

# NEW PATENTS

## METALS AND ALLOYS

### Laminated Sheet

TOKURIKI HONTEN K.K.

*Japanese Publ. Appl. 60/141,383/4/5/6*

Sheets of Pt and two or more of Pt-Ir, Pt-Rh and Pt-Au alloys are manufactured to predetermined thicknesses so that interlayer recrystallisation is prevented and internal defects do not coincide.

### Amorphous Alloy for Torque Sensors

TOSHIBA K.K. *Japanese Publ. Appl. 60/234,948*

An amorphous alloy for detecting torque without contact, with high saturated magnetic flux density and magnetostriction, is composed of  $Fe_aM_bSi_cB_d$  where M is 1-10% of at least one platinum group metal, and part of the Fe is replaced by Ni and/or Co.

### Magnetic Recording Material

SONY CORP. *Japanese Publ. Appl. 60/239,007*

Amorphous thin film of composition  $Co_{1-x}Hf_xPt_y$  where x is 0.04-0.07, y is 0.005-0.15, having large saturation magnetic flux density, and small saturation magnetostriction constant is made by liquid quenching or sputtering.

### Magnetic Recording Medium

FUJI PHOTO FILM K.K.

*Japanese Publ. Appl. 61/11,925*

A magnetic recording medium with superior travelling durability consists of a layer of ferromagnetic alloy powder containing glass powder and up to 20% of Pd, Rh, Ag, Re, etc., on a non-magnetic base.

## CHEMICAL COMPOUNDS

### Platinum Alkyne Complexes

DOW CORNING CORP. *European Appl. 173,512A*

New complexes are formed by reacting Pt vinylsiloxane complexes with alkynes, for example by reacting the product of hexachloroplatinic acid and  $(ViMe, Si)_2O$  with  $PhC\equiv CC(Me)(Ph)(OH)$ . They can be used as catalysts.

## ELECTROCHEMISTRY

### Electrode for Reducing Oxygen

NATIONAL RESEARCH DEVELOPMENT CORP.

*British Appl. 2,164,785A*

An electrode for reducing O has a substrate of low-ash C, such as coconut shells converted to charcoal. The substrate is loaded with a catalyst such as Pt phthalocyanine or Pb-Ru oxide. Macrocyclic derivatives of transition metals, Au or Ag may be used as the catalyst on electrodes for fuel cells.

### Hydrogen Storage

TOPPAN PRINTING K.K.

*Japanese Accepted Appl. 86/3,281*

A unit which stores  $H_2$  in an electric-insulative tank contains a permeable electrode of Pd or Pd alloy.

### Electrode for Electrolysis

PERMELEC ELECTRODE *French Appl. 2,560,611*

An electrode of increased service life when used in the electrolysis of dilute  $H_2SO_4$  acid, for example, consists of a substrate such as Ti coated with an intermediate layer which is a mixture of (a)  $TiO_2$  and/or  $SnO_2$ , (b)  $Al_2O_3$ ,  $Ga_2O_3$ ,  $Fe_2O_3$ ,  $Co_2O_3$ ,  $Ni_2O_3$  and/or  $Tl_2O_3$  and (c) Pt, and then with a layer of active material, preferably In oxide.

### Composite Electrode

W. C. HERAEUS G.M.B.H. *German Offen. 3,423,605*

A composite electrode used as an  $O_2$  anode in the electrolytic recovery of metals consists of a plastic containing a carrier and a catalyst of Pt, Pd, Ir, Ru or Rh metal and/or oxide, and a non-noble metal and/or oxide, preferably Ru-Ti oxide.

## ELECTRODEPOSITION AND SURFACE COATINGS

### Black and Blue Rhodium Plating

NIPPON MINING K.K. *European Appl. 171,091A*

Wear resistant black or blue Rh plating is obtained by anodic electrolysis in a bath comprising (in)organic acid or salts, but not strong acid, and (m)ethanol, ethylene glycol, etc., and/or  $NH_4OH$ .

