

ELECTRICAL AND ELECTRONIC ENGINEERING

Origin of Blistering Observed on Forming-Gas-Annealed Ti/Pt Ohmic Contacts

G. HENEIN, *Thin Solid Films*, 1983, **109**, (1), 115-125
The blistering of Ti/Pt ohmic contacts to GaAs/(Al-Ga-As) semiconductor lasers occurring during a forming gas anneal is reported. The simultaneous presence of Ti, Pt, H and O in the annealing furnace was found to be a necessary condition for the formation of blisters. The Pt-catalysed formation of H₂O vapour occurred at an annealing temperature of >450°C which locally delaminates the film from the substrate. It is also shown how the presence of residual H₂O vapour in the blisters can lead to corrosion of laser chip bonds.

Suppression of Platinum Penetration Failure in Ti/Pt/Au Beam Lead Metal Systems Using a TiN Diffusion Barrier

S. KANAMORI and T. MATSUMOTO, *Thin Solid Films*, 1983, **110**, (3), 205-213
The ability of a TiN diffusion barrier to suppress metal penetration, which induces junction-shortening in a Ti/Pt/Au beam lead metal system on polycrystalline Si is reported. Failure analysis, performed by X-ray spectroscopy using an electron microprobe, showed that the junction-shortening was dominated by Pt penetration equivalent to the localised growth of Pt silicide.

Effect of HCl and Cl₂ on Pd Inlay Coupons and Pd Connector Contacts

E. S. SPROLES and S. P. SHARMA, *IEEE Trans. Components, Hybrids Manuf. Technol.*, 1983, **CHMT-6**, (3), 343-348

A study of the effects of Cl₂ and HCl vapours in high relative humidities (RH) on connectors and on coupon surfaces was performed. The high contact resistance values measured on the coupons were not representative of the contact resistance changes detected on connection contacts undergoing accelerated ageing in the mated condition. Pd and 60Pd-40Ag against Au are much superior in performance to Pd against Pd when exposed to Cl₂ environments. Extensive exposure in high concentrations of HCl vapours and high RH effectively destroys Pd inlay coupon samples, but does not significantly degrade any of the connector systems tested.

Fermi Energy Pinning Behaviour and Chemical Reactivity of the Pd/GaAs (110) Interface

T. KENDELEWICZ, W. G. PETRO, S. H. PAN, M. D. WILLIAMS, I. LINDAU and W. E. SPICER, *Appl. Phys. Lett.*, 1984, **44**, (1), 113-115

The room temperature growth of the Pd/n-GaAs (110) intimate interface was studied by soft X-ray core level photoemission spectroscopy. The results showed that Pd reacts with the GaAs surface forming an arsenide compound in which phase segregated Ga metal is included. The Schottky barrier height of this system is experimentally determined to be 0.9 ± 0.05 eV.

NEW PATENTS

METALS AND ALLOYS

Magnetic Alloy

RESEARCH INSTITUTE OF ELECTRIC & MAGNETIC ALLOYS
U.S. Patent 4,396,441

A permanent magnet having an ultra-high coercive force and large maximum energy product is made from an alloy of specified crystal structure consisting of 63.76-75.96% Pt, remainder Fe.

Brazing Alloy

GENERAL ELECTRIC CO. *U.S. Patent 4,396,577*

A brazing alloy particularly suitable for use in high temperature gas-turbine engines consists of 25-95% Pd, up to 5% Si, up to 3.5% B, remainder Co.

High Chromium Superalloy

JOHNSON MATTHEY P.L.C. *East German Patent 202,310*
Ni alloys containing 23-27wt.% Cr of improved mechanical properties and corrosion resistance contain up to 1.7% C, up to 1.5% Ti and/or up to 1.5% Al, 0.3-4% Pt and/or 0.3-8% Ru. The alloy is especially suited for use in contact with molten glass, for example in a centrifugal spinner.

ELECTROCHEMISTRY

Water Electrolysis

INSTITUTE OF GAS TECHNOLOGY

U.S. Patent 4,395,316

In a process for producing pure H₂ by water electrolysis, the anode is depolarised with a solution of monosaccharides and/or lignins to suppress the evolution of molecular O₂. The anode is preferably of Pt coated with a Pb-rich Ru pyrochlore of general formula Pb₂(Ru_{2-x}Pb_x)O_{7-y} where x is 0-1.2.

