

NEW PATENTS

METALS AND ALLOYS

Platinum-Cobalt-Boron Alloy for Permanent Magnets

VANDERBILT UNIV. *World Appl.* 90/13,134A

A magnetic PtCoB alloy contains 12–14 at.% B and Pt and Co in amounts to give a Pt:Co atomic ratio of 0.90–1.1, and is prepared by rapid solidification of a homogeneous melt of the alloy to form a casting, and heat treating to improve its magnetic microstructure and increase coercivity. The alloy is used for permanent magnets, especially where large energy products, corrosion resistance and fracture toughness are required.

Palladium Alloys with Oxidation Resistant Surface Coating

JOHNSON MATTHEY P.L.C. *U.S. Patent* 4,960,647

Pd metal or Pd alloys, preferably 30% Pd-70% Ag, are treated by wetting the surface with 0.5–10 wt.% boric acid, and heating at 25–150°C for 4–5 hours to produce a ceramic-like surface which is resistant to oxidation. The treated metal or alloy is specifically claimed for use between layers of dielectric as a capacitor.

Palladium Material Containing Boron for Welded Pipes

TANAKA KIKINZOKU KOGYO

Japanese Appl. 2/205,638

A Pd based material containing B is manufactured by melting B rich Pd or Pd alloy together with B poor Pd or Pd alloy in vacuum. Oxidation of B during the manufacture of the material is mostly avoided, and Pd alloys containing B at high precision can be produced. The Pd material is used for welded pipes of H₂ purifiers.

Platinum Alloy Spring for Ornamental Use

TANAKA KIKINZOKU KOGYO

Japanese Appl. 2/250,946

A Pt alloy spring consisting of 84–96 wt.% Pt, 1–10 wt.% Ga and 0.5–10 wt.% Cu is made by brazing the components, followed by heat treating at 400–600°C. The spring is used for tiepins and clip form brooches.

Production of a Fine-Grained Alloy Powder

TANAKA KIKINZOKU KOGYO

Japanese Appl. 2/254,101

A fine-grained alloy powder is produced by thermal treatment at 300–600°C of a fine-grained composite powder of Ag with Pt or Pd, in a fused alkaline salt such as NaOH, to alloy the composite powder. A fine-grained alloy powder is produced which has high reliability for use in pastes and solders.

Magneto-Resistive Alloy Containing Rhodium and Palladium

URALS UNIV.

Russian Patent 1,534,082

An alloy having a magneto-resistive effect up to 7.5 times higher than that of the known alloy contains 57.7–64.3 wt.% Rh, 1.4–8.1 wt.% Pd and balance Fe, and is produced in an arc furnace. The alloys have an increased magneto-resistive effect and an extended range of working temperatures.

ELECTROCHEMISTRY

Deuterium-Lithium Cold Fusion Energy Cell

DREXLER TECHN. CORP. *World Appl.* 90/13,897A

An energy conversion cell includes heavy water and an electrolyte containing 6-LiOD, electrodes, and an ion accumulator having a D ion and Li ion permeable surface layer, preferably of Pd or Pd alloy, which allows ion-ion combination. The apparatus separates the electrolysis and ion accumulation processes, and by applying a variable voltage local ion flow can be changed, which can trigger the fusion process.

Modified Palladium Cathode for Cold Fusion Type Electrochemical Process

JOHNSON MATTHEY P.L.C. *World Appl.* 90/15,415A

A heat generating electrochemical process of the cold fusion type may be obtained by electrolysis of D₂O using a modified Pd cathode. Pd of grain size 10–40 μm is modified by combination with rare earths, Y, Sc, Ce, Gd, Li enriched with Li-6, or Ag, and may have a coating which is a modified surface region of Pd black or a Pd/Ag alloy. When the compositions are loaded with deuterium cold fusion can occur, producing heat, neutrons and/or tritium.

Electrolytic Production of Ozone

SASAKURA KIKAI SEIS. *Japanese Appl.* 2/259,090

Ozone production by water electrolysis using a cation-exchange resin of a perfluorosulphonic acid type uses a cathode of porous Ni or Ni alloy steel coated on one side with Pt. Zero-gap electrolysis is carried out by contacting the Pt electrode surface with the cathode side of the cation exchange membrane, while pressurising.

Platinum Cathode for Electrolytic Polymerisation

TOYOBO K.K.

Japanese Appl. 2/263,825

Conductive polymers are produced by oxidative electrolytic polymerisation of monomers using a Pt cathode and a NESA glass anode. The conductive polymers have excellent stability and high conductivity in the doped state, and are used as conductive materials, electrode materials and display materials.

Electrodes for Chlorine Production

TDK CORP. *Japanese Appl.* 2/263,989

An electrode for chlorine production is produced by coating an electroconductive base with a solution of Ir, Pt and Ta compounds, and heating in an oxidising atmosphere to give a coating layer consisting of 40–80 mol% Ir as Ir oxide, 1–20 mol% Pt, and 50–20 mol% Ta as Ta oxide. The electrodes are used for high efficiency electrolysis of dilute brines such as sea water to produce chlorine, useful for producing hypochlorous acid.

Platinum and Gold Electrodes for Electrolytic Ozone Generator

ODS. K.K. *Japanese Appl.* 2/270,981

An electrolytic ozone generator has a solid electrolytic membrane with a porous Pt electrode laminated to the anodic surface and a Au electrode attached to the other side, with the electrodes having DC potentials of negative and positive polarity. Highly efficient ozone generation is achieved.

Oxygen Generating Anode with Palladium and Iridium Layers

DAISO CO. LTD. *Japanese Appl.* 2/282,490

An O₂ generating anode consists of an electroconductive metal base, an intermediate coating layer of 85–95 mol% of an oxide of at least one of Ti, Ta, Sn, Nb and Zr, and 5–15 mol% Pd oxide, and a catalytic surface coating layer of 20–70 mol% of an oxide of at least one of Ti, Ta, Sn, Nb and Zr, and 30–80 mol% Ir oxide. The insoluble anodes are used in electrolytic processes with O₂ generation, particularly for electroplating Sn, Zn and Cr.

Water Electrolysis Anode with Reduced Potential

MOSC. POWER INST. *Russian Patent* 1,564,202

An anode is prepared by sequentially applying layers of Ir and Pd of equal thickness onto a substrate, heating at 300–400°C for 4 hours, then chemically dissolving the Pd in boiling HNO₃. In an example an anode had 0.15 μm thick layers of Ir and Pd on a porous Ti substrate before dissolving the Pd. Using the anode, the power requirement for water electrolysis is reduced by reducing the anode potential.

ELECTRODEPOSITION AND SURFACE COATINGS

Palladium Catalyst for Electroless Plating

NIPPON PAINT K.K. *European Appl.* 392,235A

Plating a metallic deposit between functional pattern lines on a plastic or glass plate involves forming a cured film containing a Pd catalyst for electroless plating on the substrate, forming functional pattern lines, and electroless plating. The Pd catalyst is prepared by reducing Pd chloride with stannous chloride in the presence of an acid.

