

CHEMICAL TECHNOLOGY

Spinneret Makers Enjoy Fibres Surge. Are Pushed by Economic and Technological Factors Likely to Continue Unabated for Some Time

Chem. Engng. News., 1965, 43, (5), 34-36

Spinneret alloys commonly used for rayon production are 70% Au-Pt, 10% Rh-Pt, 49% Au-1% Rh-Pt. Fibre production depends on the precision with which the holes are made; 0.0001 inch tolerance for diameter, perfect shape, sharp-edged. Special shapes are used for special fibres.

Influence of Deformation and Tempering Temperature on the Electrochemical Corrosion of Titanium and the Titanium Alloy with 0.2% Palladium

N. D. TOMASHOV and YU. M. IVANOV, *Zashchita Met.*, 1965, 1, (1), 36-41

Cold-rolled Ti and 0.2% Pd-Ti sheets corrode less than annealed sheets. The rate of corrosion decreases as the deformation from rolling increases.

Investigation of the Protective Action Mechanism of Palladium in Corrosion-resistant Titanium-Palladium Alloys by Radiochemical Methods

N. D. TOMASHOV, M. N. SHCHULEPNIKOV and YU. M. IVANOV, *Ibid.*, 122-123

As surface corrosion commences, there is an accumulation there of Pd which passivates the surface and which leads to Pd additions of 0.1-0.2% to Ti being sufficient.

Technological Properties and Corrosion Behaviour of a Titanium Alloy with 0.2% Palladium

K. RUDINGER, *Werkstoffe u. Korrosion*, 1965, 16, (2), 109-115

Tests on welded and non-welded samples of 0.2% Pd-Ti and of Ti showed that their technological, physical and processing properties are similar. Alloy and metal have the same corrosion-resistance under oxidising conditions but 0.2% Pd-Ti is superior under reducing conditions.

NEW PATENTS

METALS AND ALLOYS

Production of Ultra Pure Hydrogen

JOHNSON, MATTHEY & CO. LTD.

British Patent 982,509

Ultra-pure H₂ is produced from a gas or gaseous mixture by passing it through a diffusion cell, at 50-400 p.s.i.g. and 600-1000°F, consisting of a ceramic tube impregnated with an Ag-Pd alloy.

ELECTRICAL ENGINEERING

Electrical Contact Materials in Low Current Technology

W. H. ABBOTT and H. R. OGDEN, *Battelle Tech. Rev.*, 1965, 14, (3), 17-22

A survey of contact types, causes of failure, and contact design. Au, Pt metal and precious metal alloy contacts are particularly useful. Their properties and difficulties in use for electronics applications are described.

TEMPERATURE MEASUREMENT

Pressure Dependence of the emf of Thermocouples to 1300°C and 50 kbar

R. E. HANNEMAN and H. M. STRONG, *J. Appl. Phys.*, 1965, 36, (2), 523-528

Relative temperature corrections accurate to $\pm 1^\circ\text{C}$ due to pressure are given for Pt:10% Rh-Pt, Pt:13% Rh-Pt, Chromel-Alumel, and iron-constantan thermocouples as functions of temperature and pressure. They exceed 40° in some cases. Absolute corrections ΔT were also studied and are proportional to pressure at a given temperature. ΔT can exceed 50° for Pt:10% Rh-Pt at 50 kbar, $T > 1300^\circ\text{C}$.

A New Method for the Computation of Temperature in Platinum Resistance Thermometry

J. L. HALES and E. F. G. HERINGTON, *J. Sci. Instrum.*, 1965, 42, (4), 203-209

Temperatures on the International Practical Scale of Temperature of 1948 between -182.97 and $+630.5^\circ\text{C}$ can be calculated from the resistance of a Pt thermometer using the equation $t = t_{Pt} + \delta_{Pt}(t_{Pt} - 100)t_{Pt} \cdot 10^{-4}$, where δ_{Pt} depends on the Pt temperature t_{Pt} and on the thermometer constants δ and β . A master table of δ_{Pt} as a function of t_{Pt} is given for a thermometer with $\delta = 1.492$, $\beta = 0.110$ and tables can be derived for other values of δ and β . Using such tables and a desk calculator, temperature errors should not exceed 3×10^{-4} deg C.

