NEW PATENTS

PHOTOCONVERSION

Photocatalytic Substrate Active under Visible Light
SAINT-GOBAIN GLASS FRANCE. World App. 2005/102,952
A transparent glass substrate, used for glazing, contains a mechanically resistant, long-lasting coating, of a photocatalytically active compound containing a thin layer of Pt, Rh or Pd, closely associated with a doped GaP, CdS, TiO\(_2\), etc. An energy jump of 1.55-3.26 eV occurs between the upper level of the valence band and the lower level of the conductive band, corresponding to a wavelength in the visible field.

APPARATUS AND TECHNIQUE

Titania Nanotube Arrays for Use as Sensors
THE PENN RES. FOUNDATION. U.S. App. 2005/224,360
An electrical resistive device (1) for sensing H\(_2\) gas includes: an array of TiO\(_2\) nanotubes (1) formed by anodising a Ti layer; and a plurality of Pd (or other noble metal) clusters on top, mechanically supported by an integral member. (1) may contain dopant of < 1 mass% of Pd, Pt, Ru, Sb, etc. In O\(_2\), photocatalytically removes contaminants (liquid crude petroleum, pathogens, etc.) by exposure to radiant energy emitted within frequency range from visible to ultraviolet.

Integrated Capacitive Micromembrane Sensors
CALIFORNIA INST. TECHNOLOG. U.S. App. 2005/243,500
A microfluidic device for capacitive pressure sensing includes a fluid channel, a cavity region, and a polymer-based membrane in between. Additionally, the device includes two capacitor electrodes, consisting of Pt, Au, Al, Cr, Ti and doped polysilicon, coupled to the membrane and the cavity region, and an electrical power source placed between which causes an electric field within the cavity field.

VCSEL Structure with Platinum Sublayer
HONEYWELL INT. INC. U.S. App. 2005/243,886
A vertical cavity surface emitting laser (VCSEL) with high reflectivity and heat dissipation characteristics includes a bottom distributed Bragg reflector (1) on a substrate; a metal layer (2), including a reaction barrier sublayer of Pt, W and/or Ti interposed between (1) and the substrate, forming a composite mirror structure. A patterned dielectric layer may be interposed between to reduce a deleterious chemical reaction between (2) and (1).

Ammonia Gas Sensor Having Improved Detection
FIS INC. Japanese App. 2005-127,743
An NH\(_3\) gas sensor, with improved accuracy, comprises a semiconductor embedding a coil-like heater made of Pt or a Pt alloy acting as a substrate and a conductor-like electrode in a gas sensitive body (1) formed into a spherical shape. (1) is mainly made of Sn oxide and contains Au, to suppress the disturbance of NH\(_3\) detection output by Pt.

HETEROGENEOUS CATALYSIS

Elimination of Aldehydes by Catalytic Oxidation
HENKEL KG European App. 1,591,156
Aldehydes are eliminated by catalytic oxidation in the presence of a three-component catalyst comprising a catalytic composition of Ru/ZrO\(_2\) in O\(_2\), where M is Ca, Mn, Cu and/or In; \(x = 0.2-3\), especially 0.5-2 (the respective upper and lower limiting values are included). The process may be run at relatively moderate (for example, ambient) temperatures leading to a high conversion rate of aldehydes, thus resulting in harmless degradation products, especially CO\(_2\) and H\(_2\)O.

Platinum Catalysts Formed by in Situ Reduction
DE NORA ELETTRODI SPA World App. 2005/097,314
A C-supported Pt black catalyst (1) is obtained by chemical reduction of in situ-formed Pt dioxide (2) by conversion of dihydrogen hexahydroxplatinate precursor on a C black support, with an active area of 50 m\(^2\) g\(^{-1}\). The reducing agent is H\(_2\), formaldehyde, etc. (1) is obtained by variation of pH and/or temperature (120-500°C) and can be incorporated in a gas diffusion electrode or in a coated membrane.