Composite Material for Surface Coatings

H. C. STARCK, BERLIN G.m.b.H.

European Appl. 401,611A

A composite material consists of 0.01–75 wt.% of hard particles of carbides of V, Nb, Mo, W and/or others, dispersed in a matrix based on a metal-Cr-Al-Y type alloy with 5–15 wt.% Pt and/or Rh as the alloying element. The composite has high temperature stability at 600–1100°C, good wear and corrosion resistance, and is used for surface coatings produced by build-up welding or spraying.

Catalytically Active Coatings for Hydrogen Cyanide Production

DEGUSSA A.G. *European Appl.* 407,809A

Catalytic coatings containing AlN and Pt metal(s) are produced on moulded Al oxide products by wetting with a suspension of a Pt metal and Al at a Pt metal:Al atom ratio of 0.001–1, evaporating, heating slowly to 1000–1350°C under N₂ and/or NH₃, and optionally activating. The process is simpler and safer, and enables different thicknesses to be produced with a single coating process.

Selective Electroless Plating on a Non-Conductive Substrate

UEMURA KOGYO K.K. *Japanese Appl.* 2/240,271

An activating agent for forming a metal Pd nucleus on W, Mo or Cu contains a water soluble Pd salt, an inorganic acid, and a water soluble compound of one or more of Pb, Tl, Bi and Sb. Selective electroless plating involves forming conductor patterns of W, Mo or Cu on the non-conductive substrate, dipping in Pd activating agent solution, forming a metal Pd nucleus selectively on the patterns, and electroless plating on the patterns.

Noble Metal Coated Electroconductive Particles

MATSUSHITA ELEC. IND. K.K.

Japanese Appl. 2/243,768

Electroconductive particles are prepared by activating the surfaces of electroconductive composite oxide particles with a Pd-colloid, and coating directly with noble metal in an electroless plating bath. The composite oxide has one or more solid solution system compositions, such as La_{1-x}Sr_xCoO₃, where x=0.1–0.8. The particles are used for an electrode material and have excellent conductivity.

Platinum Plating for Electrochemical Devices

MITSUBISHI DENKI K.K. *Japanese Appl.* 2/247,386

Pt plating is effected using an electroless plating bath containing a Pt nitro- and/or nitroamine complex, and a hydroxylamine salt as a stabilising agent, followed by heating in an acidic solution and rinsing in water. The plating process is used for material for electrochemical devices.

APPARATUS AND TECHNIQUE

Electrochemical Nuclear Fusion Reaction SEMICONDUCTOR ENERGY LAB.

European Appl. 392,324-25A

Apparatus used for an electrochemical nuclear fusion reaction has a pressurised reaction vessel containing a solution of heavy water and a metal salt, in which are two electrodes of Au and Pd, connected to a DC voltage source. The apparatus also includes a shield plate and heat exchangers. The reaction is optionally controlled by a pulsed DC voltage, and gives a high pressure and means of producing heat energy.

Platinum Resistance Thermometer Compensated for Non-Linearity

NORAPP J.H. ANDRESEN *World Appl.* 90/13,009A

A Pt resistance thermometer has a Pt resistor and a reference resistor which are fed by equal, constant DC currents, with the voltage difference across them sensed by an amplifier. The amplifier output generates a current which is used to compensate for thermometer non-linearity, by this simple process.

Determination of the Alcohol Content of Beer

CRISP INSTR. LTD. *World Appl.* 90/13,026A

Measuring the alcohol content of aqueous solutions, particularly beers and other alcoholic beverages, involves passing gas through the solution, and determining the alcohol content of the resulting vapour with a sensor. The alcohol sensor includes two heated Pt wires, one of which is coated with a catalyst. The simple apparatus can give accurate and reliable results in a short time, using a small sample.

Hydrogen Gas Sensor

BATTELLE MEMORIAL INST. *U.S. Patent* 4,976,991

A sensor for monitoring H₂ concentration in gases has a thick film solid electrolyte body printed on a substrate, a printed thick film detector electrode of Pt, Pt oxide, Pd or Pd oxide with the surface to be exposed to the gas on the electrolyte body surface, a printed thick film reference electrode of Na-W bronze, and an insulating material. The sensor can be made cheaply, has a short response time for H₂ and a low cross-sensitivity to other gases.

Temperature-Humidity Sensor

TANAKA KIKINZOKU KOGYO

Japanese Appl. 2/228,546

A ceramic base plate has a temperature measuring Pt resistor on one face, and a Pt or Au comb electrode on the other with a humidity sensitive element formed over it. The Pt resistor and comb electrode have 250 and 100 μm line widths, respectively, spacings of 250 and 100 μm, and 1.0 μm thickness. The temperature and humidity of a location in a wide or narrow space can be measured simultaneously.

Oxide-Dispersed Platinum Based Member

TANAKA KIKINZOKU KOGYO

Japanese Appl. 2/258,170

A Pt based member reinforced by dispersed oxide has a hot forge-welded reinforced band at the butt welded joint, which is highly hammered at the centre but only lightly hammered at both ends. This provides a Pt based member such as a large crucible for melting glass; enforced at the welding joint without causing grain coarsening. In an example a Pt member with 0.1 wt.% of dispersed ZrO₂ grains, and a reinforced band showed improved creep fracture strength.

Platinum Electrode for Hydrogen Peroxide Detector

TOSHIBA K.K.

Japanese Appl. 2/259,556

A hydrogen peroxide detector consists of a sealed pressure resistant vessel containing a Pt electrode and a stainless steel electrode, and an instrument to measure the potential difference between them, for measurement at high temperature and pressure. The sample solution can be measured directly.

Semiconductor Gas Sensor Used as an Alarm Device

FUJI ELECTRIC MFG. K.K. *Japanese Appl.* 2/263,145

A gas sensor has a substrate such as Al₂O₃, an internal layer of 0.2-0.6 wt.% Pt catalyst on Sn oxide, and an outer layer on the internal layer of 1.0-2.4 wt.% Pt catalyst on Sn oxide, and includes electrodes and a heater. The gas sensor is used as an alarm device for gas leakage, does not give an error signal due to alcohol, and gives constant resistance.

Electrochemical Element for Oxygen Sensors

NGK INSULATORS K.K. *Japanese Appl.* 2/276,957

An electrochemical element consists of a solid electrolyte, a measuring electrode exposed to sample gas and containing as catalyst a Pt group metal and a metal oxide hexaluminate, and a reference electrode exposed to standard gas. Sintering of the measuring electrode at high temperatures is suppressed, and high surface area, activity and gas permeability are maintained, providing O₂ sensors of good response and durability.

Sensor to Detect Ruthenium Tetraoxide Concentration

HITACHI K.K.