### Chemical Plating of Fibrous Articles

TODA KOGYO CORP. *European Appl. 174,183A*

Shaped, fibrous articles are made electroconductive by chemical plating, as before, but now the sensitising stage is carried out with a Pd hydrosol containing a cationic surfactant, an anionic surfactant and/or a non-ionic surfactant.

### Vacuum Deposition of Films

KIEV POLY. *World Patent Appl. 86/00092A*

An evaporator for vacuum deposition of films such as of Pt, Pd, Au and Ag is claimed.

### Palladium-Nickel Alloy Electrodeposition

I.B.M. CORP.

*U.S. Patent 4,564,426*

A process for plating circuit contacts whereby the composition of the deposit can be more easily controlled uses an aqueous electroplating bath containing 9-15 g/l Pd ion from palladosammine chloride, Ni ion,  $(NH_4)_2SO_4$ ,  $NH_4Cl$  and  $NH_4OH$ .

## LABORATORY APPARATUS AND TECHNIQUE

### Oxygen Sensor

TOYOTA CHUO KENKY. *British Appl.* 2,162,324A  
An O<sub>2</sub> sensor with low sensitivity to Pb poisoning comprises a solid electrolyte and a composite sensing electrode having a Pt layer and a Rh and/or Pd layer.

### Getter/Ion Atomisation Combination Pump

SIEMENS A.G. *British Appl.* 2,164,788A  
A combination pump for high and ultra high vacuum systems comprises an ion atomisation pump in combination with a getter sorption pump consisting of at least one getter element such as Pt, Pd, Zr, Ce or their mixtures or alloys.

### Electrochemical Flow Cell

ESX INC. *U.S. Patent* 4,552,013  
An electrochemical flow cell of specified design for testing solutions incorporates (a) two reference electrodes, for example of Pd oxide wire, (b) two counter electrodes, for example of Pd wire, and (c) a working electrode of microfine Au particles.

### Sensor for Hydrogen Fluoride

BRITISH NUCLEAR FUELS LTD. *U.S. Patent* 4,552,624  
In an electrochemical device for measuring HF in the atmosphere or gas streams the cathode and anode are both of Pt wire.

### Electrode for Oxygen Sensor

HITACHI CHEMICAL K.K. *Japanese Publ. Appl.* 61/17,950  
Pt paste was applied to the surfaces of a closed cylinder of ZrO<sub>2</sub> stabilised yttria, and calcined to form a Pt layer. An aqueous solution of hexachloroplatinic acid was put on top of the Pt layer and baked to form the detector electrode. The catalytic layer is firmly attached and remains so, while resistance to O ion conduction is low.

### Carbon Monoxide Detector

OFF. NAT. AEROSPATIALE *French Appl.* 2,565,346  
A CO detector comprises a thin layer of Sn oxide doped with Pt or Pd deposited on an electrically resistant substrate.

### Portable Oxygen Generator

ATOMIC ENERGY CANADA LTD. *Canadian Patent* 1,134,551  
A portable O<sub>2</sub> generator comprises an electrolytic O<sub>2</sub> and H<sub>2</sub> generator from H<sub>2</sub>O, a residual O<sub>2</sub> and H<sub>2</sub> gas recombiner containing a catalyst of Pt crystallites dispersed in polymeric material, a primary H<sub>2</sub> and O<sub>2</sub> recombiner also containing a Pt crystallite/polymeric material catalyst and a means for connecting the water source to the electrolytic generator.

## JOINING

### Ethylene Oxide Production Catalyst

NETHERLANDS TNO *U.S. Patent* 4,548,921  
The adhesion of Ag to a SiO<sub>2</sub> carrier is improved by pre-coating the SiO<sub>2</sub> with finely divided particles of a metal, preferably a platinum group metal, especially Pt or of a specified metal oxide preferably SnO<sub>2</sub>.

