

# NEW PATENTS

## ELECTROCHEMISTRY

### Activated Cathode for Hydrolysis

CHLORINE ENGINEERS CORP. LTD.

*European Appl. 739,999A*

An activated cathode, for hydrolysis of alkali metal halide or hydroxide solutions, has a metal substrate supporting a first layer containing Ni or Co, and a second layer containing Pt or Ru formed on top by immersing in a solution containing a Pt or Ru salt and electrolyses the substrate. The cathode operates with low hydrogen overvoltage for long periods.

### Highly Durable Electrochemical Material

MATSUSHITA DENKI SANGYO K.K.

*Japanese Appl. 8/136,497*

An electrochemical element is composed of a sintered substrate, such as stabilised ZrO<sub>2</sub>, and Pt electrode layers formed on the surface of the substrate, containing a binder, a sintered O ion conductive solid electrolyte and Pt. It can be sintered at < 1000°C and its durability is improved as degradation of the O ion conductivity is compensated for by the O conductive solid electrolyte. Electrodes can be formed at low temperature.

### Gaseous Diffusion Electrode

AGENCY OF IND. SCI. & TECHNOL.

*Japanese Appl. 8/162,124*

A H<sub>2</sub>O repelling treated C sheet is ozone treated to oxidise the C surface and then immersed in a solution containing a Pt complex cation to achieve ion exchange. The sheet is then reduced to give a gaseous diffusion electrode carrying Pt particles. The Pt particles are dense and uniformly dispersed, and have good catalytic activity.

### Electrodes for Water Electrolysis

KOMIYA TECH. K.K.

*Japanese Appl. 8/168,771*

Pt-plated Ti net electrodes for H<sub>2</sub>O electrolysis and electrolysis baths for sterilising drinking H<sub>2</sub>O, at higher current efficiency are reported. Also claimed are a cylindrical electrode made from the Pt plated Ti net material, a H<sub>2</sub>O electrolysis bath equipped with a cathode made of the Ti net material and an anode of stainless steel, Pt-plated Ti net, etc. The electrode has a larger surface area and provides a higher current efficiency to sterilise drinking H<sub>2</sub>O.

### Sea Water Electrolysis

ISHIFUKU KINZOKU KOGYO K.K.

*Japanese Appl. 8/170,187*

An electrode for sea H<sub>2</sub>O electrolysis comprises an electrode substrate of Ti or Ti group alloy with a thin Ti oxide layer on its surface, and a porous Pt covering layer, which is supporting a composite of 30–65 mol% Ir oxide, 10–40 mol% Ta oxide, and 25–60 mol% Pt. The electrode has high Cl<sub>2</sub> generating efficiency and stability towards acid cleaning, greater bonding, and less composite is consumed.

### Insoluble Anode Electrode

TOBATA SEISAKUSHO K.K. *Japanese Appl. 8/193,297*

An insoluble anode electrode for electrolytic plating includes a power supplying portion formed on an electrode body composed of Ti, a surface side which is Pt plated for discharging and a rear fluoro-resin non-discharge side. Reproduction of the discharge portion of the electrode can be easily performed.

### Electrode for Electrolysis

ISHIFUKU KINZOKU KOGYO K.K.

*Japanese Appl. 8/199,384*

An electrode has a Ti substrate with a Ti-Ta surface layer which provides good adhesion to the first and second intermediate layers. The following are successively provided on the surface layer in mol %: a first intermediate layer of 3–7 Ir oxide and 93–97 Ta oxide; a second intermediate layer of 10–30 Ir oxide and 70–90 Ta oxide; and an outer layer consisting of 60–98 Ir oxide and 2–40 Ta oxide. The electrode is used as an anode for electrolysis, including metal surface treatment with O<sub>2</sub> generation on the anode and metal foil production. The outer layer is catalytic.

## ELECTRODEPOSITION AND SURFACE COATINGS

### Platinum Electroplating Bath

DEGUSSA A.G.

