mounted on recrystallised Al_2O_3 tubes 0.8 mm o.d. and 50 mm long. A sheath of recrystallised Al_2O_3, 500 mm × 8 mm, encloses the coil assembly which is freely exposed to dry air. The resistance of the thermometer, 1.4Ω at 0°C and 6.4Ω at 1063°C, allows measurements equivalent to 0.002°C. The sensitivity of the thermometer is maintained after heating for 1 h at 1063°C.

Platinum : Rhodium-Platinum Thermocouples

R. LACROIX, *Bull. Soc. Franc. Céram.*, 1960, (48), 19–30

Pt : 10% Rh-Pt or Pt : 13% Rh-Pt thermocouples are most suitable for the measurement of temperatures up to 1300°C because of the high melting points, ductility and great purity of Pt and Rh-Pt alloys. Reference tables for both combinations are given and the use of these thermocouples for precision measurements with a reproducibility better than 0.1°C, as well as for routine measurements to within ±2°C, is described. The effect of contaminants such as Pb, Sn, Bi, Zr, Cd and Si and the choice of protective refractories are discussed. For temperature measurements in the range 1300°C–1850°C, combinations of Rh-Pt alloys recommended include 5% Rh-Pt : 20% Rh-Pt, 6% Rh-Pt : 30% Rh-Pt, 10% Rh-Pt : 30% Rh-Pt, 10% Rh-Pt : 40% Rh-Pt, and 20% Rh-Pt : 40% Rh-Pt. Other thermocouples which have been suggested for use above 1500°C are Rh : 8% Re-Pt, Rh : 8% Re-Rh, Ir : 10% Ru-Ir, 10% Rh-Ir : 10% Ru-Ir, Ir : 40% Ir-Rh, Ir : 40% Rh-Ir and W : Ir. (60 references).

Temperature Measurement with Platinum Metal Thermoelements

J. SAGOSCHEN, *Metall*, 1961, 15, (1), 34–40

In this review, the historical development of Pt metal thermocouples is outlined. Properties of Pt : Rh-Pt thermocouples, their construction and calibration are described in detail. The effects of various impurities and operating atmospheres on their accuracy and durability are indicated and precautions to be observed in their use are explained. Industrial uses of Pt : Rh-Pt thermocouples described include temperature measurement and control in the 1000°–1500°C range in the iron, steel, non-ferrous metal, glass, ceramic and cement industries. Other Pt combinations mentioned are 40% Pd-Au : 10% Ir-Pt, 40% Pd-Au : 10% Rh-Pt and those with a Au-Pd-Pt basis for temperatures about 1000°C. For temperatures in the range 1500°–1800°C, Rh-Pt : Rh-Pt thermocouples of various compositions are recommended. (74 references.)

NEW PATENTS

Conversion of Sulphoxides to Sulphones

THE M.W. KELLOGG CO. *British Patent* 853,623

Osmium tetroxide is used as catalyst in the preparation of organic sulphones from organic sulphoxides.

Platinum Plating

SEL-REX CORP. *British Patent* 853,939

Relatively thick layers of bright platinum are plated out by use of an electrolyte comprising an aqueous solution obtained by dissolving platinum diamino dinitrite in a mixture of sulphuric and phosphoric acids and adding water to provide a solution containing at least 6 g/l of platinum metal.

Anodes

N.V. CURACAOSCHE EXPLOITATIE MAATSHCAPPIJ UTO. *British Patent* 855,107

An anode for electrolytic or other electrochemical processes is formed of a core of titanium and a coating of a platinum group metal with a barrier layer of titanium dioxide beneath the coating where the latter is porous. The barrier layer may be formed electrolytically after the precious metal coating has been applied.

Production of New Cyclopentano-phenanthrene Derivatives

SYNTEX S.A. *British Patent* 855,801

A 5% palladium on charcoal hydrogenation catalyst is used in the production of a 19-nor-androstan-17β- ol-3-one compound.

Low Stress Platinum Platings

SEL-REX CORP. *British Patent* 856,405

Relatively thick layers of stress-free platinum are deposited from an aqueous solution of sulphamic acid and platinum diamino dinitrite to which is added water to provide a solution containing at least 6 g/l of platinum metal. The aqueous solution is formed by heating the acid solution to dissolve the platinum salt.

Platinum or Alloy Conductors

NORTON GRINDING WHEEL CO. LTD. *British Patent* 856,309

A platinum or platinum alloy electric heating element is coated by flame spraying with a refractory oxide, e.g. alumina or zirconia, to reduce or inhibit the volatilisation of the platinum and embrittlement of the metal.

Electrodeposition of Rhodium

JOHNSON, MATTHEY & CO. LTD. *British Patent* 856,867

A rhodium plating bath giving a bright rhodium deposit comprises an aqueous solution of rhodium perchlorate, the rhodium concentration being 1 g/l to 30 g/l, preferably 15 g/l.

