Cl, Br or I. Change in sensitivity and gradation of Ag halide photographic photosensitive material with lapse of time and forcible deterioration can be reduced.

Silver Halide Photosensitive Material

KONICA CORP. *Japanese Appl.* 1/304,448

A photosensitive material contains a Ag-halide emulsion—the particles of which contain at least one high AgI containing region—and water soluble salts of Ir and Rh. The material can be handled in the yellow safe light, giving less fog and high sensitivity to an Ar laser beam, excels in hard tone and sharpness.

GLASS TECHNOLOGY

Electrochromic Variable Transmission Glazing for Automobile Sunroof

SAINT-GOBAIN VITRAG *European Appl.* 338,876A

Electrochromic-type variable transmission glazing consists of two transparent substrates joined by an organic polymer, with one substrate having a layer of electrochromic material and the other having an Ir oxide layer symmetrical with the electrochromic material. Degradation of the glazing appearance is avoided for a large number of colour modulation cycles, so it has long life, and is claimed for use for an automobile sunroof.

Coating Agent for Optical Glass Fibre

SHINETSU CHEM. IND. K.K. *Japanese Appl.* 1/257,151

A coating agent for optical glass fibre consists of a photopolymerisable compound containing at least one polymerisable C=C double bond, Pt or Pt compound, and a photopolymerisation initiator such as benzoyl peroxide. H₂ gas is hardly generated when heating the coating agent, so light transmission loss of optical fibre coated with the coating agent is reduced.

ELECTRICAL AND ELECTRONIC ENGINEERING

Rhodium Oxide Thin Film Resistor

FUJI XEROX K.K. *European Appl.* 341,708A

A thin film resistor consists of Rh oxide as the resistive material with at least one of Si, Pb, Bi, Zr, Ba, Al, B, Sr and Ti, where the metal:Rh ratio is 0.3–3. A uniform thin film resistor can be obtained, with resistance determined by the proportion of the metals used, firing conditions, and film thickness. The resistor is used in hybrid IC's and thermal heads, and is more reliable by immunity to static or noise.

Electrical Connection with Interdigitated Vertical Members

IBM CORP.

European Appl. 347,561A

An electrical connection consists of a planar horizontal conductive area, interdigitated vertical members of hillock or dendritic materials (especially Pt, Pd, Rh, Os, Ru or W) fastened to the planar area, and a means for accommodating lateral stresses. The separable and reconnectable connections are used for IC chips, circuit boards and cables.

Ohmic Electrode for n-Gallium Arsenide

SUMITOMO ELEC. IND. K.K. *European Appl.* 349,790A

An ohmic electrode formed on n-GaAs consists of a 300–1500 Å thick Pd layer, and a Ge layer 500–1500 Å thick. Both layers are preferably formed by vacuum evaporation, followed by a rapid thermal anneal at 500–600°C, for 3–20 seconds, in an inert atmosphere. The electrode has high reliability.

Platinum Silicide Imager

FORD AEROSPACE

U.S. Patent 4,857,979

A PtSi imager for IR imaging consists of a transparent semiconductor substrate, a transparent PtSi layer forming with the substrate a reverse-biased Schottky barrier diode, and a metallic reflector on the PtSi layer biased to create a surface depletion layer around the periphery of the diode.

Ferromagnetic Powder for Magnetic Storage Medium

HITACHI MAXELL

Japanese Appl. 1/223,703

A ferromagnetic powder consists of an oxide type magnetic powder, on the surface of which is a lower magnetic alloy layer containing Co and Ni, and an upper non-magnetic layer of Pt, Pd, Rh, Ir, Os, Ru, Au, Ag or Cu. The ferromagnetic powder has increased electroconductivity, and is suitable for a magnetic storage medium (such as magnetic tape or disc), which shows excellent resistance and electromagnetic transducing properties.

Composite Alloy for Magnetic Heads

HITACHI METAL K.K.

Japanese Appl. 1/243,207

An alloy for magnetic heads is a composite of Fe, Cu, Si, B, Cr, Al; Co and/or Ni; at least one of Nb, W, Ta, Zr, Hf, Ti and Mo; and one of Pt, Pd, Rh, Ir, Os, Ru, Au and Ag. Average particle diameter is <1000 Å, with at least 50% as fine crystalline particles. A magnetic head with high anti-corrosion properties and anti-abrasion properties can be obtained.

Improved Composite Superconducting Oxide

AISIN SEIKI K.K.

Japanese Appl. 1/246,174

A composite superconducting oxide is produced by mixing a superconductive powder containing at least one of Y and rare earth elements, at least one of Ca, Sr and Ba, and Cu, with powdered Pt, Pd, Rh, Ir, Au and/or Ag. The method provides a superconductor of uniformly dispersed metal powder.

