FUEL CELLS

Fuel Cell Uses Methanol. Methanol is Source of Hydrogen for Hydrogen-Oxygen Fuel Cell that Generates 5 kw Electricity

The Shell Research Ltd fuel cell generates up to 5 kw at 60°C by converting CH₃OH to H₂ and reacting the latter with air. The H₂ is purified by diffusion through Ag-Pd alloy. Electrodes are microporous PVC sheets with a Ag layer over which is a Pt metal catalyst layer. Each electrode is 85% porous and about 1.3 ft², 0.03 in. thick. The electrolyte is alkaline, 62 cells in each of two batteries form a truck-mounted unit.

Fuel Cells. I. Propane on Palladium Catalyst. II. Propane and Propylene on Adams' Platinum Catalyst. III. The Propylene Potential in Low Temperature Cells

Low temperature cells using gaseous hydrocarbons as fuels were studied. First, negative electrode catalysts of Pd, reduced by C₃H₈ at H₂, supported on porous discs of Ni or C, in many cases waterproofed, were tested using gaseous C₃H₈ fuel, 30% KOH electrolyte, carbon-black air electrode, at 50°C. Repeated small current discharges gave steady high open-circuit potentials and electrodes with fairly good discharge rates. Fifteen discs of Adams' catalyst pressed with Ag powder were tested at 80°C in He, C₆H₅C₂H₆ and H₂. The effect of the period of electrode reduction on the potential with C₂H₆ was studied. Finally, from the reproducible C₂H₆ potential at the Pt catalyst in 30% KOH, at 25°C a potential of 0.465 V (NHE) was calculated compared to 0.838V for the C₂H₆/O₂ cell. Possible reaction mechanisms in C₂H₆ cells are discussed.

NEW PATENTS

METALS AND ALLOYS

Spring Elements
THE INTERNATIONAL NICKEL CO. (MOND) LTD.
British Patent 974,057
A spring for use at 500°C or above consists of an Ir alloy containing 0.5-7 wt.% W and incidental impurities.

Commutator Devices for Micromotors
HITACHI LTD.
British Patent 975,299
A commutator device for micromotors has commutator segments made of 80-60 wt.% Ag and 20-40 wt.% Pd alloy and holders carrying in sliding contact with the segments metallic brushes made of 95-70 wt.% Pt and 5-30 wt.% Ir alloy.

Improving the Ductility of Ruthenium
THE INTERNATIONAL NICKEL CO. (MOND) LTD.
British Patent 981,535
The workability of Ru is improved by melting it under neutral conditions in contact with 0.05-5 wt.% of one or more of the elements: Zn, Cd, Bi, Ti, Ge, Ba, Hf, Ce, Er, Ga, Ho, La, Pt, Sn, Y or Yb and allowing it to solidify without changing the conditions.

Precious Metals and Alloys
THE INTERNATIONAL NICKEL CO. (MOND) LTD.
British Patent 981,792
A sheet or strip of Pt group metals or their alloys is produced by forming a compact of flake powder with or without alloying ingredients, heating so that sintering occurs and working the sintered metal to give the desired sheet or strip.

Electrical Resistors
INTERNATIONAL RESISTANCE CO.
U.S. Patent 3,154,503
An electrical resistor is produced by applying to a ceramic substrate and firing a vitreous enamel consisting of 99-50 wt.% glass frit including 1-24 wt.% Ag₂O and 1-50 wt.% finely divided Pd, Pt or Rh.

Coating Glass or Refractory Oxides
DEUTSCHE GOLD- & SILBER-SCHEIDEANSTALT
French Patent 1,366,570
The thermal resistance of refractory metal oxide bodies or mixtures of silicates is improved and their corrosion by other materials is prevented by coating them with a Pt alloy containing 2-10 wt.% Rh and 0.5-10 wt.% Pd.
Spinnerets
DEUTSCHE GOLD- & SILBER-SCHEIDEANSTALT
German Patent 1,181,922
Longer spinneret life is achieved using alloys containing 25-40% Rh and the remainder Pt.