Resistor Compositions

E. I. DU PONT DE NEMOURS & CO.

British Patent 982,789

An electrical resistor comprises a solid ceramic base and a conductive resistor composition applied on it and consisting of 20-49 wt.% glass frit matrix and 51-80 wt.% 0.5-50 μ particle size Pd and Ag, taken in a 55:45 to 45:55 ratio by wt., the said Pd containing 0.1-1 wt.% combined oxygen.

Production of Platinum-containing Metal Sheet or Strip

THE INTERNATIONAL NICKEL CO. (MOND) LTD.
British Patent 983,223

Pt-containing metal sheet or strip is produced by forming a laminated stack from at least 25 sheets, each 0.001–0.1 inch thick, at least some of which consist of or comprise Pt, bonding the sheets together by forging and rolling the product to a thickness no more than 1/20 of the original stack, which may contain Pd, Rh or some other Pt group metal in addition to Pt.

Production of Assemblies Comprising Titanium

IMPERIAL CHEMICAL INDUSTRIES LTD.
British Patent 984,973

Pt group metal or alloy plated Ti bodies are obtained by removing the surface skin of the Ti support and applying on it several coatings comprising Pt group metal compounds or their mixtures in an organic vehicle and firing each individual film in an oxidising atmosphere at 350–550°C.

Platinum Group Metal Sheet or Strip

THE INTERNATIONAL NICKEL CO. INC.
U.S. Patent 3,166,417

Metal sheet containing 0.1–5 vol.% dispersed hard metal oxide phase is produced by mixing metallic flake powder containing up to about 50 wt.% Au, Ag, Ni and Cu and the balance essentially a Pt group metal, in particular Pt, Pd, Rh or their alloys, with an organic solvent solution of a metal salt decomposable to said metal oxide, e.g. Th nitrate, compacting the treated flake powder, sintering at a temperature of at least 800°C and working the sintered compact into a sheet.

Noble Metal Dental and Jewellery Alloy

NOBILIUM PRODUCTS INC.
German Patent 1,187,378

New alloy consists of 10–50% Au, 2–15% Ga, 2–5% Ru or Ir, remainder 40–70% Pd.

Platinum Laminate for Non-cutting Shaping

DEUTSCHE GOLD- UND SILBER-SCHNEIDANSTALT
German Patent 1,187,804

A core of Rh, Ir, Ru or Os or their alloys is sheathed with heat resistant Pt and then shaped without cutting, e.g. to wires.

CHEMICAL COMPOUNDS

Production of Carbonyls

IMPERIAL CHEMICAL INDUSTRIES LTD.
British Patent 983,792

Ru carbonyl is produced by contacting an organic acid Ru salt, in a liquid medium consisting of or containing H₂O, with a 1:1 CO/H₂ mixture present in an inert gas at 1–3000 atm, 25–300°C.

ELECTROCHEMISTRY

Electrodes for the Electrolytic Protection of Metal Parts

W. MATTEWMAN. *British Patent 984,477*

An electrode for the protection of metallic parts in contact with a potentially corrosive electrolyte consists of a Cu-cored Ti rod provided with a continuous or discontinuous thin Pt coating and encased in a sheath of perforated or porous plastic, which has a direct mating fit over the rod.

Catalyst Electrode for Anodic Oxidation

ESSO RESEARCH & ENGINEERING CO.
British Patent 989,474

An anodic oxidation electrode for use in electrochemical cells consists of a substrate formed by a Pt screen welded to a Pt plate and a catalytically active Pt-Re coating formed by treating the electrode surface with a solution of a Pt and an Re salt followed by co-precipitation of the metals with a chemical reducing agent.

Gas Diffusion Electrode

VARTA A.G. *Dutch Application 64,08,224*

The electrode has a sandwich structure consisting of a layer of catalyst, preferably a Pt metal, between two porous sinter layers.

ELECTRODEPOSITION AND SURFACE COATINGS

Immersion Plating

ENGELHARD INDUSTRIES INC.
British Patent 982,621

Au deposits are advantageously immersion-plated on to Cu substrates by a first immersion-plating of a thin layer of Pt, Pd, Rh or Ru, using a solution containing a halide or sulphamate of the metal and then immersion-plating an Au film by using a standard KAu(CN)₂ plating solution.

