NEW PATENTS

METALS AND ALLOYS

Hydrogen Permeation Alloy

ISHIFUKU KINZOKU KOGYO KK

Japanese Appl. 2001/131,653

An alloy for a H_2 permeation film for the purification and separation of H_2 comprises 3–15 at.% Tb, Dy, Ho or Er of the rare earth elements, and balance of Pd and impurities. The alloy has a high H_2 permeability, compared to conventional membranes.

Palladium Based Alloy

GUIYAN PLATINUM IND CO LTD *Chinese Appl.* 1,301,875

A Pd based alloy (1) used as a contact material contains (in wt.%): 30–85 Pd, 14–70 Cu and 0.05–1 La, Ce, Sm or Gd. A Pd based composite contactor is prepared by compounding (1) with a Cu based alloy material, which comprises (in wt.%): 84–98.4 Cu, 0.5–5 Fe, 1–10 Ag and 0.1–10 rare earth selected from La, Ce, Sm or Gd. (1) may be made into wire, or contacts of pure or composite alloy.

ELECTROCHEMISTRY

Platinum/Iridium Electrode Film for Electrolysis

SHINKO PANTEC CO LTD *Japanese Appl.* 2001/073,178

An electrode film contacted to a solid polymer electrolyte (SPE) film is made using magnetron sputtering. The apparatus has an Ir cathode and a SPE anode. Voltage is impressed orthogonal to the magnetic field, which is parallel to the cathode, forming an Ir oxide layer on the anode. A Pt layer is formed on top. The electrode film has good adhesion and permits prolonged electrolysis irrespective of the electrolysis temperature.

Photocatalyst for Decomposition of Water

POSTECH FOUND *Korean Appl.* 2001/025,812

A photocatalyst (1) for decomposing H_2O to H_2 and O_2 under ambient temperature and pressure has the formula, $A_nB_nO_{3n+2}$, where A is Ca or La, B is Nb and Ti, and n is 4 or 5. The decomposition occurs using a self-sacrifice organic alcohol. (1) is impregnated with 0.1–5 wt.% of Pt, Ni, Cs or Bi. (1) is reduced at 300–800°C and oxidised at 200–500°C.

ELECTRODEPOSITION AND SURFACE COATINGS

Aluminide Coating for Turbines

UNITED TECHNOLOGIES CORP *European Appl.* 1,111,091

The corrosion and oxidation resistance of MCrAl overlay coating, for turbine engines, is improved by adding one O-active element, such as Y, Hf and Si, to the coating for the superalloy substrate. A Group VIII metal, such as Pt, is then applied to the overlay and the coating is aluminised by CVD and heat treated. A ceramic thermal barrier may be applied. The durability of the overlay coating is increased.

Platinum Electrolyte for Electroplating Gas Turbines

HONEYWELL INT INC *World Appl.* 01/51,688

An electrolyte, for electroplating gas turbine blades and vanes with Pt, comprises 0.01–320 g l^{-1} of Pt as $Pt(NH_3)_2(NO_2)_2$ and 0.1–240 g l^{-1} of M_2CO_3 or $MHCO_3$, where M is selected from Li, Na, K, Rb or Cs. The electrolyte reduces the production of Cl, S or P contaminants. A highly stable electrolytic ultra-pure Pt plating on superalloys is obtained. No insoluble Pt compounds are formed during plating or storage.

Electroplating Using Magnetic Field

S. Y. CHOI *et al.* *Korean Appl.* 2001/010,788

A magnetic field generator is added to a plating vessel to produce uniform plated Pt, Ru or Cu on a large scale Si substrate. The magnetic field controls the directions and densities of the flowing metal ions of the electrolyte. Well distributed Pt, Ru and Cu layers are obtained by combining a permanent magnet and an electromagnet in the plating vessel. An ultrasonic oscillator is attached to the cathode.

