

The Selective Homogeneous Hydrogenation of Alkynes in the Presence of Alkenes Catalyzed by [RuH(PMe₂Ph)₅]PF₆

M. O. ALBERS, E. SINGLETON and M. M. VINEY, *J. Mol. Catal.*, 1985, **30**, (1-2), 213-217

The homogeneous hydrogenation of alkynes with cationic Ru(II) complexes [RuHL₅]PF₆ (L = PMe₂Ph, P(OMe)₂Ph, PMe₂(C₆H₄OMe-o), AsMe₃) as catalysts in which the title complex selectively reduces internal and terminal alkynes without hydrogenating the corresponding olefin is reported. This complex is a precursor to the most efficient catalyst known to date for the selective hydrogenation of alkynes. The catalyst shows negligible tendency to isomerise or hydrogenate olefinic substrates.

Ruthenium-Catalyzed Oxidation of Alcohols with Sodium Bromate

Y. YAMAMOTO, H. SUZUKI and Y. MORO-OKA, *Tetrahedron Lett.*, 1985, **26**, (17), 2107-2108

A convenient and effective method for the oxidation of secondary alcohols to ketones using NaBrO₃ in the presence of catalytic amounts of Ru trichloride hydrate is described.

CHEMICAL TECHNOLOGY

Catalytic Etching of Platinum during Ethylene Oxidation

N. L. WU and J. PHILLIPS, *J. Phys. Chem.*, 1985, **89**, (4), 591-600

Catalytic etching of Pt foils during ethylene oxidation was studied by SEM and TEM. The etching was a strong function of surface temperature and C₂H₄ : O₂ ratio in the gas phase. A novel model was developed to explain all the regions of the phase diagram, and showed five regions on the plane defined by surface temperature and O₂ : C₂H₄ ratio and three types of catalytic etching. The etching was attributed to formation of methylene radicals above ~770K in the boundary layer over the catalyst.

NEW PATENTS

METALS AND ALLOYS

Magneto-resistive Materials

INTERNATIONAL BUSINESS MACHINES CORP.

U.S. Patent 4,476,454

New magneto-resistive materials are alloys of Ir with Fe, Ni and/or Co.

Permanent Magnet Materials

RESEARCH INSTITUTE OF ELECTRIC & MAGNETIC ALLOYS

U.S. Patent 4,481,045

A permanent magnet having a high coercive force and large maximum energy product is an alloy of Fe with 25-40 at.% Pd or 19.5 at.% Pd and 0.1-27.5 at.% Ag.

TEMPERATURE MEASUREMENT

Semiconductor Chip with Platinum Thin Film Resistor for Temperature Sensing

Res. Discl., 1985, (251), 141

A Pt resistor is formed on a semiconductor chip and is connected as a temperature sensitive resistor in a temperature measuring circuit. The resistor is a thin film and is ~100µm long, 0.5µm wide and a few Å thick. It can be formed by ion beam sputtering, patterned by photoresist techniques and etched by ion beam milling. The TCR is very reproducible. The Pt resistor can operate at high temperatures and resists oxidation.

Interpolation Procedures for Ceramic-Encapsulated Rhodium-Iron Alloy Resistance Thermometers in the Temperature Range 77 to 273K

L. M. BESLEY, *J. Phys. E*, 1985, **18**, (3), 201-205

The thermometric characteristics of six ceramic-encapsulated Rh-Fe alloy resistance thermometers were studied between 32 and 273.15K. Data are given for the resistance-temperature relationship and the self-heating. Interpolation means were investigated for the range 77-273.15K. An eleven-term polynomial fitted to many points gives a precision of ±0.5mK over this range.

MEDICAL USES

Circadian Timing of Cancer Chemotherapy

W. J. M. HRUSHESKY, *Science*, 1985, **228**, (4695), 73-75

Circadian timing of adriamycin and cis-platin was found to influence toxicity substantially. Administering adriamycin in the morning and cis-platin in the evening caused fewer complications, dose reductions and treatment delays than administering adriamycin in the evening and cis-platin in the morning, in a study of 31 patients with advanced ovarian cancer.

Superconducting Type II Material

STATE UNIVERSITY OF NEW YORK RESEARCH FOUNDATION

U.S. Patent 4,485,152

A new superconducting type II Pd-Cu alloy hydride material includes a contiguous surface at which at least a portion of the alloy region contains H and at least a portion of the Pd region contains H.

Cutting Material

DEGUSSA A.G.

