

# ABSTRACTS

of current literature on the platinum metals and their alloys

## PROPERTIES

### Local Reactivity of Thin Pd Overlayers on Au Single Crystals

A. ROUDGAR and A. GROß, *J. Electroanal. Chem.*, 2003, 548, 121–130

The local reactivity of thin pseudomorphic Pd overlayers on Au(111) and (100) single crystal surfaces was studied by periodic density functional theory calculations within the generalised gradient approximation. The adsorption energies of atomic H and of CO as a microscopic probe of the reactivity were determined. The lattice expansion (5%) of the pseudomorphic Pd films and the interaction of the Pd films with the Au substrate increased the reactivity of the overlayers.

### The Superelasticity of TiPdNi High Temperature Shape Memory Alloy

J. WU and Q. TIAN, *Intermetallics*, 2003, 11, (8), 773–778

In  $\text{Ti}_{51}\text{Pd}_{30}\text{Ni}_{19}$  (1), superelasticity was found for the first time. The recoverable superelastic strain was 7% without failure of the specimen. The shape memory effect at room temperature was evaluated as 7.2% with the recovery rate of 100%. Superelasticity was obtained by introducing large numbers of dislocations and precipitates in the matrix of (1).

## CHEMICAL COMPOUNDS

### Coordination Isomerism in Salicylhydroxamate Complexes of Platinum(II) and Palladium(II)

W. HENDERSON, C. EVANS, B. K. NICHOLSON and J. FAWCETT, *Dalton Trans.*, 2003, (13), 2691–2697

Reaction of *cis*- $[\text{PtCl}_2(\text{PPh}_3)_2]$  with salicylhydroxamic acid (1) and trimethylamine (2) gave O,O'-bonded  $[\text{Pt}\{\text{OC}(\text{=NO})\text{C}_6\text{H}_4\text{OH}\}(\text{PPh}_3)_2]$ , but  $[\text{PtCl}_2(\text{cod})]$  gave N,O-bonded  $[\text{Pt}\{\text{OC}_6\text{H}_4\text{C}(\text{O})\text{NOH}\}(\text{cod})]$  (3). Ligand substitution of (3) gave other N,O-bonded complexes such as  $[\text{Pt}\{\text{OC}_6\text{H}_4\text{C}(\text{O})\text{NOH}\}(\text{PPh}_3)_2]$ . Reaction of  $\text{K}_2\text{PtCl}_4$  with  $\text{EPh}_3$  (E = As, Sb), (1) and (2) gave products of different structures:  $\text{AsPh}_3$  gave  $[\text{Pt}\{\text{OC}(\text{=NO})\text{C}_6\text{H}_4\text{OH}\}(\text{AsPh}_3)_2]$ , while  $\text{SbPh}_3$  gave  $[\text{Pt}\{\text{OC}_6\text{H}_4\text{C}(\text{O})\text{NOH}\}(\text{SbPh}_3)_2]$ , respectively.

### Structure and Bonding of $\text{Pd}@\text{[Bi}_{10}]^{4+}$ in the Subbromide $\text{Bi}_{14}\text{PdBr}_{16}$

M. RUCK, V. DUBENSKYY and T. SÖHNEL, *Angew. Chem. Int. Ed.*, 2003, 42, (26), 2978–2982

The high-temperature reaction (1270 K) of the intermetallic phase  $\text{Bi}_2\text{Pd}$  with additional Bi and  $\text{Br}_2$  yields grey lustrous platelets of  $\text{Bi}_{14}\text{PdBr}_{16}$  (1). Single-crystal X-ray diffraction of (1) showed it to be a complex salt that consists of cluster cations  $[\text{PdBi}_{10}]^{4+}$  (2) and anionic octahedra chains  $^{4-}[\text{Bi}_4\text{Br}_{16}]^4$ . (2) is a pentagonal antiprism of 10 Bi atoms with a Pd atom at their centre.

### Palladium(II) Complexes of the Reducing Sugars D-Arabinose, D-Ribose, *rac*-Mannose, and D-Galactose

P. KLÜFERS and T. KUNTE, *Chem. Eur. J.*, 2003, 9, (9), 2013–2018

An aqueous solution of  $[(\text{en})\text{Pd}^{\text{II}}(\text{OH})_2]$  (en = ethylenediamine) reacts with the title monosaccharides to form dimetallated aldose complexes, when the molar ratio of Pd and sugar is  $\geq 2:1$ . In the  $\text{Pd}_2$  complexes, the aldoses are tetra-deprotonated and act as bisdiolato complexes. Two crystalline pentose complexes were isolated, along with two hexose complexes. On substitution of en by isopropylamine, monometallation of the aldoses in the 1,2-position was observed.

