

1-phenylalkanols and silyl enol ethers respectively. Asymmetric hydrosilylation of a series of alkyl phenyl ketones catalysed by chiral phosphine-Pt(II) complexes was studied.

Palladium-catalysed Dibenzofuran Synthesis by Dehydrogenative Ring Closure

A. SHIOTANI and H. ITATANI, *J. Chem. Soc., Perkin Trans. I*, 1976, (11), 1236-1241

Studies of the dehydrogenation of diphenyl ethers in the presence of a Pd acetate catalyst showed that under O₂ pressure the coupling proceeds with a catalytic quantity of Pd acetate to give dibenzofuran in higher yields relative to dimers. The regeneration of the Pd acetate is described.

CHEMICAL TECHNOLOGY

The Effect of Nickel and Palladium Additions on the Activated Sintering of Tungsten

R. M. GERMAN and V. HAM, *Internat. J. Powder Metall. Powder Technol.*, 1976, 12, (2), 115-125

Studies of sintering processes on two different W powders show that Pd is a better sintering activator than Ni at 1100-1400°C. Both Pd and Ni give best shrinkage enhancement when present at the quantity of four atomic monolayers.

NEW PATENTS

METALS AND ALLOYS

Alloys Containing Platinum Group Metals

JOHNSON MATTHEY & CO. LTD.

French Appl. 2,277,903

Apart from impurities, the alloy contains at least 40% Ni or Co, a trace to 30% Cr and a trace to 15% of one or more of Pt, Pd, Rh, Ir, Os and Ru. The alloy is useful for manufacturing reaction motor parts and gas turbines.

ELECTROCHEMISTRY

Seawater Electrolysis Cathode

ELECTRONOR CORP.

U.S. Patent 3,947,333

A cathode for a cell has an electrically conductive electrode base with an outer coating, on at least a portion of its surface, of an alloy of Pd and 10-50% of either Ag or Pb.

Iridium Thin Ribbon Electrodes for Electrochemical Cells

E. I. DU PONT DE NEMOURS & CO.

U.S. Patent 3,954,590

An electrolytic moisture detection cell consists of a substrate and spaced thin ribbon metal electrodes having a thickness of 0.1-1.0 μm attached

ELECTRICAL AND ELECTRONIC ENGINEERING

Electroetching of Platinum in the Titanium-Platinum-Gold Metallisation on Silicon Integrated Circuits

R. P. FRANKENTHAL and D. H. EATON, *J. Electrochem. Soc.*, 1976, 123, (5), 703-706

A rapid electrolytic method of etching patterns in Pt on semiconductor slices is described, a periodically varying potential being applied to the Si wafer immersed in HCl solution at room temperature. The dissolved Pt can be recovered and the process is also applicable to the etching of metallisations on other high-resistance substrates.

Hydrogen-sensitive Palladium Gate MOS Capacitors

M. C. STEELE, J. W. HILE and B. A. MACIVER, *J. Appl. Phys.*, 1976, 47, (6), 2537-2538

The C-V characteristics of Pd gate MOS capacitors using thin Pd films (100Å) on thin oxide layers (100-1000Å) change considerably when exposed to an air ambient containing up to 4% H₂. The changes are attributed to the lowering of the Pd work function brought on by the formation of Pd hydride.

to and supported by the substrate. The electrodes consist of an anode and a cathode, the cathode being formed by Ir or an alloy containing at least 10% Ir and the remainder Pt. A hygroscopic film is deposited on the substrate and fills at least a portion of the space between the anode and the cathode.

ELECTRODEPOSITION AND SURFACE COATINGS

Thin Layers of High Melting Point Materials

SIEMENS A.G.

British Patent 1,442,109

A thin layer of Os, W, Mo or Re is produced on a substrate by evaporating the (IV) oxide of the metal under a high vacuum while heating the substrate.

Chemical Plating Catalyst

A.M.P. INC.

U.S. Patent 3,937,857

A substrate is catalysed for chemical plating by applying and then thermally decomposing a thin film of a complex L_mPdX_n or the corresponding Pt complex. L is a ligand or unsaturated organic group, X is halide, alkyl or a bidentate ligand, m is 1-4 and n is 0-3. A typical complex is Pd bis-triphenylphosphine dichloride.

Brazed Electronic Circuit Package

BURROUGHS CORP. *U.S. Patent 3,941,916*

Au plated electrical lead pins are fixed in pin receiving holes in a ceramic layer of an electronic package by depositing Pd-Ag on the interior surfaces defining the holes, depositing Au on the Pd Ag, positioning Au plated pins within the holes and brazing the Au plated pins within the holes with an Au-Ge solder.

Rhodium Plating of Contacts

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

German Offen. 2,442,212

Long life spring contacts are provided on spring Ni-Fe elements, by applying a Rh layer in at least two electroplating operations with intermediate annealing to increase the adhesion.