Magnetic Thin Film for Thin Film Heads

TOHOKU SPECIAL STEEL LTD. *Japanese Appl.* 1/253,215
A magnetic thin film contains up to 2 wt.% Co, 73–82 wt.% Ni+Co, 1–8 wt.% Nb and/or Ta, 0.01–2 wt.% of one or more of Mo, V, Cr, W, Cu, Ti, Zr and Hf, 0.001–2 wt.% of one or more of Pt, Pd, Rh, Ru, Au and Ag, and balance Fe and impurities. The thin film has good hf magnetic characteristics, and is used for thin film heads for reproducing high density magnetic records, or magnetic cores of electric apparatus.

High Density Magnetic Recording Medium

VICTOR CO. OF JAPAN *Japanese Appl.* 1/256,017
A magnetic recording medium consists of a Cr layer formed on a non-magnetic substrate such as NiP₃, and a magnetic layer formed of quaternary CoCrTaPt alloys containing 1–18 at.% Cr, 1–8 at.% Ta, and 1–15 at.% Pt. The medium is used for magnetic discs, magnetic tapes, and so on.

Lead Ruthenate Fine Powder for Conductive Materials

SUMITOMO METAL MINI K.K. *Japanese Appl.* 1/257,136
High purity Pb ruthenate of formula Pb₂Ru₂O_{6.5} can be obtained in high yields in the form of fine powder of particle size 500–1000 Å by addition of NaOH to an aqueous solution of Ru chloride and Pb nitrate at 65°C. The powder is used to make a paste for thick film resistors.

Copper Paste for Thick Electroconductive Layer

SHOWA DENKO K.K. *Japanese Appl.* 1/258,307
A Cu paste contains 80–90 wt.% of a solid component having 1–8 wt.% Bi₂O₃ powder, 1–8 wt.% CuO powder, 0.1–1 wt.% Pd powder and remainder Cu powder, with 20–10 wt.% of a vehicle component. The Cu paste shows excellent adhesion strength and small contact resistance.

Production of Resistors

TOKURIKI HONTEN K.K. *Japanese Appl.* 1/265,502
A resistor used in electrical circuits is produced by metallising both ends of a cylindrical ceramic carrier which has a Pt-based metal film resistor layer formed on it. A lead wire is soldered to each end of the carrier, consisting of a Pt coated clad wire rod having a head section on the end, with a Au- or Pd-alloy based solder material. Production yield is improved, and there is reduced variation in resistance value.

Optical Information Recording Medium with Gold-Palladium Film

VICTOR CO. OF JAPAN *Japanese Appl.* 1/276,446
An optical information signal recording medium consists of an information signal formed substrate coated with an alloy reflection film with Au as the main component and 1.0–15.0 at.% Pd, and then covered with a protective film. The medium has improved atmospheric resistance and adhesion to plastics.

Linear Superconducting Material Manufacture

SUMITOMO ELEC. IND. K.K.

Japanese Appls. 1/279,512–14 and 1/279,516–17
A linear superconducting material is made by putting raw material powder into a cylinder together with Pt₃O₄, PtO, PtO₂, IrO₂ or Ir₂O₃, plastically working the cylindrical member, and heating to sinter the raw material powder. The material is used for linear or long length superconducting material.

Platinum or Palladium Resistors for Electronic Devices

FUJI XEROX K.K. *Japanese Appls.* 1/304,702–3
Resistors containing oxides of Pt or Pd, Si, and at least one of Bi, Pb, Sn, Al, B, Ti, Zr, Ba and Ca are prepared from resistance pastes containing organic co-ordinated complex compounds of these elements, by calcining at a temperature of at least 500°C. Resistors in the form of uniform and thin films can be economically obtained, having good uniformity, reliability and power resistant properties.

Ruthenium-Silver Contact Material

TECHNOPOLICE HAKODA *Japanese Appl.* 1/307,114
A sulphidation resistant contact material contains 0.1–30 wt.% Ru particles dispersed in a Ag sintered compact, and has a Ru oxide layer formed on the surface. Preparation is by sintering a compression moulding of a mixture of Ag powder with Ru powder in a weak oxidising atmosphere at 650–960°C.

Ink for Thin Film Resistor

MATSUSHITA ELEC. IND. K.K. *Japanese Appl.* 1/310,503
An ink containing a Ru compound, rosin and a solvent, is used for making a thin film type resistor by painting onto a substrate, drying and calcining. The resistor has improved smoothness, surface resistance and electric properties, and is used for a thermosensitive printer-head.

Ink for Forming Thin Film Resistors

MATSUSHITA ELEC. IND. K.K. *Japanese Appl.* 2/1,101
An ink for forming thin film resistors has as its principal components a compound containing Ru in its structure, abietinic acid and a solvent. The ink is applied on a substrate, dried, heated and calcined, and no deformation of pattern appears by heating the printed film. The thin film resistors are formed for electronic devices such as thermal print heads, having improved electric properties.

Magnetic Switch Contact Component

A. V. FILATOV *Russian Patent* 1,458,899
A magnetically controlled switch contact component has a surface coating of overlapping polymer films and sections of low resistance passive Rh. Contact of the surfaces occurs along the sections with high conductivity in several points, that is along the passive surface of the Rh. The component has longer service life, and is used for electrical contacts.

