

### **A Dew Point Meter Based on Thermoelectric Cooling**

O. G. GRIFFIN and C. M. STRINGFIELD, *J. Scient. Instrum.*, 1964, **41**, (4), 241

The dew point of a gas flowing in a tube is measured by observing the temperature at which condensation forms on a mirror surface that is heated and cooled electrically. The Pallador thermocouple is soldered into a cavity in the centre of the mirror. Dew points  $20^{\circ}\text{C}$  < gas temperature and from 50 to  $-5^{\circ}\text{C}$  have been measured in gas flows of 40 l/min.

### **Thermal and Hydrostatic Behaviour of Miniature Platinum Resistance Elements**

C. M. KNOBLER, W. I. HONEYWELL and C. J. PINGS, *Rev. Sci. Instrum.*, 1963, **34**, (12), 1437-1438

Glass-clad Pt wire resistance elements by Degussa were calibrated against an N.B.S. Pt resistance thermometer from 77 to  $300^{\circ}\text{K}$ . No systematic resistance deviations were observed. Pressures up to 2,000 p.s.i. at room temperature caused no damage to the elements. Slight decrease in resistance up to 1,500 p.s.i. was equivalent to  $30-150 \times 10^{-6} \text{ }^{\circ}\text{K/p.s.i.}$

## **NEW PATENTS**

### **Rhodium Trichloride Catalyst**

E. I. DU PONT DE NEMOURS & CO.

*British Patent* 948,041

An acyclic hydrocarbon diene having 6 or 7 carbon atoms is made by: (1) condensing ethylene or propylene with 1,3-butadiene in presence of a  $\text{RhCl}_3$  catalyst until the catalyst is deactivated, (2) isolating the catalyst residue, (3) mixing it with 1 mole of aqueous HCl solution per mole of initial catalyst and, (4) using this reactivated residue as a substitute in stage (1).

### **Preparation of Dicyanogen**

ROHM & HAAS G.m.b.H. *British Patent* 948,113

A catalyst formed of an alloy of two or more Pt metals or of one or more Pt metals with one or more Group VIA metals is used in preparation of dicyanogen by oxidation of HCN. 99% Pt and 1% Pd alloy preferred.

### **Production of Aromatic Halogen Compounds**

MONSANTO CHEMICALS LTD *British Patent* 948,281

Pt or Pd, in the form of a halide of Pd or Pd/C, may be used in a process of providing halogeno-substituted aromatic compounds.

### **Purifying Sulphuric Acid**

V.E.B. FARBENFABRIK WOLFEN

*British Patent* 948,381

Concentrated  $\text{H}_2\text{SO}_4$  containing oxidised N compounds is purified by electrolysis at  $55-80^{\circ}\text{C}$ . and current density at anode of  $0.08-0.12 \text{ A/cm}^2$  and at cathode of  $0.20-0.25 \text{ A/cm}^2$  in one or more closed cells using a cathode of Pt and an anode of Pt or Pb oxide.

### **Catalytic Igniters**

ROLLS-ROYCE LTD. *British Patent* 948,578

A prime mover ignition device comprises a number of cylindrical foraminates rolls of Pt or Rh or Pt-Rh alloy, supported in an annular formation by a mass of refractory material, having a flow passage or passages extending through it to lead combustion mixture to the rolls.

### **Hydrogenation of Cycloaliphatic Compounds**

BADISCHE ANILIN & SODA-FABRIK A.G.

*British Patent* 948,861

Metallic Pd and heavy metal ions (Cu, Ag, Zn, Cd, Hg, Tl, Pb, Sn, Sb, Bi, V or Zr) are used in the partial hydrogenation of cycloaliphatic compounds.

### **Production of Ethylene-diamine or its Derivatives**

THE PURE OIL CO. *British Patent* 948,965

A Group VIII noble metal catalyst is used in the preparation of mineral acid salts or N-acyl derivatives of ethylene diamine by reacting cyanogen with hydrogen at  $0^{\circ}-300^{\circ}\text{C}$  and a pressure of over 50 lb/sq. in. in the presence of the catalyst.  $\text{Rh/Al}_2\text{O}_3$  is used.

