

NEW PATENTS

CATALYSIS – APPLIED AND PHYSICAL ASPECTS

Cationic Rhodium Complexes

JOHNSON MATTHEY PLC *World Appl.* 2008/084,258

A cationic Rh complex can be synthesised by mixing a Rh-diolefin-1,3-diketonate compound and a P ligand in a ketone solvent; mixing with an acid to form a solution of the Rh complex; evaporating at least part of the solvent; optionally treating with an ether; and treating the resulting complex with an alcohol. The Rh complex may be recovered and used as a catalyst, for example in hydrogenation reactions.

Palladium-Germanium Transalkylation Catalysts

UOP LLC *U.S. Patent* 7,378,364

Alkylaromatic transalkylation catalysts containing acidic molecular sieve, Pd and Ge are claimed to have good activities and attenuate aromatic ring saturation and lights co-production, provided that sufficient Pd is present. Pd is 0.2–1 wt.% and the atomic ratio of Ge:Pd is at least 0.9:1. The molecular sieve has pore size $\geq 6 \text{ \AA}$.

CATALYSIS – INDUSTRIAL PROCESS

Adhesive Silicone Composition

BLUESTAR SILICONES FRANCE *World Appl.* 2008/080,791

A crosslinkable adhesive silicone composition with short crosslinking time giving suitable mechanical properties for use as an adhesive joint and for waterproofing a seam is claimed. The composition includes: (a) a polyorganosiloxane with at least two alkenyl groups, preferably C₂–C₆, linked to Si; (b) a polyorganosiloxane crosslinking agent with at least two H atoms linked to Si; (c) a metal catalyst, preferably Pt; and (d) a reinforcing mineral filler. There is also a polyorganosiloxane gum containing 0.001–0.2 wt.% alkenyl group(s), preferably vinyl groups.

Silicone-Based Pressure-Sensitive Adhesive

DOW CORNING TORAY CO LTD *World Appl.* 2008/081,913

The title composition contains: (a) the condensation reaction product of a diorganopolysiloxane having silanol groups on both molecular terminals and two or more Si-bonded alkenyl groups in side molecular chains, with an organopolysiloxane resin having one or more hydrolysable groups, in the presence of a catalyst; (b) an organohydrogenpolysiloxane; (c) a diorganopolysiloxane having Si-bonded alkenyl groups on both molecular terminals; (d) an organopolysiloxane resin; and (e) a platinum catalyst.

Thermoneutral Oil Reforming Catalyst

T. INUI *et al.* *U.S. Appl.* 2008/0,152,572

A catalyst containing Ni, Ce₂O₃, La₂O₃, Pt, ZrO₂, Rh and Re can be used for the thermoneutral reforming of liquid hydrocarbon fuels to give synthesis gas (H₂, CO, CO₂ and CH₄). The catalyst contains (in wt.%): 0.5–15 Ni, 0.5–10 Ce₂O₃, 0.5–5 La₂O₃, 0.1–2 Pt, 0.5–3 ZrO₂, 0.1–2 Rh and 0.1–2 Re.

CATALYSIS – REACTIONS

5-Fluoro-N-hydroxy-pyridine-2-carboxamide

ASTRAZENECA AB *World Appl.* 2008/054,284

The title compound (1) is synthesised by reacting 2-bromo-5-fluoropyridine with a Pd source in the presence of 1-1'-bis(diphenylphosphino)ferrocene (DPPF) and acetate ions, then with a cyanide source to give 5-fluoro-pyridine-2-carbonitrile (2). The Pd source may be tris(dibenzylideneacetone)dipalladium(0) or Pd acetate. (2) is then reacted with ethanol and hydroxylamine to produce (1).

Optically Active 2-Amino-1-phenylethanols

LONZA AG *World Appl.* 2008/077,560

The title compounds or salts thereof are prepared by asymmetric hydrogenation of the corresponding 2-aminoacetophenones in the presence of a Ru complex catalyst with a chiral phosphine ligand. The chiral phosphine ligand may be a diphosphine, and the Ru complex catalyst may also have a chiral diamine ligand.

EMISSIONS CONTROL

Catalyst for Purification of Exhaust Gas

EAST CHINA UNIV. SCI. TECHNOL. *World Appl.* 2008/086,662

A close coupled three-way catalyst includes a support selected from cordierite honeycomb ceramic materials having a pore volume of 0.25–0.35 ml g⁻¹. The coating layer contains a mixture of hexaaluminates, perovskite type composite oxides, CeO₂-ZrO₂ solid solutions, rare earth oxides, alumina, alkali earth metals and zeolites having a high Si:Al ratio. The active components are Pd-Rh, rare earth oxides and transition metals in the hexaaluminates and perovskite type composite oxides. The catalyst works for low temperature oxidation of HC and reduction of NO_x.

Engine Exhaust Catalysts Containing Palladium-Gold

NANOSTELLAR INC *European Appl.* 1,925,362

A catalyst for cleaning engine exhaust is claimed to have improved CO oxidation characteristics. The catalyst includes a first supported catalyst containing Pt, Pt-Pd or Pt plus a promoter such as Bi. A second supported catalyst contains Pd and Au in the weight ratio Pd:Au of ~ 0.5:1.0–1.0:0.5, preferably ~ 0.84:1.0. To improve aged catalyst performance, the first and second supported catalysts are coated onto different layers, zones or monoliths of the substrate.

Exhaust Emission Control Device

MAZDA MOTOR CORP *Japanese Appl.* 2008-075,638

A catalyst system for exhaust gas purification removes HC and CO from exhaust gas at engine start when the exhaust gas temperature is low, particulates which are collected by a filter, and NO_x. An active O₂ generating device, an oxidation catalyst, a particulate filter and a Pt-Rh catalyst are arranged in this order from the upstream side of the exhaust passage.