German Offen. 3,319,487

An improved cutting material is a laminate of two to five layers of metal and two to five layers of ceramic. The ceramic is Al₂O₃ or Si nitride and the metal is chosen from Pt, W, Mo, Zr, Hf, Nb, Ta, Au and their alloys.

ELECTROCHEMISTRY

Gas Electrophoresis

REANAL FINOMVEGYSZERGYAR

British Appl. 2,144,768A

The electrodes of an apparatus for performing gel electrophoresis with polyacrylamide consist of spirals of Pt wire fixed in grooves on an electrode spool shaft.

Purifying Mixed-Cation Electrolyte

NATIONAL RESEARCH DEVELOPMENT CORP.

British Appl. 2,144,770A

A Pt wire coil or a Pt gauze is used as an anode in an apparatus for purifying an electrolyte containing cations of a less noble metal from contamination by cations of a more noble metal.

Electrolytic Cell Operation

IMPERIAL CHEMICAL INDUSTRIES P.L.C.

European Appl. 135,314

An electrolytic cell is operated in tandem with a unit in which the electrolyte or the electrolysis products are treated in order to reduce the amount of high pressure pipework. The cell electrodes are preferably made of refractory metal coated with a platinum group metal.

Oxygen Evolving Electrodes

ELTECH SYSTEMS CORP.

European Appl. 135,475

Electrodes suitable for the electrowinning of metals, for example, with the evolution of O_2 are made from a valve metal base coated with a mixture of Ru and Mn oxides built up from several layers of varying composition (Ru:Mn = 1:1 to 1:6). The mixed oxide coating is resistant to peeling.

Olefin Electrochemical Conversion

BRITISH PETROLEUM CO. P.L.C.

European Appl. 136,176

The electrochemical conversion of olefins to oxygenated products may take place on Pt or Os gas diffusion cathodes.

Milking Apparatus

EISAI CO. LTD.

European Appl. 137,367

An apparatus has sets of electrodes for detecting milk flows which may use Pt as the electrode material.

Electrodes for Electrolysis

NIPPON STEEL CORP.

U.S. Patent 4,477,316

Insoluble electrodes having few surface defects and a long life are prepared by coating an electroconductive, corrosion-resistant base metal, such as Ti or Ta, with at least one platinum group metal and applying a specified laser beam treatment.

Anode for Seawater Electrolysis

JAPAN CARLIT CO. LTD.

U.S. Patent 4,479,864

An anode of improved efficiency and durability in the electrolysis of seawater consists of a Ti substrate coated with a mixture of 15–85% Pt, 5–35% Ir oxide and 10–15% Ru oxide.

Cobaltic Ion Regeneration

NATIONAL RESEARCH DEVELOPMENT COUNCIL

U.S. Patent 4,482,438

Aqueous Co(II) sulphate solutions formed in the oxidation of methylnaphthalene are converted back to Co(III) sulphate solutions by electrolysis within a Pt tube which acts as the anode.

Electrolytic Electrodes

PERMELEC ELECTRODE LTD.

U.S. Patent 4,484,999

Electrodes of increased durability consist of a conductive substrate, such as Ti, coated with an intermediate layer which is a mixture of TiO_2 and/or SnO_2 with Ta_2O_5 , and then with a layer of active material containing at least one platinum group metal oxide, especially a mixture of Ru and Ir oxides.

Cathode for Electrolysis

SIGRI ELEKTROGRAPHIT G.m.b.H.

German Offen. 3,322,169

An improved cathode for the electrolysis of aqueous solutions, especially brines, consists of a Ni substrate coated with one or more layers of Ni oxide–Ru oxide.

ELECTRODEPOSITION AND SURFACE COATINGS

Metallisation of Glassy Bodies

LICENTIA PATENT-VERWALTUNGS G.m.b.H.

European Appl. 132,784

Glassy surfaces and bodies, such as a soda-lime glass disc, is first coated with an In–Sn alloy layer (for example by CVD) on to which are deposited nuclei of Pd or another chemical plating metal. The surface is then reinforced, for example with Cu.

Electrode Coating with Reduced Overvoltage

BBCA.G.BROWN, BOVERI & CIE *European Appl. 133,468*

A surface layer which reduces the overvoltage of an electrochemical electrode is a porous film of a compound of at least one transition metal, an optional Group IA and/or IIA metal and at least one of B, C, O, S, Se and Te. Typical layers consist of Ba_2LaRuO_6 , $BaFe_{0.1}Ru_{0.9}O_3$ and $CeRu_3C$.