### **Fuel Cell**

ALLIS-CHALMERS MANUFACTURING CO.

*British Patents* 948,984; 948,985; 948,986

Relate to improved liquid fuel cell of the low temperature catalyst-activated type, which offers increased current density and in which the internal resistance of the cells is reduced. The fuel electrode (948,985) carries a catalyst of a Pt group metal.

### **Organosilicon Compounds**

UNION CARBIDE CORP. *British Patent* 949,044

Catalyst of elemental Pt on  $\gamma\text{-Al}_2\text{O}_3$  is used in a process of preparing organosilicon compounds by reacting  $\text{CH}_3\text{Cl}$  and a hydrogen halosilane of given general formula in the presence of the catalyst.

### **Preparation of Trans-9-oxodec-2-enoic Acid**

"SHELL" RESEARCH LTD. *British Patent* 949,319

Refers to the use of a Pd/ $\text{BaSO}_4$  catalyst at one stage in the preparation of the above compound.

### **Boron Doping Alloys**

WESTINGHOUSE ELECTRIC CORP.

*British Patent* 949,653

Discloses a novel method of preparing a doping

alloy for producing P-type doping in semiconductor material, using a master alloy of 40% B and 60% Pt by wt. and a sub-carrier of Pt, Cu, Fe, Co, Ni, Rh, Ru, Pd, Os or Ir. The master alloy is dissolved in the liquified carrier metal in such proportion that the melt contains not over 1% by wt. of the master alloy, and the melt is maintained above melting point of the carrier until uniform distribution of the boron is obtained.

### Partial Oxidation of Hydrocarbons

NATIONAL RESEARCH & DEVELOPMENT CORP.  
*British Patent 951,100*

Reference is made to the use of a combustion chamber lined with a Pt-Rh alloy in a process for producing an unsaturated hydrocarbon by partial oxidation of a saturated hydrocarbon, e.g. production of  $C_2H_2$  from  $CH_4$ .

### Fuel Cells

LEESONA CORP. *British Patent 951,168*

The fuel electrode of a fuel cell is formed of a non-porous plastic polymer structure surface coated with Pd, Pt, Rh or Ru. The polymer membrane may be polyethylene or a polyamide.

### Preparation of 2-Amino-benzophenones

F. HOFFMANN-LA ROCHE & CO.  
*British Patent 951,301*

The above materials are made by hydrogenating the unsubstituted 5-halo-2-amino-benzo-phenone with gaseous  $H_2$  in the presence of a Pd catalyst, a halide ion acceptor and an organic solvent. The catalyst may be formed *in situ*.

### Production of Acyl-alkyl-phenols

THE DISTILLERS CO. LTD. *British Patent 951,435*

An acyl-alkyl-phenol is made by dehydrogenating an alkyl-substituted acyl cyclohexenone of given formula in the presence of a supported Pt metal catalyst.

### Silylated Compounds

DOW CORNING CORP. *British Patent 951,489*

Refers to the use of a solution of  $H_2PtCl_6$  acid in dimethylphthalate in the preparation of a silylated polyepoxide of given general formula.

### Production of Fuel Gas

BADISCHE ANILIN & SODA-FABRIK A.G.  
*British Patent 951,518*

A supported Pd/SiO<sub>2</sub> cracking catalyst is used in the production of fuel gas from liquid hydrocarbons.

### Manufacture of Methyl-4-p-aminophenyl-butyrates

THE WELLCOME FOUNDATION LTD  
*British Patent 951,628*

A catalyst of Pd/C is used in a method of making the above compound by reduction with  $H_2$  in the

presence of the catalyst of a 4-p-(lower acylamido) phenyl-4-oxobutyric acid dissolved in a  $CH_3OH$  solution.

### Synthesis of 5-Chloro-2,4-bis-(methylsulphamyl)-aniline

ABBOTT LABORATORIES INC. *British Patent 952,019*  
A Pd hydrogenation catalyst is used in the preparation of the above compound from 4,6-dichloro-1-3-bis (methylsulphamyl)-benzene.