Film Photoelectrodes

DIAMOND SHAMROCK CORP. *U.S. Patent 4,396,485*

Film photoelectrodes for use particularly in the conversion of solar energy are claimed. They may contain lanthanide and/or platinum group metals.

Cermet Anodes

DIAMOND SHAMROCK CORP. *U.S. Patent 4,397,729*

An improved anode for the electrowinning of a metal especially Al, from a molten salt bath consists of a mixture of a cermet material such as Ni ferrite and Pd, Pt, Ir, Rh, Au or one of their alloys.

Composite Electrolytic Cell Electrodes

C-I-INC. *U.S. Patent 4,401,544*
A composite electrode is made by forming a stack of alternate anode plates and cathode plates with a thin plastic film between them. The cathode plates are particularly made of valve metal coated with platinum group metals or their oxides. The composite electrode enables the cell voltage to be reduced.

Palladium Cathode

COMMISSARIAT A L'ENERGIE ATOMIQUE
French Appl. 2,517,663
An electrolytic process for treating tritium-contaminated aqueous effluents uses a Pd or Pd alloy cathode.

ELECTRODEPOSITION AND SURFACE COATINGS

Platinum Metal Paint for Chemical Plating

OKUNO CHEMICAL INDUSTRY CO. LTD.
European Appl. 92,601
A mixture of 0.01–25% Pd or Pd compound in powder form (up to 0.5 μ m) and 75–99.99% organic solvent or vehicle is applied to a ceramic or other surface and fired. The resulting film catalyses subsequent chemical plating, for example, Ni, and ensures secure adhesion to the substrate.

White Palladium Electroplating

OCCIDENTAL CHEMICAL CORP. *U.S. Patent 4,392,921*
White coating films of Pd are obtained by electrodeposition from a bath containing, per litre, 1–6g Pd as Pd(NH₃)₂(NO₂)₂ and 50–100g of an ammonium salt (sulphate or phosphate), buffered to pH 8–10.

Thermochromic Coating Compositions

LGZ LANDIS & GYR ZUG A.G. *U.S. Patent 4,394,407*
Thermochromic coating compositions, for identity or credit cards, consist essentially of an organic binder, an organic sulphur compound and a compound or complex of a metal which may be Ag, Au, Pd or Pt, among others.

Coating Films for Carbon

J. INTRATER AND G. BERTOLDO *U.S. Patent 4,396,677*
Non-dewettable films on surfaces such as graphite, diamond or sapphire are made by applying a mixture of Sn, Pb, In or one of their alloys, and a carbide- or carbonyl-forming metal which may be Ru, Rh, Os or Ir, among others.

Platinum Group Metal Thermal Barriers

JOHNSON MATTHEY & CO. LTD. *U.S. Patent 4,399,199*
Superalloys for use at very high temperatures, in gas turbine engines, are protected by applying a thin film of a platinum group metal (preferably Pt) and a thermal barrier layer of Zr oxide stabilised with another metal oxide, such as Y oxide.

Palladium Electroplating Bath

OCCIDENTAL CHEMICAL CORP. *U.S. Patent 4,401,527*
A bath which operates at high current densities and constant plating efficiencies contains Pd ions and excess free nitrite ions (based on the Pd-ions). The bath preferably contains a buffer to hold the pH at 6.5–7.5. In an example the bath contains, per litre, 50g Pd diaminodinitrite, 90g NH₄NO₃, 10g NaNO₂ and 25g ammonium borate.

Rhodium Electroplating

DEGUSSA A.G. *U.S. Patent 4,402,802*
Bright, haze-free Rh coatings of a white-Au colour are obtained from baths containing Rh sulphate and/or phosphate, sulphuric and/or phosphoric acid and also a phenol- or pyridine-sulphonic acid.

Osmium Plating

KHARKOVSKII GOSUDARSTVENNYI PEDAGOGICHSKII INSTITUT I.M.G.S.SKOVORODY *Russian Patent 1,014,996*
An Os electroplating bath contains per litre 0.19–19g Os ions, 50–300g Na₂SO₄ and 0.00004–40g NaOH.

LABORATORY APPARATUS AND TECHNIQUE

Mass Liquid Flow Measurement

LUCAS INDUSTRIES P.L.C. *British Appl. 2,119,517A*
A fluid being measured flows through a hollow collector electrode assembly which has a central wire electrode of Pt-Rh alloy, Pd-Ru alloy or Pt-plated steel.

