

NEW PATENTS

METALS AND ALLOYS

Palladium-Containing Silver Alloy

KYOCERA CORP *Japanese Appl.* 2006-037,183
A Pd-containing Ag alloy (1), having a blackish colour and a metallic lustre, with good resistance to sulfur is claimed. (1) contains (in wt.%): 10–40 Sn, 1–10 Pd and ≥ 50 Ag. Further, if necessary, either one or both of (in wt.%): 1–5 Co and 1–5 In, may be added. (1) may be used for ornamental objects.

ELECTRODEPOSITION AND SURFACE COATINGS

Fabrication of a Rocket Engine Chamber

AEROJET-GEN. CORP *U.S. Appl.* 2006/0,124,469
A method for manufacturing a rocket engine combustion chamber uses electrodeposition to form a uniform layer of Ir on a mandrel. A controlled atmosphere plasma spray (CAPS) process is then used to deposit a structural refractory layer such as metals or alloys of Re, Mo, W, Ta, or a mixture, onto the Ir layer. A second CAPS process applies a transition refractory layer containing Nb or Ta.

APPARATUS AND TECHNIQUE

Neutron Detector Assembly with Rhodium Emitters

A. Y. C. CHENG *U.S. Appl.* 2006/0,165,209
A system to measure neutron flux in a nuclear fuel assembly includes at least two detectors of differing length, made from Rh. Each detector has an outer sheath forming an inner volume into which an inner emitter is placed, which is structured to accept neutrons and provide an electrical signal. The signal is transmitted to an exterior lead by at least one lead connected to each emitter.

Material for Air Bag Inflator Primer

TANAKA KIKINZOKU KOGYO KK *Japanese Appl.* 2006-046,797
A Pd alloy (1) for an air bag inflator primer having high specific resistance value, good workability, and excellent corrosion resistance is claimed. (1) contains 5–30 wt.% Mo and the balance Pd. (1) is used as a fuse for an air bag inflator and can be manufactured at low cost, compared with alternative materials.

HETEROGENEOUS CATALYSIS

Water Gas Shift Reactor

JOHNSON MATTHEY PLC *British Appl.* 2,423,489
A water gas shift reactor is claimed which includes two different catalyst zones arranged in close proximity. The temperature of the gases leaving the first zone is the same as that of the gases entering the second. The first zone catalyst has positive-order kinetics and consists of Au dispersed on ceria or zirconia, and the second zone catalyst has negative-order kinetics and consists of Pt dispersed on ceria or zirconia.

Rhodium-Containing Catalysts

CELANESE INT. CORP *European Appl.* 1,694,435
A method of producing a catalyst or precatalyst for making alkenyl alkanooates includes four aspects which may be applied separately or in combination. The first aspect includes a Pd/Au catalyst or precatalyst with Rh on a support material (1), which may optionally be calcined. The second aspect is that (1) may be layered, with one layer free of catalytic components; the third aspect is that (1) may contain zirconia; the fourth aspect is that the catalytic components may be substantially Cl-free.

1,2-Diamino-3-methylcyclohexane Production

BASF AG *World Appl.* 2006/066,762
A method for producing 1,2-diamino-3-methylcyclohexane and/or 1,2-diamino-4-methylcyclohexane is disclosed. 2,3- and/or 3,4-diaminotoluene is reacted with H₂ under high pressure (100–300 bar) and high temperature (130–220°C), in the presence of a Rh/ γ -alumina catalyst containing 1–25 wt.% Rh relative to substrate. A dialkyl ether and/or an alicyclic ether is used as the solvent, with 5–500 mol% NH₃ added relative to substrate.

Preparation of Palladium Biocatalysts

CNRS *World Appl.* 2006/087,334
A bacterium strain (1) having a gene coding for a membrane-bound [NiFe] hydrogenase (2), or membrane extracts (3) containing (2) are used for the preparation of metallic biocatalysts containing Pd, Pt, Ru, Rh or Ir. For example, a solution of Pd(II) is brought into contact with (1) or (3) to allow initial sorption of Pd(II), then H₂ gas is bubbled through to precipitate Pd in reduced form. The resulting Pd(0) particles are cheaper to produce, have smaller particle size and higher catalytic activity than other methods.

Electrochemical Palladium Catalysed Reaction

COMBIMATRIX CORP *U.S. Appl.* 2006/0,151,335
An isolated Pd(0) catalysed reaction, preferably a Heck reaction, is performed on an electrode array device. The electrodes are immersed in a solution of a transition metal catalyst system containing Pt or Pd, plus a confining agent such as an oxidant to convert Pd(0) to Pd(II), to limit diffusion of catalyst. Catalyst is regenerated by biasing one or more electrodes.

Spongy Platinum Nanoparticles

UNIV. MIYAZAKI *Japanese Appl.* 2006-045,582
Spongy nanoparticles (1) containing Pt are fabricated by reducing a chloroplatinic acid salt with a borohydride salt, in the presence of two ionic or non-ionic surfactants. (1) have a porous single crystal structure with outer diameter 20–100 nm, with rod-like frames of diameter 1.5–4 nm interconnected in 3 dimensions, to give fine pores of size 0.3–2 nm. (1) can be used as catalysts for fuel cells or exhaust gas treatment, and in electrodes or sensors.