### Treatment of Exhaust Gases

W. R. GRACE & CO *British Patent 952,150*

Describes a method of preparing a Pt-containing catalyst for use in the oxidation of exhaust gases from an internal combustion engine.

### Electrodes and Electroplating

HARSHAW CHEMICAL CO. *British Patent 952,171*

A Pt-coated anode is made by electroplating a Pt coating on a Ti base and then heat-treating the base at 400°-800°C for 15 seconds to 1 hour. See also 952,172.

### New Quaternary Salt

CHINOIN GYOGYSZER ES VEGYESZETI TERMEKEK  
GYARA RT. *British Patent 952,289*

1-Phenyl-1-cyclohexyl-3-piperidino-propanol-1 is made by reacting  $C_8H_9N$  with 1-phenyl-1-cyclohexyl-1-hydroxypropyl-3 p-toluenesulphonate and reducing the pyridinium sulphonate thus obtained. The reduction is carried out as a catalytic hydrogenation with a Pd catalyst.

### Developer for Electrostatic Images

BURROUGHS CORP. *British Patent 952,326*

An electrically conductive powder for developing electrostatic latent images consists of non-friable powder particles of 10-80 microns diameter, the particles having electrically non-conductive cores coated with an electrically conductive metal, e.g. Pd or Rh. Glass beads may be used as the particles.

### Manufacture of Single Crystals

THE GENERAL ELECTRIC CO. LTD.  
*British Patent 952,385*

Describes an apparatus for use in a novel method of making single crystals which includes a source material retainer formed of a perforated Pt disc or sheet, or a piece of Pt gauze or a perforated Pt vessel. The seed crystals are supported by thin Pt wires.

### Formation of Metal Coatings

THE INTERNATIONAL NICKEL CO. (MOND) LTD.  
*British Patent 952,493*

A dispersion of a Pt group metal flake powder in a liquid, which will volatilise or decompose under heat, is applied to a supporting surface and is heated to sinter the flakes to an adherent coating.

### Catalyst

SOCONY MOBIL OIL CO. INC. *British Patent* 952,622  
The following method is employed to make a catalyst: hydrous  $\text{Al}_2\text{O}_3$  having a phase composition of 10–35% by wt.  $\alpha\text{-Al}_2\text{O}_3 \cdot \text{H}_2\text{O}$  and 65–90% of  $\beta\text{-Al}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$  is mixed with (1) a Pt compound in sufficient amount to give a content of 0.01–5% by wt. of Pt in the catalyst and (2) not over 5% by wt. of  $\text{HNO}_3$  based on weight of  $\text{Al}_2\text{O}_3$ ; the mixture is dried and calcined at elevated temperature to convert the monohydrate to  $\gamma\text{-Al}_2\text{O}_3$  and the trihydrate to  $\eta\text{-Al}_2\text{O}_3$ . The catalyst is stated to have unusual physical strength and strength retention.

### Production of Acetaldehyde

NIPPON GOSEI KAGAKU K.K.K.  
*British Patent* 952,718

A catalyst comprising a salt of Pd, Rh or Pt and a salt of Cu, Zn, Cr, Mn, Fe, Co or Ni is used in producing acetaldehyde by reacting  $\text{C}_2\text{H}_4$  with  $\text{O}_2$  and an aliphatic alcohol, (e.g.  $\text{CH}_3\text{OH}$  or  $\text{C}_2\text{H}_5\text{OH}$ ) in the presence of the catalyst at 50°–150°C and 1–100 atm.

### Catalysts

THE BRITISH PETROLEUM CO. LTD  
*British Patent* 953,187

A catalyst for isomerisation of  $\text{C}_4$  and higher paraffin hydrocarbons at below 400°F is made by contacting an  $\text{H}_2$ -containing  $\text{Al}_2\text{O}_3$  with  $\text{CCl}_4$ ,  $\text{CHCl}_3$  or  $\text{CH}_2\text{Cl}_2$ , or the like, under non-reducing conditions and such that chlorine is taken up by the  $\text{Al}_2\text{O}_3$  without production of free  $\text{AlCl}_3$ . The catalyst includes Pt or Pd.