### Carbenes. Pincers, Chelates, and Abnormal Binding Modes

R. H. CRABTREE, *Pure Appl. Chem.*, 2003, 75, (4), 435–443

Routes to pincer and chelate carbene complexes of Pd, Rh, and Ir include double geminal CH activation, metallation and CH activation. Abnormal binding via imidazole C5 can occur, and ion pairing can strongly influence C2 vs. C5 binding. Prior ligand binding via pyridine N before metallation is not essential. (27 Refs.)

## ELECTROCHEMISTRY

### Electroreduction Behavior of Dinitrogen over Ruthenium Cathodic Catalyst

S.-Y. ZHANG, X.-Y. ZHANG, Z.-S. ZHANG, Y. KONG and S.-N. HUA, *Chem. Lett.*, 2003, 32, (5), 440–441

A catalyst of chemically deposited Ru loaded on active C was used to reduce  $\text{N}_2$  electrochemically in aqueous solution at ambient temperature and pressure. A conventional three-electrode cell with Ru/C cathode as working electrode, Pd/C anode as counter electrode, and Hg/HgO/NaOH as reference electrode were used. A peak with many shoulders corresponding to the reduction of  $\text{N}_2$  to  $\text{NH}_3$  was first observed in the difference linear sweep voltammogram.

### Ruthenium Oxide-Added Quartz Iron Phosphate as a New Intercalation Electrode in Rechargeable Lithium Cells

F. CROCE, A. D'EPIFANIO, P. REALE, L. SETTIMI and B. SCROSATI, *J. Electrochem. Soc.*, 2003, 150, (5), A576–A581

Anhydrous, composite  $\alpha$ -quartz  $\text{FePO}_4$ , with added  $\text{RuO}_2$ , can be used as an intercalation electrode for rechargeable Li cells. The dispersion of  $\text{RuO}_2$  particles enhances the  $\text{FePO}_4$  interparticle electronic conductivity, thus improving the kinetics of the electrochemical processes. The charge-transfer resistance of the  $\text{RuO}_2$ -added  $\text{FePO}_4$  electrodes was significantly lower than  $\text{FePO}_4$  electrodes without  $\text{RuO}_2$ .

## PHOTOCONVERSION

### Luminescent Platinum(II) Terpyridyl-Capped Carbon-Rich Molecular Rods—An Extension from Molecular- to Nanometer-Scale Dimensions

V. W.-W. YAM, K. M.-C. WONG and N. ZHU, *Angew. Chem. Int. Ed.*, 2003, 42, (12), 1400–1403

$[\text{Pt}(\text{tBu}_3\text{-tpy})(\text{C}\equiv\text{C})_n\text{Pt}(\text{tBu}_3\text{-tpy})](\text{X})_2$  ((1):  $n = 1$ ,  $\text{X} = \text{OTf}$ ; (2):  $n = 2$ ,  $\text{X} = \text{OTf}$ ; (3):  $n = 4$ ,  $\text{X} = \text{PF}_6$ ;  $\text{tBu}_3\text{-tpy} = 4,4',4''\text{-tri-}t\text{-tert-butyl-}2,2':6',2''\text{-terpyridine}$ ) were synthesised. In contrast to the red shift commonly found in organic polynes and other metal-alkenyl systems, a blue shift in the transition energy was observed in the electronic absorption and emission going from (1) to (2) to (3). This was due to increasing the extent of  $\pi$  conjugation of the alkynyl bridge.

### Synthesis and Spectral Properties of 2-Pyridyl *N*-Methyl-2-imidazolyl Ketone Complexes of Iridium(III)

W. L. HUANG, M. C. TSENG, J. R. LEE and X. Y. CHEN, *Inorg. Chim. Acta*, 2003, 349, 97–103

$[\text{Ir}(\text{pik})\text{Cl}_4]$  and  $[\text{Ir}(\text{pik})(\text{phen})\text{Cl}_2]^+$  (1) show high intensity bands in the UV region. At 77 K, (1) in EtOH/MeOH (4:1 v/v) shows a structural emission with a single vibrational progression of  $1090\text{ cm}^{-1}$ . The luminescence lifetime at the 474 nm emission is 9.7  $\mu\text{s}$  and the emission energy becomes smaller while the solvent's polarity increases.