## HETEROGENEOUS CATALYSIS

### Exhaust Gas Conversion Catalyst

HUTSCHENREUTHER A.G. *British Appl.* 2,163,364A  
Exhaust gas conversion catalysts comprise 50–90wt.% SiC and 5–50wt.% of a Si alloy of Pt, Pd, Ag, Cu, Fe, O, Ni, Cr, V, Mo or Mn.

### Liquid Hydrocarbon Synthesis

EXXON RESEARCH & ENGINEERING CO. *British Appl.* 2,164,054A  
Paraffinic hydrocarbons are produced by contacting a mixture of H<sub>2</sub> and CO for at least 10 hours with a reduced and supported Ru catalyst. The Ru is supported on ZrTiO<sub>4</sub>, a lanthanide titanate or oxide.

### I.C.E. Conversion Catalysts

SOC. FR. PROD. CATALYSE *European Appl.* 170,588A  
New catalysts for exhaust gas conversion contain a support impregnated with (a) Zr, Ce and optionally Fe, (b) Pd, and (c) Ir and/or Rh. The catalysts can adsorb at least 60% of the CO, and can oxidise CO and hydrocarbons while reducing NOx.

### Three-Way Emission Control Catalyst

W. R. GRACE CO. *European Appl.* 170,841A  
An auto emission catalyst comprises an Al<sub>2</sub>O<sub>3</sub> support impregnated with a stabiliser 1–10wt.% La<sub>2</sub>O<sub>3</sub> or rare earth oxide containing La<sub>2</sub>O<sub>3</sub>, and as promoters 1–20wt.% CeO<sub>2</sub> and 0.5–5wt.% of lithia and ceria, and Pt and Rh.

### Atmospheric Pollution Control

AMOCO CORP. *European Appl.* 172,009A  
A catalyst of Pt, rare earth metal, Cr, V or a Group VIII metal is coated onto oxides of Al, Bi, Mn, Y, Sb, etc., in the form of pellets and used for removing particulates of soot, ash, etc., and S oxides from the flue gases of steel mills, power plants, catalytic cracking units, etc.

### I.C.E. Exhaust Gas Purification

NIPPON SHOKUBAI KK CO. LTD. *European Appl.* 174,495A  
Diesel exhaust gases contain more S oxides than those from petrol engines and to enable the purification catalyst to operate in these conditions, V oxide is added to the supported Pt, Pd and/or Rh catalyst.

## Strong Acid Catalyst

RESEARCH ASSOCIATION OF UTILIZATION OF LIGHT OIL  
*European Appl.* 174,836A

A new hydrocarbon conversion catalyst is a strong solid acid obtained by introducing a Group VIII metal and sulphate ions into a Group III or VI oxide or hydroxide, such as a sulphate-Pd-ZrO<sub>2</sub> combination.

## Olefins from Methanol

MOBIL OIL CORP. *U.S. Patent* 4,550,217

In the conversion of methanol to olefins using zeolite catalysts, for example exchanged with Pd or a lanthanide, higher catalyst activity is achieved by employing large zeolite particles.

## Dehydrogenation Catalyst

UOP INC. *U.S. Patent* 4,551,574

A catalyst for the conversion of paraffins to olefins consists of a porous carrier such as Al<sub>2</sub>O<sub>3</sub> supporting Pt, In and a Group IA or IIA metal. The atomic ratio In : Pt is not less than 1.6 : 1.

## Oxidation Catalyst

ATOMIC ENERGY OF CANADA *U.S. Patent* 4,552,744

In a process for making H<sub>2</sub>SO<sub>4</sub> by oxidising flue gas SO<sub>2</sub> with O<sub>2</sub> in the presence of H<sub>2</sub>O and H<sub>2</sub>SO<sub>4</sub>, the catalyst consists of a porous refractory oxide carrier supporting Pt crystallites wet-proofed with PTFE.

