

## FUEL CELLS

### Biochemical Combustion Cells

L. ONICIU and L. BEȘE, *Rev. Chim. (Bucharest)*, 1980, **31**, (10), 947-952

A short review of biochemical fuel cells is presented. Data regarding the exchange current densities and the transfer coefficients on smooth, platinised and palladised platinum and Pt incorporating Rh, determined by the electro-oxidation of glucose are given.

## CHEMICAL TECHNOLOGY

### Ion Flotation Studies and Separation Procedures for the Platinum Group Metals

D. M. DOWNEY, Ph.D. Thesis, Louisiana State Univ. and Agricultural and Mechanical Col., 1980, *Diss. Abstr. Int. B*, 1980, **41**, (4), 1357

Anionic chlorocomplexes of Pt(IV), Pd(II), Ir(IV), Ir(III), Rh(III) and Au(III) were floated from aqueous solutions with cationic surfactants of quaternary ammonium type RNR<sub>4</sub><sup>+</sup>Br. The flotation of each was determined. Most surfactants floated the platinum metals. A general flotation sequence Au(III) > Pd(II), Ir(IV), Pt(IV) > Ir(III) > Rh(III) was observed. Optimum ion flotation conditions were established for recovering the metals.

### Reclamation of Palladium from Residual Wastes after Regeneration of Active Carbon Catalysts

M. ŠIROKI, *J. Less-Common Met.*, 1980, **75**, (1), P23-P24

Pd on active C used in catalytic hydrogenation was recovered by digesting the waste with boiling concentrated H<sub>2</sub>SO<sub>4</sub>, then converting it to Pd(II) sulphate which is dissolved. After dilution and removal of the insoluble portions by centrifugation and filtration, the acidic solution is heated in the presence of oxalic acid to yield a Pd mirror which precipitates. This contains only a few impurities.

## NEW PATENTS

### METALS AND ALLOYS

#### CoCrAl(Y) Coated Nickel-Based Super-alloy

GENERAL ELECTRIC CO. *British Patent* 1,580,283

Ni-based superalloys coated with CoCrAl(Y) alloys containing less than 10% Al possess outstanding oxidation and corrosion resistance and firm adhesion between the two layers. The coating alloys contain 26-32% Cr, 3-9% Al, and up to 1% of Y, Pt, Rh, and/or other lanthanide metals.

## TEMPERATURE MEASUREMENT

### A Method for the Measurement of Temperature in a Flame with a Non-Screened Thermocouple

C. CASAROSA, F. DE BELLIS, E. LATROFA and L. PETARCA, *Riv. Combust.*, 1980, **34**, (7-8), 273-280

The true temperature of gases in a flame was determined from the experimental temperature transient of the hot junction of fine SiO<sub>2</sub>-coated and uncoated Pt:Pt-13% Rh thermocouples. Two different procedures for elaborating the transient data have been developed on the assumption of instantaneous thermal equilibrium. The temperature values calculated by the procedures agree completely with the temperature measured optically.

## MEDICAL USES

### Hardening Reactions in a High-Gold Content Ceramo-Metal Alloy

R. M. GERMAN, *J. Dent. Res.*, 1980, **59**, (11), 1960-1965

An 85wt.%Au-5wt.%Pd-5wt.%Pt alloy was studied for its hardening reactions and the hardness developed during the porcelain firing cycle. Ordering of a submicron FePt-type intermetallic phase was responsible for observed ageing behaviour.

### Age-Hardening of Dental Ag-Pd-Cu-Au Alloys

M. OHTA, T. SHIRAIISHI, K. HISATSUNE and M. YAMANE, *J. Dent. Res.*, 1980, **59**, (11), 1966-1971

Age-hardening mechanisms of dental Ag-Pd-Cu-Au alloys were investigated by electron microscopy. Hardening was due to the precipitation of the L<sub>10</sub> type CuPd-ordered platelet in the grain interior and to the discontinuous precipitation at the grain boundary. The characteristics of age-hardening curves were determined by rates of continuous and discontinuous precipitation.

## ELECTROCHEMISTRY

### Electrodes for Diaphragm Cells

IMPERIAL CHEMICAL INDUSTRIES LTD.