## ELECTRODEPOSITION AND SURFACE COATINGS

### Chemical Vapor Deposition of Macroporous Platinum and Palladium–Platinum Alloy Films by Using Polystyrene Spheres as Templates

M. FENG and R. J. PUDDEPHATT, *Chem. Mater.*, 2003, 15, (14), 2696–2698

Self-assembled polystyrene latex spheres (1) (500 nm diameter on Al or Cu) were used as templates for the low-temperature CVD ( $70^\circ\text{C}$ ) of Pt and Pt–Pd films. The precursors included  $[\text{PtMe}_2(\text{COD})]$  and  $[\text{Pd}(\text{hfac})_2]$ . For Pt deposition, a catalytic amount of  $[\text{Pd}(\text{C}_6\text{H}_7)(\text{hfac})]$  was required to initiate CVD. After the CVD, (1) are removed by pyrolysis at  $400\text{--}450^\circ\text{C}$  to give the structured metal films.

### Reduced Sulfur-Terminated Silanes to Promote the Interaction of Palladium(II) Hexafluoroacetylacetonate with Dielectric Surfaces

J. J. SENKEVICH, C. J. MITCHELL, G.-R. YANG and T.-M. LU, *Colloids Surf. A: Physicochem. Eng. Aspects*, 2003, 221, (1–3), 29–37

$\text{Pd}^{\text{II}}(\text{hfac})_2$  (1) readily interacts with –SS– and –SSSS– species obtained via silane self-assembled chemistry, but gives little or no interaction with hydroxylated  $\text{SiO}_2$  surfaces. The chemisorption under CVD-like conditions, where (1) was mixed with  $\text{H}_2$ , showed similar results as that without  $\text{H}_2$ . Mercapto-silane multilayers gave most deposition of Pd.

## APPARATUS AND TECHNIQUE

### Characterization of Platinum Nanoparticle-Embedded Carbon Film Electrode and Its Detection of Hydrogen Peroxide

T. YOU, O. NIWA, M. TOMITA and S. HIRONO, *Anal. Chem.*, 2003, 75, (9), 2080–2085

A flat, uniform film (1) of 6.5% Pt nanoparticles embedded in a graphite-like C matrix was prepared by the RF sputtering method. When used as an electrode (1) is very active for  $\text{H}_2\text{O}_2$  electrooxidation. When modified with glucose oxidase the electrode responded rapidly to glucose with a more stable baseline current than at a Pt bulk electrode sensor. (1) coupled with microbore liquid chromatography and a postcolumn enzyme reactor gave a lower detection limit for acetylcholine and choline.

### CO Sensitivity of the PtO/SnO<sub>2</sub> and PdO/SnO<sub>2</sub>

#### Layer Structures: Kelvin Probe and XPS Analysis

G. KISS, V. K. JOSEPOVITS, K. KOVÁCS, B. OSTRICK, M. FLEISCHER, H. MEIXNER and F. RÉTI, *Thin Solid Films*, 2003, 436, (1), 115–118

The CO sensitivity of  $\text{SnO}_2$  thick layers impregnated with  $\text{Pt}(\text{NH}_3)_2(\text{NO}_2)_2$  and  $\text{Pd}(\text{NH}_3)_2(\text{NO}_2)_2$  was measured by following the work function change, at  $90^\circ\text{C}$ . The complexes were decomposed, by heat treatments in air, at  $150\text{--}350^\circ\text{C}$ . The maximum CO sensitivity, the optimal response and recovery times, as measured by a Kelvin probe, were attained when PtO or PdO were present on the surface.

## HETEROGENEOUS CATALYSIS

### Platinum-Containing Polymeric Catalysts in Direct L-Sorbose Oxidation

E. SULMAN, V. MATVEEVA, L. BRONSTEIN, A. SIDOROV, N. LAKINA, S. SIDOROV and P. VALETSKY, *Green Chem.*, 2003, 5, (2), 205–208

Impregnation of hypercrosslinked polystyrene (HPS) with THF or MeOH solutions containing  $\text{H}_2\text{PtCl}_6$  caused Pt(II) complexes to form within the nanocavities of the HPS. The HPS–Pt–THF complex gave the highest selectivity (98% at 100% conversion) during the catalytic oxidation of L-sorbose in  $\text{H}_2\text{O}$ . Electron micrographs of the catalyst isolated after the induction period showed enlarged Pt nanoclusters.