*European Appl. 737,760A*

A Pt electroplating bath, especially for depositing thick layers, contains 5–30 g l<sup>-1</sup> Pt as an amine sulfamate complex of pH < 1. The electrolyte contains a maximum of 5 g l<sup>-1</sup> free amido-H<sub>2</sub>SO<sub>4</sub> acid, 20–400 g l<sup>-1</sup> strong acid, such as H<sub>2</sub>SO<sub>4</sub>, etc., and preferably 0.01–0.2 g l<sup>-1</sup> F-containing surfactant as a wetting agent. The bath permits deposition of crack-free, smooth, bright Pt layers even at thickness > 100 µm. The bath and solutions are stable when not in use.

### Platinum Strike Plating Bath

NIPPON ELECTROPLAT. ENG. K.K.

*Japanese Appl. 8/134,682*

A Pt strike plating bath comprises: 0.5–50 wt.% of H<sub>3</sub>PO<sub>4</sub>, 0.1–20 g l<sup>-1</sup> of soluble Pt salt and 0.1–10 wt.% of halogen ion. The strike plating requires a cathode current density of 5–50 A cm<sup>-2</sup> at 30–75°C. Using this bath, a Fe alloy having a passive oxide film can be coated by a Pt film with strong adhesive strength.

### Organic Platinum Compound

MITSUBISHI MATERIALS CORP.

*Japanese Appl. 8/157,490*

(Cyclooctadienyl)dialkyl Pt(II) is claimed as an organic metal of high vapour pressure which can be used to form a thin Pt film by CVD. The Pt compound has uniform vaporising speed and vaporising properties and good thermal stability. The Pt thin film is suitable for a ground electrode for the dielectric memory of a semiconductor device.

## Plating Bath for Glossy Palladium

SUMITOMO METAL IND. LTD.

*Japanese Appl. 8/193,290*

A plating bath for glossy Pd includes 5.0–50 g l<sup>-1</sup> of Pd ions, 20.0–200.0 g l<sup>-1</sup> of glycine, and 10.0–150.0 g l<sup>-1</sup> of an electrically conductive salt. The pH of the solution is 7.5–12.0. Using this bath, glossy Pd(-Ag alloy) plating can be performed without using NH<sub>3</sub> or an ammonium salt.

## APPARATUS AND TECHNIQUE

### Ink Jet Printer Head

TOSHIBA EMI K.K. *British Appls. 2,297,522–523A*

An ink jet printer head is manufactured by forming parallel ink channels in the upper piezoelectric layer of a substrate and adsorbing Pd catalyst on an electrode and wiring patterns section, to provide a core for electroless plating. A top and a nozzle plate are mounted on the substrate to cover the upper openings and front openings of the channels, respectively, to form ink chambers. This method is used to manufacture an on-demand ink jet printer head discharging ink droplets in accordance with a print command. Electrodes and wiring patterns can be thus produced to high accuracy using electroless plating, without any possibility of short circuiting.

### Treatment of Soil

EBARA CORP.

*Japanese Appl. 8/168,752*

Soil, contaminated by aromatic halogen, is heated at 250–400°C, with or without mixing with alkali metal hydrogen carbonate, to evaporate the aromatic halogens as gas. This gas is contacted with a catalyst selected from oxides of Pt, Pd, Rh, Ru or Ni, at 200–400°C, and with H<sub>2</sub> to treat the aromatic halogen. This decomposing and removing process uses harmless reagents and simple apparatus.

### Solid Electrolyte Sensor

RIKEN CORP.

*Japanese Appl. 8/193,970*

A solid electrolyte sensor, for detecting CO<sub>2</sub>, etc., is composed of a solid electrolyte, such as MgO stabilised ZrO<sub>2</sub> plate, a detecting and a reference electrode, both made of Li<sub>2</sub>CO<sub>3</sub> with a Pt collector. The sensor has good selectivity for detecting gas, and is stable for long periods.

## JOINING

### Palladium Brazing Alloy

ALLIED-SIGNAL INC.

*U.S. Patent 5,542,993*

Stainless steel is brazed by juxtaposing steel parts in the configuration of a joint to be brazed, then using a homogeneous, ductile alloy foil of composition Ni<sub>a</sub>Si<sub>b</sub>Pd<sub>bb</sub>, where b = 15–20 at. % and the Ni:Pd atomic ratio is 1:7–1:16. The foil is ≥ 150 μm thick. The alloy is preferably ≥ 50% glassy, has a liquidus of < 880°C and thickness ≥ 250 μm. The alloys combine low melting points, are resistant to erosion, have excellent corrosion resistance, and can be cast as ductile foil. The alloys are used as brazing filler metals.