Catalytic Combustible Gas Detectors

ENGLISH ELECTRIC VALVE CO. LTD.
British Appl. 2,121,180A

A combustible gas detector element comprises a heatable wire filament which may be made of Pt or one of its alloys, embedded in a pellet formed overall of an oxidation catalyst, such as Pd or Pt, and a porous non-catalytic inert carrier which comprises colloidal SiO₂.

Carbon Monoxide Gas Sensor

HONEYWELL INC. *European Appl. 95,844*
A CO sensor has an Al₂O₃ substrate coated with 200–500 \AA of Rh or Ru which chemisorbs the CO as it passes over the film. The resistance of the film changes in a corresponding way.

Detecting Oxidising and Reducing Agents in Fluids

DOW CHEMICAL CO. *European Appl. 96,117*
A new detector with an ion exchange membrane has two electrodes with a membrane separating them and also separating the second electrode from the fluid, which contains an oxidising agent or a reducing agent to be detected. This enables the device to stabilise quickly. The first electrode preferably consists of Pt and the second of Pt or Ag. The device is particularly intended for determining Cl₂ in air.

Dissolved Hydrogen Concentration Measurement

HITACHI LTD.

European Appl. 96,417

The H₂ dissolved in a water sample is measured by an electrode with a H₂-permeable membrane on its surface, preferably made of Pd. A Ag/Ag sulphate reference electrode may be used.

Hydrogen Sensor

NETHERLANDS TNO

European Appl. 97,390

An electrochemical sensor for measuring H activity in metals, for example for testing welds, uses a thin layer of Pd or Pd-Ag alloy as contact and electrode.

Electrochemical Sensor

BAYER A.G.

U.S. Patent 4,394,239

In a rapid-response sensor for measuring the concentration of CO, H₂ or hydrazine in the air, the electrolyte is an aqueous gelatinous polymeric adhesive containing dissolved ionic materials and the measuring electrode is a matrix containing a catalyst. For CO and H₂ the matrix is graphite and the catalyst is Pt while for hydrazine the matrix is C coated with Au and the counter electrode is C coated with Pt black.

HETEROGENEOUS CATALYSIS

Autothermal Hydrocarbon Reforming Catalyst

UNITED TECHNOLOGIES CORP.

British Appl. 2,118,857A

Highly active hydrocarbon steam reforming catalysts, particularly catalysts for autothermal reforming, contain 0.01–6% Rh deposited on an Al₂O₃ substrate impregnated with 10–35% CaO. These catalysts eliminate the C plugging that occurred with Ni catalysts.

Formaldehyde Production

MITSUBISHI GAS CHEMICAL CO. INC.

British Appl. 2,121,787A

Formaldehyde is produced by catalytic oxidation-dehydrogenation of methanol with air in the presence of a Ag-Pd catalyst which may contain up to 5% Pd.

Catalytic Alcohol Production

INSTITUT FRANCAIS DU PETROLE

European Appl. 95,408

Alcohols are obtained when carboxylic esters are hydrogenolysed in the presence of a supported mixture of Rh and Ge, Sn and/or Pb. Thus ethanol and butanol are produced by the hydrogenolysis of butyl acetate using a Rh-Sn/SiO₂ catalyst.

Iridium Catalyst Pretreatment

MOBIL OIL CORP.

European Appl. 96,483

A freshly prepared reforming catalyst containing Ir is initially treated with O₂ and a hydrogen halide (dry HCl) and then with a reducing agent, also at

elevated temperature. A typical catalyst contains 0.3% each of Ir, Pt and Re on a support. The treatment ensures that the Ir is present in its most effective oxidation state.

Heterocatalyst System

UNIVERSITY PATENTS INC.

European Appl. 98,289

Heterocatalyst systems where a metal complex is reacted with an –OH group which is in a zeolite or molecular sieve cavity are useful for carbonylation, hydrogenation, and Fischer-Tropsch reactions. The metal complex may be of a Group VIII metal, such as Rh, Pd or Pt, as in zeolite-O-Rh(alkyl)₂.

Paraffin Dehydrogenation Catalyst

SHELL INTERNATIONALE RESEARCH Mij. B.V.