## Ethanol Synthesis Catalyst

MITSUBISHI GAS CHEMICAL CO. INC.  
*U.S. Patent* 4,552,986

A catalyst for the production of ethanol from methanol and synthesis gas consists of Co phosphate optionally together with a C-supported platinum group metal and/or a tertiary phosphine.

## Monolithic Catalyst

TOYOTA JIDOSHA K.K. *Japanese Publ. Appl.* 61/4,535  
A monolith catalyst carrier has Pt, Pd, Ir or Rh catalyst on the inner surface of its pores, giving a higher temperature at the centre than near the circumference. The catalyst clarifies I.C.E. gas, and the gas flow rate is higher at the centre of the catalyst.

## HOMOGENEOUS CATALYSIS

### Carboxylic Acids from Lower Esters and Formic Acid

HULS A.G. *European Appl.* 173,019A

Carboxylic acids are produced from esters and formic acid, such as acetic acid from methyl acetate, using a Rh-halogen catalyst promoted with a Cr compound, an organic N compound and/or a P compound, such as Rh trichloride and CH<sub>3</sub>I used with Cr hexacarbonyl or pyridine or triphenyl phosphine.

## Hydrocarbon Oxidation

BRITISH PETROLEUM CO. P.L.C.  
*European Appl.* 174,194A

The oxidation of paraffins and olefins with an organic hydroperoxide is catalysed by a Ru compound promoted with HBr, such as Ru acetylacetonate/HBr.

## Hydroperoxide Decomposition Catalyst

ATLANTIC RICHFIELD CO. *U.S. Patent* 4,551,553

A very active, stable catalyst for the decomposition of organic hydroperoxides to corresponding alcohols and ketones is Cr and Ru acetylacetonates.

## Aldehyde Production Catalyst

RUHRCHEMIE A.G. *German Offen.* 3,420,491

Aldehydes are made by reacting olefins with synthesis gas in aqueous medium in the presence of a quaternary ammonium tri(m-sulphophenyl)phosphine and Rh or a Rh compound.

## CORROSION PROTECTION

### Monitoring Cathodically Protected Structures

ORONZIO DE NORA IMPIANTI  
*European Appl.* 170,929A

Simultaneous potential readings at different points of a cathodically protected structure are undertaken by an electrode assembly of reference and auxiliary electrodes, set along a cable. The reference electrodes may have an active coating of platinum group oxides.

## CHEMICAL TECHNOLOGY

### Radionuclide Generator

ISRAEL ATOMIC ENERGY *British Appl.* 2,161,979A

A generator for short lived radionuclides, especially for producing <sup>191m</sup>Ir from <sup>191</sup>Os, comprises a column of supported ion exchange agent loaded with the parent nuclide. <sup>191m</sup>Ir is used in angiocardiology.

### Fire Extinguishing and Explosion Suppression Systems

GRAVINER LTD. *British Appl.* 2,164,251A

In a fire extinguishing or explosion suppression mixture, a CO removing substance comprises Pd or one of its salts, compounds or complexes, a mixture of Mn oxide and Cu oxide with a minor amount of Ag oxide, Pt, or a Pd sulphate/silicomolybdate complex.

### High Surface Area Particles

PLASMA FUSION INC. *U.S. Patent* 4,563,566

Porous high surface area particles especially catalysts of Pt, Pd or Ni are formed by agglomeration and fusing the grains in a plasma gun.

## Assessing Selectivity of Hydrocarbon Dehydrogenation

I. G. BLUVSHTEIN *Russian Patent 1,173,309*

During hydrocarbon dehydrogenation the contact gas is stripped of H<sub>2</sub> by passing it through a Pd alloy diaphragm, and the density of the resulting gas is determined. This method assesses selectivity more accurately than previous means.

## ELECTRICAL AND ELECTRONIC ENGINEERING

### Phase Delay Element Production

INTERNATIONAL STANDARD ELECTRIC CORP.  
*European Appl. 174,352A*

On a Li niobate single crystal substrate there is applied an O-inert diffusion barrier in the form of a Pt layer in which there is etched a desired strip pattern structure. A Ti layer is applied over this before heating in an O<sub>2</sub> atmosphere. Ti diffuses along the strip pattern structure and forms an optical channel where light is retarded by an electric field.