### Isomerisation of Paraffin Hydrocarbons

THE BRITISH PETROLEUM CO. LTD.  
*British Patents* 953,188; 953,189

Covers processes for isomerisation of  $\text{C}_4$  and higher paraffin hydrocarbons using the catalyst of 953,187 above.

### Production of Noble Metal Layers

N. V. PHILIPS GLOBILAMPENFABRIEKEN  
*British Patent* 953,431

A noble metal layer is formed on a non-metallic, non-conductive support photographically by subjecting a light-sensitive layer to a minor exposure (defined), treating the layer with an aqueous germ introduction agent including a water-soluble Hg or Ag compound which reacts with the layer to form a partly external metal germ image and physically developing this image with a non-stabilised intensifier. Layers of Au, Pt, Pd, Ir or Rh can be obtained. See also 953,432; 953,433.

### Dibenzofuran Derivatives

MONSANTO CHEMICALS LTD.  
*British Patent* 953,661

A Pd/C hydrogenation catalyst is used in a process of producing a dibenzofuran.

### Cracking Process

FARBENFABRIKEN BAYER A.G.  
*British Patent* 953,747

A Pd hydrogenation catalyst is used in a process for pyrolysis of liquid hydrocarbon in which the cracked gasoline obtained in the pyrolysis is hydrogenated so as completely to hydrogenate the diolefines and leave the mono-olefines and aromatic compounds unchanged.

### Alloy

AEROJET-GENERAL CORP. *British Patent* 953,948

An alloy for use in brazing material is formed of: 96–1% Au, 72–1% Pd, 61–2% Ni, Cr and/or Co. Numerous examples given. The alloy is stated to be extremely resistant to corrosion by hot gases, moist conditions or corrosive liquid.

### Production of Cyclohexylhydroxylamine

COMMERCIAL SOLVENTS CORP.  
*British Patent* 953,995

Cyclohexylhydroxylamine is made by hydrogenating nitrocyclohexene in the presence of Pd or Pt catalyst at 0–65°C and 100–2,000 p.s.i. pressure. 3–3½ moles of  $\text{H}_2$  are used for each mole of nitrocyclohexene.

### Selective Hydrogenation

CHEMETRON CORP. *British Patent* 954,203

A catalyst for use in the selective hydrogenation of highly unsaturated hydrocarbons in a concentrated olefin stream is formed of 0.01–0.09% by wt. Pd, 0.01–0.09% Cr deposited in an  $\text{Al}_2\text{O}_3$  carrier having a pore volume of surface pores of 0.0–0.4 c.c./g. Threshold diameter of surface pores is not over 800 Å.

### N-substituted Nitro-phenylene Derivatives

BRISTOL-MYERS CO. *British Patent* 955,743

A Pt or Pd catalyst is used in the catalytic hydrogenation of a 2,4-dinitro-phenylamine to an acid addition salt of the corresponding 2-nitro-4-amino-phenylamine or para-phenylene-diamine derivative.

### Manufacture of Dicyclohexylamine

ABBOTT LABORATORIES *British Patent* 956,116

Dicyclohexylamine is made by mixing equimolar amounts of phenol and aniline and subjecting the mixture, in a low pressure hydrogenation plant, to  $\text{H}_2$  gas at 100 p.s.i.g. or less and at room temperature to 100°C in the presence of metallic Pd (0.45% by wt. of the mixture). The catalyst is supported on charcoal.

### Separation of Hydrogen from Gaseous Mixtures

JOHNSON, MATTHEY & CO. LTD.  
*British Patent* 956,176

A  $\text{H}_2$  diffusion membrane or tube is formed of an 0.05–2 wt.% B-Pd alloy.