Catalyst Used for the Oxidation of Hydrogen
BASF AG World App. 2005/097,715
A supported catalyst (1) for the oxidation of H\(_2\) in a hydrocarbon dehydrogenation process comprises \(\alpha\)-Al\(_2\)O\(_3\) carrying 0.01-0.1 wt.% Pt and 0.01-0.1 wt.% Sn, with the Pt:Sn ratio being 1:4 to 1:0.2, relative to the total weight of the catalyst. Also disclosed are methods for oxygenating H\(_2\) and for dehydrogenating hydrocarbons using rows of integrated reactors with (1).

Removal of Carbon Monoxide and Hydrocarbons
HTE AG World App. 2005/102,513
Simultaneous removal of CO and hydrocarbons from O-rich exhaust gases is carried out in the presence of a catalyst (1) containing SnO\(_2\) and Pd supported on a carrier oxide, such as a zeolite, being in a roentgenographically amorphous or nanoparticle form. (1) contains 3-50 wt.% SnO\(_2\) and 0.2-10 wt.% Pd and, optionally, Pt, Rh, Ir and Ru; based on the mass proportions relatively to the carrier oxide. (1) may also contain B oxide and/or other promoters.

Catalyst Prepared by Microwave Heating
DOW GLOBAL TECHNOLOG. World App. 2005/102,525
A hydro-oxidation catalyst (1) for the hydro-oxidation of a hydrocarbon, preferably a C3-C8 olefin, such as propylene, by O\(_2\) in the presence of H\(_2\) to the corresponding partially-oxidised hydrocarbon, such as propylene oxide is presented. (1) comprises Pt group metal(s), and/or Au, Ag, lanthanide rare earth metals, deposited on a titanosilicate, preferably TS-1, which is prepared by microwave heating.
Supported Ruthenium Nanoparticle Catalyst
UNIV. HONG KONG World Appl. 2005/102,971
Oxidation of alkenes is carried out on Ru nanoparticle catalysts (1-100 nm in size), with Mn and Fe nanoparticles, grafted on an inert solid support, such as hydroxyapatite. The reaction yields a cis-1,2-diol from an alkene, an oxidant and acid at -78 to 40°C. The catalyst effects cis-dihydroxylation and oxidative cleavage of alkenes to give the respective cis-diols and carbonyl products. The catalyst can be separated by filtration or centrifugation, and reused.

Modified Carbon Supported Palladium Catalyst
CSIR U.S. Patent 6,963,016
A highly active modified C supported Pd catalyst (1) containing 2-6 wt.% Pd, is produced by the simultaneous impregnation of activated C with Pd and organic Al precursors, such as Pd chloride and Al isopropoxide, respectively, in a tetraethyl ammonium hydroxide aqueous solution. (1) is used for the hydrodechlorination of dichlorodifluoromethane to hydroxide aqueous solution. (1) is used for the production of platinum-ruthenium alloy catalysts (1-100 nm in size), with Mn and Fe nanoparticles, grafted on an inert solid support, such as hydroxyapatite. The reaction yields a cis-1,2-diol from an alkene, an oxidant and acid at -78 to 40°C. The catalyst effects cis-dihydroxylation and oxidative cleavage of alkenes to give the respective cis-diols and carbonyl products. The catalyst can be separated by filtration or centrifugation, and reused.

HOMOGENEOUS CATALYSIS
Palladium Catalysed Indolisation
BOEHRINGER INGELHEIM INT. World Appl. 2005/090,302
Substituted indole compounds (1) were synthesised by reacting a 2-bromoaniline or 2-chloroaniline with a substituted acetylene in the presence of a Pd(OAc)2 catalyst, 1,1'-bis(di-tert-butylphosphino)ferrocene ligand, and K2CO3 base, in 1-methyl-2-pyrrolidinone solvent at 110-140°C. (1) are used in the field of pharmaceuticals and more specifically in processes for making substituted indole compounds.