*British Patent* 1,579,427

Anodes for brine cells are formed from two groups of finger electrodes, the planes of each group facing and diverging from each other, to give an improved current distribution. The electrodes are made from valve metals coated with platinum group metals or metal oxides typically Ru oxide-Ti oxide coated Ti.

## Resilient Anodes for Diaphragm Cells

IMPERIAL CHEMICAL INDUSTRIES LTD.

*British Patents 1,581,347/9*

The anodes are in the form of bent wires mounted on a base plate. The wires are made from Ti or other film forming metals and are coated with a platinum group metal, platinum group metal oxide or metal oxide such as Pr, RuO<sub>2</sub>-TiO<sub>2</sub> or RuO<sub>2</sub>-SnO<sub>2</sub>-TiO<sub>2</sub> or alternatively with a fibrous refractory material embedded in a catalytically active matrix.

## Electrochemical Destruction of Stable Complexes

MATTHEY RUSTENBURG REFINERS (PTY.) LTD.

*British Patent 1,582,130*

Very stable, soluble complexes or compounds of platinum group metals are difficult to remove from solution by chemical or electrochemical treatment. Recovery may be achieved by electrolysis in alkaline solution (pH at least 10) using a Ru, Rh, Pd, Ir, Pt or alloy electrode (or graphite), and an anode potential having a half cell voltage of at least 5.5 volts NHE.

## Brine Electrolysis Electrodes

GENERAL ELECTRIC CO. *British Appls. 2,048,946/7 A*

A new form of cell has unitary electrode-electrolyte structures in the form of electrochemically active electrodes physically bonded to ion-transporting permselective membranes. The anodes and cathodes are made from a sintered mass of polymer and catalyst (platinum group metal) particles.

## Solar Cell

INSTITUTE OF GAS TECHNOLOGY

*U.S. Patent 4,215,182*

Solar energy is converted to chemical energy using a photoelectrochemical membrane cell to regenerate the redox anolyte of a redox-oxygen cell. Photosensitisers used in the cell may be [Ru(bipy)<sub>2</sub>]<sup>+</sup> (ClO<sub>4</sub>)<sub>2</sub> with long chain organic constituents or a [Rh<sub>2</sub>(1,3-diisocyanopropane)<sub>4</sub>Cl<sub>2</sub>]<sup>+</sup> ion.

## ELECTRODEPOSITION AND SURFACE COATINGS

### Ruthenium Electrode Coating Process

DOW CHEMICAL CO.

*British Patent 1,578,702*

A Ru-economical process coats a valve-metal substrate with two solutions containing Ru and a valve metal. The first solution contains only a small amount of Ru (for example 1-50 mg/ml) and the second a higher proportion of Ru.

### Providing Surface Coatings on Inner Wall of Cavities

WAVE ENERGY DEVELOPMENT I VASTMANLAND A.B.

*British Patent 1,580,108*

An electroplating method of applying coatings to the inner wall of, for example, the flushing channel of a

rock drilling bit, uses a resilient perforated fibrous carrier to convey the electrolyte to the plating areas. The carrier is preferably mounted on a Pt electrode.

## Ruthenium Electroplating

INCO EUROPE LTD.

*European Appl. 18,165*

Smooth, crack-free deposits are obtained by electrolysis from an aqueous, monoacidic bath containing a Ru derivative which is the product of reaction of K<sub>2</sub>[Ru<sub>2</sub>N(H<sub>2</sub>O)<sub>2</sub>Cl<sub>8</sub>] with oxalic acid.

## Preparation of Platinum-Coated Substrates

BOARD OF REGENTS OF UNIVERSITY OF FLORIDA

*U.S. Patent 4,214,017*

Passivated metal or n-type semiconductor substrates, are coated with a thin Pt layer by immersion in a molten salt solution containing Pt or halo-Pt ions. The preformed salt bath consists of Pt(II) ions and LiCl-KCl.

## Depositing a Catalyst Layer on a Support

DEUTSCHE GOLD- UND SILBER-SCHNEIDANSTALT

*U.S. Patent 4,218,341*

In an improved process for coating large surface area carriers, the carrier is first contacted with an organic liquid, optionally containing a complexing agent, and then with a solution of the catalytically active element. The carrier is then heated to remove the liquid. Pt or Pd are used as the catalytic metals.