### Manufacture of Hydrogen Cyanide

E. I. DU PONT DE NEMOURS & CO.  
*British Patent* 956,200.

HCN is made by passing over a Pt catalyst at 1000°–1200°C a mixture, pre-heated to 400°–525°C, of CH<sub>4</sub> and NH<sub>3</sub> in a vol. ratio of 0.8:1 to 1.2:1, and air in amount equivalent to 25–40% of that theoretically required for complete oxidation of the NH<sub>3</sub> and CH<sub>4</sub>.

### Decontamination of Palladium Diaphragms

A. O. SMITH CORP. *U.S. Patent* 3,113,080

Pd diaphragms for transferring atomic H to hydrogenation cells are decontaminated and protected by applying a coating of Pd black or Pt black.

### Catalytic Alkyl Benzene Isomerisation

SINCLAIR RESEARCH INC. *U.S. Patent* 3,113,979

Positional isomerisation and isomerisation between alkyl substituents are produced in a single stage process by the use of a catalyst consisting of a Pt metal and B oxide deposited on Al<sub>2</sub>O<sub>3</sub>.

### Acetylene Selective Hydrogenation Catalyst

IMPERIAL CHEMICAL INDUSTRIES LTD.

*U.S. Patent* 3,113,980

Acetylenes are selectively hydrogenated in the presence of olefines by the use of a catalyst consisting of Pd deposited on Al<sub>2</sub>O<sub>3</sub> having pores whose mean radius lies between 100–1400Å.

### Electrode Production

GENERAL ELECTRIC CO. (NEW YORK)

*U.S. Patent* 3,114,087

The adherence of electrodes made of Ta to tab leads is increased by applying a layer of Pd to the Ta.

### Inlay Metal Strip

JOHNSON, MATTHEY & CO. LTD.

*U.S. Patent* 3,115,702

A Pt metal or alloy strip is bonded to a refractory metal base element by applying to the strip and element, in contact and encased in a metallic sheath, heat and uniform pressure simultaneously throughout the entire area thereof.

### Fuel Cell Electrode-catalyst

A. J. HIPF *U.S. Patent* 3,116,165

New electrode-catalyst is produced by the chemical deposition of Pd, Ir, Pt, Os or Ru on a Ni plaque by heating it in a solution of the Pt metal at 40–70°C and pH 1 or less.

### Fuel Cell Electrode Production

SHELL OIL CO. *U.S. Patent* 3,116,170

A conductive layer of Ag is deposited by evaporation on a plate of non-conducting porous polyvinyl chloride, then further Ag is electrodeposited and finally Pd black catalysts applied.

### Catalysed Nitrile Production

THE PURE OIL CO. *U.S. Patent* 3,116,313

The production of aromatic nitriles from the corresponding halides and HCN is catalysed by a Pt metal deposited on a refractory support. The same supported catalyst may be used for aliphatic nitriles (No. 3,116,318).

### Multistage Catalytic Reforming Process

STANDARD OIL CO. *U.S. Patent* 3,117,073

A hydrocarbon naphtha is hydroformed in the presence of a hydrogen-rich recycle gas and a Pt/Al<sub>2</sub>O<sub>3</sub> catalyst in which the Al<sub>2</sub>O<sub>3</sub> surface area in a first stage is less than 130 m<sup>2</sup>/g and the area in a second stage is 130 m<sup>2</sup>/g or more.

### Mixed Platinum Reforming Catalyst

STANDARD OIL CO. *U.S. Patent* 3,117,096

New catalyst giving a high aromatic content from alkyl cyclopentanes consists of 1–20 wt. % BN and 0.1–2 wt. % of an Al<sub>2</sub>O<sub>3</sub>-supported Pt metal.

### Catalyst for Olefine Oxidation

FARBWERKE HOECHST A.G. *U.S. Patent* 3,118,001

A new catalyst system for the oxidation of olefins to aldehydes and ketones consists of a Pt metal, CuCl<sub>2</sub> and either trichloroacetic acid, dibromoacetic acid or their salts or mixtures.

### Catalytic Nitric Acid Reduction

NATIONAL DISTILLERS & CHEMICAL CORP.