## Low Temperature Resin-Free Glass

QUANTUM MATERIALS INC. *U.S. Patent 5,543,366*

An essentially resin-free paste, for bonding semiconductor devices to ceramics, comprises in wt. %: > 67–76 of conductive metallic particles selected from Pt, Pd, Ag, Au, Al, Cu, Ni, Zn and Sn; 10–19 of a glass composition of 40–65 Ag<sub>2</sub>O, 15–35 V<sub>2</sub>O<sub>5</sub>, 0–20 TeO<sub>2</sub>, 0–30 of PbO, or Pb<sub>3</sub>O<sub>4</sub>; 10–15 of an inorganic solvent; and < 0.1 of resin. The low temperature sealing glasses improve the reliability of hermetically sealed devices and the thermal stress properties.

## HETEROGENEOUS CATALYSIS

### Purification of Exhaust Gases

CATALER IND. CO. LTD. *European Appl. 722,767A*

A catalyst for purification of exhaust gases, especially from diesel engines, comprises a catalyst carrier K<sub>2</sub>O.nTiO<sub>2</sub>, where n = 4–8, free of Al<sub>2</sub>O<sub>3</sub>, and Pt, Pd and/or Rh metal, preferably in an amount 0.2–10 g/100 g K titanate. The catalyst also contains at least one binder selected from sols of SiO<sub>2</sub>, TiO<sub>2</sub> or ZrO<sub>2</sub>. The catalyst has high activity at low temperatures and can suppress the conversion of SO<sub>2</sub> into H<sub>2</sub>SO<sub>4</sub>. It removes CO, HCs and soluble organic fractions.

### Removal of Hydrogen

DEGUSSA A.G.

*European Appl. 723,811A*

A catalyst for removal of H<sub>2</sub> and/or CO from moist air, consists of 0.05–5 wt. % of a Pt group metal on a porous inorganic carrier, and is obtained by impregnating the carrier, which is pre-impregnated with an alkali salt solution, with a solution containing the Pt group metal, followed by drying and treating with a reducing agent heated to 90°C. The catalyst has improved long term stability and catalytic activity. It is also used to recover highly pure N<sub>2</sub> in the electronics industry, and to remove CO from street tunnels.

### Carbon Monoxide and Hydrogen Removal

AIR LIQUIDE S.A.

*European Appl. 723,931A*

CO and H<sub>2</sub> are eliminated from gaseous mixtures by catalytic oxidation, in the presence of Pd and/or Au catalysts, supported on TiO<sub>2</sub>, to give CO<sub>2</sub> and H<sub>2</sub>O, respectively. Also claimed is a process for the preparation of N<sub>2</sub> from air containing CO and H<sub>2</sub>. The process purifies mixtures of N<sub>2</sub> and/or Ar with O<sub>2</sub>. It can be operated continuously over a long period of time without regeneration of the catalyst. The catalytic oxidation can be effected at < 130°C.

### Diesel Engine Exhaust Gas Purification

ICT CO. LTD.

*European Appl. 727,248A*

A catalyst for the purification of diesel engine exhaust gas comprises catalytic components of: (a) Fe and Mn, and a refractory inorganic oxide, (b) Pd, Pt and/or Rh and a refractory inorganic oxide deposited in a single layer on a refractory three-dimensional structure, and (c) comprising (a), a refractory inorganic oxide and an alkaline earth and/or rare earth element and (b). It can remove carbonaceous particulates, unburned HCs and CO, and can suppress sulfate formation.

## Purification of Exhaust Gas

NE CHEMCAT CORP. *European Appl.* 730,900A

The purification of exhaust gas from internal combustion engines operated at fuel-lean air:fuel ratios involves contacting the gas with an Ir-containing catalyst in a first zone and then with a Pt-containing catalyst in a second zone downstream of the first. The system effectively treats exhaust gas from such engines over a wide temperature range. It produces less NOx and can provide effective purification at > 700°C.

## Catalyst for Selective Oxidation of Hydrogen

MITSUBISHI CHEM. CORP. *European Appl.* 730,906A

A catalyst for the selective oxidation of H<sub>2</sub> contains Pt and/or Pd supported on at least one carrier of an oxide of Sn, Ti, Ta and/or Nb. H<sub>2</sub> in a gas mixture also containing hydrocarbons is selectively oxidised by contact with the catalyst in the presence of an O<sub>2</sub>-containing gas. A method for dehydrogenation of hydrocarbons is also claimed. The selective oxidation is highly efficient and higher styrene yields are obtained.