European Appl. 98,622

Paraffins containing 2, 3 or 4 C atoms are dehydrogenated in the presence of a known Pt-Sn composition produced in a new way. The Al₂O₃ is first impregnated with an aqueous Sn compound solution and calcined. The product is then impregnated with an aqueous Pt compound solution, reduced and dehalogenated and finally a Group IA metal compound, such as CsOH is introduced.

Catalytic Engine

JOHNSON MATTHEY & CO. LTD. *U.S. Patent* 4,389,983

A catalytic I.C. engine can be operated on the stratified charge principle. The engine includes one or more precombustion chambers containing a catalyst which is preferably a honeycomb, gauze or corrugated sheet or foil of a platinum group metal and/or alloy (excluding Os).

Catalyst for I.C. Engine Exhaust Systems

W. R. GRACE & CO.

U.S. Patent 4,390,456

A catalyst consists of platinum group metal or metals supported on a specified carrier consisting of spheroidal Al₂O₃ particles of defined properties.

Hydrocarbon Production Catalysts

STANDARD OIL CO.

U.S. Patent 4,390,639

Synthesis gas is converted to a mixture of olefins, alcohols and carboxylic acids over a catalyst which is a mixture of Au and a partly reduced Ru oxide supported on a SiO₂-Al₂O₃ carrier. The products may optionally be further hydrogenated over a mixed oxide catalyst such as RuCoPdZn_{0.4}O_x.

Benzene Hydrogenation Catalyst

STAMICARBON B.V.

U.S. Patent 4,392,001

The partial hydrogenation of benzene to cyclohexene in the presence of steam is catalysed by metallic Ru.

Hydrocarbon Processing

INSTITUT FRANCAIS DU PETROLE

U.S. Patent 4,392,002

In a process for making petroleum from 4C hydrocarbons, butyl-1-ene is converted to the 2-isomer in the presence of H₂ over a catalyst which is an Al₂O₃ carrier supporting Ni, Co or preferably Pd.

Osmium Tetroxide Catalyst

EXXON RESEARCH & ENGINEERING CO.

U.S. Patent 4,393,253

The formation of diols by reaction of olefins with water and t-butyl hydroperoxide is catalysed by OsO₄ preferably promoted with Na bromide or iodide.

Hydrocarbon Conversion Catalyst

U.S. DEPARTMENT OF ENERGY *U.S. Patent 4,396,539*

A catalyst for the conversion of synthesis gas to hydrocarbons consists of a carrier such as Al₂O₃ supporting Co and Pd or Pt.

Hydrocarbon Dehydrogenation Catalyst

UOP INC.

U.S. Patent 4,396,540

A catalyst for the dehydrogenation of hydrocarbons consists of a carrier such as Al₂O₃ impregnated with 0.01–2% Ru formed by pyrolysis of a carbonyl complex, 0.01–2% Pd, Pt, Rh or Ir, 0.01–5% Re and 0.01–5% Group IA or IIA metal.

Immobilised Group VIII Metal Catalysts

MOBIL OIL CO.

U.S. Patent 4,400,561

Catalysts for olefin conversion reactions such as dimerisation or hydroformylation consist of a refractory oxide carrier of specified surface properties modified with a functional amine which acts as a bridge to a Group VIII metal. The metal is preferably a platinum group metal, especially rhodium or ruthenium.

Hydrocarbon Reforming Catalyst

STE. FRANCAISE DES PRODUITS POUR CATALYSE

U.S. Patent 4,401,557

Hydrocarbon conversion, especially reforming, is catalysed by a supported mixture of 0.005–1% Pt, 0.005–1% Rh or Os, 0.005–5% Cr, W, Mo, Mn, Re, Ga, In, Tl, Th, Ce, Sm, La, Zn, Cd, Ti or Zr and 0.01–10% halogen.

Hydrocarbon Reforming Mixed Catalyst

STANDARD OIL CO. (INDIANA) *U.S. Patent 4,401,558*

A new catalyst, superior in properties to multimetal supported catalysts, is a mixture of particles of two components, one containing a platinum group metal or metals and the other a Group IVB or VB metal, on halogenated oxide supports. Thus one may contain Pt and Pd and the other V, Ta or Zr.

Reforming Catalysts

EXXON RESEARCH & ENGINEERING CO.