APPARATUS AND TECHNIQUE

Soot Sensor Used in Internal Combustion Engines

HERAEUS ELECTRO-NITE INT NV

European Appl. 1,106,996

In a soot sensor used in ICEs part of the exhaust gas carrying particles of soot passes through a ceramic meander-type moulded substance (1) with open pores in the direction of the current. A thin-film Pt resistor temperature probe in the soot sensor measures the temperature of the substance. After reaching the ignition temperature of the soot on (1), the temperature is kept isothermal by recycling the heat, which is evaluated to measure the amount of soot that flowed past.

Hydrogen Gas Sensor

MATSUSHITA DENKI SANGYO KK

Japanese Appl. 2001/033,425

A sensor for detecting H_2 gas has a pair of Pt electrodes adhered to a porous ceramic layer carrying a H_2 oxidising catalyst and O ion electroconductive solid electrolyte layer placed sequentially on a heater. The test gas is made to flow in the catalyst area of the sensor. The ceramic substance has a controllable mean pore diameter of ~ 100 Å, which prevents poisoning. The sensor is durable and highly reliable.

Oxygen Sensor

NGK SPARK PLUG CO LTD *Japanese Appl.* 2001/074,688

An O_2 sensor has leads of ~ 10 μm thickness passing through a support. The leads are made of an electrically conductive material and Pt is the principal component. The sensor can detect the O_2 concentration in waste gas from the ICE of vehicles and the combustion parts of boilers. Operation of the sensor is improved by reduced electrical resistance of the leads.

Constant Electrical Resistance Alloy

DENKI JIKI ZAIRYO KENKYUSHO *Japanese Appl.* 2001/107,160

A constant electrical resistance alloy for an eddy current-type sensor contains (in wt.%): 37–47 Ag; remainder of Pd; and 7 Mn, Ta, W, Fe, Co and/or Ni; ≤ 5 Re, Os, Ru and/or Rh; ≤ 3 Mo, Nb, In, V, Ge, Ti, Zr, Hf, Cr and/or Tl; ≤ 2 Be, Ga, Al, Si, Sn and/or Sb; ≤ 0.5 C, B and/or P; ≤ 1 Bi, Zn and/or Cd; or 0.001–10 rare earth elements. The alloy has high tensile strength and a temperature coefficient of electrical resistance at 0–600°C of 100×10^{-6} to -100×10^{-6}/°C. It can be used under high temperature and high pressure conditions.

Oxygen Sensor and Manufacturing Method

NGK SPARK PLUG CO LTD *Japanese Appl.* 2001/124,726

An O_2 detection electrode (1) for use in ICE is produced by heat processing a Pt electrode, which is doped with a single metal from Groups IB, IIB, IIIB, IVB, VB and VIB, at 900–1500°C. The Pt electrode is attached to one surface of a solid electrolysed body that has O ionic conductivity. Doping improves the low temperature control of (1), so stable operation is achieved under high temperature conditions.

Ozone Weather Meter

SUGA SHIKENKI KK *Japanese Appl.* 2001/133,388

An ozone generator (1) for a weather meter comprises a ceramic dielectric plate with Au, Pt, Ir or Rh deposited on its upper surface, and also a discharge electrode film covered by a glass membrane. An earth electrode, thermoelectric refrigeration element and cooling plate are arranged on the under surface. The generator has an O_2 scraper launcher and an ozone gas receptacle. (1) is small in size and stable generation of ozone is obtained without mixing impurities.

Nitrogen Oxide Detector

VALTION TEKNILLINEN TUTKIMUSKESKUS *Japanese Appl.* 2001/149,758

NOx is detected in waste gas exhausts by contact with a catalyst of Pd, Rh and/or their oxides supported on zeolite. The fuel, supplied under rich/lean periodic conditions, is burnt and the waste gas formed contacts the catalyst. NOx in the waste gas is detected at the contacted part. The fuel can be burnt at a high reaction temperature in the presence of O_2 and SOx. The method is highly reliable.

HETEROGENEOUS CATALYSIS

Cyclododecanone and Cyclododecanol

UBE IND LTD *European Appl.* 1,090,900

Cyclododecanone (1) and cyclododecanol (2) are produced in high yields, by reacting an epoxycyclododecane compound with H_2 in the presence of a solid catalyst containing Pt group metal(s), a promoter of at least one from Groups VIII, IIB, IIIB, IVB, VB, VIB or VIIB or lanthanide, and a carrier. (1) and (2) are intermediates for synthetic resins and fibres.