ELECTROCHEMISTRY
Coated Titanium Electrodes
CANADIAN INDUSTRIES LTD. British Patent 974,320
An electrode particularly suitable as an anode in the electrolysis of brine consists of a Ti core with a 10-200 μ thick electrodeposited layer of an alloy of 35-60 wt.% Rh and 65-40 wt.% Pt.

Activated Platinum-plated Titanium Anode
UNIVERSAL OIL PRODUCTS CO. British Patent 974,570
An anode suitable for the electrolysis of an alkaline chloride solution is prepared by electroplating a Ti member from H₃PtCl₆ solution at 71-77°C to give an adherent amorphous coating of Pt which is then activated by heating above 316°C in the presence of an air stream containing hydrocarbon vapours, whereby catalytic oxidation of the vapours occurs over the entire surface of the Pt coating.

Production of Super-pure Hydrogen
NIPPON JUNSINZO K.K. U.S. Patent 3,155,467
Super-pure H₂ is obtained by passing a gaseous H₂ mixture at 500-600°C through a permeable wall of a Pd alloy containing 2-40 wt.% of at least one Group I B metal and 0.1-20 wt.% of at least one Group VIII metal other than Pd, e.g. Ag-Ru-Pd or Au-Pt-Pd.

Activation of Platinum Group Metals
JOHNSON, MATTHEY & CO. LTD. French Patent 1,364,203
The Pt group metals, and in particular various electrodes coated with such metals, are activated by contacting them with an alkaline metal amalgam, distilling off Hg at 260-482°C and recrystallising the Pt or Pt-Rh alloy film at 371-537°C.

Hydrogen Diffusion Tubes
CHEMETRON CORP. French Patent 1,367,110
An improved apparatus for the production of extremely pure H₂ uses an arrangement of 75 μ thick Pd diffusion tubes.

ELECTRODEPOSITION
Electrolytic Palladium Plating
INTERNATIONAL BUSINESS MACHINES CORP. U.S. Patent 3,150,065
Non-porous Pd deposits suitable for use as electrical contacts for printed circuit cards are obtained by using a Pt anode and connecting the substrate as a cathode in a diaphragmless bath solution containing 60 g/l palladosamine chloride, 10 g/l Na₃C₂O₄, 25 g/l (NH₄)₂SO₄ and 50 ml/l NH₃OH.

Palladium or Platinum Plating Bath
JOHNSON, MATTHEY & CO LTD. German Patent 1,182,924
Bath contains an aqueous solution of a complex dinitritoplatinate (II) or dinitritopalladate (II).

Platinum Electrodeposition
THE INTERNATIONAL NICKEL CO. (MOND) LTD. Dutch Application 212,533
Electrodeposition takes place using an aqueous chloroplatinate solution containing 10-50 g Pt and 180-300 g HCl at 45-90°C using plating conditions laid down in a diagram.

Platinum Plating Baths
ASAHI KASEI K.K. Dutch Application 64.02.931
An electroplating bath consists of NH₄, K or Na sulphamate dissolved in an aqueous solution of dinitroidiaminoplatinic acid. High gloss coatings can be obtained.

Chemical Deposition of Pd
THE INTERNATIONAL NICKEL CO. (MOND) LTD. Dutch Application 64.03.079
Pd is deposited in adherent layers on surfaces by chemical plating from a bath containing Pd (II), an unsymmetrical dimethyl hydrazine and NH₃ and/or one or more aliphatic triamines.

BRAZING
Brazing Alloys
THE INTERNATIONAL NICKEL CO. (MOND) LTD. British Patent 976,660
A brazing alloy for the production of ceramic-to-ceramic and ceramic-to-metal joints consists of 30-75 wt.% Pd, 2-9 wt.% Ti and the remainder, except for impurities, Ni, preferably taken in a 3:2 Pd:Ni ratio.

Brazing Alloys
AEROJET-GENERAL CORP. U.S. Patent 3,148,053
Brazing alloys suitable for use in a vacuum furnace comprise 1-77 wt.% Au, 1-59 wt.% Pd and 20-61 wt.% Ni, Cr or their mixtures.