Plating of Palladium and Other Metals of Group VIII

AUTOMATIC TELEPHONE & ELECTRIC CO. LTD.
British Patent 988,174

A chemical plating bath for the electroless plating of Group VIII metals, in particular Pd, comprises a pH 1–3.5 aqueous plating solution containing a source of metal ions in a complexed form and a source of sulphamate ions, e.g. sulphamic acid and Pd diamminodinitrite.

Palladium Decorating Compositions

ENGELHARD INDUSTRIES INC.
British Patent 989,463

An article is decorated with Pd by applying on it a composition comprising a fluid organic vehicle and a bishioether palladous salt coordination compound, firing the film and then burnishing it to provide a soft lustrous finish.

Deposition of Metals of the Platinum Group

DEUTSCHE GOLD- UND SILBER-SCHNEIDANSTALT
British Patent 990,174

Films of Pt group metals less than 1μ thick and greater than 600 \AA in grain size are deposited on Mo, W, Ti, Zr, Ta, Ni or stainless steel by applying on the substrate an organic solution of a Pt group metal chelate of $A-CH_2-A$, where A is CN and/or R-Co, and R is alkyl or alkoxy, evaporating the solvent and decomposing the chelate by 1–10 min at about 400°C .

Platinum Plating

SEL-REX CORP. *German Patent* 1,184,173

Thick, light-coloured Pt coatings are electro-deposited from a solution of Pt diaminodinitrite in an amount equivalent to at least 6 g/l in H_3PO_4 and H_2SO_4 .

Chemical Palladium Plating

THE INTERNATIONAL NICKEL CO. (MOND) LTD.
German Patent 1,187,886

A plating bath contains, per litre, 0.001–0.25 mol Pd (II), 2.5–14 mol NH_3 , 0.002–0.05 mol N_2H_4 and a stabiliser, e.g. 0.01–0.10 mol of a dihydroxy-dialkyl sulphide.

BRAZING

Brazing Alloys

THE INTERNATIONAL NICKEL CO. (MOND) LTD.
French Patent 1,375,498

Brazing alloys suitable for the formation of ceramic-ceramic and metal-ceramic joints consist of 30–75 wt.% Pd, 2–9 wt.% Ti and balance Ni.

CATALYSIS

Production of Organic Acetates

FARBENFABRIKEN BAYER A.G.
British Patent 981,987

Organic acetates are produced by reacting a 2–4C mono-olefine or lower alkylbenzene at $50\text{--}250^\circ\text{C}$ with O_2 and CH_3COOH in the presence of Pd supported on a macroporous material and preferably at 2–200 atm.

Production of Aliphatic Percarboxylic Acids

LES USINES DE MELLE. *British Patent* 982,490

Aliphatic percarboxylic acids are produced by reacting an aliphatic carboxylic acid in organic solvent and in the presence of a strong inorganic acid, cation exchange resin or an organosulphonic acid with alkyl anthraquinone hydroperoxide produced by the hydrogenation of the corresponding alkylanthraquinone in the presence of a supported Pd catalyst.

Catalytic Hydrogenation

ABBOTT LABORATORIES. *British Patent* 984,516

Aromatic amino compounds are produced by

hydrogenating a suitable nitro compound at $25\text{--}150^\circ\text{C}$, 1–150 atm and in the presence of 0.01–2 wt.% Rh catalyst, the activity of which as a ring-hydrogenation promoter is substantially exhausted.

Production of Alpha-olefinic Alcohols

INSTITUT FRANCAIS DU PETROLE, DES CARBURANTS ET LUBRIFIANTS. *British Patent* 984,916

α -Olefinic alcohols are produced by forming a 2–85 wt.% solution of 4–20C olefinic hydrocarbon α -hydroperoxide in a liquid hydrocarbon containing a hydrophilic solvent and contacting it with H_2 in the presence of a catalyst obtained by treating Pd metal with an aqueous solution of Pb and/or Bi salt and a N-containing organic base.