### Selective Oxidation of Alcohols to Carbonyl Compounds and Carboxylic Acids with Platinum Group Metal Catalysts

R. ANDERSON, K. GRIFFIN, P. JOHNSTON and P. L. ALSTERS, *Adv. Synth. Catal.*, 2003, 345, (4), 517–523

High throughput screening techniques were used to identify catalytic activity and product selectivity for the title reaction. Using air as oxidant and  $\text{H}_2\text{O}$  as solvent, 5% Pt, 1% Bi/C was identified as an efficient catalyst for the transformation of 2-octanol to 2-octanone and 1-octanol to octanoic acid. For Ru/C, the incorporation of Pt increased conversion, but at the expense of aldehyde selectivity.

### Selective Removal of a Benzyl Protecting Group in the Presence of an Aryl Chloride under Gaseous and Transfer Hydrogenolysis Conditions

J. LI, S. WANG, G. A. CRISPINO, K. TENHUISEN, A. SINGH and J. A. GROSSO, *Tetrahedron Lett.*, 2003, 44, (21), 4041–4043

The selective removal of a benzyl protecting group in the presence of an aryl chloride in the synthesis of a quinolinone can be achieved using Pd/C under gaseous and transfer hydrogenolysis conditions. The addition of chloride salts such as NaCl to the debenzoylation reaction resulted in excellent selectivity. The chloride salts suppress an undesired dehalogenation reaction.

### Dehalogenation of Trihalomethanes in Drinking Water on Pd–Fe<sup>0</sup> Bimetallic Surface

E. GUASP and R. WEI, *J. Chem. Technol. Biotechnol.*, 2003, 78, (6), 654–658

Degradation of trihalomethanes (THMs), byproducts of potable H<sub>2</sub>O disinfection, by Pd-treated Fe granules (1), Pd–Fe<sup>0</sup>, was studied in a flow-through column system. Columns were loaded with Torpedo and Silica sands plus anthracite mixed with (1) at a 10:1 ratio (w/w). A single passage of THM samples (50–200 ppb) through the column resulted in greater than 90% disappearance of THMs with one or more Br atoms (CHCl<sub>2</sub>Br, CHClBr<sub>2</sub> and CHBr<sub>3</sub>), but the degradation of CHCl<sub>3</sub> was slower. The column could be regenerated with simple acid washing. No measurable Pd and Fe concentrations were detected in the column effluents over 3–4 weeks, indicating that (1) is stable in the column.

## HOMOGENEOUS CATALYSIS

### Hydrogenation of Olefins Using Ligand-Stabilized Palladium Nanoparticles in an Ionic Liquid

J. HUANG, T. JIANG, B. HAN, H. GAO, Y. CHANG, G. ZHAO and W. WU, *Chem. Commun.*, 2003, (14), 1654–1655

Phenanthroline ligand-protected Pd nanoparticles (1), in the ionic liquid 1-*n*-butyl-3-methylimidazolium hexafluorophosphate, were shown to be a very active and selective catalyst system for the hydrogenation of olefins. Low temperature (20–60°C) and low pressure of H<sub>2</sub> (1 bar) were used. (1) can be reused many times, without reducing the activity. The diameters of (1) are in the range of 2–5 nm.

### Preparation of a Series of Aryl Isonipecotic Acids Using Microwave Irradiation

S. ANTANE, *Synth. Commun.*, 2003, 33, (12), 2145–2149

Rapid parallel synthesis of aryl isonipecotic acids (1) was achieved by microwave irradiation of a Pd catalysed coupling amination reaction of an amino ester with aryl bromides. Pd<sub>2</sub>(dba)<sub>3</sub>/BINAP/NaO<sup>t</sup>Bu was used as the catalyst system. The amount of solvent (toluene) was kept to a minimum. (1) are used in the preparation of a wide range of potential drug agents such as anticoagulants, antimicrobial agents and serotonergic/dopaminergic receptor antagonists.

### Sequential Azomethine Imine Cycloaddition–Palladium Catalysed Cyclisation Processes

C. W. G. FISHWICK, R. GRIGG, V. SRIDHARAN and J. VIRICA, *Tetrahedron*, 2003, 59, (24), 4451–4468

The *in situ* generation of azomethine imines from aryl/heteroaryl aldehydes and *N,N'*-disubstituted hydrazines followed by cycloaddition to *N*-methylmaleimide gives pyrazolidines. These undergo Pd(0) catalysed cyclisation involving the aldehyde and hydrazine substituents, with formation of 6–8 membered rings in good yield. The cyclisation catalyst system was either Pd(OAc)<sub>2</sub>/PPh<sub>3</sub>/NEt<sub>3</sub>/Cl/K<sub>2</sub>CO<sub>3</sub> or Pd(OAc)<sub>2</sub>/PPh<sub>3</sub>/TiOAc.