Coatings Resistant to Heat and Corrosion

U.S. SECRETARY OF THE NAVY *U.S. Patent 4,477,538*

A material for use in hot, corrosive atmospheres is coated successively with Pt, Pd, Ir or Rh, then by MCrAlY alloy where M is Fe, Co or Ni and lastly by Pt, Pd, Ir or Rh.

Electrodeposition of Palladium–Silver Alloys

LEARONAL INC.

U.S. Patent 4,478,692

A bath for the electrodeposition of Pd–Ag alloys contains a soluble Pd compound such as $(NH_3)_2Pd(NO_2)_2$, a soluble Ag compound such as $AgNO_3$ and sufficient strong acid to maintain the Pd and Ag compounds in solution without the addition of chloride or bromide ions.

Palladium Alloy Electroplating Bath

A.T. & T. BELL LABORATORIES U.S. Patent 4,486,274

An alloy of at least 10 mol% Pd with Ag, Cu and/or Ni is electrodeposited from a bath containing Pd as a complex with diaminopropane, diaminobutane, diaminoethane, tetramethyl ethylene-diamine or hydroxydiaminopropane.

Palladium Electroplating

W. C. HERAEUS G.m.b.H. German Offen. 3,317,493

Adherent, ductile, homogeneous coatings are obtained on metals such as Ni by electrodeposition from a bath containing, per litre, 5–50g Pd as $(\text{NH}_3)_4\text{PdBr}_2$, 10–150g NH_4Br , 10–150g sulphamic acid and/or ammonium sulphamate, 1–20g nicotinic acid and/or 0.1–0.5g nicotinamide at pH 6.5–10.

Rhodium Electroplating Solution

ORDENA TRUDOVOGO KRASNOGO ZNAMENI INSTITUT KHIMII I KHIMICHESKOI TEKHNOLOGII AN LITOVSKOI SSR Russian Patent 1,109,481

Deposits of improved electrophysical properties are obtained from baths containing, per litre, 4–40g cis (triammino) (trinitro) Rh, $(\text{Rh}(\text{NH}_3)_3(\text{NO}_2)_3)$, 20–200g H_2SO_4 and 3–100g sulphamic acid.

LABORATORY APPARATUS AND TECHNIQUE

Engine Exhaust Gases Analysis

BL TECHNOLOGY LTD. British Appl. 2,143,645A

An apparatus for detecting combustion-supporting constituents in exhaust gas comprises a heated Pt wire over which exhaust gas and butane are intermittently fed together. The heating effect on the wire due to any combustion of the butane in residual O_2 in the exhaust gas gives a measure of uncombined O_2 in the exhaust gas.

Gas Sensor

HOCHIKI K.K. British Appl. 2,144,849A

A gas sensor comprises a laminate of a metal, such as Pd or Pt, capable of adsorbing and dissociating H_2 gas and a gas which is a compound containing H, and a solid compound, such as W trioxide, Mo trioxide, TiO_2 , Ir hydroxide or V pentoxide, reducible by H atoms to change its photo absorption and, an optical means for detecting a change in photo absorption of the solid compound.

Bismuth Germanate Monocrystals

CRISMATEC European Appl. 133,084

An Ir crucible is used in growing Bi germanate crystals in a neutral or oxidising atmosphere to avoid the formation of a Pt-Bi alloy in a Pt crucible.

Torque Sensor of the Non-Contact Type

TOSHIBA K.K. European Appl. 136,086

Torque applied to a shaft is sensed magnetically using a strip of magnetic film wrapped round the shaft and made of $(\text{Co}_{1-a}\text{Fe}_a\text{M}_b)_x\text{Si}_y\text{B}_z$, where M may be a platinum group metal, Au, Ag or a lanthanide.

Hydrogen Detector

LAWRENCE ELECTRONICS CO. and JULIA F. LAWRENCE

U.S. Patent 4,477,778

A H_2 detector having a H-permeable membrane between the atmosphere and the inside of a vacuum tube is made of a Pd alloy, preferably 75 Pd–25 Ag.

Calibrating Apparatus

MERCK & CO. INC. U.S. Patent 4,479,726

A portable apparatus for calibrating thermoelectric surface-temperature-measuring devices incorporates two standard Pt resistance probes.

Carbon Monoxide Indicator

E. I. DU PONT DE NEMOURS & CO.

U.S. Patent 4,482,635

An improved CO indicating composition consists of fumed SiO_2 containing the dried residues of Pd sulphate, H_2SO_4 and ammonium molybdate. The SiO_2 may be incorporated in a paper strip.