LABORATORY APPARATUS AND TECHNIQUE

Ion Monitoring

ETAT FRANCAIS

British Patent 1,436,287

Ion monitoring apparatus for the detection of a cyanide ion-forming component in a gaseous medium of cyanide ions in aqueous solution has a working electrode formed of a metal selected from Pt, Ag and Au.

Oxygen Sensor

GENERAL ELECTRIC CO.

British Patent 1,436,339

The sensor has a first electrode of a corrodible metallic base member such as W, a second electrode of Rh or Pt wire coupled electrically to the metal of the first electrode, and a third electrode of Ag with at least a partial layer of Ag halide, other than fluoride, on the surface.

Gas Pollution Monitor

BRITISH GAS CORP.

British Patent 1,438,107

Low concentrations of NO_x and CO in a gas are measured by apparatus which includes a galvanic cell associated with each of two gas streams and consisting of a Pt cathode in contact with a buffered halide electrolyte in which is immersed an active C or Ag anode.

Oxygen Sensor Devoid of Catalytic Oxidation Activity

NISSAN MOTOR CO. LTD. *U.S. Patent 3,941,673*

An oxygen sensor has a layer of a solid oxygen-ion electrolyte, a first electrode formed on one side of the layer to communicate with a reference gas and a second electrode formed on the opposite side of the layer of Pt or Rh and at least one catalytic poison selected from Pb, S, P, As and their compounds. The catalytic poison is such that the complex material is devoid of catalytic activity with respect to oxidation of CO and hydrocarbons in an engine exhaust gas.

HETEROGENEOUS CATALYSIS

Alkanolamine Derivatives

IMPERIAL CHEMICAL INDUSTRIES LTD.

British Patent 1,433,592

Hydrogenolysable protecting groups are removed by catalytic hydrogenation in the presence of Pd on charcoal catalyst in the production of 3-isopropylamino-1-[2-methoxy-4-(3-methylureidomethyl) phenoxy]-2-propanol.

Preparing Cycloolefins

INSTITUT NEFTEKHIMICHESKOGO SINTEZA IMENI A.V. TOPCHIEVA AKADEMII NAUK S.S.S.R.

British Patent 1,434,176

A cycloolefin is prepared by hydrogenating the corresponding cycloolefin with hydrogen in the presence of a catalyst which is an alloy containing Pd and Ru or Rh, preferably 10% Ru or 2% Rh.

Hydrocarbon Conversion with a Sulphided Catalytic Composite

UNIVERSAL OIL PRODUCTS CO.

U.S. Patent 3,936,369

The hydrocarbon is contacted with a catalytic composite consisting of a porous carrier material containing 0.01-2% Pt or Pd, 0.01-2% Ir, 0.01-5% Ge and 0.1-3.5% halogen. The Pt or Pd, Ir and Ge are uniformly dispersed throughout the porous carrier material and the catalytic composite is sulphided prior to contact with the hydrocarbon, by treating the composite with a sulphiding gas at conditions selected to incorporate 0.05-0.5% S.

Platinum Group Metal on a Support Having Separate Alumina Phase

ATLANTIC RICHFIELD CO. *U.S. Patent 3,937,742*

In the hydroformylation of 2-16C olefins a new catalyst consists of 0.001-1% Rh, Ru, Pt or Pd deposited on a SiO₂-Al₂O₃ support which has a separate Al₂O₃ phase. The support consists of 45-95% amorphous SiO₂-Al₂O₃ and 5-55% of a separate phase of Al₂O₃ resulting from the calcination of a mixture of amorphous hydrous Al₂O₃ and Al monohydrate.

Catalyst for Purifying I.C.E. Exhaust

JOHNSON MATTHEY & CO. LTD.

U.S. Patent 3,945,948

A catalyst consists of a mixed oxide obtained by co-precipitating Ru and a base metal as hydrated oxides from a solution of Ru salt and salt of Ti, Zr, Hf, Nb and/or Bi, drying and calcining.

Zinc Aluminate Catalyst Compositions

PHILLIPS PETROLEUM CO. *U.S. Patent 3,948,808*

A catalyst composition consists of Zn aluminate promoted with 0.05-20%, calculated as the metal, of at least one of Pt, Pd, Ir, Re, Ni, Cu, Bi, Mn and Ce or La, and is used in the purification of organically polluted water.

1 to 20% Rh-Pt Catalysts

JOHNSON MATTHEY & CO. LTD.