## Diesel Engine Exhaust Catalyst

CATALER IND. CO. LTD. *European Appl.* 734,756A

A catalyst for purification of diesel engine exhaust gases comprises a catalyst substrate, a support layer formed on the substrate, at least one Pt group element on the support layer, and a compound oxide of V with La, Ce, Y and/or W, also loaded on the support layer. Catalyst activity is maintained and the formation of SO<sub>3</sub> is suppressed.

## Catalytic Converter

GENERAL MOTORS CORP. *European Appl.* 734,757A

A catalytic converter for a vehicle has a cellular substrate coated with a first layer of Pd and a second layer of Pt and Rh. The weight ratio of first layer:second layer is 3–1.25:1, preferably 3–2:1. Both layers are applied as an aqueous washcoat and then calcined at 400–550°C, in one calcining step. The converter provides improved emission conversion efficiency.

## Conversion of Chlorinated Alkanes

SOLVAY BELGE S.A. *World Appl.* 96/16,003A

The conversion of chlorinated alkanes into less chlorinated alkenes involves reacting the alkane with H<sub>2</sub> in the presence of a supported bimetallic catalyst containing 0.05–10 wt.% Pd with respect to a support, such as activated C, and 0.05–10 wt.% Ag, Ga, In, Tl, Ge, Sn, Pb, Sb or Bi, or their mixtures, at 150–450°C and 1–30 bar. The weight ratio of Pd:metal is 0.5–20. The conversion rate is high and selectivity is also good; especially for allyl chloride conversion.

## Oxidation or Combustion Catalyst

UNIV. DUNDEE *World Appl.* 96/23,573A

A catalyst for oxidation or combustion reactions, especially of hydrocarbon fuels and exhaust gases, comprises a metal selected from Pt, Pd, Rh, Ru, Ni, Ag, Co, Fe, Mo and W in combination with a material which is an electron donor or its precursor. The catalyst has chemical stability, lower light-off temperatures, high catalytic activity and long life.

## Production of High Octane Alcohols

RES. OCTANE INC. *World Appl.* 96/24,652A

High octane alcohols are prepared from a mixture of alcohol and hydrocarbons by adjusting the pressure and temperature of the mixture to a specific range, reacting the mixture with a Pt catalyst, reducing the temperature to 90–190°F, and separating the liquid and gas products from the mixture. High octane alcohols can be produced efficiently using a conventional heat exchanger and separator tank apparatus. The process is safe and inexpensive.

## Selective Reduction of Nitrogen Oxides

NORSK HYDRO A.S. *World Appl.* 96/27,428A

A catalyst for the selective reduction of NOx comprises a promoted  $\beta$ -zeolite with SiO<sub>2</sub>:Al<sub>2</sub>O<sub>3</sub> ratio = 10 and average kinetic pore diameter  $\geq 5\text{ \AA}$ , 0.1–10 wt.% Cu promoter and 0.01–1 wt.% Pd or Rh promoter. NOx in O<sub>2</sub>-containing effluent gases are selectively reduced by passing the gases and a reductant at 150–500°C over the catalyst. This selective catalytic reduction of NOx occurs at higher conversions and at < 300°C without giving higher formation of N<sub>2</sub>O and/or higher emission of unconverted NH<sub>3</sub>.

## Manufacture of Alkylmethyl Cyclic Siloxane

DOW CORNING CORP. *U.S. Patent* 5,516,870

Alkylmethyl cyclic siloxanes are manufactured by reacting a mixture containing  $\alpha$ -olefin and silanol-free methyl hydrogen cyclic siloxanes in the presence of an anhydrous Pt/C catalyst. The mixture and the catalyst are agitated until the alkylmethyl cyclic siloxane formed is SiH free. This method can be used to prepare easily workable linear cyclic polysiloxanes, which can be used for skin conditioners, etc.