Induction Heated Crucible

PHILIPS PATENTVERWALTUNG G.m.b.H.

German Offen. 3,316,547

An induction-heated crucible for melting nonmetallic inorganic material such as a lanthanide metal-gallium garnet may be partly made from Pt or Ir.

Gas Sensor

DEUTSCHE I.T.T. INDUSTRIES G.m.b.H.

German Offen. 3,422,823

A gas sensor consists of a substrate such as Al_2O_3 coated with a gas-sensitive semiconductor oxide and then with a film of active metal, preferably Pt.

Hydrogen Getter

ORDENA TRUDOVOGO KRASNOGO ZNAMENI INSTITUT FIZICHESKOI KHIMII Russian Patent 1,104,104

A vacuum getter for H_2 consists of cobalt oxide (Co_3O_4) coated with 0.25–0.5% Pd.

JOINING

Palladium-Gold Brazing Alloys

G.T.E. PRODUCTS CORP. U.S. Patent 4,486,386

A ductile brazing foil consists of 0.05–4% of a reactive metal such as Ti, Zr and/or V, 5–45% Pd and 55–94.9% Au. It is useful for brazing ceramics, other non-metallic materials and metals. Al_2O_3 may be brazed using a 20% Pd, 79.5% Au and 0.5% Ti alloy.

HETEROGENEOUS CATALYSIS

Radiation-Curable Silicones

SHIN-ETSU CHEMICAL CO. LTD.

British Appl. 2,143,837A

An organopolysiloxane composition curable by u.v. or electron beam irradiation includes a Pt or Rh catalyst and optionally a lanthanide compound, such as Ce oxide or a compound of La, Nd or Sm.

Crystalline Metallosilicates

BRITISH PETROLEUM CO. P.L.C.

British Appl. 2,144,727A

Crystalline metallosilicates having catalytic and molecular sieving properties, of the MTN-type, are prepared using as template a six-membered heterocyclic compound having at least two hetero atoms selected from O and N. They may be ion exchanged or impregnated with a compound of Pt, Pd, Rh, Ir, Ru or Ag.

Combustion Plant Exhaust Gas

Purification

FERDINAND LENTJES DAMPFKESSEL- & MASCHINENBAU

European Appl. 132,584

A fuel is burnt in a firing plant and the stack gases are first treated over a multifunctional catalyst to remove CO, unburnt hydrocarbons and NO_x before the S present is oxidised. A Pt-Rh catalyst may be used.

Nitrogen Oxide Removal from Gases

HOECHST A.G.

European Appl. 135,033

In the waste gases of a nitric acid plant the NO_x content may be reduced by reaction with an added olefin in the presence of a noble metal catalyst. In one example ethylene is added and the catalyst consists of Pt/Al₂O₃.

Siloxane Impregnation of Textiles

WACKER CHEMIE G.m.b.H. *European Appl. 135,187*

Platinum group metal catalysts are used in conventional siloxane compositions employed in a new process for impregnating organic fibre textiles.

Platinum Hydrodewaxing Catalyst

MOBIL OIL CORP.

U.S. Patent 4,474,618

A preferred catalyst for the hydrodewaxing of lube oil consists of 0.2–1% highly dispersed Pt supported on ZSM-5 zeolite.

Oxidation Catalyst

TELEDYNE INDUSTRIES INC.

U.S. Patent 4,474,739

A catalyst for the atmospheric oxidation of low concentrations of H₂S or HCN in air consists of an Al₂O₃ carrier impregnated with Pd dichloride and Cu dichloride.

Three-Way Catalyst

W. R. GRACE & CO.

U.S. Patent 4,476,246

A three-way catalyst for the purification of I.C.E. exhaust gases is made by impregnating an Al₂O₃ carrier with Ce oxide, Na oxide and Pt, Pd and/or Rh by a specified procedure.

Synthesis Gas Conversion Catalyst

STANDARD OIL CO.

U.S. Patent 4,476,247

A catalyst for the conversion of synthesis gas to a mixture of alkanes and alkanols preferably consists of a carrier such as alundum supporting about 5% of a compound of general formula M_aRu_bCu_cM'_dN_xO_y, where M is Na, K or Rb, M' is Pt, Pd, Rh and/or Ir, a is 0.02–0.5, b, c are 0.5–3, and d is 0.05–0.5.