Pure Halogenated Benzyl Alcohol

CLARIANT GmbH *European Appl.* 1,101,752

Pure fluorinated or chlorinated benzyl alcohol derivatives are prepared in high yield and purity by reacting a corresponding benzaldehyde with H_2 at 0–120°C over a catalyst, optionally in the presence of a solvent. The catalyst contains Pd or Pt supported on active C, Al_2O_3, SiO_2, etc. Almost no formation of dehalogenated byproducts is obtained (despite the use of highly active hydrogenation catalysts).

Oxacylation Catalyst

DAIREN CHEM CORP *European Appl.* 1,112,775

An oxacylation catalyst (1), for allyl acetate production, comprises a main Pd catalyst, Sn or a mixture of Sn and other metal(s) as the promoter, and alkali or alkaline earth compound (2) supported on the outer surface of a porous carrier. (1) is prepared by impregnating a porous carrier with a solution containing Pd and promoter metal(s) in an oxidative state, followed by reduction of the metal(s) and final impregnation with (2). The catalytic activity and life of (1) is retained, with high selectivity.

Hydrogenation of Dicarboxylic Acids

TONEN CHEM CORP *European Appl.* 1,112,776

A catalyst (1) for the hydrogenation of dicarboxylic acids comprises Pd and Re supported on an active C carrier, obtained from coal, coconut or peat. Random points on the catalyst are analysed by EPMA; in terms of Re, ≤ 20% of analysed points have an intensity ratio of ≥ 2. (1) has very high capability for hydrogenating dicarboxylic acids and a high selectivity to lactones and to products hydrogenated further, even at low hydrogenation pressures.

Diesel Exhaust Catalytic Converter

DMC2 DEGUSSA METALS CATALYSTS CERDEC AG *European Appl.* 1,129,764

A long-life automotive diesel engine catalyst (1) comprises a zeolite with Al oxide or silicate, and Si, Ti or Zr dioxide, and 0.05–10 wt.% Pt, Pd, Rh or Ir, w.r.t. the overall weight of the catalyst. The Pt group metal has a mean oxidation number of < +2.5, with > 3 metal- and < 3 O-ligands. Pt group metal crystallites (1–6 nm) are present on the surface of the zeolite and substrate oxides. (1) has high oxidation activity for CO and hydrocarbons at 120–170°C.

Hydrogenating Highly Unsaturated Hydrocarbons

PHILLIPS PETROLEUM CO *World Appl.* 01/19,763

A catalyst for hydrogenating highly unsaturated hydrocarbons, such as alkynes and diolefins, to lower unsaturated hydrocarbons, such as ethylene, propylene, etc., comprises Pd, a metal aluminate catalyst support and a Ag or alkali metal catalyst compound. The Al_2O_3 (at least two forms) support is impregnated with a melted metal component, dried and calcinated at 600–1350°C. The Pd has a better surface distribution, and no physical mixing and coprecipitation is needed. The process gives increased selectivity.

Removal of Organic Compounds from Waste Gas

GENERAL ELECTRIC CO *World Appl.* 01/37,976

A process for removing organic compounds from industrial waste gas, such as MeOH and cumene, byproducts from phenol manufacture, is claimed. Waste gas, maintained at 120–160°C, is passed through a guard bed in the presence of O_2, and then through a 0.1–3 wt.% Pd/activated Al oxide catalyst bed. Volatile organic chemicals are removed from the waste gas stream while avoiding catalyst deactivation due to phenol tar formation. Highly destructive industrial waste gas, containing harmful substances, can be efficiently removed and purified.

Catalytic Converter for Exhaust Gas

CATALER CORP *U.S. Patent* 6,261,989

A catalytic converter for exhaust gas comprises a heat resistant support with a catalytic coating containing Pd-carrying particles of a Ce complex oxide, Pt- and Rh-carrying particles of Zr complex oxide, and particles of a heat resistant inorganic oxide. At least one sulfate is present to prevent Pd poisoning. The converter maintains high catalytic activity even at high temperature while also providing effective catalytic activity before the engine is sufficiently warmed up at the relatively low temperature of 200–400°C.