U.S. Patent 3,951,860

A catalyst consists of an inert porous refractory ceramic material such as zircon-mullite, mullite, α - Al_2O_3 , in the form of a corrugated cellular honeycomb which is coated with a layer or deposit of a mixture of two catalytically active refractory metal oxides. The first of the oxides is an oxide of Be, Mg, B, Al, Si, Ti, Zr, Hf and/or Th and the second is an oxide of Sc, Y and/or a lanthanide. A second coating consisting of a mixture of Pt and 1-20% Rh is applied to the refractory oxide coating. The catalyst is particularly useful in the vapour phase oxidation of CO and the lower hydrocarbons.

Hydrocarbon Conversion Catalyst

UNIVERSAL OIL PRODUCTS CO.

U.S. Patent 3,951,868

A conversion catalyst consists of a porous carrier material containing 0.01-2% Pt group metal, 0.1-3.5% halogen, 0.01-5% Ge or Sn and In in an amount sufficient to result in an atomic ratio of In to Pt group metal of about 0.1 : 1 to about 1 : 1. A typical catalyst contains 0.375% Pt, 0.22% In, 0.5% Sn and 1.0% combined chloride. The atomic ratio Sn : Pt is 2.19 : 1 and of In : Pt is 1 : 1. The catalyst may be used for reforming naphtha.

Hydrocarbon Conversion Catalysts

EKKON RESEARCH & ENGINEERING CO.

U.S. Patent 3,953,368

Useful hydrocarbon conversion catalysts consist of Ir and at least one other metal, preferably Pt, in the form of highly dispersed polymetallic clusters on a refractory support.

Hydrocarbon Conversion Catalyst

STE. FRANCAISE DES PRODUITS POUR CATALYSE

French Appl. 2,268,558

A high strength, abrasion resistant catalyst for hydro conversion reactions, especially isomerisation and dehydrocyclisation reactions, consists of a support such as Al_2O_3 , a Pt group metal or metals and a pair of metals selected from Mn/Ge, Mn/Sn and Ge/Sn. A halogen is also preferably present. In one example Al_2O_3 carrying 0.4% Mn, 0.35% Pt, 0.5% Ge and 1.05% Cl is used.

Hydrodealkylation Catalyst

INSTITUT FRANCAIS DU PETROLE

French Appl. 2,268,772

The hydrodealkylation of alkyl aromatic compounds is catalysed by a supported mixture of 0.05-5% Pt group metal, Co and/or Ni and 0.05-5% of Au, Ag, Cu, a lanthanide, Ti, Hf, Nb and/or Ta. Al_2O_3 -supported mixtures of 0.4% Ir and 0.5% Au or 0.4% Rh and 0.5% Eu are used in one example for benzene production from alkyl benzenes.

Ruthenium Containing Catalyst

FORD FRANCE S.A.

French Appl. 2,274,352

Finely divided Ru is fixed on a catalyst by preparing an acid solution containing at least two materials at least one of which is a product which contains Ru and a lanthanide which can be used with the active material in an oxidising atmosphere to form a non-oxidising, non-volatile and heat-stable compound and precipitating the two materials from a solution on to the substrate which forms the support.

HOMOGENEOUS CATALYSIS

Vinylation of Aromatic Compounds

UNIVERSAL OIL PRODUCTS CO.

U.S. Patent 3,936,473

A coumarin is produced from a hydroxylic aromatic compound by vinylation in the presence of a Pt group metal or Cu acetylacetonate or carboxylate. A preferred catalyst system consists of Pt acetylacetonate, cupric propionate, propionic acid and air.

Transition Metal Carboxylates

JOHNSON MATTHEY & CO. LTD.

U.S. Patent 3,939,219

A process for homogeneous, liquid-phase, hydrogenation reactions uses, as catalyst, a cation of a Pt group metal, Mo, Cr, Cu or Re which may be complexed with carboxylate, thiocarboxylate or dithiocarboxylate groups, such as a protonated Ru acetate. The metal complex may be prepared from a metal carboxylate salt, optionally stabilised, and a strong acid.

Production of Aromatic Primary Amines

MONSANTO CO.

U.S. Patent 3,944,615

Aromatic primary amines are prepared by reducing an aromatic nitro compound with CO and water in the presence of a basic N containing compound, tertiary amine or an amide, and a Rh catalyst selected from Rh oxide, Rh hydroxide, a Rh carbonyl compound and a Rh salt which forms a Rh carbonyl compound under reduction conditions.

Iridium Carbonyl Complexes

MONSANTO CO.

U.S. Patent 3,948,962

New hydrocarboxylation catalysts are Ir carbonyl halide complexes of MR_3 , where M is P, As, Bi or Sb and R is 1-20C alkyl, alkoxy, aryl or aryloxy, such as $\text{IrBr}(\text{CO})_2(\text{PPh}_3)$.

Carbonylation of Olefins and Acetylenes

IMPERIAL CHEMICAL INDUSTRIES LTD.