U.S. Patent 4,404,094

The activity of supported Pt-Ir-halogen reforming catalysts also containing Cu, S or preferably Se is increased by pretreatment with a stream of dry H₂ at specified temperature and flow rate for 16 hours or more.

Hydrogenation Catalyst

PHILLIPS PETROLEUM CO.

U.S. Patent 4,404,124

The selective hydrogenation to ethylene of acetylene in a gas stream composed mainly of ethylene is

catalysed by Al₂O₃ particles impregnated with 0.01–0.025% Pd and at least twice this weight of Ag. The Ag is distributed evenly but the Pd is concentrated at the surface of the particles.

Carbonylation Catalyst

HOECHST A.G.

German Offen. 3,203,060

An improved catalyst for the synthesis of acetic acid, acetaldehyde and methanol from CO and H₂ consists of a SiO₂ carrier impregnated with a lanthanide metal chloride and then with Rh chloride.

HOMOGENEOUS CATALYSIS

Crystalline Silicate Catalyst

RESEARCH ASSOCIATION FOR PETROLEUM ALTERNATIVES DEVELOPMENT *British Appl. 2,122,591A*

Crystalline silicates, useful as catalysts for organic reactions such as polymerisation, alkylation, isomerisation and disproportionation, may include a proportion of La₂O₃, Ce₂O₃ and/or M₂O₃ in which M is Al or at least one trivalent transition metal, such as Rh, Ru, Pd or Ce. The silicates may be impregnated with Ru, Rh, Pd, Pt, La, or Ce. A typical silicate has the formula 0.4Na₂O.(0.5La₂O₃.0.5Ce₂O₃).80SiO₂ and part of the Ce may be replaced by Ru or Nd.

Rhodium Complex Catalysts

IMPERIAL CHEMICAL INDUSTRIES LTD.

European Appl. 94,748

The formation of aldehydes and acetals from conjugated 4–6C dienes, alcohols, CO and water is catalysed by a system consisting of a Rh complex such as ClRh(CO)(PPh₃)₂, triphenylphosphine and a strong acid.

Rhodium Complex Catalyst

BRITISH PETROLEUM CO. P.L.C. *European Appl. 94,785*

The formation of alkyl formates by reaction of alcohols with CO₂ and H₂ in THF media, and in the presence of a basic oxide is catalysed by RhCl₂(PPh₃)₃.

Hydroformylation Process

DAVY McKEE (LONDON) LTD.

European Appls. 96,986/88

A new Rh catalyst giving an n-aldehyde:iso-aldehyde ratio in the product comparable to a Co catalyst contains Rh, CO and a cyclic phosphite having a bridgehead P atom linked to three O atoms of which at least two form part of an -O-P-O-ring, such as 2,8,9-trioxa-1-phosphatricyclo-[3.3.1.1^{3,7}]-decane. Similar phosphites are claimed in 96,987.

Mixed Carboxylic Acids Production

SHELL INTERNATIONALE RESEARCH Mij. B.V.

European Appl. 97,978

Mixtures of carboxylic acids, of which one contains a -CH₂COOH grouping, are produced by reacting an acid, ketone or ester with CO and H₂ in the presence

of a Rh catalyst and a source of I and/or Br. The Rh catalyst is preferably complexed with a phosphine, phosphite, etc. Thus propionic acid, acetic acid, butyric acid and isobutyric acid may be produced from methyl acetate in the presence of propionic acid.

Ethanol Production

IMPERIAL CHEMICAL INDUSTRIES P.L.C.

European Appl. 98,031

Ethanol is produced directly and selectively from CO and H₂ using a catalyst mixture of Ru, a Group VII and/or VIII metal and a source of halide in an aprotic amide, imide or heterocyclic compound, such as an alkyl pyrrolidone. Typically the catalyst contains Ru and Co, Fe or Ni carbonyls and KI.

Oil Production from Garbage

JOHNSON MATTHEY P.L.C.

U.S. Patent 4,396,786

Cellulosic material is converted to fuel oil by hydrolysing the cellulose, carbonylating the product using a reducing gas, for example H₂ and CO in the presence of Cu or a platinum group metal to form a keto acid, heating to polymerise the keto acid and hydrogenating the polymer to form fuel oil. The preferred catalyst is Na ruthenate.

Rhodium Phosphine Hydroformylation Catalysts

TOA NENRYO K.K.