Androstane and Androstene Derivatives

RHONE-POULENC S.A. *British Patent* 984,980

The reaction of 1 β -acetoxy-17-oxoandrost-5-ene with alkylmagnesium halide followed by hydrolysis gives 1 β ,17 β -dihydroxy-17 α -alkyl-androst-5-ene, which can be hydrogenated with H_2 in the presence of Adams Pt, to the corresponding androstane derivative.

Production of Halides of Unsaturated Aliphatic Acids or Derivatives thereof

IMPERIAL CHEMICAL INDUSTRIES LTD.

British Patent 987,274

Unsaturated carboxylic acid halides are produced by contacting a compound containing $C=C-C-X$ group, where X is halogen, with CO at $50\text{--}250^\circ\text{C}$, 50–3000 atm and in the presence of Pd or its complex or salt.

Preparation of Carboxylic Acid Halides

IMPERIAL CHEMICAL INDUSTRIES LTD.

British Patent 987,516

Carboxylic acid halides are produced by reacting an organic aromatic compound with CO and halogen or with a carbonyl halide, at $200\text{--}250^\circ\text{C}$, 1–350 atm and in the presence of a catalytic amount of a Group VIII noble metal, in particular Pd or its compounds.

Purification of Olefine Polymers

COSDEN OIL AND CHEMICAL CO.

British Patent 987,640

A saturated liquid polymer obtained by polymerising 2–5C olefine gas fraction and containing polyisobutylene is purified by hydrogenating the mixture at $65\text{--}730^\circ\text{C}$, 1 atm to 210 kg/cm² and in the presence of Pt, Pd or their compounds as catalyst.

2,4-Diaminopteridine Derivative

THE WELLCOME FOUNDATION LTD.

British Patent 987,916

2,4-Diamino-6-hydroxy-7,8-dihydropteridine is produced by catalytic hydrogenation, in the presence of PtO, of 2,4-diamino-6-hydroxypteridine or 2,4-diamino-6,7-dihydroxypteridine.

Production of Hydroxy Benzaldehydes

RHONE-POULENC S.A. *British Patent* 987,947

The oxidation of a suitable hydroxybenzyl alcohol in an aqueous medium with inert gas-diluted oxygen and in the presence of a Pd catalyst produces m- or p-hydroxybenzaldehyde.

Production of 1,4-Cyclohexanedimethanol

EASTMAN KODAK LTD. *British Patent* 988,012

1,4-Cyclohexanedimethanol is produced by reacting a dialkyl terephthalate with H₂ at 100–400°C, 50–500 atm and over a fixed bed catalyst containing 0.25–10 wt.% Pd, passing the effluent through a second hydrogenation stage using Cu chromite as catalyst.

Manufacture of Amines

MONSANTO CO. *British Patent* 989,257

Amines are produced by heating, at below 350°C and in the presence of Pt group hydrogenation catalyst and optionally a H acceptor, a six-membered alicyclic ketone and an ammonia compound retaining at least one H on the N atom.

Treatment of Hydrocarbons

THE BRITISH PETROLEUM CO. LTD.

British Patent 989,269

A hydrocarbon feedstock containing alkyl aromatics is dealkylated by contacting it at 450–900°F, 50–1500 p.s.i.g. and in the presence of H with decationised zeolite Y supporting 0.1–5 wt.% Pt group metal, preferably Pd.

Catalyst for Exhaust Gas Oxidation

UNIVERSAL OIL PRODUCTS CO.

British Patent 989,728

A catalyst for the oxidation of exhaust gases of combustion engines comprises a spherical inorganic oxide carrier having an apparent bulk density of 0.15–0.35 g/cm³ supporting 0.01–5 wt.% Pt group metal.

Novel Indole Derivatives and a Process for the Manufacture thereof

ROCHE PRODUCTS LTD. *British Patent* 990,092

Pharmaceutically active hydroxylamino-indoles are produced from nitro-indoles, the catalytic reduction stage involving the use of a hydrogenated Pt oxide catalyst.

Preparation of Vinyl Esters

RHONE-POULENC S.A. *British Patent* 990,447

Vinyl esters are produced by reacting ethylene with 1–4C aliphatic carboxylic acid at 50–80°C, 10–100 atm and in the presence of a noble metal halide, e.g. PdCl₂, p-quinone and an alkali metal salt of such an organic acid, separating the vinyl ester formed and the noble metal catalyst, reoxidising the diphenol produced to the quinone with O in the presence of carbon black supported Rh catalyst and using the regenerated p-quinone in further reaction.