### Iridium–HetPHOX Complexes for the Catalytic Asymmetric Hydrogenation of Olefins and Imines

P. G. COZZI, F. MENGES and S. KAISER, *Synlett*, 2003, (6), 833–836

Heterocyclic phosphino oxazolines (HetPHOX) derived from thiophene and benzo[*b*]thiophene form highly active Ir complexes for the catalytic enantioselective hydrogenation of olefins and imines. When treated with Na tetrakis[3,4-bis(trifluoromethylphenyl)]borate, the Ir–HetPHOX complexes gave complete conversion of olefins after 2–4 h at catalyst loadings of 1–2%. Enantioselectivities were generally excellent: ≤ 99% ee for (*E*)-1,2-diphenyl-1-propene. An imine was hydrogenated in ≤ 86% ee employing 0.1 mol% of catalyst.

### Iridium-Catalysed Labelling of Anilines, Benzylamines and Nitrogen Heterocycles Using Deuterium Gas and Cycloocta-1,5-dienyliridium(I) 1,1,1,5,5,5-Hexafluoropentane-2,4-dionate

M. J. HICKEY, J. R. JONES, L. P. KINGSTON, W. J. S. LOCKLEY, A. N. MATHER, B. M. MCAULEY and D. J. WILKINSON, *Tetrahedron Lett.*, 2003, 44, (20), 3959–3961

Anilines, benzylamines and nitrogen heterocycles can be readily deuterated by exchange with D<sub>2</sub> gas and the title Ir(I) complex. The isotopic exchange is effective in dimethylformamide or dimethylacetamide, hence it can also be applied to the deuteration of polar compounds such as pharmaceuticals. Isotope incorporation is rapid and yields *ortho*-regiospecificity.

### Benchmarking of Ruthenium Initiators for the ROMP of a Norbornenedicarboxylic Acid Ester

S. DEMEL, W. SCHOEFBERGER, C. SLUGOVIC and F. STELZER, *J. Mol. Catal. A: Chem.*, 2003, 200, (1–2), 11–19

A kinetic study of the ROMP of (±)-*exo,endo*-bicyclo[2.2.1]hept-5-ene-2,3-dicarboxylic acid diethyl ester with Ru benzylidenes gave values for the rates of initiation and of propagation of the initiators. These were correlated to the molecular weight and polydispersity of the isolated polymers. The classical 'first generation Grubbs catalyst' was the only initiator to give virtually monodisperse polymers, while *N*-heterocyclic carbene-based initiators polymerised at a propagation rate much higher than the initiation rate giving polymers with a wider molecular weight distribution.

## FUEL CELLS

### Formation, Microstructural Characteristics and Stability of Carbon Supported Platinum Catalysts for Low Temperature Fuel Cells

E. ANTOLINI, *J. Mater. Sci.*, 2003, 38, (14), 2995–3005

The method for preparation of Pt/C electrocatalysts influences the choice of the C support and its pretreatment. The microscopic distribution of Pt on the C support is dependent on the method of preparation and the characteristics of the substrate. High Pt uniformity, low Pt content in the catalyst and/or C with high resistance to corrosion are reported to improve Pt particle stability. (85 Refs.)

### Conducting Polymeric Nanotubes as High Performance Methanol Oxidation Catalyst Support

B. RAJESH, K. R. THAMPI, J.-M. BONARD, H. J. MATHIEU, N. XANTHOPOULOS and B. VISWANATHAN, *Chem. Commun.*, 2003, (16), 2022–2023

Pt nanoparticle-supported conducting nanotubes of polypyrrole (1) prepared by a template method showed excellent catalytic activity for the electrooxidation of MeOH in comparison to Pt/polypyrrole. MeOH oxidation is a reaction of importance for the development of DMFCs. (1) can also be employed for H<sub>2</sub> oxidation in PEMFCs.

### Structural, Chemical, and Electronic Properties of Pt/Ni Thin Film Electrodes for Methanol Electrooxidation

K.-W. PARK, J.-H. CHOI and Y.-E. SUNG, *J. Phys. Chem. B*, 2003, 107, (24), 5851–5856

Pt/Ni thin film electrodes (1) were fabricated by e-beam evaporation of metal layers and rapid thermal annealing. The structural, chemical and electronic properties of annealed (1) were classified as: Pt-dominant (as-deposited Pt/Ni or 200°C Pt/Ni); Pt-based (300°C Pt/Ni) (2); and Ni-dominant (500°C Pt/Ni). (1) were comparable with Pt/Ni (3:1), (1:1) and (1:3) nanoparticles, respectively, synthesised by borohydride reduction for use in MeOH electrooxidation in a DMFC. (2) showed the highest catalytic activity in MeOH electrooxidation.