CATALYSIS
Removal of Alkynes from Hydrocarbon Mixtures
SHELL INTERNATIONALE RESEARCH MIJ. N.V. British Patent 974,038
Alkynes are removed from a hydrocarbon mixture containing alkadienes by passing a solution of H₂ dissolved in such a mixture together with gaseous H₂ in an upflow stream through a fixed bed con-
sisting of a macroporous support carrying 0.1–5 wt.% Pd catalyst.

Platinum and Palladium Oxide Catalysts in the Production of 2-Ethyl-pyridine

WEB LEUNA-WERKE "WALTER ULBRICHT"

British Patent 974,113

2-Ethyl-pyridine is produced by heating 2-(β-hydroxyethyl)-pyridine to 250–400°C in an H₂ atmosphere and in the presence of a catalyst consisting of Al₂O₃ and Pd or Pt oxide.

Platinum Group Metal Phosphatide Hydrogenation Catalysts

CENTRAL SOYA CO. INC.

British Patent 974,432

Phosphatide material is hydrogenated by contacting Pd, Pt, Rh or their mixtures supported on C, Al₂O₃, CaCO₃ or diatomaceous earth with H₂ and then contacting 0.05–1.0 wt.% of the hydrogenated catalyst with the phosphatide and H₂.

Production of Sulphonamides

CIBA LTD.

British Patent 974,983

A Pd/C hydrogenation catalyst is used in the production of 1,4-endoalkylene-cyclohexane-2-sulphonamides by the reaction of sulphonyls with NH₃ or amine followed by hydrogenation and if desired also N-alkylation or N-acylation.

Derivatives of 1-Phenyl-2-aminoethanol

IMPERIAL CHEMICAL INDUSTRIES LTD.

British Patent 975,291

The production of 1-phenyl-2-aminoethanol derivatives involves a hydrogenation stage in the presence of Pt or Pd/C catalyst.

Production of Carboxylic Acid Esters

IMPERIAL CHEMICAL INDUSTRIES LTD

British Patent 975,709

Carboxylic acid esters of unsaturated monohydric alcohols are produced by contacting an olefin with a Pd salt, a carboxylate, which is ionised under the reaction conditions, and a redox system in a carboxylic acid.

Production of Cyclohexanone

ALLIED CHEMICAL CORP.

British Patent 976,339

Cyclohexanone is produced by the hydrogenation of phenol at 150–225°C, 2.46–10.5 kg/cm² and in the presence of 5 wt. % Pd/C catalyst promoted with 1000–7000 p.p.m. of combined Na based on wt. of catalyst and 1–10 p.p.m. of phenol of an inorganic sodium compound.

Production of Aromatic Halogen-containing Compounds

MONSANTO CHEMICALS LTD.

British Patent 976,438

Halogen-substituted aromatic compounds are produced by subjecting an aromatic sulphonyl halide to thermal decomposition at 300–400°C and in the presence of Pd or Pt or an oxide or halide thereof as a catalyst.

Process for Preparing Esters

NATIONAL DISTILLERS & CHEMICAL CORP.

British Patent 976,613

Ethylenically unsaturated esters are produced by reacting an alkene in the vapour phase with a carboxylic organic acid and an O₂-containing gas in the presence of a catalyst comprising a Group VIII noble metal and/or its salt or oxide, e.g. Pd/C or PdX₂, where X is halogen, or RhCl₃.

Platinum Group Metal Catalysts

SOCONY MOBIL OIL CO. INC.

British Patent 978,265

Pd group metal catalysts are produced by introducing an appropriate metal into a crystalline alumino-silicate zeolite, or into a reaction mixture for preparing such a zeolite, so that the metal is distributed on or within the crystalline structure of the zeolite, followed by thermal treatment at 250–1000°F so that the Pt group metal is catalytically activated.

Production of Cyclohexanone Oxime and its Hydrochloride

BADISCHÉ ANILIN- & SODA-FABRIK A.G.