## Hydrogen-Methane Mixtures

CHEMISAR LAB INC. *U.S. Patent* 5,516,967

The production of a gaseous mixture containing H<sub>2</sub> and CH<sub>4</sub> (hythane), useful as an alternative fuel for ICE, involves oxidation of CH<sub>4</sub> with H<sub>2</sub>O vapour at 400–500°C and 1–5 atm over a Pd-containing catalyst, supported on a porous carrier, such as Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub> or ZrO<sub>2</sub>. The catalyst is Pd, Pd-Ni, Pd-Cu, Pd-Mg, Pd-La or Pd-Ce, and it contains 2 wt.% Pd or 1:1 weight ratio alloy. It provides economical production of hythane at low temperatures and pressures, at or near the vehicle fuelling site, thus eliminating the storage and transportation of reactive H<sub>2</sub>.

## Reforming of Mixed Hydrocarbons

UOP *U.S. Patent* 5,520,796

The reforming of a mixed hydrocarbon fraction to obtain a higher octane product involves: contacting the fraction over a primary bifunctional reforming catalyst comprising 0.1–2 wt.% Pt group metal, 0.15 wt.% metal promoter and 0.2–15 wt.% halogens, supported on a refractory inorganic oxide. The intermediate is contacted with a molecular sieve reforming catalyst consisting of one medium pore non-zeolitic molecular sieve, an inorganic binder and a Group VIII metal. The catalyst increases octane yield and product selectivity with increased aromatic content.

## Conversion of Alkane to Alkene

MOBIL OIL CORP.

*U.S. Patent 5,530,171*

The catalytic conversion of alkanes to alkenes, which are useful as fuel and lubricant components, involves contacting the alkane in the absence of co-fed O<sub>2</sub> with a dehydrogenation catalyst comprising Pt or Pd and a solid oxygen source, which is a reducible metal oxide of Bi, In, Sb, Tl, Pb and/or Te. The equilibrium dehydrogenation reaction is promoted to produce alkenes. This catalyst has high selectivity to alkenes and provides a high temperature heat source to supply at least part of the endothermic heat of reaction.

## Solid Acid Catalyst

JAPAN ENERGY CORP.

*Japanese Appl. 8/126,842*

A solid acid catalyst for isomerism, etc., comprises a hydroxide or a hydrated oxide of a Group III metal or a Group IV metal containing 2–15 wt.% of a Pt group element and a sulfate group, containing 0.5 wt.% with respect to S. It has a very high acid strength and activity and is useful for chemical reactions requiring an acid catalyst, such as alkylation, esterification, etc. It has little corrosive action and can be easily separated from the reaction product and reused.

## Heat Resistant Gas Purification Catalyst

TOYOTA CHUO KENKYUSHO K.K.

*Japanese Appl. 8/131,830*

The catalyst is composed of an Al<sub>2</sub>O<sub>3</sub> carrier coated by CeO<sub>2</sub> and carrying Pt. The sintering of Pt is prevented by the O<sub>2</sub>-occluding action of CeO<sub>2</sub>. The catalyst also contains ZrO<sub>2</sub>, and may also be a mixture of a porous carrier with Pt and a carrier with Rh. The catalyst, which is used for treating exhaust gas, has improved heat resistant performance.

## Compression Ignition Engine

T. YAMAGUCHI

*Japanese Appl. 8/210,138*

A compression ignition type engine for motor vehicles uses a catalyst metal, such as Pt, Pd or Rh, supported by metallic plates made of Ni or chrome steel. A catalyst plug is positioned so that the catalyst board faces the combustion chamber connected to a cylinder head. The catalyst plug reduces the harmful exhaust content by expelling smoke and NO<sub>x</sub> out of the combustion chamber. Electronic control of the removal of harmful exhaust products is achieved. Diesel knock is prevented by ignition lag, and increased output and improved reliability of operation are obtained.

## HOMOGENEOUS CATALYSIS

### Preparation of 22,23-Dihydroavermectin

BAYER A.G.

*European Appl. 729,971A*

The preparation of 22,23-dihydroavermectin involves selective catalytic hydrogenation of avermectin B1a and/or B1b over a Rh complex compound. The catalyst is prepared either from a Rh salt, a hydrazine (or a hydrazine salt) and a tertiary phosphine, or from a Rh-phosphine complex and a hydrazine (or a hydrazine salt). The process is useful for the selective production of ivermectin which is an anthelmintic, ectoparasitocidal, insecticidal or acaricidal agent.