Hydrocarbon Reforming Catalyst

MOBIL OIL CO.

U.S. Patent 4,477,590

A hydrocarbon-reforming catalyst is a mixture of a particulate carrier such as Al₂O₃ supporting Pt and Re and a particulate carrier such as Al₂O₃ impregnated with Ir and Re, prepared by a specified procedure.

Platinum Group Metal and Base Metal Catalysts—Lead Tolerant

JOHNSON MATTHEY & CO. LTD.

U.S. Patent 4,478,797

Exhaust gas emitted from an I.C. engine operating on a Pb-containing fuel can be oxidised using a catalyst with improved Pb-tolerance. The catalyst comprises one or more platinum group metals and WO₃, TiO₂ or NiMoO₄ supported on a ceramic or metallic monolith coated with Al₂O₃.

Vegetable Oil Hydrogenation

UOP INC.

U.S. Patent 4,479,902

In the continuous selective reduction of vegetable oils over a fixed bed, the catalyst preferably consists of Pt or Pd supported on TiO₂ and pre-activated in H₂ at a temperature above about 325°C.

Conversion Catalysts

STE. FRANCAISE DES PRODUITS POUR CATALYSE

PRO-CATALYSE

U.S. Patent 4,480,048

Improved moving-bed catalysts for hydrocarbon conversion reactions preferably consists of an Al₂O₃ carrier supporting 0.1–0.5% Pt or Ir, 0.4–1% Ti and 0.2–0.5% Mn, Tc or Re.

Exhaust Gas Catalyst

UOP INC.

U.S. Patent 4,480,050

In a process for making a catalyst for the oxidation of I.C.E. exhaust gases, a porous refractory oxide carrier (alumina) is impregnated with an aqueous solution of Li acetate to give a Li content of 0.1–0.8%, dried and calcined prior to impregnation with Pt, Pd or Rh.

Thermosetting Organopolysiloxanes

BAYER A.G.

U.S. Patent 4,481,341

Compositions of good storage stability at room temperatures, curing rapidly at elevated temperature, consist of an unsaturated organopolysiloxane, a hydridopolysiloxane and a Pt catalyst finely dispersed in a solid silicone resin which melts or softens in the range 70–250°C.

Metal-Containing Active Carbon Products

STANDARD OIL CO. (INDIANA)

U.S. Patent 4,482,641

A high surface area, porous active C matrix, with metal or metals dispersed uniformly in it, is obtained by co-crystallising a metal salt or salts with an aromatic acid, phenol, thiol or aromatic amine, mixing the co-crystallite with a Group IA hydroxide and pyrolysing the product at 400–980°C. The preferred metals include Pt, Pd, Rh and Ag. The metal-carbon materials may be used as hydrocarbon conversion catalysts.

Double Bond Isomerisation Catalyst

MOBIL OIL CORP. U.S. Patent 4,482,752

A variety of organic compound conversions may be catalysed by a Group VIII metal, such as Pt or Rh, co-ordinated via an amino-Si function to an inorganic support, especially a zeolite.

Combustion Catalyst

BENMOL CORP. U.S. Patent 4,483,259

In order to reduce the contents of CO, SO_x and NO_x in the flue gases from combustion of fossil fuels such as bituminous coal, the combustion catalyst preferably consists of a Ca aluminate, Ca aluminate cement, Ca titanate or Ba titanate adsorbant-support impregnated with Pt, Pd and Rh.

Catalytic Combustor

MATSUSHITA ELECTRIC INDUSTRIAL CO. LTD. AND OSAKA GAS CO. LTD. U.S. Patent 4,483,673

A catalytic combustor of improved design for use in a gas heater incorporates a mat of heat-resistant fibres impregnated with Pt, Pd and/or Rh.

Reforming Catalyst

UOP INC. U.S. Patent 4,483,767

A hydrocarbon-reforming catalyst consists of Pt and P or a P compound on an Al₂O₃ carrier.

I.C.E. Exhaust Gas Purification Catalyst

NIPPON SHOKUBAI KOGYO CO. LTD. U.S. Patent 4,483,940

A catalyst of improved thermal-shock resistance for use in the purification of I.C.E. exhaust gases is made by coating a monolithic ceramic honeycomb carrier with a water soluble organic compound of high molecular weight such as a saponified polyvinyl alcohol, and then with Al₂O₃, and impregnating with Pt, Pd and/or Rh.