British Patent 978,497

The hydrogenation of 2-chlorocyclohexanone-(1)-oxime or a corresponding compound containing one or two olefinic bonds, if carried out at 0–130°C in an inert solvent and in the presence of dispersed, supported Pd or Pt catalyst, yields cyclohexanone oxime HCl.

Hydrocracking Process

UNIVERSAL OIL PRODUCTS CO.

British Patent 978,613

Hydrocarbon oils are hydrocracked at 288–454°C and 75–136 atm H₂ pressure in the presence of a catalyst containing 0.01–3.0 wt. % Pd or other Pt group metal on a precalcined base consisting of 37–88 wt. % SiO₂ and 63–12 wt. % Al₂O₃.

Alpha-acetoxypropionaldehyde

AJINOMOTO CO. INC.

British Patent 980,239

The reaction between liquid vinyl acetate and H₂ and CO at 30–180°C and above 50 kg/cm² pressure, if carried out in an organic solvent and in the presence of 0.001–1.0 g/l Rh in the form of its carbonyl, or Rh-containing substance which is converted to carbonyl under the reaction conditions, results in the formation of α-acetoxypropionaldehyde.

Preparation of Dipyridyls

IMPERIAL CHEMICAL INDUSTRIES LTD.

British Patent 981,353

2,2'-Dipyridyls or their alkyl derivatives are produced by heating pyridine or its alkyl derivatives at 250–450°C in the presence of 1–50 wt.
alumina catalyst supporting about 5 wt.% finely divided Rh, Os or Ir.

Hydrazine Derivatives
T. J. SMITH & NEPHEW LTD.
British Patent 981,460
N₂H₄ derivatives of formula OHPH-CH₂-NR-NHR are produced by the hydrogen reduction of OHPH-CH₂NR-NH₂ in alcoholic solution in the presence of R₂CO and a PtO catalyst.

Hydrocarbon Conversion Catalysts
THE BRITISH PETROLEUM CO. LTD
British Patents 981,691-9
Hydrocarbon conversion catalysts useful as catalysts for isomerisation, the production of halogenated hydrocarbons and dehydrohalogenation comprise a refractory metal oxide supporting 0.01-5 wt.% Pt group metal, preferably Pt or Pd, 0.01-10 wt.% alkali or alkaline earth metal and 1.0-15 wt.% retained halogen, preferably Cl.

Platinum Catalyst for the Oxidation of Exhaust Gases
UNIVERSAL OIL PRODUCTS CO.
U.S. Patent 3,148,036
An exhaust gas converter uses as the oxidation catalyst Al₂O₃ spheres supporting 0.1 wt.% Pt.

Catalyst Structures
VARTA A G. & SIEMENS-SCHUCKERTWERKE A G.
U.S. Patent 3,150,011
Double skeleton catalyst structures are produced by applying a finely divided supporting skeleton material on a conductive substrate base, sintering at 600-1100 °C, embedding a finely divided Raney alloy of Pt, Pd, Rs, Ag, W, Mo or Ni activated by a Pt group metal, sintering the laminate and dissolving out the soluble component.

Isomerisation Catalyst
CITIES SERVICE RESEARCH & DEVELOPMENT CO.
U.S. Patent 3,150,073
A reforming and isomerisation process for hydrocarbons utilises 0.6 wt.% Pt/Al₂O₃ catalyst, 0.5-5 moles H₂/mole hydrocarbon and is operated at 600-950 °F and 100-600 p.s.i.g.

Production of Cyclohexane
PHILLIPS PETROLEUM CO.
U.S. Patent 3,150,195
Activated charcoal supporting 0.01-5 wt.% Pt is used as a dehydrocyclisation catalyst in the production of C₆H₁₄ from a mixture of n-C₆H₁₄ and methylcyclopentane.

Dehydrogenation Catalyst
EDOGAWA K.K.K.
U.S. Patent 3,150,930
In the cyclic production of H₂O₂, tetra-hydroanthraquinone is dehydrogenated to the corresponding anthraquinone at 80-300 °C, 1 atm, with an C₆H₄ or C₆H₅ or H₂ acceptor and Pd catalyst supported by Al₂O₃, MgO₃, etc.