### Pt-Ru and Pt-Ru-P/Carbon Nanocomposites: Synthesis, Characterization, and Unexpected Performance as Direct Methanol Fuel Cell (DMFC) Anode Catalysts

W. D. KING, J. D. CORN, O. J. MURPHY, D. L. BOXALL, E. A. KENIK, K. C. KWIAKOWSKI, S. R. STOCK and C. M. LUKEHART, *J. Phys. Chem. B*, 2003, 107, (23), 5467–5474

Six Pt-Ru/C nanocomposites (1) were prepared, using five different Pt,Ru-bimetallic precursors. (1) without P contain Pt-Ru nanocrystals that are highly dispersed on the C. However, (1) with P, Pt-Ru-P/C, contain f.c.c. Pt-Ru alloy nanocrystals and primitive cubic nanocrystals of PtRuP<sub>2</sub>. (1) containing substantial amounts of nano-PtRuP<sub>2</sub> performed as well as commercial (1) as the anode catalyst in DMFCs.

## ELECTRICAL AND ELECTRONIC ENGINEERING

### Diffusion Barrier Performance of Novel RuTiN Material for High-Density Volatile Memory Capacitor

D. S. YOON, J. S. ROH, S.-M. LEE and H. K. BAIK, *Acta Mater.*, 2003, 51, (9), 2531–2538

Electrical properties linked to the oxidation of TiN and RuTiN films in diffusion barrier material were examined. The TiN film (1) barrier in a sputtered-(Ba,Sr)-TiO<sub>3</sub> simple stack-type structure was partially oxidised in the as-deposited state and almost completely oxidised at 550°C, degrading the capacitance. However, a RuTiN (2) barrier was not oxidised at ≤ 600°C, and had capacitance > 30 fF/cell, although the leak current was very high (~ 10<sup>-9</sup> A/cell) due to the low work function (4.43 eV). Thus, for a high-density volatile capacitor, (2) had a better O diffusion barrier performance than (1).

### All Solid-State Rechargeable Thin-Film Microsupercapacitor Fabricated with Tungsten Cosputtered Ruthenium Oxide Electrodes

H.-K. KIM, S.-H. CHO, Y.-W. OK, T.-Y. SEONG and Y. S. YOON, *J. Vac. Sci. Technol. B*, 2003, 21, (3), 949–952

An all solid-state thin-film microsupercapacitor (TFSC) was fabricated with W cosputtered RuO<sub>2</sub> electrodes (W-RuO<sub>2</sub>) and Li<sub>2.94</sub>PO<sub>2.37</sub>N<sub>0.75</sub> electrolyte. The room-temperature charge-discharge behaviour of the TFSC was similar to that of a bulk-type supercapacitor. The W-RuO<sub>2</sub>-based TFSC exhibited a higher discharge specific capacitance and more stable cyclability, than a RuO<sub>2</sub>-based TFSC.

## MEDICAL USES

### Electrochemical and Surface Studies on the Passivity of a Dental Pd-Based Casting Alloy in Alkaline Sulphide Solution

K. ENDO, H. OHNO, K. MATSUDA and S. ASAKURA, *Corros. Sci.*, 2003, 45, (7), 1491–1504

The alloy Pd-25Ag-18Cu-12Au (1) exhibited higher resistance to corrosion and tarnish in Na<sub>2</sub>S solution (2) at 37°C than Ag-20Pd-18Cu-12Au. XPS indicated the presence of a thin PdS film, which is responsible for the passivity of (1) in (2). These properties make (1) suitable for use in dental casting restoration.

### Laser Weld: Microstructure and Corrosion Study of Ag-Pd-Au-Cu Alloy of the Dental Application

M. L. SANTOS, H. A. ACCIARI, L. C. O. VERCIK and A. C. GUASTALDI, *Mater. Lett.*, 2003, 57, (13–14), 1888–1893

The title alloy for use in dental implant prostheses was examined before and after laser welding. The weld area had a refined microstructure derived from the high speed cooling, while the base metal away from the weld area had a coarse fusion microstructure. Electrochemical studies indicated that the weld area had superior corrosion resistance.