Japanese Appl. 2/293,644

A sensor to detect Ru tetraoxide has sample and reference quartz oscillators with an organic membrane of polyethylene or rubber on the electrode surface. The Ru tetraoxide is reduced to Ru dioxide and deposited on the organic membrane, where the weight increase changes oscillator frequency. The concentration of Ru tetraoxide can be detected on the spot with high sensitivity especially in HNO₃.

Dissolved Ozone Detector with Platinum Anode

ODS K.K.

Japanese Appl. 2/298,858

A sensor for detecting dissolved ozone consists of a Ag(Cl) cathode coated with a F type cation exchange membrane, a Pt or Au anode, and a device to detect the electromotive force between the cathode and anode. The dissolved ozone detector is simple, has a quick response time, allows continuous reading of the ozone concentration, is small, and is useful for measurement of the ozone water in a bio clean room.

Platinum Wire Catalyst Used in Detection of Harmful Gases

SIEMENS A.G.

German Appl. 4,007,375

A gas stream is passed over a catalyst such as a directly heated Pt wire before reaching a heated sensor for detecting harmful gases such as chloroform, acetone or trichloroethylene vapours. The catalytic reaction, for example at 1000°C, may be aided by an additive in the gas stream, and produces the target compound or an identifiable compound fraction.

Photometric Determination of Rhodium

COLLOID CHEM. WATER *Russian Patent 1,536,309*

Analysis of Rh in natural or industrial materials is made possible by complexing with 0.002M 4-(2-pyridylazo) resorcinol in an 8–15% solution of a water soluble aliphatic alcohol in acetate buffer at pH 5.7, followed by warming and measuring the optical density at 520 nm. The method is rapid, taking only 20 minutes to form the complex, and has high sensitivity, allowing determination of 0.03 mg/ml Rh.

Potentiometric Determination of Rhodium without Interference

LATV. UNIV.

Russian Patent 1,545,154

Determination of Rh involves complex formation with tetraethylammonium 4-nitrobenzoldithiocarboxylate, and standard potentiometry at 455 nm. The analysis is 3–4 times faster than before as the sample does not need degrading, sensitivity is higher – 0.001 µg/ml of Rh can be determined, and selectivity is improved, with interference from the Pt group metals being prevented. The method can be used for natural or industrial samples and wastes.

Qualitative Determination of Ortho-Nitroaniline

LENINGRAD LENSOVET TECH.

Russian Patent 1,550,387

Ortho-nitroaniline present in solutions is detected by introducing a sample into an acetone solution containing 0.6–1 mg/ml bis(triphenylphosphine) carbonyl hydroxo Rh, and observing the appearance of a red-orange coloration over 20–30 min if it is present. The method shows increased selectivity, giving best results at 2–5 mg/ml ortho-nitroaniline. Oxidation products do not interfere with the results.

Catalyst Sample Preparation for Electron Microscopy

MEDICINE MICROBIOL.

Russian Patent 1,553,879

A Pd catalyst is prepared for electron microscopy by milling in a ball vibro-mill to powder form with a dispersion of 80–120 Å, then suspending in a neutral liquid such as water, applying to a Cu lattice carrier, and drying. This preparation involves less work as it is not necessary to apply layers to a substrate, and the sample gives more information as an image is formed of the separate powder particles at the surface.

HETEROGENEOUS CATALYSIS

Rhodium Catalyst for Improved Hydrogenation of Aromatic Amines

AIR PRODUCTS & CHEM. INC.

European Appl. 392,435A

Hydrogenation of aromatic amines to the ring hydrogenated equivalents is by contact with H₂ in the presence of a novel catalyst consisting of Rh supported on TiO₂ chemically bonded with SiO₂, TiO₂ or ZrO₂, or ZrO₂ bonded with SiO₂ or Al₂O₃. A low H₂ partial pressure can be used, such as 700–1500 psig. The catalyst has good attrition resistance, does not have to be alkali-moderated, and gives the product with high selectivity and reaction rates.

Platinum-Palladium-Ceria Catalyst for Exhaust Gas Treatment

ENGELHARD CORP.

European Appl. 393,612A

A catalyst composition consists of a carrier having a bulk ceria support, with dispersed Pt and Pd present at a Pt:Pd wt. ratio of 50:1–1:50, and a binder. The catalyst may be used with a second catalyst composition effective for reduction of NO_x, and is used as an oxidation catalyst and/or a three-way catalyst.

Exhaust Purification Catalyst with Effective Nitrogen Oxides Removal

TOYOTA CHUO KENKYUS

European Appl. 396,085A

An exhaust purification catalyst consists of a porous support, preferably a silicoaluminophosphate with pores >3 Å in diameter, supporting as base metal Cu, Cr, Co or Fe, and Pt, Pd or Rh. The catalyst is used to purify high temperature internal combustion engine exhaust gases from fuel/air mixtures having excess O₂, has high heat resistance and durability, and is particularly effective for removal of NO_x.

Preparation of Fluoroalkyl Vinyl Compounds

DAIKIN INDS. LTD.

European Appl. 396,974A

A fluoroalkyl vinyl compound is prepared by reacting a fluoroalkyl vinyl halide with H₂ in the presence of water and a catalyst of Pd supported on activated C. The process requires no strict controls of reaction conditions and gives high yield of the compounds.

Diesel Exhaust Purification Catalyst

NIPPON SHOKUBAI KAGAKU *European Appl.* 397,411A

The catalyst consists of 3–300 g/l of refractory inorganic oxide, 2–200 g/l of an oxide of at least one of Pr, Nd and Sm, 0.1–10 g/l (total) of Pt and/or Rh and optionally Pd, preferably Pd and Rh, and 0.1–3 g/l of an oxide of at least one of Cu, Ag, Zn, K and Na, deposited on a 3-dimensional structure. The catalyst is used to remove carbonaceous fine particles, hydrocarbons and CO from diesel exhaust gases, and has good long term stability at 400°C or above.

Three-Way Catalysts Containing Noble Metal and Uranium

INST. FRANCAIS DU PETROLE

European Appl. 399,892A

A catalyst has a support with a porous layer containing 0.1–20% of at least one of Pt, Pd, Rh, Ru, Ir or a mixture, 50–99.7% of inorganic refractory oxide(s), 0.1–25% of uranium oxide(s), and 0.1–35% of metal oxide(s). The catalysts are used for the conversion of CO, hydrocarbons and NO_x in exhaust gases from petrol or diesel engines; having enhanced initial activity and stability above 800°C.

Platinum-Iron Catalyst for Carbon Monoxide Oxidation

PHILLIPS PETROLEUM CO. *European Appl.* 402,899A

An oxidation catalyst contains Pt metal and Fe oxide and/or metallic Fe supported on Al₂O₃ and/or Mg aluminate. During preparation the impregnated support is reduced, treated with liquid acid, and reduced again. The catalyst can be used at –50 to 400°C and 0.1–2000 psia for oxidation of CO to CO₂ in the presence of O₂, and is used in breathing masks, exhaust purification, tobacco products, CO₂ lasers, and to prepare labelled CO₂.