Photodecomposition of Water

CIBA-GEIGY CORP. U.S. Patent 4,484,992

A catalyst for the production of H₂ by photodecomposition of H₂O in the presence of an ammonium of Group IA metal sulphide or sulphite consists of a finely particulate semiconductor powder carrier which is CdS, Cd sulpho-selenide or TiO₂, at least partly coated with one or two of the platinum group metals, Ni, Ag and Au.

Hydrogenation Catalyst

INSTITUT FRANCAIS DU PETROLE French Appl. 2,543,946

The hydrogenation of methyl formate to methanol is catalysed by supported Rh promoted with Sn, Ge and/or Pb.

Catalysts for Carboxylic Acid Production

HOECHST A.G. German Offen. 3,318,210

In a process for making acetic, propionic and butyric acids simultaneously, synthesis gas is converted over a supported Rh catalyst promoted with a Group IA metal, preferably Li, and a specified transition or lanthanide metal, preferably Yb.

Ketone Production Catalysts

BASF A.G. German Offen. 3,319,430

In a process for making a higher ketone by reacting a ketone with an aldehyde and H₂, the catalyst consists of a carrier such as Al₂O₃ or Mg oxide impregnated with Pt or preferably Pd promoted with a lanthanide metal oxide, especially La₂O₃, Pr₂O₃, Nd₂O₃, CeO₂.

HOMOGENEOUS CATALYSIS

Carboxylic Acid Production

BP CHEMICALS LTD. European Appl. 135,286

Acetic acid or another carboxylic acid is obtained by the rearrangement of methyl formate or a higher ester in the presence of an Ir catalyst, a halide promoter and a strong acid, for example, Ir trichloride, CH₃I and methane sulphonic acid.

Acetic Acid Production

CHEMISCHE WERKE HULS A.G. European Appl. 135,776

Acetic acid is produced by the rearrangement of methyl formate in the presence of Rh metal, a Rh salt or a Rh complex; a halogen or halogen compound; an organic ligand, and chromium carbonyl and/or halide. One example shows the use of Rh chloride, Cr carbonyl, triethyl methyl ammonium iodide and CH₃I as the catalyst.

Ruthenium Catalysts

BP CHEMICALS LTD. U.S. Patent 4,474,959

The formation of quaternary ammonium formates from tertiary amines, H₂ and CO₂ in aqueous isopropanol is catalysed by Ru derivatives, such as RuCl₃·3H₂O or [Ru(CO)₂Cl₂]_n.

Hydrosilylation Catalysts

GENERAL ELECTRIC CO. U.S. Patent 4,474,976

The formation of phenyl silanes from hydrosilanes and halogenated aromatic compounds such as bromobenzene or benzoyl chloride is catalysed by a t.phosphine complex of Pt, Pd, Rh or Ru.

Ruthenium Isobutyrate Catalysts

EASTMAN KODAK CO. U.S. Patent 4,474,995

The formation of isobutyraldehyde from propylene, CO and H₂ is catalysed by Ru₂(iBuCOO)₄X.

Complex Catalysts

CIBA-GEIGY CORP. U.S. Patent 4,476,305

Complexes of platinum group metals with polymerised 2-substituted-5-vinyl pyrimidines are useful catalysts in a variety of reactions. Pd complexes catalyse the transesterification of vinyl esters.

Mixed Metal Catalysts

PRODUITS CHIMIQUES UGINE KUHLMANN U.S. Patent 4,478,757

Catalysts for the formation of aromatic isocyanates from corresponding nitro compounds and CO are made by thermal decomposition of a supported complex M₂M'(Cp)₂(CO)₆(PPh₃)₂, where M is Pd and M' is Mo, Cr or W; or M is Pt and M' is W.

Olefin Hydroxylation Catalyst

EXXON RESEARCH & ENGINEERING CO.

U.S. Patent 4,482,763

The hydroxylation of olefins with an organic hydroperoxide in water is enhanced by an Os compound and a halohydrocarbon, such as OsO₄ and butyl iodide. A platinum group or transition metal halide may also be present.

Ruthenium Catalysts

SUN TECH INC.

U.S. Patent 4,485,245/46

A catalyst for the hydrogenation of carboxylic acid anhydrides to esters or lactones is chosen from [RuCl(SnCl₃)(PPh₃)₂], [Ru₂Cl₃(SnCl₃)(CO)₂(PPh₃)₄], [Ru₂Cl₃(SnCl₃)(CO)₂(PPh₃)₂(Me₂CO)₂] and [RuH(SnCl₃)(PPh₃)₃], optionally promoted with an amine.