U.S. Patent 4,397,788

New rhodium phosphine compounds isoelectronic with HRh(CO)(PPh₃)₃ have the structure HRh(CO)(XR₃)_x(YR₃)_y, when X is P, As or Sb, Y is As or Sb; when X is P, Y is P or Sb; when X is As, Y is P, As or Sb; when X is Sb, R is the same or different aryl group, x is 1 or 2 and y is 2 or 1. These compounds, such as HRh(CO)(SbPh₃)(AsPh₃)₂, can be used as hydroformylation catalysts.

Phase Transfer Hydroformylation of Olefins

JOHNSON MATTHEY P.L.C.

U.S. Patent 4,399,312

A process for the hydroformylation of olefins which facilitates recovery of noble metal catalysts and which proceeds under mild conditions comprises using as catalyst a water-soluble complex of a platinum group metal, the reaction mixture including aqueous and organic phases and an amphiphilic reagent.

Rhodium Complex Catalysts

UNION CARBIDE CORP.

U.S. Patent 4,400,548

In a process for the hydroformylation of olefins to aldehydes using a Rh complex catalyst, the efficiency and thermal stability of the catalyst are improved when the ligand is a bis-*t*-phosphine monoxide such as bis((diphenylphosphino)ethane P-oxide).

Rhodium Complex Catalysts

F. HOFFMANN-LA ROCHE & CO. A.G.

German Offen. 3,302,697

Asymmetric hydrogenation reactions are catalysed by Rh complexes of new chiral phosphines such as 4-

(diphenylphosphino)-2-[(diphenylphosphino)methyl]-diphenylphosphinylpyrrolidine or its sulphonate or sulphonamide.

FUEL CELLS

Electrode for a Molten Carbonate Fuel Cell

GENERAL ELECTRIC CO.

European Appls. 92,765/66

A sintered electrode consists of ceramic particles sintered together through a coating of a 5–95% Ni and 95–5% Cu alloy. The ceramic particles are sensitised with a Sn/Pd chloride solution and then chemically plated with 83% Ni and 17% Cu.

Fuel Cell Reactor Construction

W. R. GRACE & CO.

U.S. Patent 4,396,480

The fuel cell reactors consist essentially of stacks of channeled sheets of solid electrolyte, the channels being coated with a catalyst for the formation of O ions, from O₂, such as Ag, Au, Pt or Pt-Rh alloy or a catalyst for the oxidation of a reactant 'fuel', such as NH₃. This catalyst may be Pt, Pt-Rh or Pt-Rh-Pd.

CHEMICAL TECHNOLOGY

Maximum Photographic Contrast

FUJI PHOTO FILM CO. LTD.

British Appl. 2,121,554A

Internally fogged emulsions which are sensitised with Ir or Rh salts are used as part of a composite film which yields maximum contrast.

Direct Positive Silver Halide Photographic Material

KONISHIROKU PHOTO INDUSTRY CO. LTD.

European Appl. 93,002

A low speed material which can be handled safely in yellow light uses a fogged emulsion containing a Rh or Ir salt with a hydrophilic layer containing a diazole and a Au compound, such as chloroauric acid.

GLASS TECHNOLOGY

Cooling Tubes for Fibre Glass Spinning

MANVILLE SERVICE CORP.

U.S. Patent 4,397,665

Glass fibres emerging from a spinneret are cooled by hollow tubes made from a base metal such as Cu or Inconel clad with 0.004–0.008 inches of Ag, Au, Pt, Pd, Rh, Ir or their alloys. These are less costly than tubes used at present.

Atomised Platinum

OWENS-CORNING FIBERGLAS CORP.

U.S. Patent 4,402,885

Atomised metals are formed by forcing streams of molten metal under an applied gas pressure through orifices having openings so small that the surface tension of the molten metal would prevent flow at atmospheric pressure, and impinging the metal

streams with streams of pressurised gas or liquid. The process is particularly intended for making atomised Pt for use in glass fibre bushings.

ELECTRICAL AND ELECTRONIC ENGINEERING

Corrosion Resistant Conductive Glass

INTERNATIONAL BUSINESS MACHINES CORP.

European Appl. 92,644

Print heads and other precision electrode devices are made from a composite of 1-2 parts RuO₂ and 1-6 parts of a SiO₂-ZrO₂ glass frit.

Schottky Diode

SIEMENS A.G.