*U.S. Patent* 3,119,657

HNO<sub>3</sub> mixed with HCl, H<sub>2</sub>O and a Sn chloride is reduced to hydroxylamine (as hydrochloride) by H<sub>2</sub> in the presence of Pt or Pd, e.g. Pt/C.

### Olefine Oxidation Catalyst

FARBWERKE HOECHST A.G. *U.S. Patent* 3,119,874

Olefines are oxidised to carbonyl compounds in aqueous neutral to acid medium in the presence of a catalyst consisting of a Pd salt and a redox system, e.g. PdCl<sub>2</sub> and CuCl<sub>2</sub>. No. 3,119,875 covers the use of other Pt metal compounds.

### Promoter for Silica-Zirconia Hydrocracking Catalysts

UNION OIL CO. *U.S. Patent* 3,120,483

The hydrocracking activity of SiO<sub>2</sub>-ZrO catalysts is promoted by small amounts of Group VIII metals, e.g. Pt, Pd, Ir, Rh.

### Dental Coping Alloy

NIRANIUM CORP. *U.S. Patent* 3,121,629

A non-separating alloy for use with porcelain jackets to form a durable join consists of 40–55% Ni, 20–30% Cr and 20–25% of a Pt metal together with 1–4% of Be, Si and/or Mo.

### Catalytic Acetylene Amine Reaction

PHILLIPS PETROLEUM CO. *U.S. Patent* 3,121,747

Acetylenic amines are produced by the reaction

of a secondary amine, an acetylenic compound and  $H_2$  in the presence of Pt or Pd at 0–200°C and 1–1000 p.s.i.

### Graphite Bonding Method

U.S. ATOMIC ENERGY COMMISSION

*U.S. Patent* 3,122,424

A bond is produced between graphite articles or between graphite and a metal by placing a Pt foil 2 mils or more thick between the surfaces, heating in an inert atmosphere with the surfaces in contact at 1800°C, cooling, machining away graphite to expose Pt and then brazing or soldering.

### Catalytic Olefine Oxidation

CONSORTIUM FÜR ELEKTROCHEMISCHE INDUSTRIE G.m.b.H. *U.S. Patent* 3,122,586

New catalyst for the oxidation of olefines to aldehydes and ketones consists of a Pd, Ir, Ru, Rh or Pt compound and a redox system, e.g.  $PdCl_2$  used with  $CuCl_2$ .

### Palladium-coated Containers

THE METAL BOX CO. OF SOUTH AFRICA LTD.

*U.S. Patent* 3,123,491

Pd is applied in finely dispersed form to the inside of a hermetically sealed food container, e.g. dispersed in a conventional can lacquer, and is able to remove residual  $O_2$  remaining after evacuation by catalysed combination with  $H_2$ .

### Ruthenium Electrodeposition

THE INTERNATIONAL NICKEL CO. LTD.

*U.S. Patent* 3,123,544

The source of Ru for cathodic electroplating is an acid solution of at least 2.5 g/l Ru as tetra-sulphamato nitrosyl ruthenate. This aqueous solution avoids the need for molten electrolytes.

### Isomerisation Catalyst Containing Palladium

THE PURE OIL CO. *U.S. Patent* 3,123,573

A S-resistant isomerisation catalyst consists of a  $SiO_2-Al_2O_3$  support impregnated with a Pd compound to give a content of 0.3–0.8 wt.% Pd, with a F compound to give a content of 1–5 wt.% combined F, and reduced with  $H_2$  at 750–975°F.

### Catalytic Hydrocarbon Reformation

IMPERIAL CHEMICAL INDUSTRIES LTD.

*French Patent* 1,334,080

Hydrocarbons boiling up to 350°C (preferably at 30–220°C) are reformed by contact with steam at an elevated temperature in the presence of a supported catalyst containing a Pt metal or a compound reducible to such a metal. The catalyst preferably consists of 0.1–2.5 wt.%  $Rh/Al_2O_3$ . The production of the catalyst is described in 1,334,081.