Decolourisation of Phthalic Acids
RICHFIELD OIL CORPORATION.
U.S. Patent 3,151,154
Phthalic acids are decolourised by contacting their solutions in a polar solvent with Pt, Pd, Rh, but preferably PtO₂ catalyst and H₂ at 100-250°C and 50-2000 p.s.i. followed by acidification and recovery of crystalline acid.

Catalysts in the Preparation of Ketones
DIAMOND ALKALI CO.
U.S. Patent 3,151,167
The contacting of an epoxide with an alcohol solution of [Rh(CO)₃]₃ or [Ir(CO)₅]₂ causes a molecular rearrangement to R-CO-CH₃R₁.

Paraffin Conversion Catalysts
PHILLIPS PETROLEUM CO.
U.S. Patent 3,151,180
6-20°C aliphatic paraffins are converted to the corresponding olefins by contacting them with an Al₂O₃ of 0.01-5 m₃/g surface area supporting Pt, Pd or Rh, at 850-1050 °F and at atmospheric to 100 p.s.i.g. pressure and with 0.5-10 moles H₂ per one mole hydrocarbon.

Catalysts
AIR PRODUCTS AND CHEMICALS INC.
U.S. Patent 3,152,092
A Pt/Al₂O₃ hydrogenative gasoline reforming catalyst is produced by forming sorptive Al₂O₃ granules by the dehydration of bayerite, subjecting them to humidification and carbonation treatment, impregnating them with a Pt compound and heating at elevated temperature to provide a predominantly dry η-Al₂O₃ carrier with a minor amount of Pt-containing compound.

Hydrogenation Catalysts
PHILLIPS PETROLEUM CO.
U.S. Patent 3,152,144
Sulpholenes are hydrogenated to sulpholanes by adding H₂O₂ to the feed and hydrogenating in the presence of Al₂O₃ or diatomaceous earth supporting Pt, Pd or their mixtures as catalyst.

Hydrocracking Catalysts
SOCONY MOBIL OIL CO. INC.
U.S. Patent 3,152,980
Hydrocarbon charges containing at least 1 wt.% pyrenes are hydrocracked in two stages in the presence of Al₂O₃ or diatomaceous earth supporting Pt, Pd or their mixtures as catalyst.

Hydrogenation Catalysts
COMMERCIAL SOLVENTS CORP.
U.S. Patent 3,153,095
N, N-Dialkylhydrazines are produced by contacting lower N, N-nitrosodialkylamines with 0.5-1.5 wt.% urea, biuret, etc., to prevent catalyst poisoning and then hydrogenating them in the presence of a refractory oxide- or C-supported Pt, Pd, Rh or Ir catalyst.
Arylnaphthene Production
STAMICARBON N.V.  U.S. Patent 3,153,678
Aryl or alkaryl napthenes are produced by treating an aromatic hydrocarbon or an alkyl-substituted aromatic hydrocarbon with H₂ below 100 atm and 250°C in the presence of a heteropolyacid, e.g. phosphomolybodic acid and 0.1-35 wt.% Pt, Pd, Ir, Os, Rh or Ru supported on a refractory oxide, based on the wt. of such acid.

Production of Hydrogen Iodide
EL PASO NATURAL GAS PRODUCTS CO.  U.S. Patent 3,154,382
H₂I is produced by reacting H₂ and I₂ at 100-400°C in the presence of a composite catalyst consisting of Al₂O₃, 0.01-1.0 wt.% Pt and 0.1-8 wt.% halogen combined with Al₂O₃.

Demetallisation of Heavy Petroleum Oils
ESSO RESEARCH & ENGINEERING CO.  U.S. Patent 3,154,480
Metallic impurities are removed from petroleum residues boiling at 900-1500°F by contacting them with finely divided Pt/Al₂O₃ catalyst, subjecting them at 200-600°F to high energy ionising radiation followed by separation of the catalyst on which the metallic impurities have been adsorbed.