Catalyst for Steam Reforming Hydrocarbons

IDEMITSU KOSAN CO. LTD. *European Appl.* 406,896A

A reforming catalyst consists of 0.01–5 wt.% Rh and/or Ru, 0.1–10 wt.% Co and/or Mn as promoter, 0.01–2.5 wt.% K and/or Ba as further promoter (optional), on a carrier of ZrO₂, optionally stabilised with an oxide of Y, Mg or Ce. The carrier has a specified pore size distribution, which gives the catalyst high activity and long life.

Modified Alumina Support for Reforming Catalyst

EXXON RES. & ENG. CO. *European Appl.* 407,117A

A reforming catalyst consists of 0.01–2 wt.% Pt, 0–2 wt.% Ir, 0–2 wt.% Re and may contain 0.5–1.5 wt.% Cl, on a modified Al₂O₃ support containing not more than 5000 wt. ppm of a modifier consisting of 100–200 wt. ppm Si and 100–3000 wt. ppm Ca or Mg. Use of the modified support increases reformate yield, suppresses metal and acid site cracking and increases aromatisation activity and selectivity.

Oxidation Catalyst of Platinum Coated with Tin

TANAKA KIKINZOKU KOGYO

European Appl. 408,528A

An oxidation catalyst consists of Pt, Pd, Rh or Ir preferably in the form of metal black, surface coated with 10–90 wt.% Sn, and may be prepared by electrodepositing Sn on the surface of the metal black from a solution of Sn sulphate in H₂SO₄. The catalyst is used to decompose CO, formalin or HCHO in O₂, at ambient–150°C, and is used in air cleaners.

Isomerisation of Alcohols to Ketones

HENKEL RES. CORP.

World Appl. 90/12,859A

Isomerising an olefinically unsaturated secondary alcohol in which the double bond and OH group are separated only by methylene groups involves heating to 200–300°C in the presence of a fully hydrogenated Pd catalyst, 5% Pd/C and sulphided 5% Pd/C and passing H₂ through the reaction mixture to produce a saturated ketone. The alcohol is converted to the ketone with only minor amounts of saturated hydroxy- and unsaturated keto-compounds as impurities.

Catalyst for Decomposition of Organohalogen Compounds

ALLIED-SIGNAL INC.

World Appl. 90/13,352A

A catalyst for treating a gas stream containing organohalogen compounds consists of TiO₂, VO₂, WO₃ and at least one of Pt, Pd and Rh, with the VO₂ and noble metal uniformly dispersed on the TiO₂. The gas stream is contacted with the catalyst at 200–500°C in the presence of H₂O. The new process enables reduced temperature catalytic removal of at least 99% of hydrocarbons and organohalogen compounds from waste gases, over a longer time.

Lower Temperature Preparation of Lactones

GAF. CHEM. CORP.

World Appl. 90/14,344A

A method for preparing lactones from 1,4 and 1,5 aliphatic saturated diols involves reaction with a chemical oxidising agent and 0.001–2 wt.% of a Ru containing catalyst such as Ru oxide or Ru/C, at –20 to 100°C, preferably ambient temperature.

Automotive Exhaust Catalyst with Improved Thermal Stability

ALLIED-SIGNAL INC.

U.S. Patents 4,868,149 and 4,960,574

Catalysts for treating automotive exhaust consist of a honeycomb carrier, with a layer of high surface area Al₂O₃ containing dispersed: 3–22 wt.% La oxide as <25 Å crystallites, 5–50 wt.% Ce oxide, 0.1–9 wt.% Pd oxide as <25 Å crystallites, and 0.01–4 wt.% Rh oxide. This Pd/Rh catalyst has comparable or better activity than the prior art Pt/Rh catalyst, especially for hydrocarbon and NO_x removal, both when fresh and after thermal durability testing.

Platinum Catalyst for Hydrocarbon Dehydrogenation

UOP U.S. Patents 4,880,764 and 4,973,779

Hydrocarbon conversion catalysts consist of Pt (optional), a uniformly impregnated Group IA and/or IIA metal component, a surface impregnated Ir and/or Os component, and a Group IVA metal component, on a refractory oxide support. A preferred catalyst may contain 0.1–2.0 wt.% Pt, 0.1–5.0 wt.% Li, 0.1–2.0 wt.% Ir and 0.1–5.0 wt.% Sn on an Al_2O_3 support. The catalysts are used for dehydrogenation of 2–30C alkanes, cycloalkanes, alkenes, and so on, and have high activity.

Ruthenium Oxide Catalyst for Double Bond Isomerisation

SHELL OIL CO. U.S. Patent 4,962,267

Isomerisation of an olefin feedstock of mainly 4–30C α -olefins to corresponding internal olefins, at 80–250°C and 0.1–1000 psia pressure, uses a catalyst consisting of a γ - Al_2O_3 support, 0.5–5 wt.% Ru present as Ru oxide and 0.2–2.5 wt.% alkali metal present as alkali metal oxide, with the weight of alkali metal 0.1–3 times that of Ru.

Catalyst Compositions for Naphtha Reforming

EXXON RES. & ENG. CO. U.S. Patents 4,966,682 and 4,966,878–80 and 4,968,408

A naphtha feed is reformed in the presence of H_2 using a catalyst consisting of (a) selected combinations of: up to 2 wt.% Rh, 0.01–2 wt.% Ir which may have >50% crystallinity, 0–2 wt.% Re, 0–2 wt.% Sn, and 0–3.5 wt.% halide; (b) 0.01–2 wt.% Pt; and (c) balance Al_2O_3 modified with Si and alkaline earth metal(s). Using the modified support gives improved reformate yield, while metal and acid site cracking are suppressed.

Iridium Catalyst Preparation of Alkoxyate Tertiary Amines

ETHYL CORP. U.S. Patent 4,967,005

An alkoxyate tertiary amine is prepared by reaction of an oxyalkylated alcohol with a secondary amine at elevated temperature, in the presence of an amination catalyst consisting of Ir metal dispersed in an inert support with added H_2 . The process is carried out at ambient pressure, and gives high yields.

Selective Catalytic Conversion of Cyanohydrins to Aldehydes

ALLIED-SIGNAL INC. U.S. Patent 4,970,302

A cyanohydrin is selectively converted to the corresponding aldehyde by contacting an aqueous acidic cyanohydrin solution with a catalyst of zerovalent Pd dispersed on a porous solid organic polymeric resin, at 10–85°C and 10–2000 psi H_2 . The nitrile group is hydrogenated to an imine, which is separated and then hydrolysed to an aldehyde.