## LABORATORY APPARATUS AND TECHNIQUE

### Estimating the Toxicity of Petroleum Wastes

BRITISH PETROLEUM CO. LTD.

*British Patent 1,579,344*

A microbiological method for estimating the toxicity of industrial wastes uses nutrient broths and a dissolved oxygen meter with a Pt measuring electrode and a Ag/AgCl reference electrode.

### Radiation-Sensitive Record

NORTH AMERICAN PHILIPS CORP.

*British Patent 1,580,398*

A blank record is formed from two spaced-apart discs, one of which is transparent, allowing radiation to penetrate to an inner radiation-sensitive layer, which may be Rh. Use of a second disc protects the active surface.

### Particle Detector

COMMISSARIAT A L'ENERGIE ATOMIQUE

*British Appl. 2,046,010 A*

A neutron detector has two concentric tubular Pt electrodes embedded in a ceramic body, with Pt leads connecting the electrodes to the outside of the body. The absence of structural metal components allows the detector to be used at high temperatures.

## Oxygen Sensor

GENERAL MOTORS CORP. *British Appl.* 2,048,128A  
A reference electrode is rapidly, and automatically applied to the interior of a tapered zirconia thimble of an exhaust gas sensor by dispensing a measured amount of Pt ink into the thimble and then using a hollow elastomeric finger positioned inside the thimble to supply a gas jet which disperses the ink throughout the cavity.

## Liquid Level Sensor for Use in Petrol Tanks

PLESSEY CO. LTD. *British Appl.* 2,048,495 A  
A floating wiper contact arm makes contact with a series of contacts connected to a resistor network. The resistor network consists of fired Pd or Ru oxide resistor tracks and Pt-Ag, Pd-Ag or Ag contact pads supported on a petroleum resistant substrate of ceramic or porcelain-coated steel.

## Liquid Measuring Indicator

E. M. DEE CORP. *European Appl.* 18,185  
An apparatus for measuring and indicating the weight of liquid in a container which is subject to motion in use and not be in a horizontal position (such as ships' fuel tanks) includes a compression-type resistor consisting of at least one resistance element which is a compressible glass fibre mat coated with colloidal graphite, Ni or Pt.

## Carbon Monoxide Removal from Air

MATSUSHITA ELECTRIC INDUSTRIAL CO. LTD. *U.S. Patent* 4,212,854  
CO may be removed from tunnels, etc., by a catalyst consisting of a powdered C carrier containing a Group IA hydroxide or carbonate to reduce explosion risks and a bonding agent impregnated with Pd, optionally in combination with Ru, Rh or Pt.

## Method of Oxidising Osmium

GULF RESEARCH & DEVELOPMENT CO. *U.S. Patent* 4,217,291  
Os (III) or (IV) in anionic complex with O<sub>2</sub> and having Group IA metal, ammonium or tetra (lower)alkyl ammonium cation is oxidised to a valency state higher than 5 by reaction with an organic hydroperoxide below 30°C.

## Heated Oxygen Sensor

GENERAL MOTORS CORP. *U.S. Patent* 4,222,840  
A readily-assembled solid electrolyte O<sub>2</sub> sensor has a planar-type heater supported on the reference electrode terminal. Porous Pt electrodes cover the upper and lower parallel surfaces of the electrolyte disc.

## Activating Palladium-Silver Alloys

THE BABCOCK & WILCOX CO. *U.S. Patent* 4,222,900  
A differential thermocouple H<sub>2</sub> gas detector has an activated Pd or Pd-Ag coating one leg of the therm-

ocouple and a non-catalytic coating on the other leg. The claims are restricted to activating a Pd-Ag alloy by etching first with concentrated HNO<sub>3</sub> and then with boiling KOH solution.

## JOINING

### Brazable Alloy Layers on Ceramics

DEUTSCHE GOLD- UND SILBER-SCHNEIDANSTALT *British Appl.* 2,046,310 A  
Pd alloys containing Ni and/or Fe and, optionally, up to 20% of Cr, Mn and/or Ti form strongly, adhered, brazable, vapour deposited or sputtered layers on ceramic substrates.

