NEW PATENTS

PHOTOCONVERSION
Electrochromic Mirror
TOKAI RICA CO LTD
European Appl. 1,400,839
A reflecting mirror suitable for use as an interior mirror, or as a rear-view mirror in a vehicle, comprises a H storing-metal or alloy of Pd, Rh and Pt in an electrically conductive reflecting film (1). (1) also contains an ion conductive dielectric film of Ta2O5, SiO2 or MgF2. A predetermined voltage is applied between (1) and a transparent ITO electrode (2) to release H ions. The H ions move through the ion conducting film to bond with a W oxide colouring film positioned between (2) and (1) making it bluish in colour.

Organo-Electroluminescence Element
SANYO ELECTRIC CO LTD
European Appl. 1,418,217
An organic electroluminescence device has a hole injection electrode formed on a glass substrate; a hole transport layer, a light emitting layer (1) and a hole blocking layer are formed sequentially on the hole injection electrode. (1) includes an organic Pt group metal compound (2) composed of a phenanthridine derivative and a Pt group metal element. (2) can emit red-orange light via a triplet excited state.

Rh and/or Ir Doped SrTiO3 for Water Decomposition
JAPAN SCL TECHNOL. CORP
Japanese Appl. 2004-008,963
A visible light active catalyst (1) is claimed, which comprises Rh and/or Ir doped SrTiO3 and with, in particular, a Pt metal catalyst. (1) is used for H2O decomposition to generate H2 from an aqueous MeOH solution under visible light irradiation.

APPARATUS AND TECHNIQUE
Gas Sensor
NGK SPARK PLUG CO LTD
European Appl. 1,418,421
A gas sensor has a detecting element with an electrode containing a Pt metal on the surface of a solid electrolyte. It is manufactured by: (a) applying nuclei of a Pt metal by sputtering (to catalyse a gas to be measured); and (b) growing the nuclei by electrolytically plating from an aqueous solution of platinnic ammine or platinnous ammine, and a hydrazine reducer.

Hydrogen Contamination Monitor
BOEING CO
U.S. Patent 6,734,975
A H detection system includes a H sensor (1) formed of at least Pd which can detect contamination within a Pd reaction member and can generate a H contamination signal. A surface spectroscopic system (2), having an output device configured to respond to a resonant frequency of a H–Pd bond, operates in conjunction with (1) to determine the H contamination and to generate a sensor contamination signal. A controller is electrically coupled to (1) and (2) and compares both signals; the controller can thus generate a corrected H contamination signal.

HETEROGENEOUS CATALYSIS
C7+ Paraffin Isomerisation Process
HALDOR TOPSOE A/S
European Appl. 1,402,947
High-octane gasoline is produced by a selective isomerisation of C7+ hydrocarbons containing ≥20 wt.% of C7+ hydrocarbons in the presence of 0.01–5% of Pt and/or Pd catalysts supported on Al2O3-ZrO2 modified with a W oxyanion. The reaction proceeds in H2 with a H2:H2O carbon ratio of 0.1–5, at 150–300°C, a total pressure of 1–40 bar and a LHSV of 0.1–30 h⁻¹. The feed may optionally also include shorter paraffins, aromatics or cycloparaffins.

Stabilised Alumina Supports for Partial Oxidation
CONOCOPHILLIPS CO
World Appl. 2004/043,852
Stabilised supports (1) stable at >800°C are prepared by adding a rare earth metal to an Al-containing precursor prior to calcining. The stabilised Al2O3 catalyst support comprises a rare earth aluminate with a molar ratio of Al:rare earth metal of ≥ 5:1. Catalysts comprising Rh, Ru and/or Ir or their combinations, loaded onto (1) are used for synthesis gas production via the partial oxidation of light hydrocarbons.

Catalytic Partial Oxidation of Hydrocarbons
UNIV. MINNESOTA
World Appl. 2004/044,095
C6–C30 hydrocarbons are produced by using a film of a fuel source that includes at least one organic compound, on a wall of a reactor. The fuel source is contacted with a source of oxygen; the mixture of fuel and oxygen are then vaporised and contacted with a supported catalyst containing Rh and/or Pt, under autothermal conditions for ≤ 25 ms. Preferred products include α-olefins and synthesis gas.

Exhaust Gas Purification Catalyst
TOYOTA JIDOSHA KK
Japanese Appl. 2004-008,932
The activity of supported Pt metal particles in an exhaust gas purification catalyst is improved by controlling the oxidation of the Pt oxide surfaces by using Pt oxide with lower Pt valence than that of stoichiometric PtO2 (0 < x < 2 and x ≠ 1). Electrons are involved in the gas adsorption, so unstable gas is easily adsorbed, and its reactivity increases. The cycle of adsorption and desorption of the gas is shortened and the amount of adsorbed gas per unit time is increased.

HOMOGENEOUS CATALYSIS
Chiral Organometallic Compounds
AVECIA LTD
European Appl. 1,417,030
Chiral organometallic compounds, used in asymmetric synthesis, comprise a non-symmetrically substituted cyclopentadiene complexed to Pt, Pd, Rh, Ru, Ir, Co, Fe or Mn, etc. The cyclopentadiene has a second coordinating group which also complexes the above metal and is attached to the cyclopentadiene by a chiral connecting chain.
Alkylidene Ruthenium Complexes
W. A. HERRMANN et al. U.S. Appl. 2004/095,792
Ru alkylidene complexes (1) containing N-heterocyclic carbene ligands are claimed and used as highly active, selective catalysts for olefin metathesis. Acyclic olefins with ≥2C atoms or/and cyclic olefins having ≥4C atoms can be made from acyclic olefins with ≥2C atoms or/and from cyclic olefins with ≥4C atoms by olefin metathesis in the presence of (1) with addition of HCl or HBr, and BF₃ or AlCl₃, etc.