Hydro-refining Catalysts

UNIVERSAL OIL PRODUCTS CO.

U.S. Patent 3,161,586

A continuous process for hydro-refining unsaturated, coke-forming hydrocarbon distillates utilises refractory metal oxide-supported Ru, Rh, Pd, Os, Ir, Pt or their mixtures as catalysts and is operated at 250–500°F.

Production of Benzimidazolinones

RESEARCH LABORATORIUM DR. C. JANSSEN N.V.

U.S. Patent 3,161,645

In the production of 1-(1-arylpropyl-4-piperidyl)-2-benzimidazolinones, the stage of catalytic hydrogenation to remove the benzyl group is carried out in the presence of Pd/C catalyst.

Carbonylation of Conjugated Diolefines

ESSO RESEARCH & ENGINEERING CO.

U.S. Patent 3,161,672

Mono-olefinically unsaturated monoesters are produced by carbonylating 4–20C conjugated diolefines in a 1–20C alkanol solvent at 125–225°C, 500–3000 p.s.i.g. and in the presence of 0.001–5 wt.% Rh metal, oxide, nitrate or carbonyl.

Noble Metal Hydrogenation Catalysts in the Production of Substituted Pyrrolidines

GEIGY CHEMICAL CORP. *U.S. Patent* 3,164,597

Phenyl-substituted pyrrolidine-2-carboxylic acids, -carboxylic acid esters and -carboxamides are produced by hydrogenation of the corresponding pyrroline compounds in the presence of Pt, Pd, Rh or PtO catalyst.

Production of Bis-nitrogen Heterocycles

CALIFORNIA RESEARCH CORP.

U.S. Patent 3,164,599

Bis-nitrogen heterocyclic compounds are produced by refluxing in the presence of a Pd hydrogenation catalyst, e.g. Pd/C, a N heterocycle boiling at 110–900°C.

Platinum Group Metal Hydrogenation Catalysts

ALLIED CHEMICAL CORP. *U.S. Patent* 3,164,630

Polymerisable salts of xylene diamines and dicarboxylic acids are produced by reacting to cyano compound and a dicarboxylic acid with H₂ in the presence of Pd, Pt, Ru, Rh catalyst, so that xylene diamine and subsequently the desired salt are formed.

Cyanoethylation of Organosilanes

WACKER-CHEMIE G.M.B.H.

U.S. Patent 3,167,573

Cyanoethyl-substituted silanes are produced by reacting acrylonitrile with a silane at 40–350°C and in the presence of a catalyst comprising Pt and aromatic nitrile, cyanoethylated amine, cyanoethylated acid amide or quinoidal pigments.

Hydrogenation Catalysts

ALLIED CHEMICAL CORP.

U.S. Patent 3,167,588

Unsymmetrical-dialkylhydrazines are produced by forming a slurry of nitrosodialkylamine, Pt or Pd supported on C, TiO₂ or Al₂O₃ and H and feeding it through a reaction zone at 25–125°C, 10–1000 p.s.i.g. and then separating the catalyst at 70–120°C and 20–1000 mm Hg.

Production of Carbonyls

SHELL OIL CO. *U.S. Patent* 3,168,553

Carbonyl compounds are produced by reacting a 2–20C mono-olefinic hydrocarbon with CO at 75–250°C and 800–3000 p.s.i. in the presence of a catalyst consisting of Co, Ru, Rh and Ir in complex combination with Co and trialkyl phosphine.

Dehydrogenation Catalysts

SINCLAIR RESEARCH INC. *U.S. Patent* 3,168,587

4–8 C aliphatic hydrocarbons are dehydrogenated at 800–1300°F and 0.05–100 p.s.i.g. by introducing into the reaction vessel 0.01–10 mol.% O and a catalyst comprising a non-acidic refractory support carrying a minor proportion of a Pt group metal.

Hydrocracking Catalysts

SOCONY MOBIL OIL CO. INC.

U.S. Patent 3,169,107

A hydrocarbon charge is subjected to hydrocracking by contacting it under the usual conditions and in the presence of H with a catalyst comprising 25–75 wt.% SiO₂, 0.05–10 wt.% Pt or Pd and the balance Al₂O₃.