### Solderable Metal Coating for Ceramics

DEUTSCHE GOLD- UND SILBER-SCHNEIDANSTALT *German Offen.* 2,906,888  
A (Ag-) solderable coating is obtained on a ceramic surface by vapour deposition of a layer of Pd alloy containing preferably 30-60% Co and/or Fe and optionally 3-20% Cr, Mn and/or Ti.

## HETEROGENEOUS CATALYSIS

### Catalytic Ignition for I.C.E.

RICARDO CONSULTING ENGINEERS LTD. *British Patent* 1,578,027  
A catalytic assembly, preferably a Pt or Pt-plated gauze is located in the crown of the piston of each cylinder, to produce catalytic ignition.

### Palladium Catalysts

JOHNSON MATTHEY & CO. LTD. *British Patent* 1,578,123  
A Pd compound, particularly bisacetylacetonato Pd (II), is vapour deposited onto a porous support heated to a temperature above the decomposition temperature of the compound, to form a surface-coated catalyst suitable for hydrogenating animal and vegetable oils.

### Breathing Apparatus

INTERNATIONAL RESEARCH & DEVELOPMENT CO. LTD. *British Patent* 1,578,333  
Hypothermia in deep sea divers may be prevented by supplying heated breathing gases. The gases are now heated without an external power source by adding up to 0.4% of H<sub>2</sub> to the gas mixture and passing the mixture over a Pd catalyst to combine, exothermically, the H<sub>2</sub> with some of the O<sub>2</sub> present.

### Terephthalic Acid Purification

JOHNSON MATTHEY & CO. LTD. *British Patent* 1,578,725  
Aldehyde impurities in terephthalic acid are hydrogenated in the presence of a catalyst consisting of two or more of the metals Pt, Pd, Rh, Ru, Os, Ir, Fe, Ni, Co, Cr, Mn and U. Preferred metals pairs all contain Pd.

## Rh/SiO<sub>2</sub> for NO<sub>x</sub> Removal

JOHNSON MATTHEY & CO. LTD.

*British Patent* 1,581,628

An oxidising catalyst for removing NO<sub>x</sub> gases as well as oxidising CO and hydrocarbons, consists of Rh or Ir supported on SiO<sub>2</sub> or SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>. The catalyst may also contain an oxide of Ce, La and/or Ti.

## Polysiloxanes

TORAY SILICONE CO. LTD. *British Appl.* 2,046,283 A

Elastomeric polysiloxanes used for insulating electrical wiring have the disadvantage that they burn away at high temperature, such as 500°C. New Pt-catalysed compositions are converted to strong, hard ceramic materials at these temperatures.

## Multimetal Reforming Catalyst

EXXON RESEARCH & ENGINEERING CO.

*British Appl.* 2,046,615 A

The selectivity and/or activity of a supported platinum group metal catalyst (preferably Pt itself) in hydrocarbon hydroreforming is increased by adding Ir and Se to a support such as Al<sub>2</sub>O<sub>3</sub> which contains a halogen. About 0.01–3% of each component is present. Other Group IV-VIII promoters may be present.

## Metal-Polymer Complexes

MAGYAR TODOMANYOS AKADEMIA KOZPONTI

*British Appl.* 2,047,258 A

Metal compounds are complexed with polymerisable monomers and the complexes are then subjected to condensation or addition polymerisation. Thus a solution of Pd chloride and aminophenol may be treated with formaldehyde to give a brown product which is an active catalyst for cinnamic aldehyde hydrogenation.

## Start-up of a Reforming Process

EXXON RESEARCH & ENGINEERING CO.

*British Appl.* 2,047,732 A

The selectivity and activity of fresh or oxidatively regenerated Pt-Ir catalysts are enhanced by pretreatment at an elevated temperature with an atmosphere containing H<sub>2</sub>O<sub>2</sub>, H<sub>2</sub>, halogen and H<sub>2</sub>S.

## Carboxylic Amide Production

ASAHI KASEI KOGYO

*British Appl.* 2,048,854 A

A new route to amides not using nitriles is based on the reaction of a primary alcohol or an aldehyde with NH<sub>3</sub> or an amine in the presence of oxygen and a Pt or Pd catalyst, such as an Al<sub>2</sub>O<sub>3</sub> supported 1:1 mixture of Pd and Pb.

## Foldable Gauze Pack

JOHNSON MATTHEY & CO. LTD.