Carbonylation of Conjugated Dienes
SHELL OIL CO U.S. Patent 6,737,542
Carbonylation (1) of conjugated dienes proceeds by reacting a conjugated diene with CO and a hydroxyl group-containing compound in the presence of a catalyst system comprising: a source of Pt cations; a P-containing ligand X₁-R-X₂; and a source of anions wherein X₁ and X₂ contain substituted or non-substituted cyclic group of ≥5 ring atoms, one being a P atom. R is a bivalent organic bridging group and connects both P atoms. (1) can be performed batchwise, semi-continuously or continuously.

FUEL CELLS
Reduction of Ammonia during Fuel Reforming
NUVERA FUEL CELLS INC World Appl. 2004/043,851
The formation of NH₃ in a fuel reforming process, such as an autothermal reforming process, is reduced by reacting a fuel with air and H₂O in a reforming unit containing a Pt group metal catalyst bed, for example, Pt, Pd, Rh, Ru and/or Ir, to produce a H- containing reformate stream substantially free of NH₃. The operating temperature and pressure for the reforming unit can be controlled, and the amount of catalyst should be sufficient to minimise the formation of NH₃ in the reformate stream to <50 ppm.

High Surface Area Material Films and Membranes
HEWLETT-PACKARD DEV. CO U.S. Appl. 2004/048,466
Patterns of spikes, bristles, dimples, pores, etc., are produced on wafers and transferred to film of Ru, Rh, Pd, Os, Pt, Co, Fe, etc., or conductive polymer film, such as Nafion, or to biological material film, such as of lipid, protein, enzyme, etc.; by repetitive processes, such as electroplating and embossing. This gives low cost, high surface area film of ~10 µm in thickness and spikes <1 µm. High surface area membrane is extremely valuable in fuel cells; the patterns may be used to cast inexpensive fuel cell electrodes.

Catalyst for Oxidising Reformed Gas
TANAKA KIKINZOKU KOGYO KK U.S. Patent 6,726,890
A catalyst (1) for oxidising reformed gas containing H₂ can selectively oxidise CO into CO₂ with high performance. The CO contained in the H₂ fuel for a SPFC, acts as a catalyst poison in the fuel cell. (1) contains a zeolite support, such as M-type mordenite, and a bimetallic alloy of Pt and 20–50% of Ru, Rh, Fe, Co, Mo, Ni and Mn. (1) can convert ≥60% CO.

ELECTRICAL AND ELECTRONIC ENGINEERING
High-Density Readable Only Optical Disk
SAMSUNG ELECTRON. CO LTD European Appl. 1,403,860
A high-density readable only optical disk (1), with large storage capacity, includes a substrate with pits; and mask layer(s), with a super resolution near field structure, made from dielectric material of metal oxide, nitride, sulfide, fluoride or their mixture, such as ZnS-SiO₂, and metal particles of Pt, Rh, Pd, Au or their mixture. (1) can be obtained without decreasing the wavelength of a laser diode or increasing the numerical aperture of an objective lens.

Magnetoelectronics Information Device
MOTOROLA INC U.S. Patent 6,714,446
A magnetoelectronics information device includes multilayer structures with spacer layers interposed between them. The first and second spacer layers are partially formed of one of Ru, Os, Rh, Cr, Re and Cu. A pinned magnetic region comprises an antiferromagnetic layer, formed of IrMn, FeMn, RhMn, PtMn and PtPdMn, and a ferromagnetic layer of Ni, Fe, Mn and Co. Spacer layers interposed between the two magnetic sublayers provide antiferromagnetic exchange coupling quantified by a saturation field.

Enhancing Adhesion of a Ruthenium Layer
MICRON TECHNOLOG INC U.S. Patent 6,737,313
A Ru metal layer is formed on a dielectric layer of a SiO₂ layer that has been prior treated with a Si hydride gas, such as silane, disilane or methylated silanes. The Si-containing gas treatment enhances adhesion between the dielectric and the Ru without requiring the addition of a separate adhesion layer between the dielectric layer and the Ru metal layer.

Nitride Semiconductor Element
NICHIA CHEM. IND. LTD Japanese Appl. 2004-006,991
A nitride semiconductor element (1) has excellent external quantum efficiency. (1) is made from a p-type nitride semiconductor layer (2). An electrode (3) containing Rh and Ir having high reflection coefficient is formed on (2). Ohmic contact is achieved between (2) and (3). The external quantum efficiency of (1) is good because the electrode has a high reflection coefficient, therefore reduces the absorption of light.

Semiconductor Device
MATSUSHITA ELECTRIC IND. CO LTD Japanese Appl. 2004-014,716
A GaN-based compound semiconductor has a Schottky electrode (1) of Cu alloy, such as Pd-Cu with ≤20% Cu, or Cu-Pt, Cu-Au, etc. A buffer layer, an undoped GaN layer and a n-type GaN active layer are formed on a sapphire substrate. Ohmic electrodes as source and drain electrodes, and a (1) as gate electrode are formed on the n-type GaN active layer. (1) has an excellent Schottky characteristic and high adhesiveness.