TEMPERATURE MEASUREMENT

Gas Turbine Temperature Sensor

UNITED TECHNOLOGIES CORP. *U.S. Patent* 4,851,300
A temperature sensor has a first layer of Cr, Al, Y, and at least one of Ni, Co or Fe, over which is an Al oxide insulation layer, then a sputtered alloy layer containing Cr, Al and one or more of Ni, Co or Fe, followed by a noble metal layer which may include adjacent deposits of Pt and Pt-10% Rh alloy. The sputtered alloy film gives improved adhesion of the Pt thin film in the gas turbine temperature sensor.

MEDICAL USES

Combined Preparation with Increased Anti-Tumour Activity

JOHNSON MATTHEY P.L.C. *European Appl.* 339,772A
A combined preparation for simultaneous, separate or sequential use in the treatment of cancer consists of loperamide, and a Pt co-ordination compound, specifically carboplatin. Loperamide (a known anti-diarrhoeal agent) significantly increases the absorption of the Pt compound into the systemic circulation following oral administration, and causes a marked increase in anti-tumour activity.

New Ruthenium Complex Compounds as Hybridisation Probes

HOFFMAN-LA ROCHE A.G. *European Appl.* 340,605A
A new Ru complex compound consists of a DNA or RNA sequence covalently bonded to a fluorescent Ru complex containing charge transfer units. The new complex compounds are useful as hybridisation probes for detecting DNA or RNA sequences and for nucleic acid sequencing, especially by time-resolved fluorescence. The fluorescence decay times of the Ru complex are not altered by coupling to a nucleic acid.

Anti-Cancer Pharmaceutical Composition

NORSK HYDRO A/S. *European Appl.* 344,880A
An anti-cancer composition consists of an anti-cancer Pt complex and L-ascorbic acid or 5,6-o-benzylidene-L-ascorbic acid or its deuterated forms. When given with L-ascorbic acid or its derivatives, cisplatin shows higher anti-tumour activity, so lower doses of cisplatin can be used which reduce adverse side effects. For oral use doses of 10–75 mg/kg ascorbic acid and 0.5–2 mg/kg of the cisplatin compound are used.

New Platinum Anti-Tumour Agents

BOEHRINGER BIOCHEMI. *World Appl.* 89/9,218A
New ethoxylated dicarboxylic acid Pt diamine complexes are useful as anti-tumour agents against Pt-sensitive tumours as well as certain cisplatin-resistant tumours at doses of 1–1200 mg/m². The complexes have high aqueous solubility as well as lipophilic properties which improve targeting to, penetration into, and diffusion across the cell membranes.

Novel Platinum-Amine-Sulphoxide Complexes

UNIV. OF VERMONT *World Appl.* 89/9,598A
New optically active Pt-amine-sulphoxide complexes are useful as anti-tumour agents, with 1–500 mg of the complex contained in the anti-tumour compositions. The compounds can be used in vivo and are non-cross resistant with cisplatin and so can be used to treat cisplatin resistant tumours.

New Platinum Complexes for Treating Malignant Tumours

TORAY IND. INC. *Japanese Appl.* 1/246,245–46
New Pt(II) complexes for treating tumours are prepared by (a) reacting Pt 1,2-diaminocyclohexane with a piperidine-dione compound and an alkaline hydroxide; or (b) reacting dinitrato-(1,2-diaminocyclohexane) Pt(II) with 2-acyl-5,5-dimethylcyclohexane-1,3-dione in the presence of an alkaline hydroxide. The new Pt complexes are used for therapy of malignant tumours, with (b) finding application in various forms, at a dose of 0.005–200 mg/day for an adult.

Palladium Coating Used for Teeth

KURARAY K.K. *Japanese Appl.* 1/277,555
A chemical plating set for forming a Pd coating consists of a Pd-urea complex solution, for example of formula Pd(NH₂CONH₂)₂X₂ where X is Cl, Br or a monovalent anion, and a reductant such as NaBH₄ or sodium hypophosphite. A firm Pd coating is rapidly formed on hard surfaces of the tissues, such as the teeth. The Pd coated surface ensures strong fixing of additional repair materials to the teeth surfaces through adhesives.

Alloy for Metallic False Teeth Production

HERAEUS EDELMETALLE *German Appl.* 3,811,628
Metallic false teeth are made from a paste-like metal powder mixture containing 15–75 wt.% Pd, 15–50 wt.% Au and/or 10–35 wt.% Ag, and a volatile binder. The paste is formed around a ceramic model, and heated at 900–950°C to sinter the powder into an alloy. The alloy has good tissue compatibility, and false teeth can be produced without forming a molten phase or using a noble metal resinate coating.

Palladium Dental Alloy with Improved Casting Properties

MED. TECHN. RES. INST. *Russian Patent* 1,491,901
A Pd alloy used for a dental prosthesis consists of 4–18 wt.% In, 0.1–5 wt.% Sn, 0.2–6 wt.% Ti, 0.01–1 wt.% Y and balance Pd. The alloy is prepared by melting in an electric arc vacuum furnace with a non-consumable electrode in an atmosphere of purified He. Casting properties and adhesion to the Inpal alloy are improved, and the alloy has uniform coloration.

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