*British Appl.* 2,050,189 A

Catalyst catchment or getter means in NH<sub>3</sub> oxidation plants, are not made from a single pack of gauzes but are from a number of packs each shaped like a sector,

such as a quarter, of the total pack area. The gauzes are made from Pd-Au alloy wires supported by stainless steel and are easily stored and transported.

## Hydrogen Recombination

BABCOCK-BROWN BOVERI REAKTOR G.m.b.H.

*European Appl.* 19,907

The recombination of H<sub>2</sub> in a safety enclosure of a nuclear reactor is catalysed by finely divided Al<sub>2</sub>O<sub>3</sub> supporting 0.2% Pd.

## Mixed Reforming-Hydrocracking Catalyst

U.O.P. INC.

*U.S. Patent* 4,212,727

A mixed catalyst containing a zeolitic aluminosilicate-supported Pd component and an Al<sub>2</sub>O<sub>3</sub>-supported Pt-Pd catalyst containing Ir, Rh or other metal promoters, is used to obtain high octane motor fuel and isobutane from low boiling hydrocarbon fractions.

## Olefin Hydroformylation

MOBIL OIL CO.

*U.S. Patent* 4,213,921

Transition metals supported on amine-modified zeolite or other inorganic oxide substrates having defined physical characteristics provide new active heterogeneous catalysts for olefin hydroformylation. SiO<sub>2</sub>-supported Rh and Ru catalysts are claimed.

## Catalytic Heat Exchange

MATTHEY BISHOP INC.

*U.S. Patent* 4,214,867

An apparatus for providing non-polluting flameless combustion heat exchange for household heating and commercial application, consists of a ceramic-coated metal heat exchange membrane having one side coated with a platinum group metal catalyst. A fuel gas flows over the catalytic surface where it burns forming heat which travels through the membrane to contact air flowing in a heat exchange relationship.

## Ruthenium-Cobalt-Gold Hydrogenation Catalyst

PHILLIPS PETROLEUM CO.

*U.S. Patent* 4,215,019

The addition of Co and Au to a Ru catalyst considerably increases its selectivity in the hydrogenation of branched olefinically unsaturated aliphatic dinitriles to saturated diamines.

## Platinum Metal Hydrogenation Catalyst

TOA NENRYO KOGYO K.K.

*U.S. Patent* 4,218,308

A catalyst, for the production of jet fuels and white oils, consists of a platinum group metal (such as Pd) supported on a SiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> carrier having a high proportion of pores within the size range 150–600Å.

## Platinum Metal Catalyst for Oxydehydrogenation of Alcohols

DOW CHEMICAL CO.

*U.S. Patent* 4,218,401

Primary and secondary alcohols are oxidised by passing a gaseous mixture of the alcohol and air over a supported Ru, Rh, Pd, Pt, Ir or Os catalyst.

## Olefin Hydrogenation over Synthetic Amorphous Silica

MOBIL OIL CORP. *U.S. Patent 4,218,571*

Hydrolysed silane compositions having incorporated catalytic metallic ions, such as Ru, Pd, Pt, Ag and various base metals provide useful hydrogenation dehydrogenation catalysts for hydrocarbons.

## Silylhydrocarbyl Phosphine Transition Metal Catalyst Complexes

EXXON RESEARCH & ENGINEERING CO.  
*U.S. Patent 4,220,556*

A novel method is disclosed for anchoring Ru, Os, Rh, Pd, Pt and other transition metal silylhydrocarbyl phosphine complexes. The method links reactive silane groups with a complex-forming phosphine group via a divalent hydrocarbon radical.

## Promoting Regeneration of a Catalyst in a Fluidised Regenerator

AIR PRODUCTS AND CHEMICALS INC.  
*U.S. Patent 4,222,856*

500 ppm to 1% of a Pd-Pt mixture is added to a zeolite hydrocarbon conversion catalyst under fluidising conditions to promote the removal of carbonaceous deposits.

## Palladium-Arsenic Catalyst for Phenyl Esters

UBE INDUSTRIES LTD. *U.S. Patent 4,224,456*

Enhanced activity is obtained from a catalyst containing Pd, As and a Group IA or IIA metal, in a ratio of 1:0.05-4:0.1-10 in the production of phenyl esters of aliphatic acids.