## Production of 3-Pentenoic Acid Esters

BASF A.G.

*World Appl. 96/29,300A*

The production of 3-pentenoic acid esters (1) involves the carbonylation of 1–10C alkoxybutenes containing alkoxy groups in the allyl position to the double bond with CO at 60–140°C and a partial CO pressure of 3–30 MPa in the presence of a solvent and a Pd-based catalyst. (1) are produced under mild conditions without using high pressure or large amounts of the catalyst or additives, in a continuous process. They are obtained in high yield and high isomeric purity and are used as intermediates in the production of adipic acid, caprolactam, caprolactone, etc.

## Aryl-Substituted Aliphatic Carboxylic Acids

ALBEMARLE CORP.

*U.S. Patent 5,536,870*

Aryl-substituted aliphatic carboxylic acids and derivatives (1) are produced by reacting aromatic halides with olefinic compounds using a catalyst comprising Pd(0) or a salt of Pd with valency 0, 1 or 2, optionally mixed with Cu salts, and a cyclic ligand, then reacting with CO at a pressure of > 1 atm at 25–200°C. Also claimed is the production of olefins by reacting halides with olefins in the presence of a catalytic amount of Pd or Pd salts, where the Pd valency is 1 or 2, and a cyclic ligand. These processes are used in the preparation of (1) which are pharmaceutically active and include the profens: ibuprofen, ketoprofen, etc.

## Preparation of Lactic Acid Ester

MITSUBISHI CHEM. CORP.

*Japanese Appls. 8/119,903–904*

The preparation of lactic acid ester propylene glycol, used to prepare medical and agrochemical products, involves reacting propylene glycol with alcohol in the presence of Ru compounds and H<sub>2</sub> receptors, such as pyruvic acid ester. The Ru complex compounds preferably contain as ligands substituted cyclopentadienone compounds, such as (Ph<sub>2</sub>C,CO)-Ru(CO)<sub>2</sub>, etc. Preferably, the alcohol is a 1–20C aliphatic alcohol, or a 6–30C aromatic alcohol.

## FUEL CELLS

### Fuel Cell Electrode

FUJIKURA LTD.

*Japanese Appl. 8/138,682*

A fuel cell electrode for a solid state electrolyte type fuel cell consists of a fine particle material, of which is prepared by mulling Teflon binder and a fine Pt particle catalyst on a C powder carrier, coating the product on an electrically conductive porous substrate, and sintering in an inert gas. The C powder is first heated in an inert gas to convert it to graphite. The cell has a higher activity from an initial stage, due to the improved quality and lifetime of the electrode.

### Manufacture of Electrodes

TOSHIBA K.K.

*Japanese Appl. 8/138,683*

An electrode, suitable for a phosphoric acid fuel cell, is prepared by mulling Teflon binder and a fine Pt particle catalyst on a C powder carrier, coating the product on an electrically conductive porous substrate, and sintering in an inert gas. The C powder is first heated in an inert gas to convert it to graphite. The cell has a higher activity from an initial stage, due to the improved quality and lifetime of the electrode.

## Platinum Catalyst for Fuel Cell

AGENCY OF IND. SCI. & TECHNOLOGY

*Japanese Appl. 8/162,133*

A Pt catalyst for fuel cells, H<sub>2</sub> oxidation or electrochemical processes is prepared by oxidising C powder to form acidic functional groups on the surface, soaking in a solution containing Pt complex compound cation, and reducing the cation. This improved catalyst is highly active.

## Fuel Electrode for Fuel Battery

FUJI ELECTRIC CO. LTD. *Japanese Appl. 8/203,536*

The fuel electrode of a fuel battery comprises a catalyst made by mixing a C carrier and Pt carried on it, and another catalyst of a C carrier with Ni carried on it. The electrode removes the adverse effects caused by absorption of CO included in the fuel gas when starting and stopping the battery at comparatively low temperature.