Removal of Nitrogen Oxide from Road Tunnels

KANAI SHIN GIJUTSU KENKYUSHO KK *Japanese Appl.* 2001/046,866

NOx removal material for use in road tunnels, contains Ti, Zr, Al, Cr, Co, Zn, Ni, In or La and manganate-doped Ru, Rh, Pd or Au. NOx in air, in tunnels, underground passenger transport, indoor or outdoor parking places, etc., is effectively absorbed and removed. Large amounts of NOx can be dealt with, even in low concentrations.

Exhaust Purification Catalyst

NISSAN MOTOR CO LTD *Japanese Appl.* 2001/046,870

A catalyst for the purification of exhaust gas ejected from an ICE, comprises a mixture of Pt and a W group complex oxide coated on a support. The mixture is heat-treated at 300–700°C for > 1 hour, under an oxidising atmosphere containing O_2. The 4*f* bond energy of Pt is set to 70.8–71.2 eV according to XPS. Hydrocarbons, CO and NOx present in the exhaust gas are effectively removed. The durability and purification ability of the catalyst are improved.

Catalyst for Nitrogen Oxide Decomposition

MITSUBISHI JUKOGYO KK *Japanese Appl.* 2001/058,130

A high activity catalyst for decomposing NO in waste gas, such as combustion exhaust gas, comprises Pt, Pd, Rh, Ag and/or Au impregnated in a Ce group (1) solid electrolyte. (1) is $(CeO_2)_{1-x}(BaO)_x$, $(CeO_2)_{1-x}(Y_2O_3)_x$, $(CeO_2)_{1-x}(Gd_2O_3)_x$, $(CeO_2)_{1-x}(CaO)_x$, $(CeO_2)_{1-x}(Sm_2O_3)_x$, and/or $(BaO)_y(CeO_2)_{1-x-y}(Gd_2O_3)_x$, where $x = 0–0.6$, $y = 0.4–0.6$ and $x + y < 1$. NO is decomposed effectively to N_2 and O_2 and the catalyst is little affected by any coexisting H_2O and SO_2.

Purification of Exhaust Gas from ICE

DAIHATSU MOTOR CO LTD *Japanese Appl.* 2001/062,295

Catalysts for purifying exhaust gas consist of a heat resistant support and a single-layer coat (1) formed on the heat resistant support. (1) comprises a Ce-type compound oxide loaded with Pt and Rh, and a Zr-type compound oxide loaded with Pt and Rh. The catalysts purify NOx, CO and hydrocarbons from exhaust gas emitted from ICEs. The catalysts retain high catalytic activity even after exposure to high temperatures.

Hydrogenation Process for Hydrogenates

TANAKA KIKINZOKU KOGYO KK *Japanese Appl.* 2001/081,477

A hydrogenation reaction for obtaining a hydrogenate from a pyridine uses a Pd/C catalyst. The product is obtained by reacting pyridine solvent in the presence of the Pd/C. It is desirable that the hydrogenate is a closed-ring structure secondary amine obtained by the hydrogenation of a pyridine. The catalytic activity of Pd/C is improved effectively and its durability is enhanced; the yield of hydrogenated product is improved.

Nitrogen Oxide Removal Material

KANAI SHIN GIJUTSU KENKYUSHO KK *Japanese Appl.* 2001/104,781

A catalyst and method for the selective oxidative decomposition of NH_3, amines and NOx is described. The catalyst contains a manganate doped with at least one kind of metal or metal ion selected from Pt, Pd, Rh, Ru, Ir, Au, Ag, Ti, Zr, Al, V, Mo, etc. Catalytic reduction of NH_3 or amines contained in industrial waste gas and waste H_2O can be carried out selectively at low temperature.