## Group VIII Metal Hydride Catalysts for Polycyclic Aromatic Hydrocarbon Hydrogenation

ALLIED CHEMICAL CORP. *U.S. Patent 4,224,458*

Catalysts, which may be used under mild conditions, consist of anionic Group VIII metal, especially Ru, Rh, Fe and Pt hydrides containing P, As or Sb organo ligands.

## Halonitrobenzene Hydrogenation Catalyst (Phosphoric Acid Activated)

JOHNSON MATTHEY & CO. LTD.  
*German Offen. 3,006,748*

The reduction of halonitrobenzenes to the corresponding anilines by H<sub>2</sub>, without removal of the halogen, is catalysed by a Group VIII noble metal (Pt in all examples) supported on activated C which has been pretreated with phosphoric acid.

## HOMOGENEOUS CATALYSIS

### Organosilanes

WACKER-CHEMIE G.m.b.H. *British Patent 1,578,377*

A new process for preparing aliphatically unsaturated organosilanes, used in polymer filler

materials, includes promoting the addition of Si-bonded H atoms to aliphatic double bonds in the presence of a Pt complex catalyst.

### Hydroformylation Process

UNION CARBIDE CORP. *British Patent 1,582,349*

Sufficient O<sub>2</sub> is maintained in a process for hydroformylating alpha-olefins in the presence of a Rh carbonyl triarylphosphine catalyst to ensure high aldehyde production.

### Organic Group VIII Hydroformylation Catalyst

U.O.P. INC. *British Appl. 2,049,673 A*

Alcohols are synthesised from olefins, CO and H<sub>2</sub> in the presence of an organic Group VIII complex catalyst and a nitrile or NH<sub>3</sub> promoter. The preferred catalysts are formed in situ from Rh chloride, its carbonyl complex and Ru black and the olefin.

### Rhodium Hydroformylation Catalysts

DAVY MCKEE (OIL-CHEMICALS) LTD.  
*European Appls. 18,161/4*

Aldehyde ethers are obtained by the hydroformylation of olefinic ethers preferably in the presence of a Rh compound or complex HRh(CO)(PPh)<sub>3</sub>.

### Asymmetric Catalysts

MONSANTO CO. *U.S. Patent 4,220,590*

New bis-phosphine compounds, particularly bis(o-anisylphenyl-phosphinoethane), complexed with Rh, Ir or Ru, provide optically active catalysts for asymmetric hydrogenation reactions.

### Ruthenium Catalysts in Oxirane Reactions

UNION CARBIDE CORP. *U.S. Patent 4,223,160*

Ru and Nb salt (such as Ru trichloride hydrate) catalysts are employed in the reaction of oxirane compounds with carboxylic acids to produce acrylate esters (used in photocurable compositions).

## FUEL CELLS

### Fuel Cells

ELECTROCHEMISCHE ENERGIECONVERSIE N.V.  
(ELENCO N.V.) *European Appl. 18,693*

A method of operating fuel cells having porous gas-diffusion electrodes is described. The electrodes are preferably of C coated with catalytic metal(s) such as Ir, Rh, Pd, Pt and/or Au.

## CHEMICAL TECHNOLOGY

### Siloxane Elastomers

DOW CORNING CO. *British Appls. 2,045,787/9 A*

Addition of up to 5 pts of finely divided Mn oxide to Pt catalysed polydiorgano-siloxane compositions, used for electrical insulation, increases their flame-retardant and long term heat stability properties.

## Cleaning Hydrogen Used in Metal Hydride Storage Systems

BILLINGS ENERGY CORP. *U.S. Patent 4,216,198*  
A self-regenerating method for removing O<sub>2</sub> and H<sub>2</sub>O impurities from H<sub>2</sub> gas used in metal hydride storage systems, including systems using La-Ni and mischmetal-Ni alloys, uses a Pt, Pd or Ni catalyst to convert the O<sub>2</sub> to H<sub>2</sub>O and an absorbent to remove water. Upon release the H<sub>2</sub> gas reflows through the absorbent thereby cleaning the absorbent of water.