Regeneration of Noble Metal Hydrodechlorination Catalysts

DU PONT DE NEMOURS CO. U.S. Patent 4,980,324

Pt, Pd, Rh, Ir and/or Ru catalysts optionally supported on C, Al_2O_3 , fluorided Al_2O_3 , AlF_3 and/or CaF_2 are regenerated by contact at above 200°C, for more than 15 minutes, with an atmosphere containing a fluorohalo(hydro)carbon but free of air and/or O_2 , and H_2 . The catalyst is used for fluorohalo(hydro)carbon hydrodechlorination, and the deactivated catalyst can be regenerated to the equivalent of fresh catalyst activity.

Selective Production of Lower Aliphatic Alcohols

TEXACO INC. U.S. Patent 4,980,380

Lower aliphatic alcohols are prepared by reaction of CO and H_2 using a catalyst containing Rh, Co and Mo, a combination of K and Rb, preferably at equal atomic ratio and 0.01–0.1 moles (total)/100g catalyst, 1–100 ppm Cl, and a support. The catalyst is selective, does not result in substantial hydrocarbon production, and gives a product containing 2–6C alcohols and CH_3OH , used as a blending component for hydrocarbon motor fuels.

Resin Film Catalyst for Ethylene Oxidation

CHISSO CORP. Japanese Appl. 2/222,725

Ethylene generated by fruits and vegetables makes them over ripe, but can be removed using a catalyst consisting of a SiO_2 - Al_2O_3 carrier supporting 0.01–2.0 wt.% Pd and 0.1–5.0 wt.% of one or more of V, Mn and Ti. A resin film containing 0.01–1.0 wt.% of the catalyst is used to decompose absorbed ethylene by oxidation at room temperature, and is able to absorb large amounts of ethylene.

Waste Gas Purification Catalyst Containing Cerium and Palladium Oxides

TOYOTA JIDOSHA K.K. Japanese Appl. 2/237,643

A waste gas purification catalyst is prepared by coating a support with a slurry containing activated Al_2O_3 powder coated with Ce and Pd oxides. In an example, a cordierite monolithic support was wash-coated with slurry, and fired to give a 150 g/l Al_2O_3 coating. A car exhaust purification catalyst is produced with improved durability and catalytic activity.

Selective Platinum Hydrogenation Catalyst

JAPAN TOBACCO & SALT PUB.

Japanese Appl. 2/241,546

A new hydrogenation catalyst for aliphatic compounds having C-C double bonds consists of a Pt-loaded SiO_2 coupled with alkylsilyl. In an example, a catalyst was prepared from 3.0 g of dimethyl-octadecylsilyl chloride and 3.0 g of 0.5% Pt on SiO_2 , after stirring for 3 days.

Catalyst for Partial Oxidation of Alcohols

TANAKA KIKINZOKU KOGYO

Japanese Appl. 2/251,244

A new catalyst used for partial oxidation of alcohols in the presence of air consists of a gas diffusible support, with a catalyst layer containing C powders loaded with Pt fine particles poisoned with S and a binder. The catalyst can convert alcohols to the corresponding carboxylic acids with higher efficiency.

Catalysts for Methanol Reforming

MITSUBISHI HEAVY IND. K.K.

Japanese Appl. 2/252,602

Catalysts consisting of Pt and/or Pd on supports containing oxides of alkaline earth elements and rare earth elements are used in the reforming of CH_3OH to produce H_2 -containing gases. In an example a catalyst consisting of Pt on a support of MgO , La_2O_3 and Al_2O_3 in the ratio of 70:20:10 was used. H_2 -containing gases can be produced stably for a long time by reacting CH_3OH and O_2 -containing gases at low temperatures.

Improved Preparation of Dihydroxyquaterphenyl

SANKO KAIHATSU KAGA *Japanese Appl. 2/255,634*

4,4-Dihydroxyquaterphenyl is prepared by the dehalogenating and dimerising of 4-hydroxy-4-halogenobiphenyls at 50–200°C, for 1–12 h, in an inert organic polar solvent, in the presence of – for example – NaOH , and a catalyst of 0.1–20 wt.% Pd on a carrier. The products are useful as raw materials for liquid crystal compounds and synthetic rubber modifiers, and can be prepared in high yields with high purity.

Nitrogen Oxides Decomposition Using an Iridium Catalyst

OSAKA GAS K.K.

Japanese Appl. 2/258,061

Apparatus for combustion has a part for decomposing NO_x which contains a catalyst consisting of 2–50 wt.% Ir, 0–20 wt.% Cu, 30–90 wt.% Al_2O_3 , and 0–20 wt.% Y-zeolite. The apparatus prevents air pollution by enabling NO_x in combustion gas or air to be decomposed, at a lower temperature, without supplying a reducer, which gives low investment and running costs, and easy maintenance.

Noble Metal Catalyst for Decomposition of Nitrogen Oxides

BABCOCK-HITACHI K.K. *Japanese Appl. 2/258,063*

A NO_x decomposition catalyst consists of at least one of Pt, Pd, Rh, Ir, Ru, or Re, a composite oxide containing rare earth elements, Ba, Sr, Ca and Co, or a composite oxide containing Bi, Ba, Sr, Ca and Co. The catalyst is used to decompose NO_x in exhaust gases from combustion apparatus such as a boiler or car, and can be used at a lower temperature such as 400–800°C, compared with a conventional catalyst.

Ruthenium Catalyst for Ammonia Synthesis

SHIN NENSHO SHISUTE

Japanese Appl. 2/258,066

A catalyst with high activity for synthesising NH_3 is easily produced by supporting a Ru compound containing no chlorine, such as Ru nitrate, on Al_2O_3 or MgO , evacuating and/or reducing under H_2 to give a metallic Ru catalyst, and supporting on a nitrate of Rb, Cs or K. The catalyst does not contain chlorine so poisoning by chlorine is inhibited, and it has resistance to poisoning by CO which allows use of reactant gases containing CO.

Waste Gas Purification Catalyst with Separated Catalytic Metals

NISSAN MOTOR K.K.

Japanese Appl. 2/265,646

A waste gas purification catalyst consists of a substrate with a first layer of active Al_2O_3 containing Pt and/or Pd, a second oxide layer of rare earth element oxide or ZrO_2 , and a third layer containing Rh. Lowering of the catalytic activity at high temperature is controlled by using the three layer structure which prevents a solid solution of Rh with Al_2O_3 forming on heating, and by the co-catalytic effect of the rare earth element oxide.

Ruthenium Catalyst for Hydrogenation of Carbonyl Compounds to Alcohols

MITSUBISHI KASEI CORP. *Japanese Appl. 2/273,635*

Carbonyl compounds are hydrogenated to the corresponding alcohols at 15–150°C, under ordinary pressure 100 kg/cm^2 in the presence of a Ru catalyst. The catalyst is prepared by supporting Ru halides, preferably Ru chloride, on SiO_2 gel, treating with alkali to fix the Ru halides, reducing, washing and drying. The catalyst is stable and active for a long time, and gives alcohols selectively and in high yield.