## ELECTRICAL AND ELECTRONIC ENGINEERING

### Magnetic Digital Recording Medium

CONNER PERIPHERALS INC. *World Appl. 96/24,927A*

A magnetic recording medium comprises a substrate, a nucleating layer of Pt or Pd >50 Å thick on the substrate, a recording layer formed from 10–30 bilayers of magnetic metal of perpendicular anisotropy of first thickness, and Pd or Pt of second thickness. The magnetic metal is preferably Co with a first thickness of 1.5–10 Å and second thickness of 5–15 Å. The thickness of the nucleating layer and the recording layer is ≤ 1500 Å, and the coercivity of the medium > 2500 Oe. This recording medium provides higher coercivities, better outputs and reduced noise levels.

### Thin Film Magnetic Recording Medium

INT. BUSINESS MACHINES CORP.

*U.S. Patent 5,523,173*

A thin film magnetic recording medium has a Co-Pt-Cr-B layer, with a (11–20) crystallographic orientation, and has composition CoPt<sub>x</sub>Cr<sub>y</sub>B<sub>z</sub>, where  $x = 4-12$ ,  $y = 18-23$  and  $z = 2-10$ , on a non-magnetic substrate which is on a sputter deposited Cr-V underlayer. The substrate is maintained at a bias of -200 to -400 V during the sputtering. A means to move a transducer relative to the disk for reading and writing data is also claimed. The Cr-V alloy underlayer is deposited at 4–6 mtorr, at 200–250°C. The medium has better noise characteristics than Co-Pt-Cr alloys and higher coercivity.

### Electrically Conductive Paste

NIPPON CARBIDE KOGYO K.K.

*Japanese Appl. 8/148,375*

An electrically conductive paste for printing ceramic capacitors includes Ag and Pd metal powders, a glass frit and SnO<sub>2</sub>, etc., in an organic solvent. It provides highly efficient stability characteristics, reduces cracking in the dielectric layer and reduces variation in dielectric composition during baking.

## Noble Metal for Electrical Contact

AMP INC.

*Japanese Appl. 8/167,442*

A noble metal plating method for Pd, for electrical contacts used in electronic devices involves forming a soft gliding layer on the surface of a Pd plating layer. The Pd plating layer, which generates stress in the range 30,000–140,000 psi is formed in a predetermined plating area and the soft gliding layer ~ 75 µm thick is formed in the surface of the Pd plating layer. The contact has improved electrical properties.

## Manufacture of an IC Package

SUMITOMO METAL IND. LTD.

*Japanese Appl. 8/209,359*

The manufacture of an IC package involves forming a Ni or Ni alloy plating layer on a metallic layer, to form an IC package, or on the externally connecting pin body, then forming a Pd or Pd alloy layer on the Ni or Ni alloy layer by electroless plating. The Pd or Pd alloy layer is preferably further coated with a Au layer to a thickness of 0.05–0.30 µm by electroless plating.

## Magnetic Tape Multilayered Film

TDK CORP.

*Japanese Appl. 8/213,236*

Multilayered film used in the manufacture of opto-magnetic recording medium has a number of Co-Pt alloy layers which are laminated through a Pt layer, where the Co content in each Co-Pt alloy layer is 25–75%. A metal background layer is placed between the lowest Co-Pt alloy layer and the substrate. Perpendicular magnetic anisotropic characteristics, Kerr rotation angle, periodicity, reproducibility and C:N ratio are increased. The reduction in perpendicular magnetic anisotropy due to heat effects is suppressed.

## MEDICAL USES

### New Platinum Complexes

TANAKA KIKINZOKU KOGYO K.K.

*Japanese Appl. 8/113,583*

New Pt(IV) disulfonate diamine complexes are used as drugs for the treatment of malignant tumours. They are particularly active against tumours, other than those of the ovaries or testicles, e.g. cerebral tumours, and are highly lipophilic and orally administrable.

### Dental Alloy

BEGO BREMER GOLDSCHLAEGEREI

*German Appl. 1/95/25,361*

A high Au content dental alloy, containing Au with added Pt and/or Pd, additionally contains Mg, Ca and/or Mn. Preferably, the Au alloy contains 0–20 wt.% Pt and/or Pd and 0–6 wt.% Mg, Mn and/or Ca. The alloy may also contain Ir, Ru, Re and/or Rh, but contains little or no Ag and/or Cu. The alloy has a solidus temperature of > 1050°C, a hardness of 200–350 HV5 and an expansion coefficient of (14.0–14.5) × 10<sup>-6</sup>. The surface of the alloy is treated by acid etching so as to consist of 90%Au-10%Pt.

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