Purification of Waste Gases

OSAKA GAS CO LTD *Japanese Appl.* 2001/104,792

A waste gas purification catalyst contains Pt or Ru fixed on a Zr sulfate support. NOx is decomposed in the presence of CH_4 as a reducer and an excess of O_2 and the purification can be carried out effectively for a long period. A high conversion ratio for CH_4 is maintained, thus the residual CH_4 concentration in the process gas is lowered. The catalyst has stable activity for a long time, due to the presence of CH_4 reducer, and is maintained even when SOx is present.

Purification of Exhaust Gas

NISSAN MOTOR CO LTD *Japanese Appl.* 2001/129,403

A catalyst for the purification of exhaust gases ejected from a motor vehicle has two or more layers containing a Pt group metal, selected from Pt, Pd or Rh, CeO_2 and alkaline earth oxide. The weight ratios for the Pt group metal, CeO_2 and alkaline earth oxide in the inner and surface layers of the catalyst are 10:19–40:60, 99:1–50:50 and 1:99–50:50, respectively. The catalyst has high low-temperature activity and high rate of purification. The removal of hydrocarbon, CO and NOx in the exhaust gas is efficient.

HOMOGENEOUS CATALYSIS

Chiral Amine Preparation

AVENTIS RES & TECHNOLOGIES GmbH & CO KG *European Appl.* 1,103,536

Chiral amines (intermediates for pharmaceuticals, agrochemicals, etc.) are prepared by asymmetric hydrogenation of electron-rich enamines by reaction with H_2 in presence of a chiral catalyst. The catalyst is a metal-ligand complex consisting of at least one Group VIII metal, such as Rh or Ir, and at least one specific mono- or bidentate phosphine or diphosphine ligand. The enamines are hydrogenated efficiently under mild conditions to give chiral amines in good yields and high enantiomeric selectivity.

Decahydronaphthalene Dicarboxylic Acid

MITSUBISHI GAS CHEM CO INC *Japanese Appl.* 2001/031,622

Decahydronaphthalene dicarboxylic acid, for use as a polyester modifier, is produced in high yield by hydrogenating naphthalene dicarboxylic acid in the presence of a Ru and/or a Pt based catalyst, in an inert solvent, such as an alcohol, ether, lower fatty acid, etc. The reaction proceeds at ≤ 15 MPa and 40–150°C. The *trans* isomer is obtained at high selectivity. The naphthalene dicarboxylic acid is preferably diluted with solvent to a concentration of 5–30 wt.%.

Trimethylolalkane Monoalkyl Ethers

KAO CORP *Japanese Appl.* 2001/072,635

Trimethylolalkane monoalkyl ethers, used as non-ionic surfactants, are prepared with high selectivity by reacting a trimethylol derivative with a conjugated diene in the presence of a Pd compound and a tertiary phosphine or phosphite, or a Pd tertiary phosphine or phosphite complex, to give an ether with an alkadienyl group. The alkadienyl group is hydrogenated under H_2 using a Group VIII catalyst, then hydrolysed in the presence of an acid catalyst.

Methacrylic Acid Purification

MITSUBISHI RAYON CO LTD *Japanese Appl.* 2001/072,643

Methacrylic acid, manufactured from methacrolein and MeOH by liquid phase reaction using a Pd containing compound, is purified by contact with a compound containing: a primary and/or secondary amino group, a mercapto group, or sulfonic acid group. Pure methacrylic acid with reduced colouring ability and excellent polymerisation ability is obtained in high yield.

Production of Iminodicarboxylic Acids

SKW TROSTBERG AG *German Appl.* 1/99/54,194

Iminodicarboxylic acids are produced by amidocarbonylation with CO, in an acid environment, using a Pd catalyst, such as Pd acetate or Pd chloride, and an aldehyde, with hydrolytic cleavage of the *N*-acyl group in aqueous medium. The catalytic system contains HBr or HCl. The process does not require high temperature and pressure, or anhydrous conditions.

FUEL CELLS

Fuel Cell Gas Diffusion Electrode

JOHNSON MATTHEY PLC *European Appl.* 1,096,586

A gas-liquid permeable porous electrode comprises a non-uniform electrode layer supported on an electron conducting material or a proton conducting solid polymer membrane film. The layer contains an electrocatalyst (1) with concentration varying across the electrode in a pattern which coincides with the path of the gas field flow. (1) is applied to the electrode by screen printing, etc. (1) is a metal, metal oxide, supported metal or metal oxide, such as a Pt group metal, Au or Ag, or their alloys. Electrode composition and structure is specifically tailored to match operational requirements of the fuel cell for optimum performance and efficient materials use.