Methanol Reforming Catalyst

KANSAI NETSU KAGAKU

Japanese Appl. 2/277,546

A reforming catalyst consists of 2–25 wt.% Ni or Co, 0.5–15 wt.% Ce oxide or La oxide, and 0.01–2 wt.% Rh and Ru, loaded on a sepiolite support. It is used to reform CH_3OH to a gas containing H_2 and CO, which is used as a high calorific fuel gas for combustors, fuel cells or organic synthesis. Side reactions are suppressed, and the catalyst has higher selectivity for CO and H_2 , higher activity at 250–400°C, and longer operating life.

Preparation of High Purity Isopropanol

MITSUBISHI PETROCH. K.K.

Japanese Appl. 2/279,643

Isopropanol is prepared by catalytic hydrogenation of acetone over a catalyst of 0.01–5 wt.% Ru on an inorganic carrier, in a fixed catalyst bed, while maintaining the concentration of isopropanol in the reaction system above 50 wt.%. High purity isopropanol is prepared without by-products.

Dual-Phase Catalytic Hydrogenation of Nitrobenzene to Prepare Aniline

SUMITOMO CHEM. IND. K.K.

Japanese Appl. 2/279,657

A controlled reaction to prepare aniline of high purity is by liquid phase hydrogenation of nitrobenzene at 180–240°C, at 0.05–10% in aniline, in the presence of a supported Pd or Pd-Pt catalyst, followed by gaseous phase hydrogenation of nitrobenzene in a composition of aniline, water and H₂, over a fixed Cu-Cr catalyst, at 150–250°C.

Palladium Catalyst for Dehalogenation Process

SOC. ATOCHEM.

French Appl. 2,645,531

A hydrogenation process for dehalogenation of α -halo-carboxylic acids or esters by H₂ is carried out in the presence of a Group VIII metal, especially 0.3–1% Pd on C, and S or S compounds, especially S₂Cl₂ or CS₂. The process is specifically claimed for purification of monochloroacetic acid containing dichloroacetic acid.

Cross-Coupling Metal Organic Compounds and Halogen Compounds

MERCK PATENT G.m.b.H.

German Appl. 3,930,663

Metal organyls are cross-coupled with halo compounds or perfluoroalkyl sulphonates by reacting a known organometallic compound with the relevant substituted ethylidene, optionally in the presence of a metal alcoholate and using a transition metal catalyst of Pd, optionally supported. The relatively mild and stereoselective process gives good yields of the products, which are used as precursors of liquid crystalline materials.

Processing Pyrolytic Gas Line Fractions

B. A. GRIGOROVICH

Russian Patent 1,541,238

Hydrocarbon hydrogenation uses an alumino-Pd catalyst and H₂ at 80–180°C, with partial recirculation of hydrogenation products to mix with the raw material. Part of fraction C9 is additionally hydrogenated using an alumino-Pd catalyst at 200–350°C, and then recirculated for extraction of fraction C6–C8. The method is used for processing liquid products of hydrocarbon pyrolysis.

HOMOGENEOUS CATALYSIS

Platinum Catalyst for Preparation of Silane Anti-Clouding Agents

SHIN-ETSU CHEM. CO.

European Appl. 392,509A

New 3-(2-oxo-1-pyrrolidinyl)-propyl silane compounds are prepared by hydrosilylation of 1-allyl-2-oxo-pyrrolidine with a hydrogen silane in the presence of a Pt catalyst. The products are used as anti-clouding agents for treating a variety of surfaces, or as effective coupling agents, etc.

Preparation of Adipic Acid from Lactones

DU PONT DE NEMOURS CO. *European Appl. 395,038A*

Adipic acid is prepared by reaction of at least one lactone—for example α -ethylpropiolactone—with CO and water at 190–250°C and 100–2000 psi, in the presence of a homogeneous Rh catalyst and at least one promoter selected from an iodide or bromide.

Preparation of Unsaturated Acids

RHONE-POULENC CHIMI.

European Appls. 395,545–46A

New methods for the preparation of hexene-dioic acids or β , γ -unsaturated acids involve reaction at raised temperature and pressure of (a) a disubstituted butene containing alkoxy groups, for example 1,4-diacetoxybut-2-ene, or (b) an allylic alcohol, for example 2-butene-1,4-diol or 1-butene-3,4-diol; with CO and optionally water, in the presence of a Pd based catalyst and a quaternary onium chloride of N or P. High yields of 1,6-hex-3-ene-dioic acid can be obtained, which can be hydrogenated to adipic acid.

Preparation of Dihydrophenanthrene-Carboxylic Acid Esters

AGENCY OF IND. SCI. TECH.

European Appl. 397,418A

New 9,10-dihydrophenanthrene-2,7-dicarboxylic acid diesters and 7-bromo-9,10-dihydrophenanthrene-2-carboxylic acid esters are prepared by reacting 2,7-dibromo-9,10-dihydrophenanthrene with CO and alcohol, using a Pd-phosphine catalyst. The products are used as intermediates for drugs, agricultural chemicals and heat-resistant or liquid crystal polymers.

Cross-Linked Siloxane Copolymer for Optical Use

AMERICAN TEL. & TELEG. CO.

European Appl. 398,573A

A siloxane copolymer is cross-linked with a cross-linking agent in the presence of a Pt catalyst, which is preferably a chloroplatinic acid-cyclovinylmethylsiloxane complex, used in amounts of 1–20 parts per million. The silicone polymers are used as encapsulating agents, surface protective agents, or to index match optical components to other optical devices, and show good optical quality, physical and chemical properties.

Preparation of Substituted Urea Compounds

NKK CORP.

European Appl. 400,299A

N,N'-disubstituted urea compounds are produced in good yield by reacting a primary aromatic amine, an aromatic nitro compound and CO in the presence of a halogen-free Rh compound and/or Ru compound as catalyst, and a solvent. The solvent stabilises the catalyst and enables recovery as a solution for re-use, and increases catalyst activity.

Palladium Complex Catalyst for Preparation of Ibuprofen

HOECHST CELANESE *European Appl.* 400,892A

Ibuprofen, a well known anti-inflammatory agent, is prepared by carbonylation of 1-(4'-isobutylphenyl) ethanol with CO at 10°C or above and at least 500 psig, in an acidic aqueous medium, in the presence of hydrogen ions, halide ions, and a Pd compound complexed with at least one monodentate phosphine ligand as catalyst. In this process the catalyst can be precipitated from the reaction products in pure form, and recycled.

Preparation of Polycyclic Aromatic and Aromatic Vinyl Compounds

MITSUBISHI KASEI CORP. *European Appl.* 405,389A

A polycyclic aromatic compound or an aromatic vinyl compound is produced by coupling an aromatic sulphinic acid with an aromatic halogen compound or a vinyl halogen compound using a catalyst containing Pt, Pd (preferred), Rh, Ir, Os or Ru, and preferably 0.01–25 mol of an organophosphorus ligand per mol of catalyst. The products are obtained in high yield and with high selectivity, and are useful industrial starting materials.