Hydroxylation Catalyst

EXXON RESEARCH & ENGINEERING CO.

U.S. Patent 4,486,613

In a process for preparing glycols from olefins, the catalyst is an Os carbonyl, complex preferably Os₃(CO)₂. Optional co-catalysts include NaI and one or more transition metal which may be Pd, Rh or Ru, among others.

FUEL CELLS

Fuel Cell Catalyst Production

UNITED TECHNOLOGIES CORP.

British Appl. 2,146,044A

A ternary metal alloy catalyst is made by contacting a finely divided noble metal such as Pt supported on C black with a Group IV-VII transition metal compound and a Co compound, followed by heating and reduction in a N₂ atmosphere.

Fuel Cell

HITACHI LTD.

U.S. Patent 4,478,917

In a specified methanol fuel cell including an electrolyte ion exchange membrane, catalyst particles and water-repellant particles are finely distributed in the oxidiser electrode. The catalyst is at least one platinum group metal, preferably Pt.

CHEMICAL TECHNOLOGY

Metal Etching

PSI STAR

British Appl. 2,143,778A

A metal such as Pd or Cu is etched by forming a film of water on the surface of the metal and exposing the water-covered metal to gaseous NO₂ to dissolve the metal.

Sintered Ceramics

INTERNATIONAL BUSINESS MACHINES CORP.

U.S. Patent 4,474,731

In a process for making sintered ceramics using an organic binder, a small amount of a Ni or Pd salt is incorporated in the mixture to ensure the absence of residual C in the final product.

Photographic Material

KONISHIROKU PHOTO INDUSTRY CO. LTD.

U.S. Patent 4,477,561

A Ag halide photographic material having a storage-stable wide latitude for exposure includes at least two layers containing a photosensitive Ag halide, optionally sensitised with Au and S, and a water-soluble compound, of mol.wt. not less than 100, of a platinum group metal. Preferred compounds are ammonium chloroplatinate, ammonium hexachloroiridate and potassium hexachlororhodate.

GLASS TECHNOLOGY

Glass Testing

GLAVERBEL AND VERTIPACK *British Appl. 2,145,829A*

Pt or Pt alloy electrodes are used in an apparatus for monitoring the redox state of elements in molten glass.

Glass Fibre Feeders

OWENS-CORNING FIBERGLAS CORP.

U.S. Patent 4,482,370

Pt or Pd feeders reduce flooding with tipless bushes by providing passageways between the orifices.

ELECTRICAL AND ELECTRONIC ENGINEERING

Optical Cables

BICC P.L.C.

British Appl. 2,144,559A

To reduce migration of potentially harmful H into an optical fibre of an optical cable, the cable incorporates a Pd wire to absorb H or the optical fibre itself may have a Pd coating.

Thermal Cut-Out Devices for Radiant Heaters

MICROPORE INTERNATIONAL LTD.

British Appl. 2,146,431A

A Group VIII metal such as Pt, Ir, or Au is used as a radiation-reflective coating material in a thermal cut-out device for a radiant heater.

Matrix Print Head

INTERNATIONAL BUSINESS MACHINES CORP.

European Appl. 132,615

Electrolytic printing heads are made from stacked and laminated green ceramic sheets whose holes are filled with conductive paste to form electrodes. The surface is screen printed with a layer of RuO₂. The electrodes are preferably made from a Ag-Pd powder.

Conductive Sheet for Recording Purposes

TORAY INDUSTRIES INC.

European Appl. 134,117

Electrostatic recording is carried out using an organic polymer sheet coated with a layer of metal oxide and a layer of Pt, Pd, Rh, Ir, or Ru. The oxide layer may consist of In and Sn oxides.

Light-Duty Electrical Contact Material

A.T. & T. BELL LABORATORIES U.S. Patent 4,475,983

A light-duty contact material or reduced film resistance is made by powder-metallurgical techniques from a matrix material, preferably Cu, in which are dispersed particles of a harder conductive material such as Ru, Os, RuO₂, Ru₂B₃, Ru₂W₃, Ru₂Mo₅, Re, etc.

Thick Film Resistor Composition

E.I. DU PONT DE NEMOURS & CO.

U.S. Patent 4,476,039

A stain-free thick film resistor composition preferably consists of 15–30% RuO₂, 5–50% of a specified compound which will liberate O₂ on heating, such as Ag₂O or CoCrO₄, 5–20% inorganic glass frit binder and 5–45% organic medium.