### Electrical Contacts

AMERICAN TEL. & TELEG. CO.  
*World Patent Appl. 86/00461A*

Electrical contacts of high hardness and good ductility comprise base metal carrying a Pd alloy composed of 30–60Pd, (70-b) to (40-b) X and 0.05–5 Y in wt.%, where X is Co and/or Cu and Y is one or more of Ru, Ir, W, B and Nb.

### Sliding Contact with Brush and Commutator

TANAKA K.K. *Japanese Publ. Appl. 60/234,941*  
A contact consists of a brush of 30–50Au-20–40Ag-20–40Pd to which at least one of Al, Ga, Mn and Ni is added, and a commutator of Ag-Cu or Ag-Cu-Cd, where both have excellent wear resistance, less wear debris and less noise.

### Electroconductive Laminate

KONISHIROKU PHOTO K.K.  
*Japanese Publ. Appl. 61/10,443*

An electroconductive laminate used for displays, free of brightness and luminescence irregularities, is made of a transparent electroconductive film 200–9000 Å thick of Pt, Au, Cr, SnO<sub>2</sub>, etc., set on a base material, and onto the film is set a layer of material with good adhesion to polymers.

### Cathode Ray Screen

R.C.A. CORP. *German Offen. 3,522,731*  
A CRT screen has an image transparent coating consisting of a silicate material and an inorganic metal compound providing anti-static characteristics. The metal compound preferably consists of at least one of Pt, Pd, Au and Sn, and Na, K or Li silicate.

## TEMPERATURE MEASUREMENT

### Thermochemical Sensor Element

SMOLENSK ANALITPRIB. *Russian Patent 1,173,287*

The accuracy of a sensor in controlling possible explosive systems is increased when a suspension of  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> and  $\gamma$ -Al<sub>2</sub>O<sub>3</sub> coated with Pt or Pd salts is coated onto a current conducting Pt spiral.

## MEDICAL USES

### Platinum Anti-Tumour Complexes

SHIONOGI K.K. *European Appl. 166,366A*

New Pt(IV) complexes have antibacterial activity and anti-tumour activity comparable to or more potent than that of cis-platin, with lower nephrotoxicity. They have high water solubility.

### Microspheres for Labelling

YEDA RES. DEV. CO. LTD. *European Appl. 167,834A*

Polyaldehyde microspheres, to which a transition metal of Pt, Pd, Au, Ag, Te, Fe, Ni, or Co is bound, is optionally encapsulated in agarose, and optionally contains drugs or antibodies which are used for labelling and separating cells, in diagnostic assays, coating supports and catalysts.

### Rhodium Anti-Cancer Compounds

JOHNSON MATTHEY P.L.C. *European Appl. 171,984A*

New Rh co-ordination compounds of composition [Rh<sub>m</sub>X<sub>x</sub>Y]<sup>a</sup>, where X is an anionic ligand, Y is a neutral ligand, and at least one of X and Y is a N donor ligand, are useful in combination modality cancer therapy with other forms of treatment, especially with irradiation where they act as radiosensitisers.

### Ruthenium Anti-Tumour Complexes

BYK GULDEN LOMBERG *World Patent Appl. 86/804A*

New medicinal compounds containing trichloro- or tribromo-tris-N heterocyclyl-Ru complexes have tumour-inhibiting activity, especially against colorectal cancers, and favourable toxicity.

### Nucleic Acid Base Detecting Device

HITACHI K.K. *Japanese Publ. Appl. 61/11,665*

Separated nucleic acid fragments have elements not included in natural nucleic acids, such as Pt, Os, Au, Ag, Hg, S, Br, I, etc., introduced into the mixtures to form compounds which can then be detected by molecular weight fragment detection.

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