5-Aminofurans
THE NORWICH PHARMACAL CO.  U.S. Patent 3,154,543
Catalytic hydrogenation of a nitrofuran in the presence of a solvent comprising CH₃COOC₂H₅ and absolute C₂H₅OH in a 3:1 volume ratio and a catalyst consisting of charcoal supporting 5 wt.% Pd, if carried out at 2-3 atm, yields the corresponding 5-aminofurans.

Dehydrogenation Catalysts
SHELL OIL CO. U.S. Patent 3,156,735
Olefinic hydrocarbons are oxidatively dehydrogenated by contacting them at 400-550°C, in admixture with O₂ with a catalyst comprising a low surface area solid support and 0.05-5 wt.% Au and Pt, Pd, Rh, Ru or Ir taken in a ratio of 0.2-25 atoms of Au per atom of the said noble metal.

Hydrocarbon Conversion Catalysts
ABBOTT LABORATORIES  U.S. Patent 3,157,590
An improved isomerisation-cracking process for petroleum distillates utilises a Group VIII metal catalyst, preferably 0.1-1 wt.% Pt or PtO supported on an active SiO₂-Al₂O₃ support.

Production of Cyclohexanone Oxime
E. I. DU PONT DE NEMOURS & CO.  U.S. Patent 3,157,702
Cyclohexanone oxime is produced by hydrogenating nitrocyclohexane in the presence of a 5% Pd/C₂H₅ black catalyst containing 1% of Mg promoter and Pb acetate in a 1:5 Pb:Pd ratio.

Isomerisation Catalysts
ESSO RESEARCH & ENGINEERING CO.  U.S. Patent 3,158,662
5-6 C paraffins are isomerised by contact with a supported Pt catalyst containing 0.3-0.6 wt.% Pt and 5-15 wt.% AlCl₃ at 200-400°F, 400-1500 p.s.i. and in the presence of H₂.

Hydrogenation Catalyst
ABBOTT LABORATORIES  U.S. Patent 3,159,639
The hydrogenation of pyridylcarboxylic and pyridylalkanoic acids at 0-100°C, 1-1000 atm and in the presence of 0.5-5 wt.% Rh/C or Rh/Al₂O₃ catalyst will result in the formation of the corresponding piperidylcarboxylic and C-piperidylalkanoic acids.

Catalyst
GENERAL ELECTRIC CO.  U.S. Patent 3,159,662
The (PtCl₃-C₆H₅)₃ complex has been used as a catalyst in the production of organosilicon compounds by reacting aliphatically unsaturated compounds with those containing Si-H bonds.
Production of α-Acyloxy-propionaldehydes
AJINOMOTO CO. INC.  French Patent 1,361,797
The reaction in a liquid phase at elevated temperatures and pressures between a vinyl ester of fatty acids and H₂ and Co in the presence of a Rh catalyst yields α-acyloxy-propionaldehydes.

Precious Metal Hydrogenation Catalysts
SHIONOGI & CO LTD  French Patent 1,361,980
Unsaturated morphinanes may be hydrogenated with H₂ in the presence of Pt or Pd catalyst.

Glyoxal Production
BADISCHNE ANILIN- & SODA-FABRIK A.G.  French Patent 1,363,089
Glyoxal is produced by reacting C₅H₁₀ with 1-40 wt. % HNO₃ and in the presence of 0.001-1 wt. % Pd salt, preferably PdCl₂ or Pd(NO₃)₂.

Hydrocracking Catalysts
SHELL INTERNATIONALE RESEARCH MIJ.  French Patent 1,364,001
A catalyst for the hydrocracking of hydrocarbon oils consists of a refractory oxide of 50-90 wt. % SiO₂ and 10-50 wt. % Al₂O₃, part of which may be replaced by MgO or B₂O₃, carrying 0.1-20 wt. % Ag or Cu and 0.1-5 wt. % Pd, Rh, Ru or their mixtures.