FUEL CELLS

Nanowire Supported Catalysts

GM GLOBAL TECHNOL. OPERATIONS INC

World Appl. 2008/070,482

A fuel cell electrode is formed from C fibres with metal oxide or C-coated metal nanowires directly grown on them, which carry deposited nanoparticles of Pt, Pd, Rh or Ru catalyst material. The metal oxide may be SnO₂, TiO₂ or WO₃, alternatively the C-coated metal may be Sn, Ti or W. The supported catalysts can be used for an electrode in a PEM for a H₂/O₂ fuel cell.

Fuel Electrode Catalyst

SANYO ELECTRIC CO LTD *Japanese Appl.* 2008-091,102

An electrode catalyst is claimed to have improved CO poisoning resistance. An electrode for an MEA is formed by arranging an alloy catalyst layer containing Pt, Ru and one or more of Co, Ni, Mo, Pb, Fe, W or Cr; an alloy catalyst layer containing Pt-Ru; and a Ru catalyst layer, in this order from the polyelectrolyte membrane to the gas diffusion layer. The fuel for the fuel cell system may be reformed gas or organic matter.

APPARATUS AND TECHNIQUE

Palladium Alloy Composite Membrane

J.-S. PARK *et al.*

U.S. Appl. 2008/0,116,078

The title composite for H₂ separation includes an optional first metal coating layer selected from Ag, Ni, Cu, Ru or Mo, applied by an electroplating process onto a porous support which is preferably porous Ni; a Pd coating layer applied using a sputtering process; and a second metal coating layer, preferably Cu. The second metal coating layer is heat treated to form an alloy layer of Pd and the second metal.

Nonlinear Optical Organic Single Crystal Formation

FURUKAWA CO LTD

Japanese Appl. 2008-001,529

A single crystal of an organic substance such as 4-dimethylamino-N-methyl-4-stilbazolium tosylate can be formed on a Pt wire in a supersaturated solution of the organic substance by cooling the supersaturated solution. The crystal nucleus is preferentially generated on the surface of the Pt wire. Generation of multiple nucleation points is suppressed and crystals can be grown at a low degree of supersaturation.

BIOMEDICAL AND DENTAL

Organometallic Compounds for Cancer Treatment

UNIV. NEUCHÂTEL

European Appl. 1,950,217

Novel organometallic compounds for photodynamic therapy against cancer include a central porphyrin or phthalocyanine backbone with ligand linkers coordinated to at least one transition metal selected from Ru, Rh, Os, Ir or Fe, preferably Ru. A preferred compound is a tetranuclear Ru(II) complex such as [Ru₄(η⁶-arene)₄(TPP)Cl₈] (TPP = 5,10,15,20-tetra(4-pyridyl)porphyrin).

ELECTRICAL AND ELECTRONICS

Sealed Penetration for Lithium Battery

COMMISSARIAT À L'ÉNERGIE ATOMIQUE

U.S. Appl. 2008/0,118,831

A glass-to-metal penetration for the electrical insulation between two poles of a Li battery includes glass such as TA23 or Cabal 12 glass, a Pt-Ir pin containing Pt:Ir in the weight ratio 90:10, and a body made from SS304L stainless steel. The coefficient of thermal expansion (CTE) of the pin is $8.7 \times 10^{-6} \text{ }^\circ\text{C}^{-1}$. The glass has good resistance in organic electrolyte medium combined with Li salt and a CTE $< 8.7 \times 10^{-6} \text{ }^\circ\text{C}^{-1}$.

Organic Memory Device

SAMSUNG ELECTRONICS CO LTD

U.S. Appl. 2008/0,146,802

An organic memory device includes a first electrode, an organic active layer which contains an Ir organometallic compound and an electrically conductive polymer, and a second electrode. Advantages claimed are rapid switching time, decreased operating voltage, decreased fabrication costs, increased reliability and improved non-volatility. The Ir organometallic compound has a maximum emission wavelength of 450–550 nm.

Iridium Oxide Film for a Semiconductor Device

OKI ELECTRIC IND. CO LTD *Japanese Appl.* 2008-075,134

An electrode includes an Ir oxide film with a metal membrane formed on its surface. High adhesion is claimed at the boundary between the films. The electrode can be used in a dielectric capacitor for a semiconductor device. The Ir film is formed by a reactive sputtering method using an O₂-containing gas and an Ir target with film deposition temperature of 275–400°C and sputtering pressure of 0.69–1.09 Pa.

SURFACE COATINGS

Sprayable Water-Base PGM-Containing Paint

GENERAL ELECTRIC CO

European Appl. 1,936,010

A Pt group metal containing layer can be deposited on a substrate by spraying a H₂O-based paint containing metallic Pt group metal powder, H₂O and a methyl cellulose binder. Heat can be applied to interdiffuse the Pt group metal containing layer. Optionally an additional layer of NiAl may be applied as an underlayer. The Pt group metal is ≥ 96 wt.% of the paint composition exclusive of H₂O and binder.

Methods of Depositing a Ruthenium Film

ASM GENITECH KOREA LTD *U.S. Appl.* 2008/0,171,436

A Ru film can be deposited on a substrate by applying deposition cycles of a Ru organometallic compound gas; purging the reactor; supplying RuO₄ gas; and purging the reactor. Alternatively, each cycle includes simultaneously supplying RuO₄ and a reducing agent gas; purging; and supplying a reducing agent gas. A high deposition rate is claimed, with good step coverage over structures which have a high aspect ratio.