New Preparation of Pseudo-Ionone

RHÔNE-POULENC SANTE *European Appl.* 406,065A

A new preparation of pseudo-ionone is by oxidative decarboxylation of new allyl β -ketoesters such as allyl (2-acetyl-5,9-dimethyldeca-4,8-diene)-oate, in a solvent, in the presence of a catalyst. A Pd based catalyst such as Pd(OAc)₂ is used, optionally with a ligand such as triphenylphosphine. Pseudo-ionone is an intermediate in the synthesis of vitamin A.

Heat Curable Organopolysiloxane Composition

SHIN-ETSU CHEM. CO. *European Appl.* 410,697A

An organopolysiloxane composition consists of an organopolysiloxane, an organohydrogenpolysiloxane, and a Pt catalyst present at 0.1–100 ppm of the first component. The products are heat curable to form silicone gels used in the electronic or electrical industries as potting or sealing materials. They have reduced discoloration due to thermal deterioration compared to compounds in use.

Palladium Catalyst for Preparation of 3-Keto-1-Alcohols

NIPPON ZEON K.K. *Japanese Appl.* 2/240,040

A 3-keto-1-alcohol is prepared from an allyl type or propargyl type ester of a β -keto-carboxylic acid having a carbonyl group, by subjecting to an intramolecular aldol reaction in the presence of a Pd compound catalyst. In an example the catalyst consisted of Pd acetate and triphenyl phosphine. The product can be prepared in high yield, and with high selectivity for the intramolecular reaction.

Heat Curable Polymer Blend

HITACHI CABLE K.K. *Japanese Appl.* 2/242,839

A heat curable polymer blend is produced by compounding 50–95 wt.% of chloro-sulphonated polyethylene and 50–5 wt.% of a mixture of silicone compounds in the presence of a Pt compound, and cross-linking to make a network structure. The blend composition shows increased heat resistance without decreasing the tensile or tear strength, and is used as a wire coat or cable sheath, hose, or a sheet.

Preparation of High Purity Monosilanes

TONEN CORP. *Japanese Appl.* 2/267,111

Monosilanes are prepared by disproportionation of arylhydrosilanes in the presence of Rh and/or Ru or their compounds as catalyst. High purity monosilanes can be obtained under mild conditions, at low cost. In an example, Rh₄(CO)₁₂ was used to catalyse the disproportionation of phenylsilane.

Palladium Catalyst for Preparation of Vinyl Dioxolanes

MITSUBISHI PETROCH. K.K.

Japanese Appl. 2/282,382

4-Vinyl-1,3-dioxolanes are prepared by reaction of diene monoxides with excess ketones in the presence of 0.001–1 mol-fold for a Pd catalyst, preferably zero-valent Pd compounds, for example tetrakis(triphenylphosphine) Pd. The product is useful as a monomer to prepare a 1,3-dioxolane ring having (co)polymer(s), reactive towards acids and/or bases.

Palladium Compound Used in Cyclisation of Organic Acids

TEIJIN K.K.

Japanese Appl. 2/286,647

3,5-Dihydroxy-2-methylenecyclohexylidene acetic acid esters are produced by cyclising 5,7-dihydroxy-8-nonen-2-ynoic acids at 0–100°C, in an organic solvent, using a Pd compound at 0.001–1 equivalents of the acid. This provides a new industrially applicable process using readily available starting materials but not highly toxic or explosive raw materials, giving products useful as intermediates for the A ring of active type vitamins D3.

CHEMICAL TECHNOLOGY

Sintered Compact for Prevention of Rusting in Water Pipes

T. MIYANOO

Japanese Appl. 2/232,385

An aqueous solution is passed through a sintered compact made by moulding a mixture of TiO₂ fines as *n*-type semiconductor, Pt-black and SiO₂ fines, to prevent rust in steel piping for water supply. Alternatively the mixture may be applied on a solid body and fired. This method is for preventing rusting of the steel piping without any effect on the taste of the water, and using no supplementary chemicals.

ELECTRICAL AND ELECTRONIC ENGINEERING

Sintering Control Additive Containing Rhodium and Iridium

ENGELHARD CORP. *European Appl.* 394,037A

An additive consisting of Rh and/or Ir metallo organic resins is used at 0.1–10 wt.% to control the sintering rate of Ag or mixed Ag/Pd internal electrode materials, in the manufacture of multilayer ceramic capacitors. The preferred resins are Rh 2-ethylhexoate and Ir trichloride-tris-di-*n*-butylsulfide. The additive slows the electrode material sintering rate to match that of the dielectric.

New Electrically Conductive Ruthenates

W.C. HERAEUS G.M.B.H. *European Appl.* 395,799A

Novel electrically conductive pyrochlore-related oxides (ruthenates) contain Pb, Bi, Ru, Cu and/or Ag, and Ca, Sr and/or Ba, and are useful for production of thick film resistance elements. The elements have an extremely small difference between their hot (25–125°C) and cold (–55 to 25°C) temperature coefficients of resistance, and have low hot and cold temperature coefficient values.

Thick Film Thermistor Compositions Containing Ruthenium Pyrochlores

DU PONT DE NEMOURS CO.

U.S. Patents 4,906,406 and 4,961,999

Thick film thermistor compositions are an admixture of finely divided particles of: 5–60 wt.% of a Ru-based pyrochlore, and 40–95 wt.% of a borosilicate glass or glass mixture with viscosity 10–10,000 poises on firing at 700–1000°C. These components are dispersed in an organic medium, printed on a substrate, and fired. The novel thick film thermistor compositions have high positive temperature coefficient of resistance over a wide temperature range.

Electrodes Used in Moisture Sensors for Windscreen Wipers

DELCO ELECTRONICS CORP. *U.S. Patent* 4,970,122

A conductive pattern is formed on a glass windshield with electrodes consisting of a conductive oxide in glass matrix. The pattern is silk screen printed on to a windshield from an ink containing 5–20 wt.% RuO₂, 40–70 wt.% glass frit and 25–40 wt.% organic vehicle, and then dried and heated to fuse to the screen during shaping.

Compound Superconductor with Platinum Intermediate Layer

TOSHIBA K.K. *Japanese Appl.* 2/201,819

A compound superconductor is made by melting an oxide superconductor or precursor mixture and applying the melt to a matrix having a Pt or Pt alloy layer at least on the surface, or vice versa, followed by crystallising the melt to form oxide superconductors.

Platinum Composite Wire for Corona Discharge Electrode

TANAKA KIKINZOKU KOGYO

Japanese Appl. 2/217,450

A composite Pt wire is prepared by plating Pt on a W or Mo wire, extension to final wire diameter, heat treating at 600–800°C, and tension-annealing at 500–600°C. The thickness of the Pt or Pt alloy layer is homogeneous, with no pin holes, and the wire has uniform corona discharge. The Pt composite wire is used for a corona discharge electrode, with anticipated long life, reliability, and high performance.