Hydrogenation Catalysts
STÉ. D’ÉLECTRO-CHEMIE, D’ÉLECTRO-METALLURGIE ET DES ACIERIES ELECTRIQUES D’UGINE  French Patent 1,364,577
Methylenamines are produced by the gaseous phase hydrogenation of HCN with H₂ at elevated pressure, below 250°C and in the presence of a refractory metal oxide-supported Group VIII noble metal, preferably Pd or Pt.

Hydroforming Catalysts
IMPERIAL CHEMICAL INDUSTRIES LTD.  French Patent 1,365,320
Gaseous or liquid hydrocarbons are hydroformed at 550-750°C above 7 kg/cm² and in the presence of 1.3-5.5 moles H₂, in the presence of 0.1-0.5 wt. % of a refractory oxide-supported Pt, Pd, Rh, Ru, Os or Ir catalyst.

Isomerisation Catalysts
THE BRITISH PETROLEUM CO. LTD.  French Patent 1,365,885
Ethylene hydrocarbons are produced by the isomerisation of ethylene hydrocarbon mixtures in the presence of a catalyst comprising a complex of a Pt, Pd, Rh, Ru or Ir halide and the ethylene hydrocarbon, at elevated temperature and pressure.

Production of Organosilicon Compounds
COMPAGNIE FRANCAISE THOMSON-Houston  French Patent 1,366,279
Organosilicon compounds are produced by contacting an aliphatic compound with an Si compound having at least one Si-H bond in the presence of an Rh catalyst produced by reacting RhCl₃·3H₂O with compounds capable of giving an olefinic, carboxylate or substituted organoxy complex of Rh.

Production of Alkyl Aromatic Compounds
BATAAFSCHE PETROLEUM MIJ. N.V.  German Patent 1,178,065
Diaryl alkanes are converted to alkyl aromatic compounds by heating at 300-600°C in the presence of a refractory metal oxide catalyst and also a Pt or Pd dehydrogenation catalyst.

Beta-chloroalkyl Chloroformate Production
BADISCHNE ANILIN- & SODA-FABRIK A.G.  German Patent 1,179,922
The reaction of 1,2-alkylene oxides with phosgene in the vapour phase is catalysed by a Group VIII metal chloride on a support, e.g. Rh Cl₁/Al₂O₃.

Production of Vinyl Carboxylates
NIPPON GOSAI K.K.K.  German Patent 1,179,928
The reaction of C₅H₁₀O₄ and carboxylic acid to produce vinyl acetate and higher homologues is catalysed by a mixture of a Pd, Rh or Pt salt and a Cu, Zn, Hg, Pb, Cr, Mn, Fe or Ni salt.

Removal of Formic Acid from 2-8C Fatty Acids
SHELL INTERNATIONALE RESEARCH MIJ.  German Patent 1,180,360
HCOOH is removed from 2-8C saturated fatty acids by vapour phase degradation at 80-220°C using a catalyst consisting of 0.05-5 wt. % Pt/ Al₂O₃ with a neutral surface and a specific area of 20-400 m²/g.

Production of Adipodinitrile
E. I. DU PONT DE NEMOURS & CO.  German Patent 1,181,197
Adipodinitrile is produced by the hydrogenative scission of 1,2-dicyanocyclobutane in the presence of Pt or Rh catalyst.

Partial Diene Hydrogenation
BADISCHNE ANILIN- & SODA-FABRIK A.G.  German Patent 1,183,480
Cyclic compounds with at least two double bonds are reduced to cyclo-olefines by molecular H in the presence of a Pd catalyst poisoned by Cu, Ag, Zn, Cd, Hg, Th, Pb, Sb, Fe, etc.

Catalyst
SOCONY MOBIL OIL CO.  German Patent 1,183,480
Mixtures of various Al₂O₃·3H₂O are impregnated with a Pt compound to give 0.01-5 wt. % Pt in the final compound and HNO₃ and then dried and calcined.
Olefine Oxidation
FARBWERKE HOECHST A.G.

German Patent 1,183,488

The oxidation of olefines to aldehydes and/or ketones is catalysed by a Cu salt catalyst activated with a Pd salt with a Cu:Pd ratio of ~0.001:1.