Optically Active Polymers
NAT. INST. ADV. IND. SCI. TECHNOL. U.S. Patent 6,962,962
An optically active polymer (1) is obtained by polymerising a chiral alkoxy-substituted phenylacetylene, such as 1-bromo(2-methylbutoxy)phenylacetylene in the presence of a Pd(OAc)2 catalyst, 1,1'-bis(di-tert-butylphosphino)ferrocene ligand, and K2CO3 base, in 1-methyl-2-pyrrolidinone solvent at 110-140°C. (1) are used in the field of pharmaceuticals and more specifically in processes for making substituted indole compounds.

FUEL CELLS
Production of Platinum-Ruthenium Alloy Catalyst
HITACHI MAXELL LTD Japanese Appl. 2005/177,661 A Pt-Ru alloy catalyst is made by dissolving a Pt and a Ru salt or complex in an organic alcohol solvent. C powder is dispersed in the alcohol solution, which is then heated while refluxing alcohol. The Pt-Ru/C powder is filtered, then heat treated at 300-500°C in an inert atmosphere. Pt-Ru/C exhibits high activity when MeOH is oxidised and used in a fuel cell.

Electrode Catalyst for PEFCs
NISSAN MOTOR CO LTD Japanese Appl. 2005-196,972 Electrode catalysts (1) for use in PEFCs are manufactured by mixing Rh chloride-containing and Pt ion-containing reversed micelle solutions. Reducing agents, such as hydrazine, Na borohydride, etc., are added and conductive C supports are dispersed in the solution for loading composite metal particles onto the support. (1) have high activity and durability.

ELECTRICAL AND ELECTRONIC ENGINEERING
Ferroelectric Capacitor with a Template
TEXAS INSTRUMENTS INC U.S. Appl. 2005/230,725 A ferroelectric capacitor (1) comprises: a first electrode layer, including Ir, located over a substrate. An oxide electrode template (2) (20-100 nm thick) is located on the first electrode layer and includes perovskites: SrIrO3, SrRuO3, PbIrO3, PbRuO3, etc. (1) may include a ferroelectric dielectric layer over the oxide electrode template and a second electrode layer over the ferroelectric dielectric layer (2). (1) is used in ferroelectric random access memory devices.

TiW Platinum Interconnect
ANALOG DEVICES INC U.S. Patent 6,956,274 A metallisation stack used as a contact structure in integrated MEMS devices, particularly optical MEMS and Bio-MEMS, comprises a Ti-W adhesion and a barrier layer (1) with a Pt layer on top. (1) is formed by sputtering etching the Pt in Ar, followed by a wet etch in aqua regia using an oxide hardmask. Alternatively, the Ti-W and Pt layers are deposited sequentially and patterned by a single plasma etch process with a photoresist mask.

MEDICAL USES
Radiopaque and MRI Compatible Nitinol Alloys
ADV. CARDIOVASC. SYST. INC World Appl. 2005/102,407 A medical device, such as a stent, is made from radiopaque and magnetic resonance imaging compatible alloy, for use with, or implanted in, a body lumen. It has improved radiopacity, retains superelastic and shape memory behaviour, and has a thin strut/wall thickness for high flexibility. The stent is made from alloy (1) such as Ni-Ti (nitinol), and includes a ternary element of Ir, Pt, Pd, Rh, Ru, Au, Re, etc. A balloon-expandable stent made from (1) is claimed.

Supramolecular Photoactivated DNA Cleavage
VIRGINIA TECH INTELL. PROP. U.S. Patent 6,962,910 Replication of hyperproliferating cells is decreased by using a supramolecular metal complex as a DNA cleaving agent to transfer charge from MLCT light absorbing metal, Ru or Os, to electron acceptor metal, Rh, by a bridging π-acceptor ligand. A bioactive MLCT state that can cleave DNA is thus generated. The complexes are tunable and can cleave DNA by low energy light in the absence of O2.