### Nitroaromatic Hydrogenation

DOW CHEMICAL CO. *French Patent* 1,334,504

Aromatic compounds having nitro and halo

substituents are hydrogenated to haloarylamines in the presence of an Rh catalyst activated with an alkali or alkaline earth metal hydroxide, carbonate or acetate.

### Monoskeletal Silver or Platinum Metal Catalyst Electrode

BROWN, BOVERI & CIE. *French Patent* 1,337,705

Fuel cell porous electrodes are produced by compressing and sintering a catalyst metal (e.g. Ag, Pt, Pd, Rh) with a non-catalyst metal (e.g. Al or Zn) and removing the latter with acid.

### Catalytic Hydroquinone Oxidation

STE. DES USINES CHIMIQUES RHONE-POULENC

*French Patent* 1,338,462

The oxidation of hydroquinone to *p*-benzoquinone, effected with  $O_2$  in organic medium, is catalysed by Ru or Rh on an inert support, e.g. Rh on C black.

### Acetylene Selective Hydrogenation

CHEMETRON CORP. *French Patent* 1,338,769

Acetylenic compounds mixed with dienes are selectively hydrogenated using a Pd-CuO catalyst, e.g. a catalyst containing 20–70% CuO, 30–80%  $Cr_2O_3$  and 0.04–1% Pd.

### Fuel Cell Electrodes

LEESONA CORP.

*French Patents* 1,338,755; 1,338,756; 1,338,757

The action of electrodes for fuel cells made of, inter alia, Ru, Rh, Os, Ir, Pt or Pd is improved by incorporating metallic Li in their surface. The electrode surface is coated with Pt/C after Li has been introduced. (No. 1,338,756).

### Catalytic Vinyl Acetate Production

STE. DES USINES CHIMIQUES RHONE-POULENC

*French Patent* 1,339,614

Vinyl esters are produced by the reaction at elevated pressures and temperatures of ethylene and a fatty acid, particularly acetic acid, in the presence of a noble metal chloride, particularly Pd chloride, a lower fatty acid salt and benzoquinone.

### Pd-Cu Oxidation Catalysts

W. R. GRACE & CO. *French Patent* 1,341,068

Catalysts for the treatment of exhaust gases from internal combustion engines by oxidation consist of a support containing 5–30% and preferably 10–20% CuO and 0.0025–0.4% Pd. A typical catalyst contains 0.01% Pd and 10% CuO on an  $Al_2O_3$  support.

### Catalytic Acetaldehyde Production

NIPPON GOSEI KAGAKU K.K.K.

*French Patent* 1,341,796

The oxidation of  $C_2H_4$  in the presence of an aliphatic lower alcohol to acetaldehyde is catalysed by a noble metal, e.g. Pd or Pt.

### Hydrocarbon Hydrogenation Catalyst

FARBENFABRIKEN BAYER A.G.

*French Patent* 1,342,470

Hydrocarbons boiling in the petrol range are hydrogenated over a catalyst consisting of a noble metal deposited on a porous support having a water absorption of at least 10% and an internal surface of less than about 100 m<sup>2</sup>/g. A typical catalyst consists of Pd on sintered Al<sub>2</sub>O<sub>3</sub>.

### Catalytic Dicyclohexylamine Production

ABBOTT LABORATORIES *French Patent* 1,343,391

A mixture of phenol and aniline is catalytically hydrogenated to dicyclohexylamine using H<sub>2</sub> at 7 kg/sq. cm or less and 20–100°C in the presence of at least 0.45 wt.% metallic Pd, e.g. as Pd/C.

### Cyclohexyl Hydroxylamine Catalytic Production

COMMERCIAL SOLVENTS CORP.

*French Patent* 1,343,869

Nitrocyclohexane is hydrogenated over a Pt or Pd catalyst at 0–65°C and 7–140 kg/cm<sup>2</sup> to form cyclohexyl hydroxylamine.

### Catalyst for Alcohol Production

CONSORTIUM FÜR ELEKTROCHEMISCHE INDUSTRIE G.m.b.H. *German Patent* 1,158,960

The hydrogenation of  $\alpha$ ,  $\beta$ -unsaturated aldehydes to the corresponding alcohols is catalysed by a PtO<sub>2</sub> catalyst modified by an Fe or Zn salt.