European Appl. 93,866

A new Schottky diode has an increased breakdown voltage without an extra forward voltage drop. The metal semiconductor barrier is surrounded by a guard ring. The metallisation consists of W or Mo, and Pt, Ni, Au, Ag or Pd and Ag.

Semiconductor Photoelectric Converter

SEMICONDUCTOR RESEARCH FOUNDATION

European Appl. 94,973

Pt and Mo silicide Schottky barriers are used in a high speed, high sensitivity photoelectric converter based on a field effect transistor, static induction transistor or static induction thyristor.

Electrochromic Device for Energy Storage

THOMSON-CSF

European Appl. 95,973

Pt anodes may be used in electrochromic devices where the cathode is obtained by the deposition of a polymer obtained electrochemically, from a furan, pyrrole or thiophene.

Optical Recording Material

KONISHIROKU PHOTO INDUSTRY CO. LTD.

European Appl. 98,125

A medium for recording laser beam optical information includes a supported film of physical development nuclei which may be Ag sulphide, Rh sulphide or colloidal Ag, Au or Pd among other materials.

Sparking Plug

NGK SPARK PLUG CO.

U.S. Patent 4,393,324

A sparking plug which requires only a small amount of discharge-tip noble metal is made by sealing a ball of the metal on to the central small bore of a refractory insulator. The metal is Ag and/or Au and/or alloy(s) of them with Pd.

Thick Film Conductor Compositions

E.I. DU PONT DE NEMOURS & CO. *U.S. Patent* 4,394,171

Improved compositions useful for making printed terminations for hermetic ceramic capacitors contain 50-95% of a finely divided mixture of 6-60% Pd and 40-94% Ag and 5-50% of a glass frit consisting essentially of 50-80% Pb₃O₄ and 10-30% GeO₂.

Solar Cells

DIAMOND SHAMROCK CORP. *U.S. Patent* 4,400,451

In solar cells the first electrode is a photoactive true solid/solid solution semiconductor material such as SrTi_{1-x}M_xO₃, where M is Rh or Ru, and the second transparent electrode may be a Au film or a ternary metal oxide such as La_{0.01}Sr_{0.99}SnO₃.

Metallisation Process

R.C.A. CORP.

U.S. Patent 4,404,235

In an improved process for depositing a metal film on a dielectric surface, the surface is first exposed to a gaseous mixture of H₂ and WF₆ at 500-650°C to form an adherence layer. The metal is preferably Pt.

TEMPERATURE MEASUREMENT

Temperature Sensor

WELWYN ELECTRONICS LTD. *British Appl.* 2,120,453A

A sensor particularly suitable for use in an anemometer has a ceramic substrate, a temperature sensitive resistance element and terminations. The resistance elements are preferably produced by thick film screen printing, by using a Ag/Pd ink.

Radiation Pyrometer

SMITHS INDUSTRIES P.L.C. *British Appl.* 2,121,978A

A radiation pyrometer for a gas turbine engine has a sapphire lens to focus the radiation from the turbine blades. The exposed surface of the lens has a vapour deposited Pt alumina layer to catalyse the oxidation of coke deposited on the lens.

MEDICAL USES

Palladium Dental Alloy

J.M. NEY CORP.

British Appl. 2,118,971A

A new alloy which simulates the appearance of a Pt alloy contains 50-85% Pd, 5-40% Cu and/or Co, 1-15% Ga, up to 5% Ni, Au, In, Ru, and/or Sn, up to 0.5% Re and/or Ir and up to 1% B. The alloy bonds to porcelain well and does not discolour. In one example the alloy contains 78.65% Pd, 10% Cu, 9% Ga, 2% Au, 0.25% B and 0.1% Re.

Co-ordination Platinum Compounds

JOHNSON MATTHEY P.L.C.

U.S. Patent 4,394,319

The compound dichlorodihydroxydi (isopropylamine) Pt useful for the treatment of cancer or malignant neoplasms is provided in substantially pure form by preparation involving a novel intermediate adduct with dimethylacetamide.

Dental Alloy

W. C. HERAEUS G.M.B.H.

U.S. Patent 4,400,350

A dental alloy is claimed which consists of 70-82% Pd, 0.1-10% Au, 5-10% In, 2-5% Cu, 0.5-5% Ga, 0.5-5% Sn, 0.9-2.7% Co, 0.01-0.3% Re and 0.08-0.25% Ru and/or Ir.