Improved Magnetic Recording Medium

MATSUSHITA ELEC. IND. K.K.

Japanese Appl. 2/235,215

A magnetic recording medium consists of a Co group alloy perpendicular magnetic film formed on a particle shaped base, having an undercoat layer made of Pt, Pd or Rh. The medium is applied to magnetic tape, and has an improved running life at suitable play back power and C/N ratio, at high density recording domain.

Contact Point Material with Excellent Wear Resistance

FURUKAWA ELECTRIC CO. *Japanese Appl.* 2/259,086

A contact point material has a coating layer of at least one electroconductive ceramic of Ti nitride, Ti boride and Zr boride formed on at least part of the surface of a Cu or Cu alloy base, with a thin layer of at least one of Pt, Pd, Au and their alloys on the coating layer. The material is for use at weak currents, providing excellent wear resistance, corrosion resistance and heat resistance.

Optical Recording Medium with Protecting Layer

MITSUI PETROCHEM. IND. K.K.

Japanese Appls. 2/260,253 and 2/261,822

A photo- or optical recording medium consists of a base plate, a protecting layer containing Si, N, optionally O and one or more of Pt, Pd, Rh, Ir, Ru, Au, Ag, Ni, Cu, Tc and others, and a recording layer which may contain one or more 3d transition metals, an anti-corrosive metal such as Pt, Pd, Ti or Zr, and rare earth elements. The refractive index is preferably >1.7, and the extinction coefficient is <0.1. The protecting layer is free from cracking, and prevents oxidation or corrosion of the recording membrane.

Soft Magnetic Thin Film Containing Ruthenium

FUJI PHOTO FILM K.K. *Japanese Appl.* 2/262,307

A soft magnetic thin film contains Fe, over 0–5 at.% of at least one of Co, Ni and Ru, and over 0–5 at.% of N. The thin film is used for the core material of magnetic heads having high saturation magnetic flux density and low coercive force.

Heat Resistant Silicone Gel for Sealing Integrated Circuits

SHINETSU CHEM. IND. K.K. *Japanese Appl.* 2/269,771
A silicone gel consists of an organopolysiloxane, an organohydrogenpolysiloxane, a zero valent Pt compound at 0.1–100 ppm of Pt to the total of the siloxanes, and 150 ppm or less of OH bonded to Si atoms to the total of the other components. The gel has low elasticity, good electrical properties, heat and low temperature resistance, stain resistance and moisture resistance, and is used for sealing (hybrid) ICs.

Ink for Forming Thin Film Resistor Device

MATSUSHITA ELEC. IND. K.K. *Japanese Appl.* 2/301,101
An ink used to form a thin film resistor consists of a Ru compound, a solvent, 5–60 wt.% of a Ru oxide with mean particle diameter 50–1000 Å, and a metal or metal oxide (may be Co, but not Ru) with the same particle diameter. The ink is coated on a substrate, dried, heated and fired to form a rigid resistor film.

Material Containing Ruthenium for Electrical Resistors

W.C. HERAEUS G.m.b.H. *German Appl.* 3,941,283
A material mixture used for electrical resistors preferably consists of 5–90 wt.% of Cu and Ru oxides, and 10–95 wt.% glass frit. The oxides consist of $\text{CaCu}_2\text{Ru}_4\text{O}_{12}$ and/or $\text{LaCu}_2\text{Ru}_4\text{O}_{12}$. The material mixture is used for the production of temperature dependent resistance layers in temperature sensors, and has a high coefficient of resistance.

Thermoelectric Transducer

MITSUBISHI METAL K.K. *German Appl.* 4,017,776
In a doped *n*-conducting Fe silicide used as a thermoelectric transducer, part of the Fe is replaced by Pt, Pd and/or Ni, and optionally part by Co. The product has excellent energy conversion properties, especially a large Seebeck coefficient and low specific resistance, and is useful as a thermoelectric generator or cooler, and for various heat sensors.

MEDICAL USES

Platinum Complexes with Anti-Tumour Activity

DANA-FARBER CANCER *European Appl.* 392,662A
Complexes of K tetrachloroplatinate with nitroaromatic-azoic-diazo dyes, preferably the nuclear dye "Fast Black", are used to delay tumour growth in mammals, and in enhancing the killing of tumour cells by radiation therapy and/or hyperthermia. The complex can be administered by percutaneous injection in solution, at a dose of 50–600 mg/kg body weight, preferably given a few hours before exposure when used with radiation or heat.

Palladium Alloy Foil for Dental Crowns

D.C. DIMMER *U.S. Patent* 4,980,124
A dental restoration is made by forming a malleable Pd alloy foil to the shape of a tooth, applying a particulate alloy coating to the external surface of the foil, sintering to bond the alloy to the foil and give a crush resistant unitary copying, and applying a porcelain veneer. The technique is used to prepare dental crowns, uses less noble metal, and eliminates the need for waxing, casting and machining.

New Tetraplatinum Complexes for Anti-Tumour Drugs

TSUMURA & CO. *Japanese Appl.* 2/258,789
A new Pt complex showing an anti-tumour effect against mouse leukaemia cell P-388 is used in an anti-tumour drug. The acute toxicity (LD50) is 200 mg/kg, and the drug can be administered by common dosage forms, at a daily oral dose of 1–600 mg for an adult, divided over several times.

Cancer Treatment Drug Containing Platinum Complex and Iodinated Oil

SUMITOMO SEIYAKU K.K. *Japanese Appl.* 2/290,813
An anti-cancer drug composition contains an oil-soluble Pt(II) complex and an iodinated oil. For preparation, iodinated oil and its fatty acid esters are used, such as olive oil, peanut oil, lanolin, and so on. The Pt(II) complex dissolved in iodinated oil was shown to reduce tumour size in rats transplanted with sarcoma 180, when injected into the tail artery.

New Platinum Complex with Anti-Tumour Activity

TORAY IND. INC. *Japanese Appl.* 2/295,993
A new Pt(II) complex for treating malignant tumours consists of dichloro-(1,2-diaminocyclohexane) Pt(II) and 18-β-glycyrrhetic acid, and an anti-tumour remedy is obtained by reaction of these components. The remedy can be given orally or parenterally in various forms, at a daily dose of 0.01–50 mg/kg, and preferably contains 0.005–60 wt.% of the effective component. The remedy has potent anti-tumour activity with only weak toxicity.

Fixing Tissue Sections Using an Osmium Solution

PHYSIOLOGY INST. *Russian Patent* 1,528,435
More efficient detection of Ca ions in the structure of neurons involves fixing sections of the tissue in a 1:1 mixture of OsO_4 solution and 2% K pyroantimonate solution, for 5 min. Subsequent treatment with alcohol, alcohol-acetone, acetone, acetone-araldite, and araldite, thermostating and electron microscopy complete the process.

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