Ketene Polymerisation

SHELL INTERNATIONALE RESEARCH MIJ. N.V.

French Patent 1,370,507

Ketenes are polymerised at 10–50°C by being contacted with a catalyst selected from PdCl₂ or (Ar₃X)₂PdCl₂, where Ar is an aryl, in particular phenyl, and X is P, As or Sb.

Hydro-reforming Catalysts

IMPERIAL CHEMICAL INDUSTRIES LTD.

French Patent 1,372,516

Hydrocarbons boiling at 30–350°C are subjected to hydro-reforming at 470–700°C and 1–50 atm in the presence of a catalyst comprising a refractory metal oxide support, 3–80 wt.% Ni or Co and 0.001–0.5 wt.% Pt, Rh or Ru.

Hydrogenation Catalyst

SOCIETA FARMACEUTICI ITALIA

French Patent 1,372,742

(Dimethoxy-3,4-phenyl)-1-tert-butyl-2-amino-ethanol is produced by hydrogenating t-butylamine- ω -dimethoxy-3,4-acetophenone in aqueous solution, at 2–5 atm, at ambient temperature and in the presence of Pd/C catalyst.

Exhaust Gas Purifiers

DEUTSCHE GOLD- UND SILBER-SCHNEIDANSTALT

French Patent 1,373,299

A purifier for combustion engine exhaust gases contains a first thin layer composed mainly of a noble metal, in particular Pt or Pd and a second thick, fluidised layer containing only a minor amount of such metal.

Polymerisation Catalysts

IMPERIAL CHEMICAL INDUSTRIES LTD.

French Patent 1,375,869

Elastomeric compositions comprise 100 wt. parts diorgano-polysiloxane, 0.1–100 wt. parts another organosilicon compound, 0–10 wt. parts structure controlling agent, 0–150 wt. parts reinforcing filler, 0–200 wt. parts semi- or non-reinforcing filler and up to 0.2 wt.% Pt, Ru, Rh, Pd, Os or Ir.

Hydrocarbon Conversion Catalysts

INSTITUT FRANCAIS DU PETROLE, DES CARBURANTS ET LUBRIFIANTS. *French Patent* 1,376,480

5–6C paraffins are converted to 3–4C paraffins by hydrogenating them at 350–450°C, 10–250 atm and in the presence of a Pt group metal catalyst, preferably Pt or Pd.

Molecular Sieves

INSTITUT FRANCAIS DU PETROLE, DES CARBURANTS ET LUBRIFIANTS. *French Patent* 1,376,483

3–4C paraffins are obtained by subjecting 5–6 C paraffins to hydrocracking at 350–550°C, 10–250 atm and in the presence of a molecular sieve of about 6 Å pore size activated by 0.2–1 wt.% Pt group metal, preferably Pt or Pd.

Hydrogenation of Organic Compounds

UNION CARBIDE CORP. *French Patent* 1,376,744

Organic compounds are hydrogenated by contacting them with H₂ and a catalyst obtained by reacting, at elevated temperature and in an inert liquid, Ru, Rh, Pd, Os, Ir or Pt with 10–20 molar excess of organosilicon possessing Si-H bonds, whereby the precious metal component is reduced to lower valency state, preferably zero.

Production of Enolic Ethers of 3-Keto-5 α -androstanes

FRANCESCO VISMARA S.P.A.

French Patent 1,377,260

Enolic ethers of 3-keto-5 α -androstanes are produced by the hydrogenation of ethers of 3-hydroxy-androsta-3,5-dienes at 5–30°C, in an inert organic solvent and in the presence of a Pt or Pd catalyst on an inert support, preferably Pd/CaCO₃.

Catalysts for Exhaust Gas Filters

W. R. GRACE & CO. *French Patent* 1,377,737

Catalyst for the oxidative purification of exhaust gases of internal combustion engines are produced by impregnating a high specific surface area

refractory oxide support, e.g. Al_2O_3 , to provide 3–15 wt.% CoO and 0.01–0.1 wt.% Pd, drying the material at 127°C and then calcining for 3–19 h at about 760°C.