Hydrogen Generation Device

MATSUSHITA ELECTRIC IND CO LTD *World Appl.* 01/47,802

A H_2 generating device contains a reformer with a reforming catalyst, a raw material supply part, a H_2O supply, a heater, a modifying Pt group metal and a metal oxide catalyst, and a purifying catalyst for the oxidation or methanation of CO. H_2 for cogeneration systems and/or fuel cells is produced. The generator operates safely for long periods on repeat starting and stopping. The standing time of the device is reduced.

Catalyst for Fuel Cell Batteries

IDEMITSU KOSAN CO LTD *World Appl.* 01/64,337

A catalyst for removing CO from H_2-containing gas in fuel cell batteries, comprises Ru, such as Ru nitrate, on a flame-resistant inorganic oxide carrier, such as Al_2O_3 and Al_2O_3-TiO_2. The catalyst is dried and then reduced without burning. The Al_2O_3 has a maximum value for distribution of fine pores (pore radius ≤ 100 Å). The catalyst has significantly improved activity.

Alloy for Hydrogen Permeation Films

ISHIFUKU KINZOKU KOGYO KK *Japanese Appl.* 2001/046,845

An alloy for H_2 permeation films used for the purification and isolation of H_2 for fuel cells, comprises 3–15 at.% of Sm, Ce and Yb, and remainder Pd. The H_2 permeation alloy film allows permeation of H_2 at high rate. No intermetallic compound such as Pd_5Sm is produced so that excellent H_2 permeation capacity is assured. H_2 can be obtained at a high temperature.

Carbon Monoxide Removal from Hydrogen Gas

NISSAN MOTOR CO LTD *Japanese Appl.* 2001/089,101

Selective removal of CO from H_2 gas involves contacting H_2 with a gas mixture containing O_2 over a catalyst having Ru on a support containing Ce. CO concentration is efficiently reduced within a temperature range where the side reactions such as methanation are suppressed. The process is used to remove CO from the H_2 obtained by modifying MeOH supplied to the fuel electrode of a fuel cell.

High Activity Electrode for Fuel Cells

JAPAN STORAGE BATTERY CO LTD *Japanese Appl.* 2001/118,580

An electrode for fuel cells contains a cation exchange resin, C particles and Pt. The quantity of H_2 desorbed at 50–150 mV/RHE is ≥ 60% of the H_2 desorbed at 50–400 mV/RHE, measured by cyclic voltammetry. The electrode has a high activity and its performance with respect to reduction reaction of O_2 is improved.

Methanol Reforming Catalyst for Fuel Cells

NISSAN MOTOR CO LTD *German Appl.* 1/00/62,578

A MeOH reforming catalyst useful for producing H_2 for fuel cells comprises a metal oxide support impregnated with a Pd-Zn alloy. The catalyst contains at least one component selected from Pd-Zn-Ce, Pd-Zn-Zr and Pd-Zn-Ce-Zr based compounds. The catalyst is used in the gas phase reaction of MeOH with steam and O_2 to produce a H_2-containing gas as an energy source for a vehicle. The catalyst has high activity, good stability in a hot oxidising atmosphere and low CO production.

ELECTRICAL AND ELECTRONIC ENGINEERING

Dielectric Element for Ferroelectric Memory

SANYO ELECTRIC CO LTD *European Appl.* 1,102,329

A dielectric element (1), for a capacitor, has an insulator film with an oxide based dielectric film (2) and an electrode including a first conductor film containing at least Ir, Pt, Ru, Re, Ni, Co or Mo, and Si. (1) is used in ferroelectric memory and DRAM. O_2 is inhibited from diffusing along the grain boundaries during heat treatment of (2) so oxidation and deterioration of memory characteristics are suppressed.