### Ruthenium Hydroformylation Catalyst

IMPERIAL CHEMICAL INDUSTRIES LTD.

*German Patent* 1,159,926

The hydroformylation of olefines to form aldehydes and ketones is catalysed by the use of a composition containing Ru, e.g. RuCl<sub>3</sub>, supplied at the rate of 0.005–0.01%, based on the olefine.

### Catalytic Reduction of Nitroaromatics

GENERAL ANILINE & FILM CORP.

*German Patent* 1,160,445

Aromatic monocyclic mononitro compounds are reduced to the corresponding amines by reduction at 25°–125°C using a noble metal catalyst having a surface area of at least 150 m<sup>2</sup>/g, e.g. Pt or Pd on C or Pd/Al<sub>2</sub>O<sub>3</sub>, the reaction water being dispersed as a separate liquid phase throughout the reaction zone.

### Catalytic Carboxylate Production

THE DISTILLERS CO. LTD. *German Patent* 1,160,846

The production of alkyl carboxylates from optionally substituted olefines and cuprous halocarboxylates is catalysed by Pd, e.g. metallic Pd or PdCl<sub>2</sub>.

### Acetylene Hydrogenation Catalyst

V.E.B. LEUNA-WERKE "WALTER ULBRICHT"

*German Patent* 1,161,555

New catalyst consists of an inert support impreg-

nated with 0.002–5 wt.% of a mixture of Ag and Pt containing 60–90 wt.% Pt and a 20–80 fold amount of Fe oxide.

### Catalyst for Alcohol Oxidation

ESSO RESEARCH & ENGINEERING CO.

*German Patent* 1,161,873

Aldehydes or ketones are produced from saturated acyclic 3–8C alcohols by contact with O<sub>2</sub> at 50–300°C in the presence of H<sub>2</sub>PtCl<sub>6</sub>, the catalyst being regenerated at 50–300°C in a separate zone using molecular O<sub>2</sub>.

### Production of O-vinyl Compounds

FARBWERKE HOECHST A.G.

*German Patent* 1,161,878

The reaction of compounds containing OH groups and acetylene at elevated temperatures and pressures is catalysed by the presence of both (a) an alkali metal, Zn or Cd compound and (b) a Group VIII noble metal or a compound of such a metal, e.g. CdO used with Pd/C.

### Fuel Cell Electrode

ELECTRIC STORAGE BATTERY CO.

*German Patent* 1,161,965

Fuel cell electrode consists of a sintered mixture of 1–47% Ni, 3–15% Pd and 50–96% Ag.

### Catalytic Cyclododecanonoxime Production

BADISCHE ANILIN-& SODA-FABRIK A.G.

*German Patent* 1,162,359

2-Chloro-cyclododecanone-(1)-oxime which contains 1 or 2 olefinic bonds is converted to cyclododecanonoxime by reduction at 0–130°C in the presence of a Group VIII noble metal catalyst, e.g. Pd/BaSO<sub>4</sub>.

### Catalytic Hydrogen Cyanide Production

IMPERIAL CHEMICAL INDUSTRIES LTD.

*German Patent* 1,163,304

The conversion of NH<sub>3</sub> and hydrocarbons to HCN over a Pt metal or alloy catalyst is improved by adding small amounts of a volatile S compound to the feedstock.

### Catalytic Glycerol Purification

STE. D'ELECTRO-CHIMIE, D'ELECTRO-METALLURGIE et DES ACIERIES ELECTRIQUES D'UGINE

*German Patent* 1,164,387.

Glycerol produced synthetically is purified by catalytic hydrogenation in the presence of Ru and an acid ion exchange resin.

### Production of Powdered Palladium

E. M. PROKEFEV *Russian Patent* 157,112

High yields of finely dispersed powdered Pd are obtained by roasting palladosamine progressively until the temperature reaches 650°C. The resulting product is milled and then roasted again with the temperature rising to 800°C. The Pd is then held at this temperature for about 2 hours.