

NEW PATENTS

ELECTRODEPOSITION AND SURFACE COATINGS

Enhanced Alloy Compositions for Sputter Targets

HERAEUS INC *U.S. Appl. 2005/274,221*

A sputter target comprising Co; (in at.%) 0–24 Cr, 0–20 Pt, 0–20 B, 0–10 Au; one of the elements W, Y, Mn, Mo; and 0–7 at.% of an element selected from Pd, Rh, Ir, Ru, Ti, V, Zr, Nb, Hf and Ta. When manufacturing a magnetic recording medium, at least an initial thin-film data storage layer is sputtered over a substrate from the sputter target.

Nucleation and CVD of PGM Films

MICRON TECHNOL. INC *U.S. Appl. 2006/014,367*

A method of depositing a film (1) of Pt, Rh, Ir or Ru metal by CVD includes bubbling a non-reactive gas through an organometallic precursor (2) to transport vapourised (2) to a deposition chamber. (1) is deposited onto a non-silicon bearing substrate (3) under UV light. (1) is then annealed in an O₂ atmosphere at low enough temperature to avoid oxidation of (3). The resulting (1) is free of silicide, consistently smooth, and has good step coverage.

APPARATUS AND TECHNIQUE

Semiconductor Gas Sensor

FIS INC *World Appl. 2006/011,202*

A gas sensor with improved sensitivity and responsiveness is provided with a metal oxide semiconductor element (1). The electrical resistance of (1) alters on sensing a gas to be detected. A metal oxide insulator holding at least Pt or Pd is dispersed in (1). Adverse effects of Pt and Pd on (1) are suppressed. Operation of the inner part of the element is thus entirely catalysed by Pt and Pd.

HETEROGENEOUS CATALYSIS

Exhaust Gas Purifier and Method of Purification

HONDA MOTOR CO LTD *World Appl. 2005/121,517*

A technology for removing NO_x in exhaust gas from a stoichiometric combustion gasoline engine can also remove NO_x from O-rich exhaust gases such as those from diesel engines. The catalyst (1) is Pd oxide supported on LnAlO₃. H₂ is fed into the exhaust gas from a supply unit upstream of the catalytic converter. (1) is highly reactive with NO_x, even with O present, giving a high depollution ratio.

Catalytically Coated Particle Filter

UMICORE AG & CO KG *World Appl. 2006/021,337*

A catalytically coated particle filter (1) comprises two sequential catalysts. The first Pd/Pt catalyst (2) is in the gas inlet zone of (1). The second catalyst (3) is located behind (2) and preferably contains only Pt as the catalytically active component. (2) and (3) impart good resistance to ageing and sulfur poisoning to (1).

Hydrogenation of Methylenedianiline

AIR PRODUCTS CHEM. INC *U.S. Appl. 2006/047,173*

A crude methylenedianiline feedstock (1) is pretreated and partially hydrogenated by passing over a Ru catalyst on a fixed bed support. (1) is cooled without venting H₂ gas and solvent vapour. Pretreated (1) is then ring-hydrogenated in a batch reaction over a Rh or mixed Rh/Ru catalyst carried on a monolith support incorporating a washcoat.

Exhaust Gas Cleaning Catalyst with Oxygen Occlusion Material

MAZDA MOTOR CORP *Japanese Appl. 2005-279,332*

An exhaust gas cleaning catalyst consists of a catalytic layer formed on the cell walls of a honeycomb base containing Al₂O₃. The catalytic layer contains Pd and an O occlusion material (1), which is a multiple oxide containing Ce, Zr and K. Exhaust gas cleaning performance is enhanced by the O occluding/releasing properties of (1).

Catalyst for Purifying Exhaust Gas

TOYOTA MOTOR CORP *Japanese Appl. 2005-279,435*

A ZrO₂ catalyst carrier (1) supports Rh and contains a lanthanide element. The crystal lattice of Rh conforms to that of (1). The affinity of Rh particles (2) for (1) is enhanced by this method. (2) are stabilised, remain immobile, even at high temperatures, and the grain growth of (2) is inhibited. The catalyst is manufactured by adding an acid solution of a Rh compound to an aqueous solution of a basic lanthanide salt in which ZrO₂ powder is dispersed.

Toxic Gas Oxidation Catalyst

KOREA RES. INST. CHEM. TECHNOL.

Japanese Appl. 2005-305,403

Active Pt, Pd and Cu ions are deposited with uniform distribution on a solid porous carrier to produce a catalyst (1). Toxic gases such as CO, SO₂, CH₃CHO and NH₃ are removed effectively by a low-temperature oxidation reaction using (1). (1) has a long lifetime even when the toxic gas contains moisture. Applications include air cleaning for indoor environments and industrial sites producing pollutants.

HOMOGENEOUS CATALYSIS

Process for Making Haloorganoalkoxysilanes

GENERAL ELECTRIC CO *World Appl. 2005/118,598*

A haloorganoalkoxysilane is prepared by reacting an olefinic halide with an alkoxysilane in which the alkoxy group(s) contain at least two C atoms. The reaction medium contains a Ru-containing catalyst and an electron-donating aromatic compound promoter. The process can be used to prepare, among other things, chloropropyltriethoxysilane, a key intermediate in the manufacture of silane coupling agents.