X-Ray Tube

SPIRE CORP.

U.S. Patent 4,477,921

A composite target for use in an X-ray lithography source tube includes at least one X-ray-generating layer of Cu, Al, Si, W, Mo, Ag, Pt, Pd or Rh; and a water-interface layer including a layer of material of high thermal conductivity, preferably Cu, coated on one side by a material of high melting point, preferably Ta, and on the other side by a material of good corrosion resistance, preferably Pd.

Capture of Solar Energy

YEDA RESEARCH & DEVELOPMENT CO. LTD.

U.S. Patent 4,478,699

A device using solar energy to convert CO₂ and H₂O to a mixture of formic acid, formaldehyde and methanol includes a layer of powdered photoactive material which may be Ru oxide or sulphide, among others.

Electric Contacts

CHUGAI DENKI KOGYO K.K.

U.S. Patent 4,479,892

An electric contact material for use at high current density and/or high temperature consists of a substrate of Cu, Ni, Fe and/or Ag; a layer of Ag containing 2–20% finely dispersed particles of Sn, Sb, Zn, In, Cd and/or Bi oxide(s); and a surface layer of Pd or Au diffused into the Ag layer under pressure and at 700–900°C.

Electrochromic Display Devices

CITIZEN WATCH CO. LTD.

U.S. Patent 4,482,216

By using two layers of electrochromic material with an additional electrode, a lower driving voltage is needed to achieve the same colour change. The first electrochromic material may be W oxide and the second is selected from Ir, Rh and Ni oxides.

Magnetic Recording Medium

T.D.K. ELECTRONICS CO. LTD.

U.S. Patent 4,486,498

A magnetic recording medium consists of a substrate layer and at least one magnetic layer which is an alloy of Co with Zn, Rh or Ir in the ratios by weight for Co:Zn of 70:30–86:14, Co:Rh of 73:27–85:15 and Co:Ir of 75:25–90:10.

Contact for Solar Cells

TELEFUNKEN ELECTRONIC G.m.b.H.

German Offen. 3,316,417

The electrical contact on the reverse side of a semiconductor solar cell device is formed from consecutive layers of Ti, Pd and Ag.

MEDICAL USES

Immunological Compositions

NATIONAL RESEARCH DEVELOPMENT CORP.

British Appl. 2,144,330A

Immunogenic compositions consist of a peptide or protein material and OsO₄, K permanganate or Ru oxide. Antibodies raised by the use of such compositions are of value in therapy and diagnosis, such as in snake venom vaccines.

Trace-Labelled Metallothioneins

E. I. DU PONT DE NEMOURS & CO.

European Appl. 137,457

Compounds for diagnostic or therapeutic applications are target-seeking biologically active molecules which are associated with metallothioneins containing trade-label metals such as the platinum group metals, Au and Ag, among others.

Sugar Determination

SIEMENS A.G.

U.S. Patent 4,477,314

An apparatus for the electrocatalytic determination of glucose, especially in blood, incorporates a platinised Pt electrode and a reference electrode.

Platinum Complexes for Cancer Treatment

OTSUKA CHEMICAL CO. LTD.

U.S. Patent 4,477,387

Compounds of increased activity in the treatment of cancer are complexes of Pt with a diamine, such as a cyclohexane-1,2-diamine or phenyl ethylene-diamine, and D-gluconic acid.

Dental Restoration Alloy

J. M. NEY CO.

U.S. Patent 4,482,323

A casting alloy which offers good adhesion to fired porcelain contains 45–60% Pd, 25–45% Ag, 3–15% of a hardening component (Sn and/or In), 0.3–9% Zn, 0.1–1% Si, up to 0.5% of a grain refining agent (Re and/or Ir) and up to 5% of Cu, Mn, Ga and/or Ru. A typical alloy contains 55% Pd, 35% Ag, 9% Sn.

Antitumour Platinum Oligomers

F. ROCHON and P. KONG

French Appl. 2,541,284

Polycarboxylic acids are reacted with Pt iodide complexes of ammonia, a primary or secondary amine or pyridine to give oligomeric complexes, such as cis-platinum diammine cyclobutylamine benzene tetracarboxylate.

Dental Alloy

DEGUSSA A.G.

German Offen. 3,316,595

An improved dental alloy contains 65–85% Pd, 0–10% Au and/or 0–5% Pt, 0.1–10% Sn, 1–10% Ga, 1–12% Cu, 0.05–1.5% Ru and/or 0.05–0.7% Re.