Catalysts for Exhaust Gas Purification

W. R. GRACE & CO. *French Patent* 1,377,776

Catalysts for the oxidative purification of exhaust gases of internal combustion engines are produced by impregnating a high surface area refractory metal oxide with solutions of Mn and Pd salts so that after 3–9 h calcination at 538–760°C the catalyst contains 5–20 wt.% MnO_2 and 0.01–0.1 wt.% Pd.

Vinyl Acetate Production

FARBENFABRIKEN BAYER A.G.

German Patent 1,185,604

The reaction of C_2H_4 and O_2 is catalysed by a Pd catalyst on a macroporous support having an internal surface of less than 50 m^2/g .

Tritium Introduction Catalyst

U.K. ATOMIC ENERGY AUTHORITY

German Patent 1,187,235

Tritium is introduced into tetrasodium-1,4-dihydroxy-2-methyl-1,4-dihydronaphthalene-(1,4)-diphosphate using Pt or Pd hydrogenation catalysts.

Organosilicon Compound Production

IMPERIAL CHEMICAL INDUSTRIES LTD.

German Patent 1,187,240

The reaction of silanes with organic compounds is catalysed by a Pt (II) salt complex with an olefine.

Nitroaromatic Reduction

E. I. DU PONT DE NEMOURS & CO.

German Patent 1,187,243

Amines are produced from nitroaromatic compounds by reduction in the presence of a Pt catalyst and a cycloaliphatic N base.

Production of Dihydrotriazine

VITAMINS LTD. *German Patent* 1,187,626

4,6-Diamino-1,2-dihydro-2,2-dimethyl-1-hydroxy-1,3,5-triazine is produced by hydrogenation of the corresponding unsaturated compound in the presence of a Pd catalyst.

Benzene Production

SUN OIL CO. *German Patent* 1,188,063

The aromatisation of methylcyclopentane is catalysed by a Pt catalyst, on an Al_2O_3 support containing a halide, in the presence of NH_3 or an amine.

Hydroxybenzaldehyde Production

RHONE-POULENC S.A. *German Patent* 1,188,069

The oxidation of hydroxybenzyl alcohols to the corresponding aldehydes is effected by O in

aqueous-alkaline medium in the presence of a Pd catalyst.

Selective Acetylene Hydrogenation

SNAM S.P.A. *Dutch Application* 64.05,225

Water-miscible acetylenic compounds are hydrogenated selectively in an aqueous Zn salt solution in the presence of a Pd catalyst.

Production of Halohydrocarbons

IMPERIAL CHEMICAL INDUSTRIES LTD.

Dutch Application 64.06,346

The reaction of alkenes with a halogen acid is catalysed by a mixture of a Pt metal and one of its compounds, e.g. Pt and chloroplatinic acid.

Ketone Production

F. HOFFMANN-LA ROCHE & CO. A.G.

Dutch Application 64.07,001

A catalyst for ketone production consists of a Pd-Fe compound mixture.

Carboxylic Acid Production

SHELL INTERNATIONALE RESEARCH MIJ. N.V.

Dutch Application 64.08,476

The reaction of unsaturated compounds with CO to form acids is catalysed by a Group VIII noble metal, e.g. Pd.

FUEL CELLS

Fuel Cells

LEESONA CORP. *British Patent* 986,837

A porous reducing electrode for fuel cells is formed of 1–100 μ particle size powder of a Pd alloy containing 0.25–10 wt.% Ag.

Precious Metal Fuel Cell Electrodes

SHELL RESEARCH LTD. *French Patent* 1,374,387

Improved microporous electrodes for fuel cells may consist of a microporous substrate which has been coated with a thick film of Pd, Pt, Os, Ir, Rh or their alloys, which may be further thickened by application over almost the entire surface of another metal selected from the same group.

Fuel Cell Electrode

SIEMENS-SCHUCKERTWERKE A.G.

Dutch Application 64.06,694

A porous ferromagnetic electrode core is used and the catalytic metal, e.g. Pt, is introduced by magnetic forces.

Porous Fuel Cell Cathode

UNION CARBIDE CORP.

Dutch Application 64.07,594

A Ru catalyst is obtained with a spinel catalyst on a fuel cell electrode by co-deposition from a solution of a heavy metal salt, an Al salt and a Ru salt.