U.S. Patent 3,952,034

Olefins and acetylenes are carbonylated using a homogeneous catalyst containing Pd and Fe or a Group IVA, VA or IIIB element as a mutual complex or a simple mixture. In one example a

phosphino-Pd-Fe carbonyl complex is used and in another example a bis(triphenyl phosphine) Pd chloride-ferric chloride mixture.

GLASS TECHNOLOGY

Producing Decorated Glass-ceramic Surfaces

P.P.G. INDUSTRIES INC. *British Patent 1,436,040*
A glass-ceramic article containing less than 0.02% As oxide and Sb oxide is decorated by contact with a material containing molten Sn so that the Sn penetrates at least 5 μm into the surface of the article. A stain decorating composition including a colourant selected from compounds of Pt, Pd, Ag or Au, is applied to portions of the surface of the article. The article is heated causing the colourant to penetrate the surface.

ELECTRICAL AND ELECTRONIC ENGINEERING

Plastic-packed Semiconductor Device

R.C.A. CORP. *British Patent 1,442,881*
The conductors in a p-n junction semiconductor consist of a layer of Ti, a layer of Pt or Pd, a layer of Au and a SiO₂ protective coating.

Multi-layer Capacitor

P. R. MALLORY & CO. INC. *British Patent 1,444,380*
The capacitor consists of a body including a number of layers of material which has been formed by rolling from powdered ceramic material, and Pd, Pt, Au and Ag electrode layers between and contiguous with the ceramic layers. Metallic termination layers of the same metals are formed on the body surface.

Schottky Barrier Diode Semiconductor

SIGNETICS CORP. *U.S. Patent 3,938,243*
In a method for fabricating a Schottky barrier diode semiconductor structure, Si semiconductor body ohmic contacts are formed from a ternary alloy of approximately 50% Si, 37.5-45% Ni and 5-12.5% Pt. The relative amounts of Ni and Pt in the alloy are adjusted to provide a predetermined barrier height in the range of approximately 0.64-0.835 eV.

Powder Compositions of Polynary Oxides and Copper

E. I. DU PONT DE NEMOURS & CO. *U.S. Patent 3,950,597*
Resistors are formed on dielectrics from powders of conductive polynary oxides with a pyrochlore crystal structure. The oxides have the formula $M_x M'_{2-x} M''_2 O_{7-2}$ where M is Ag and/or Cu, M' is Bi used alone or mixed with Cd, Pb, Y, Tl, In or a lanthanide, M'' is Ru and/or Ir or their mixtures with Pt, Ti and/or Rh, x is 0.1-0.6 and z is 0.1-1.0.

Resistance Element

SIEMENS A.G. *German Offen. 2,446,606*
A protected resistance element has a resistance path of Pt-Au alloy applied to the inside of a hollow tube of insulator.

Liquid Metal Connector

JOHNSON MATTHEY & CO. LTD. *German Offen. 2,542,582*
Current is supplied to a vessel filled with conducting material, such as molten glass, by means of a fin which enters the vessel but is not rigidly attached to it. The other end of the fin is linked to a second filled container attached to a current source. The fin conductor is a Pt group metal, Au, Ag, Cu, Al or their alloys.

TEMPERATURE MEASUREMENT

Electrical Accumulators Having Temperature Indicating Means

VARTA BATTERIE A.G. *British Patent 1,437,752*
A battery has visible means for indicating when a given temperature differing from ambient temperature has been reached. The visible indicator is Ag-Hg iodide or Ag-Cu-Hg iodide combined in a coil of blue asbestos cloth catalysed with Pd and made H₂O repellent.

High Temperature Sensing Elements

SIEMENS A.G. *British Patent 1,441,739*
A high temperature sensing element consists of a hot conductor installed in a gas- and liquid-tight quartz housing containing an oxidising atmosphere. Current is supplied by Pt supply lines.

MEDICAL USES

Plastics Article for Use with Biological Tissue

DEVEX S.A. *British Patent 1,441,627*
The article is, for example, a surgical implant for use in prolonged contact with biological tissue and consists of a transparent body of plastics material, at least part of the surface having a transparent film of Ag, Au, Rh, Pt or Pd on it.

Dental Gold Alloys

W. C. HERAEUS G.m.b.H. *German Offen. 2,441,360*
Au alloys particularly suitable for firing on to porcelain contain 20-30% Pd, 15-25% Ag, 2.5-5% Sn, 0.05-0.5% Ir, 0.05-0.5% Ru, 0.05-0.5% Cu, 0.1-2% In, remainder Au.

Copper-free Dental Gold Alloy

DEUTSCHE GOLD- & SILBER-SCHNEIDANSTALT *German Offen. 2,453,799*
An alloy for crowns and bridges contains 25-40% Ag, 40-60% Au, 5-20% Pd, 0.05-0.5% Ir, 0-6% In, 0-6% Sn and 0-2% Zn.