Metal Oxide Deposition for Capacitor

APPLIED MATERIALS INC *World Appl.* 01/50,510

A capacitor comprises a metal oxide layer deposited on a substrate (by CVD at 480°C) followed by annealing at 600–900°C for a time of 0.1 s to 30 min, then at 500–600°C for 5 min. A 3D cup-type capacitor comprising a Pt bottom electrode, a BaSr titanate dielectric layer, and a Pt top electrode is claimed. The capacitor has reduced current leakage (< 10 fA/cell) and is used in DRAM for data storage. The deposited oxide layer/film has uniform composition and a high degree of crystallinity, giving higher capacitance.

Thin Film Magnetic Disk

X. BIAN *et al.* *U.S. Appl.* 2001/0,018,136

A thin film magnetic disk comprises: a substrate; a pre-seed layer with an amorphous or nanocrystalline structure; a non-magnetic RuAl seed layer; non-magnetic underlayer(s); onset layer(s); and magnetic layer(s). The latter comprises an alloy of $CoPt_xCrB_y$, where (in at.%) $x > 4 + y$. The disk is used for data storage devices. The pre-seed layer improves grain size and thermal conductivity.

Magnetic Transducer Element

HEADWAY TECHNOLOGIES INC *U.S. Patent* 6,239,948

A magnetic transducer element comprises a non-magnetic conductor layer made from an alloy of Ni and a non-magnetic conductor metal(s) of (in wt.%): 45–90 Cu, 20–75 Zn, 35–85 Cd, 55–90 Pt, and/or 75–95 Pd. The transducer element is used in magnetic read heads, inductive magnetic write heads, inductive magnetic read-write heads, etc., and for a magnetic data storage enclosure. It has enhanced reliability.

Capacitor for Memory Cell

S. J. DEBOER and R. P. S. THAKUR *U.S. Patent* 6,251,720

A capacitor for a memory cell, such as DRAM, is fabricated on a supporting substrate by forming a high dielectric constant (HDC) capacitive dielectric film (1) on a bottom plate electrode comprising Pt, Pt-Al, Rh, Rh oxide, W, W nitride, Ti, Ti nitride, Cs oxide, or SrRh oxide; followed by densifying or conditioning the capacitive dielectric film at ~ 1 atm. Increased capacitance per unit area due to the use of the HDC material is obtained. The leakage current of (1) is reduced, and the thermal budget is conserved.

Platinum-Manganese Based Target

HITACHI METALS LTD *Japanese Appl.* 2001/089,850

A Pt group metal-Mn alloy (1) for the manufacture of antiferromagnetic magnetic film in magnetic discs is formed by solidifying rapidly quenched and sprayed particles of (1) obtained by gas atomisation, by hot isostatic pressing, etc. (1) has excellent film forming characteristic, strength and uniform dispersion. Targets based on (1) combine high coercive force with reduced dispersion due to the uniform structure.

Magnetising Directional Control Film

FUJITSU LTD *Japanese Appl.* 2001/111,136

Thin, magnetised-directional control film (1) has an antiferromagnetic layer formed on a foundation layer (2), made of a six-metal alloy, one being chosen from the group of Ru, Ti and Zr. An antiferromagnetic layer formed above (2), consists of Fe-Mn, Ir-Mn, Pd-Mn, Pt-Mn, Pd-Pt-Mn and Ni-Mn. A magneto-resistance effect type sensor is also claimed. (1) is used in hard disks for controlling the direction of magnetisation of magnetic recording media.

Magnetic Head for Recording/Reproducing Apparatus

SONY CORP *Japanese Appl.* 2001/134,904

Magnetic heads comprise soft magnetic laminated films of laminated thin soft magnetic layers (1) and Pt, Au, Ag or Pd layers, formed on a magnetic core. (1) consists of $Fe_aSi_bTa_cRu_dGa_eN_f$ (in at.%): $62 < a < 75$, $7 < b < 18$, $3 < c < 10$, $0 = d < 10$, $0 = e < 6$, $5 < f < 12$ and $b + c > 13$. Heads, for recording/reproducing apparatus, have high saturation magnetic flux density, excellent corrosion resistance and improved reproduction.

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