## ELECTRICAL AND ELECTRONIC ENGINEERING

### Electromagnetic Device

WESTERN ELECTRIC CO. INC. *British Patent 1,578,654*

An electromagnetic device has a body of amorphous low magnetostriction alloy of formula (Co<sub>a</sub>Fe<sub>b</sub>T<sub>c</sub>)<sub>x</sub>, where T is a metal which may be Pt, Pd, Au or Ag and X is a glass former metal.

### Schottky Transistor Logic Arrangements

SIEMENS A.G. *British Patent 1,580,977*

A new form of arrangements reduces gate times to around 1 ns. The outlet electrodes of the system are made of PtSi or PdSi.

### Semiconductor Encapsulation

E.M.I. LTD. *British Patent 1,581,436*

Semiconductor devices such as avalanche photo-diodes are fed by optical fibres and the body of the semiconductor is used to seal an opening in its envelope via a bond of layers of Pt, Mo and Au.

### Ferrite Single Crystals

HITACHI LTD. *European Appl. 18,111*

Ferrite material is melted in a prescribed atmosphere on a susceptor heated by r.f. induction, and passes through openings in the susceptor to recrystallise below in single crystal form. The susceptor is a disc of 80%Pt-20%Rh alloy.

### Lift-off Metallisation Process

BELL TELEPHONE LABORATORIES INC. *U.S. Patent 4,214,966*

New lift-off metallisation techniques may be used for metals other than Al, particularly for Pt. In the process delineation is achieved using a polymer resist and metal removal is by acute angled ion-milling.

### Compensated Amorphous Silicon Solar Cell

R.C.A. CORP. *U.S. Patent 4,217,148*

A solar cell has a region of intrinsic hydrogenated amorphous Si fabricated by glow discharge, incorporating p-type compensating dopents. Deposited Au or Pt forms contact areas on the hydrogenated Si layer.

## Nickel-Palladium Alloy Electroding for Semiconductors

MITSUBISHI DENKI K.K. *U.S. Patent 4,224,115*  
Electrodes having good thermal stability for use on Schottky barrier devices are prepared by depositing a 57 at.% Ni-43 at.% Pd alloy from an alkaline plating bath.

### Fused Solid Electrolytic Capacitor

UNION CARBIDE CORP. *U.S. Patent 4,224,656*

A fuse of a Pd-Al composition is located in an insulated body positioned between the Ag anode riser and current collector of the Ta capacitor body.

## MEDICAL USES

### Intraocular Lens

AMERICAN OPTICAL CORP. *British Patent 1,577,825*

Intraocular lenses are secured in place, usually with a Ti wire, which has a tendency to stick. The problem is now overcome by use of a biocompatible, platinum group metal cladding which acts as a lubricant. The cladding is, preferably, a tightly fitting tube of 90% Pt-10% Ir alloy, Pt or Au.

### Branched Chain Amino Complexes of Platinum IV

RUSTENBURG PLATINUM MINES LTD. *British Patent 1,578,323*

New agents for the chemotherapeutic treatment of cancer are complexes of Pt basic chlorides (or other halides) with aliphatic amines, such as *cis*-dichloro-trans-dihydroxybis(isopropylamine) Pt (IV) hydrate.

### Surface Treatment for Cured Silicone Elastomers

DOW CORNING LTD. *British Appl. 2,045,824 A*

Discolouration of silicone elastomers continuously in contact with the skin, such as elastomers used in prostheses and spectacle nose pads, is reduced by impregnating the surface with Pt-catalysed organosiloxanes.

### Dental Gold Composition

ARGEN (PTY.) LTD. *British Appl. 2,048,939 A*

A light weight porcelain-bonding dental alloy contains 35-55% Au, 5-10% In, 0.1-0.5% Ru, 0-1% Ga and the remainder Pd. A preferred composition contains: 51.4% Au, 38.5% Pd, 9.4% In, 0.1% Ru and 0.5% Ga.

### Gold Dental Alloy

DEUTSCHE GOLD-UND SILBER-SCHNEIDANSTALT *U.S. Patent 4,218,244*

Au alloys for firing on to dental porcelain, which do not have the grey colouration of known alloys, contain 80-90% Au, 5-15% Pt, 0.5-10% Pd, 0.5-3% Rh, 0.1-3% In, up to 3% Sn and optionally 0.1-2% Ta and/or W replacing some of the Rh.