Reforming of Naphtha
ESSO RESEARCH & ENGINEERING CO.

Dutch Application 208,826

Pt/Al₂O₃ catalyst is used in treating high S, high boiling naphtha in a multiple zone reformation process.

Hydrogenation of Tetracycline Precursors
AMERICAN CYANAMID CO.

Dutch Application 226,460

A supported Pd catalyst is used in the production of tetracyline by catalytic hydrogenation.

γ-Caprolactam Production
TEIJEN LTD.

Dutch Application 64.02,303

The caprolactam is produced from γ-caprolactone, γ-hydroxyacetronamide or amides of γ-hydroxy-caproic acid by reaction with NH₃ in the presence of a hydrogenation catalyst, e.g. Pt/C or Pd/C. (See also No. 64.02,312).

Hydrogenation of Hydrocarbons
U.S. RUBBER CO.

Dutch Application 64.02,424

Organic compounds, such as heterocyclic compounds, are hydrogenated non-destructively using a Pt metal sulphide catalyst with H₂.

Reforming Catalyst
UNIVERSAL OIL PRODUCTS CO.

Dutch Application 64.03,228

A catalyst consists of a noble metal deposited on a refractory oxide, e.g. Pt/Al₂O₃, which has been modified with 0.05–1.5 wt.% S.

Selective Hydrogenation of Trienes
J. R. GEIGY AG.

Dutch Application 64.04,143

Pd catalysts can be used for selective hydrogenation when they are used in the presence of a cyclic compound source of H₂.

Production of Organic Isocyanates
AMERICAN CYANAMID CO.

Dutch Application 64.10,490

Organic nitro compounds are reacted with CO in the presence of a noble metal catalyst, e.g. PdCl₂, to form organic isocyanates.

FUEL CELLS

Fuel Cells
LEESONA CORP.

British Patent 975,314

Electrodes for fuel cells are made by forming an electrode structure by bonding a layer of zeolite to a ceramic structure or a zeolite layer of different pore size, ion-exchanging the naturally occurring ions of the zeolite for Pt, Pd, Rh ions and heating the composite at 600–1000°C to stabilise it.

Fuel Cells
ESSO RESEARCH AND ENGINEERING CO.

British Patent 976,796

A fuel cell suitable for use with liquid combustible fuels comprises an electrolyte container, an aqueous electrolyte and an electrode assembly consisting of Pt coated wire screen anode and cathode placed 0.001–1.0 mm away on each side of a 10–80% porous membrane with a 5–50Å pore.

Hydrogen Diffusion Electrodes
LEESONA CORP.

U.S. Patent 3,148,089

Fuel cells utilise fuel electrodes in the form of H diffusion tubes constructed of Pd or Pd/Ag alloys containing 5–40 wt.% Ag.

Fuel Cell Electrodes
IONICS INC.

U.S. Patent 3,152,014

A fuel cell consisting of a pair of spaced porous electrodes each of which is in contact with an ion-permeable membrane uses as both oxidant and fuel electrodes a porous C impregnated with Pt or preferably a porous structure activated by Rh, Pt, Ir or Pd.

Palladium Electrode for Fuel Cells
ET LUBRIPANTS

French Patent 1,368,109

An electrode for fuel cells operating at 150–300°C is constituted by a thin Pd foil of practically negligible porosity yet permeable to H₂.

TEMPERATURE MEASUREMENT

Multi-junction Thermocouples
G. S. BACHMAN

British Patent 974,070

Multi-junction thermocouple suitable for refractory furnaces utilises wires of Pt used in conjunction with Pt-Ir or Pt-Rh alloy wires arranged so that, when part of the junction wire is eroded, the Pd wire or strip, placed between the junction wires, melts and provides a new hot junction.

Electrical Resistance Elements
JOHNSON, MATTHEY & CO. LTD.

British Patent 981,807

Electrical resistance elements suitable for use as heater elements or as thermocouple elements consist of a sintered refractory ceramic material core and a Pt group metal or its alloy as the external layer which will not alloy with the ceramic at the operating temperature.