NEW PATENTS

CATALYSIS – APPLIED AND PHYSICAL ASPECTS

Platinum-Ruthenium Catalyst for Methanol Oxidation

JPN. ADV. INST. SCI. TECHNOL. HOKURIKU

Japanese Appl. 2007-190,454

A PtRu-based catalyst with increased uniformity of Pt particle size is claimed, where coagulation of Pt particles is prevented. Ru particles are dispersed on a carrier surface, followed by Pt particles with an average diameter 0.5–15 nm. Standard deviation of the Pt particle diameter is 7–13. The supported particles are heat treated at < 300°C in a non-oxidising atmosphere.

CATALYSIS – INDUSTRIAL PROCESS

Hydroformylation Process with Rhodium Recovery

DOW GLOBAL TECHNOL. INC

World Appl. 2007/133,379

A non-aqueous hydroformylation process with liquid catalyst recycle includes a hydroformylation step and one or more phase separation stages to recover high molecular weight aldehyde product and Rh catalyst. Hydroformylation is carried out at 250–450 psia (1724–3103 kPa). The product mix contains aldehydes, conjugated polyolefins, a Rh-organophosphorus ligand complex, free organophosphorus ligand and a polar organic solubilising agent. Phase separation stages use added H2O with CO(g), H2(g) or a mixture, and are carried out at 20–400 psia (138–2758 kPa). Sum of pressures in both steps is > 360 psia (2482 kPa).

Preparation of 3-Methylbut-1-ene

OXENO OLEFINCHEMIE GMBH

World Appl. 2008/006,633

The title compound is prepared from a hydrocarbon stream containing ≥ 70 wt.% isobutene with linear butenes or olefins containing 3–5 C atoms, by hydroformylation in the presence of a Rh catalyst with organophosphorus ligands, followed by hydrogenation of the resulting aldehyde to an alcohol. Elimination of H2O gives the final product.

CATALYSIS – REACTIONS

Cross Metathesis of Cyclic Olefins

MATERIA INC

World Appl. 2008/008,440

Ring-opening, ring insertion cross metathesis of cyclic olefins with internal olefins such as seed oils is carried out in the presence of a Ru alkylidene olefin metathesis catalyst. Olefinic substrates may include an unsaturated fatty acid or alcohol or an esterification product of an unsaturated fatty acid with a saturated or unsaturated alcohol. The Ru catalyst may be a Grubbs-Hoveyda complex and may contain an N-heterocyclic carbene ligand associated with the Ru centre, and is present in < 1000 ppm concentration relative to olefinic substrate.

Synthesis of 10-Hydroxycamptothecin

UNIV. FUDAN

Chinese Appl. 1,054,381

The title compound is synthesised from 20(5)-camptothecin by catalytic hydrogenation using Pt/C or Rh/C, in the presence of a mitigator containing organic compound, followed by oxidation of the resulting tetrahydrocamptothecin to obtain the desired product. Yield is 70–75% and product purity is > 98.5%.

EMISSIONS CONTROL

Removing Mercury from Gas Streams

JOHNSON MATTHEY PLC

World Appl. 2007/141,577

Heavy metals such as Hg can be removed from high-temperature gases such as coal-derived syngas streams, using a sulfided Pd-containing absorbent, preferably Pd,S. Pd content is > 1.5 wt.%, preferably ~ 2 wt.%, loaded on a support, preferably γ-alumina. Hg forms a PdHg phase on contact with absorbent.

Exhaust Particulate Filter

NISSAN MOTOR CO LTD

Japanese Appl. 2007-239,522

A DPF which can be partially regenerated at relatively low temperatures is claimed. A Pt catalyst is coated on the surface of a porous monolithic filter, with Pt concentration higher in the centre part to increase the probability of contact between the Pt catalyst and exhaust particulate.

FUEL CELLS

Palladium-Ruthenium Electrocatalyst

JOHNSON MATTHEY PLC

World Appl. 2008/012,572

An electrocatalyst for the anode of a DMFC is made from a PdRu alloy with a single crystalline phase, and contains (in at.%): 5–95 Pd, 5–95 Ru and < 10 other metals, but not 50 Pd and 50 Ru. Preferred compositions contain (in at.%): 5–49 Pd, 51–95 Ru and < 10 other metals on a support of high surface area.

Water Management of PEMFC Stack

GM GLOBAL TECHNOL. OPER. INC

Japanese Appl. 2007-194,195

A fuel cell system includes a means of humidifying the cathode inlet airflow and the H2O to the anode. A surface active agent such as EtOH is added to reduce surface tension and allow wicking of H2O to the flow field channels. The catalyst layers may include Ru as well as Pt to mitigate poisoning of Pt by CO formed by oxidation of EtOH on the cathode side.
Platinum Alloy for Jewellery

SEKI KK, Japan Appl. 2007-239,089

A Pt alloy contains ≥ 99.7 wt.% Pt with 0.002–1.0 wt.% P, S or Be, preferably 0.005–0.3 wt.%. The alloy can be hallmarked Pt 1000, and Pt content is controlled in the range 98.90–99.94 wt.%, preferably 99.70–99.94 wt.%. Good wear and deformation resistance and low susceptibility to casting defects are claimed.

Electrochemical Detection of DNA

GENEOHM SCI, U.S. Appl. 2008/0,026,397

An assay for detecting a polynucleotide such as DNA includes the steps of immobilising the polynucleotide on an electrode, contacting with a Ru complex having a reduction potential which does not coincide with that of O2(g), such as Ru(III) pentaamine pyridine, and electrochemically detecting the Ru complex as an indicator of the presence of a nucleic acid binding agent such as carboplatin, oxaplatin or cisplatin.

Iridium Spark Plug Alloy

TANAKA KIKINZOKU KOYO KK, World Appl. 2008/013,159

A spark plug chip is made from Ir with (in wt.%): 0.2–6.0 Cr plus 2.0–12.0 Fe and/or Ni. The surface may be oxidised by heating at 300–900°C in an oxidising atmosphere, to give an oxide of Cr-Fe, Cr-Ni or Cr-Fe-Ni of thickness 5–100 μm.

BIOMEDICAL AND DENTAL

Anticancer Drug Combinations

BAYER PHARM. CORP, World Appl. 2007/139,930

Drug combinations and pharmaceutical compositions are claimed for treating cancer such as non-small cell lung carcinoma. The compositions contain at least one substituted-diaryl urea, at least one taxane and at least one Pt complex antineoplastic nucleic acid binding agent such as carboplatin, oxaplatin or cisplatin.

Dental Mirror with Ruthenium Coating

I. A. MCCABE, U.S. Appl. 2007/0,268,603

A dental mirror includes a glass substrate coated with a Ru film on either the front or rear surface. The coating thickness is 250–650 Å, preferably 350–550 Å. An adhesion enhancing layer may optionally include a protective circuit module. Pulse rise time provided to the electronic device is < 5 ms.

Surface Coatings

Platinum-Coated Refractory Oxide Ceramic Part

JOHNSON MATTHEY PLC, World Appl. 2007/148,104

A refractory metallic oxide ceramic part for use in molten glass processing is surface treated to provide an array of slots or closed-end holes, and may then be spray coated with a Pt group metal or alloy of thickness 200–500 μm for erosion and corrosion protection.