HOMOGENEOUS CATALYSIS

2-Substituted Propionic Acids and Amides

PHOENIX CHEM. *British Appl.* 2,422,603

A process for preparation of 2-substituted propionic acids and amides includes converting a substrate by enantioselective hydrogenation. Preferred hydrogenation catalysts include a ligand containing a metallocene group with a chiral P or As substituent, a linker group such as a ferrocene or a diphenyl ether, and a metal chelating group. A metal such as Rh, Ru, Ir, Pd, Pt or Ni is coordinated to the ligand.

FUEL CELLS

Palladium-Cobalt Particles as Electrocatalysts

BROOKHAVEN SCI. ASSOC. *World Appl.* 2006/086,457

Pd/Co particles (1) are used in O_2 -reducing cathodes for fuel cells. (1) may be in the form of nanoparticles of diameter between ~ 3 –10 nm and may be supported on C black, graphitised C, graphite or activated C. (1) may have a binary alloy composition represented by the formula $Pd_{1-x}Co_x$, where x is between ~ 0.1 –0.9.

Anode Electrode

NITTO DENKO CORP *Japanese Appl.* 2006-019,133

An anode and a membrane-electrode junction are claimed which can reduce the cost of a solid polymer fuel cell, by improving the output of a Pt catalyst used for the anode. The catalyst layer includes Pt and a proton conductive polymer carried on a porous base. Particles of diameter < 100 nm, selected from Si oxide, Ti oxide or Al oxide are also included.

ELECTRICAL AND ELECTRONIC ENGINEERING

Platinum(II) Complexes in OLEDs

BASF AG *European Appl.* 1,692,244

Pt(II) complexes (1) are used as emitter molecules in OLEDs. (1) may include phosphine, bathophen or bipyridyl ligands, which may contain CN, acetylide, thiocyanate or isocyanate groups plus aryl, alkyl, heteroaryl or alkenyl groups. The OLEDs can be used in various devices including static screens for computers and televisions, or in screens for mobile devices such as mobile phones, laptops and vehicles.

Recording Medium and Reproducing Method

KYOTO UNIV. *Japanese Appl.* 2006-039,225

A high density recording medium (1) for digital holograms contains a recording layer consisting of a thin film of nanoparticles (2) containing Pt, Pd or Ni, with average particle size and film thickness of 3–20 nm. (1) uses laser light from near-UV to visible wavelengths to give instant recording and good stability. Information is recorded as a pattern of interference fringes between aggregated and non-aggregated regions of (2), induced by two beams of laser light: an information beam and a reference beam.

Superconducting Oxide Material

NIPPON STEEL CORP *Japanese Appl.* 2006-062,896

A bulk oxide superconductor, high in critical current density, consists of particles of $BaCeO_3$ or $Ba(Ce_{1-a}M_a)O_{3-b}$ ($0 < a < 0.5$ and $0 \leq b \leq 0.5$, M is a metal such as Zr, Hf, Sn) dispersed as pinning centres in a crystal of $RE_{1+x}Ba_{2-x}Cu_3O_y$ ($0 \leq x \leq 0.1$ and $6.5 \leq y \leq 7.2$, RE is at least one element selected from the group consisting of Y, La, Nd, Sm, Eu, Gd, Dy, Ho, Er, Tm, and Yb). One or both of Pt and Rh are added, between 0.1–5 wt.% of the material.

MEDICAL USES

Antitumour Compositions with Platinum Derivatives

SCHERING CORP *World Appl.* 2006/057,998

Combination compositions including a Pt-based compound, such as satraplatin, along with another chemotherapeutic agent such as temozolomide or lonafarnib are claimed. The combinations can be used for the prevention or treatment of various cancers in human patients. The pharmaceutical composition can be formulated into a single oral dosage form with a pharmaceutically acceptable carrier or administered as separate components.

Noble Metal Dental Alloy

P. J. CASCONI *U.S. Appl.* 2006/0,147,334

A dental alloy containing Ru which can be cast or machined into a dental prosthesis consists of $> 25\%$ metal selected from Ru, Pt, Pd, Ir, Os and Au, with $> 15\%$ or the greater portion being Ru, plus 15–30% Cr. The balance consists of a metal chosen from Fe, Ni and Co. Optionally, other elements can be added (in %): ≤ 15 Ga, ≤ 5 Si, ≤ 1 B; and/or ≤ 5 Nb, Ta or Re.

New Gene Expression Inhibitor

SCI. UNIV. TOKYO *Japanese Appl.* 2006-045,131

A new Pt-containing compound (1) capable of inhibiting gene expression based on a specific sequence is described. The structure of (1) includes two 5- or 6-membered rings each containing at least one N atom, with one N atom in each ring binding to Pt. The rings may be pyridine, pyrazine, pyrimidine, triazine, thiazole or imidazole rings. (1) is combined with a nucleic acid sequence related to a specific gene to achieve gene expression inhibition.

High Frequency Treatment Tool for Endoscope

PENTAX CORP *Japanese Appl.* 2006-068,407

A high-frequency treatment tool consists of a stainless steel or W alloy electrode (1), partly or completely coated with Pt or Au metal or their alloys, by plating, vacuum evaporation or ion plating. (1) is arranged at the distal end of an electrically insulated sheath inserted into the treatment tool insertion channel of an endoscope. (1) can be used to cauterise living tissue, without causing viable tissue to stick to it even under conditions of high-frequency treatment, and can be used continuously and repeatedly at high frequency.