Process for Forming an Aromatic Amine Compound

EASTMAN KODAK CO *World Appl.* 2006/011,879

An aromatic amine product is formed by combining an aromatic primary or secondary initial amine with an aromatic halide compound in the presence of a Pd complex and a phosphine compound catalyst to form a mixture (1); heating (1) to a first temperature of at least 60°C; and adding a base material to the heated mixture. The temperature of the mixture is maintained at or above the first temperature for sufficient time to form as a product an aromatic substituted form of the aromatic primary or secondary initial amine. The process provides products of high purity in good yields.

Direct Oxidation of Methane to Acetic Acid

BP CHEMICALS LTD *U.S. Appl.* 2006/025,628

CH₃COOH is produced by oxidising CH₄ with an O₂-containing gas in the presence of either concentrated or fuming H₂SO₄, a Pd-containing catalyst (1) and a promoter, preferably a Cu or Fe salt. Adding a promoter and O₂ to a system containing (1) (for instance, PdCl₂) increases the rate of formation of CH₃COOH from CH₄ by more than an order of magnitude as compared with previous methods. The precipitation of Pd black is also inhibited.

Continuous Hydrocracking of Polyester

MITSUBISHI GAS CHEM. CO INC

Japanese Appl. 2005-296,826

A method for the continuous hydrocracking of polyesters to produce alcohols is claimed. The reaction solvent (1) and a Ru complex catalyst (2) with 1,1,1-tris(diphenylphosphino)methyl ethane as a ligand are separated from the reaction mixture by distillation. An organic solvent is added to the distillation residue to separate and recover (2). Both (1) and (2) are reused.

Production of Optically Active Alcohols

KAWAKEN FINE CHEM. CO LTD

Japanese Appl. 2005-298,411

A prochiral carbonyl compound (especially one containing an amino group) undergoes asymmetric hydrogenation in the presence of a Rh complex or salt, an optically active diphosphine, an optically active diamine, and an acid. The corresponding optically active alcohol is produced at a practical reaction rate and in high enantiomeric excess.

FUEL CELLS

Stabilisation of Power Generation

TOYOTA MOTOR CORP *Japanese Appl.* 2005-276,526

Pt catalyst is supported at the inner walls of conductive porous C tubes in a F ion exchange resin film. This configuration improves the discharge of H₂O produced by the reaction in a fuel cell which would otherwise cause a drop in power generating performance in areas of high current density. Power generation is stabilised at high voltage and high current by enhancing the efficiency of the cell reaction.

Electrode Resistant to Freezing Damage

NISSAN MOTOR CO LTD *Japanese Appl.* 2005-302,434

An electrode paste is manufactured by mixing, agitating, and vacuum deaerating a C particulate carrying Pt (1), a different C particulate (2) of smaller particle size carrying no Pt, and a solution of a perfluorosulfonic acid polymer system of low molecular weight having H ion conductivity. By this process, the micropores of (1) are closed by (2), thus protecting the electrode from damage by freezing and expansion of H₂O.

Platinum-Ruthenium Alloy Catalyst for DMFC

HITACHI MAXELL LTD *Japanese Appl.* 2005-324,156

A Pt-Ru alloy catalyst is manufactured in stages. C powder is dispersed in an organic solvent composed of at least one kind of alcohol and a Pt chloride and a salt or complex of Ru is then dissolved in the dispersion. The pH value of the alcohol solution is adjusted to the range of 9 to 10. Lastly the solution is heated under reflux in an inert atmosphere.

CHEMICAL TECHNOLOGY

Iridium Recovery from Waste Solution

TANAKA KIKINZOKU KOGYO KK

Japanese Appl. 2005-298,240

An alkali metal hydroxide is added to a waste solution (such as a plating solution) containing an Ir-halogen complex to recover Ir as Ir(OH)₄ (1). (1) is suspended in water. HCl or HBr is added, followed an alkali metal halide to obtain an Ir-alkali metal complex (2). (2), obtained at high yield in high purity, is suitable for processing into Ir metal or fresh plating solution.

ELECTRICAL AND ELECTRONIC ENGINEERING

Hard-Bias Design for Extra-High Density Recording

HEADWAY TECHNOL. INC *U.S. Appl.* 2005/275,975

A hard-bias structure for biasing a free layer in a magnetoresistive element within a read head comprises a composite hard-bias layer of configuration Co_{78.6}Cr_{5.2}Pt_{16.2}/Co₆₅Cr₁₅Pt₂₀. The upper Co₆₅Cr₁₅Pt₂₀ layer has a larger H_c value and a thickness ~ 2 to 10 times > that of the Co_{78.6}Cr_{5.2}Pt_{16.2} layer. The magnetic moment of the hard-bias structure may be enhanced by a b.c.c. underlayer such as FeCoMo. Optionally, there is no Co_{78.6}Cr_{5.2}Pt_{16.2} layer and the Co₆₅Cr₁₅Pt₂₀ layer is formed on the b.c.c. underlayer.

MEDICAL USES

Molecular Markers for Cisplatin Resistance

RES. DEVELOPMENT FOUNDATION

U.S. Appl. 2006/019,268

Diagnostic and/or prognostic methods involving a collection of differentially expressed genes may be used to identify resistance (1) to the therapeutic effect of the Pt-based drug cisplatin in human ovarian cancer. The method includes the identification and use of markers for (1).