Preparation of α-Amino-lactams

STAMICARBON N.V. *British Patent* 856,967

A palladium-on-carbon (5% Pd) hydrogenation catalyst is used in the preparation of an α-amino-lactam by reducing an α-nitrolactam with hydrogen in the presence of the catalyst.

Fuse Member

SIGMUND COHN CORP. *British Patent* 857,281

A fuse consists of 80–20 parts by vol. of a first material and 20–80 parts by vol. of a second material in intimate contact with the first material. At least 95% of the first material consists of palladium or platinum and at least 95% of the second material consists of aluminium or magnesium. The fuse may consist of a core of aluminium or magnesium and a sheath of palladium or platinum.

Production of Hydrogen Peroxide

FOOD MACHINERY & CHEMICAL CORP. *British Patent* 858,035

Hydrogen peroxide is made by the successive reduction and oxidation of an alkylated anthraquinone in a cyclic process, reduction being effected by hydrogenation in the presence of a hydrogenation catalyst composed of palladium on a predominantly alkaline earth metal carbonate carrier, e.g. dolomite.

Safety Lamps

THE WOLF SAFETY LAMP CO. LTD. *British Patent* 858,870

A flame safety lamp includes a battery filament relighter, the circuit of which is closed by a frangible metal conductor deposited on the surface of the glass and encircling it. The conductor may be platinum applied by spraying, painting, electrolytically or as a transfer.

Safety Lamp

THE WOLF SAFETY LAMP CO. LTD. *British Patent* 858,871

The battery-operated flame relighter of a safety lamp has a filament formed of pure platinum, a platinum-ruthenium alloy (at least 4% Ru) or a platinum-5% copper alloy.

Production of Hydrogen Peroxide

FOOD MACHINERY & CHEMICAL CORP. *British Patent* 859,219

A catalyst used in the production of hydrogen peroxide by hydrogenating an anthraquinone may consist of a platinum group metal supported on an open surfaced oxide of silicon or aluminium or a mixture thereof, the open surface factor "f" of the oxide being not less than 3 nor greater than 25. "f" is defined as BET surface area/electromicroscopic area.

Reducing Organic Nitro-compounds to Amines

E. I. DU PONT DE NEMOURS & CO. *British Patent* 859,251

Fluorine-chlorine- or bromine-substituted aromatic nitro-compounds are reduced to the corresponding amine by catalytic hydrogenation with a platinum-on-carbon catalyst; wt ratio of compound to platinum is greater than 10,000 to 1.

Preparation of Ketoximes

E. I. DU PONT DE NEMOURS & CO. *British Patent* 860,340

A ketoxime is prepared by the catalytic hydrogenation of a nitro-cycloalkane or a secondary nitro-alkane with a platinum and/or palladium catalyst and in the presence of elemental lead present in, or a support for, the catalyst.

Production of Benzene

UNIVERSAL OIL PRODUCTS CO. *British Patent* 860,424

Benzene is produced by conversion of a cycloparaffin containing 6 carbon atoms per molecule and at least 5 carbon atoms in the ring at elevated temperature (320–540°C) and pressure of 3–40 atm in the presence of hydrogen and a non-siliceous catalyst containing alumina, a minor amount of combined fluorine and a minor amount of a platinum group metal. Surface area of catalyst is 75–150 sq. m/g.

Synthesis of Carbazole

AMERICAN MARIETTA CO. *British Patent* 860,554

Diphenylamine is catalytically cyclodehydrogenated to yield carbazole in a reaction zone in the absence of air or oxygen and in the presence of a platinum or palladium catalyst supported on alumina and/or silica, whereby two competing reactions of cyclodehydrogenation and hydrogenolysis of the diphenylamine occur. The reaction zone is maintained at a temperature of at least 375°C to promote the cyclodehydrogenation reaction in preference to the hydrogenolysis reaction.

Alloy for Electrical Contacts and Potentiometers

W. C. HERAEUS G.m.b.H. *German Patent* 1,080,784

An alloy of 10–35% (preferably 20–30%) iridium and remainder palladium is used as material for electrical contacts and potentiometers. Up to 15% of the palladium may be replaced by one or more other platinum metals.

Alloy for Electrical Contacts and Potentiometers

W. C. HERAEUS G.m.b.H. *German Patent* 1,080,785

An electrical contact or potentiometer is made of an alloy of 5–45% (preferably 15–40%) rhodium and balance palladium. Up to 15% of the palladium may be replaced by one or more other platinum metals.

Production of Catalytically-active Metal Coatings on Finely-divided Carrier Materials

DEUTSCHE GOLD-UND-SILBER-SCHEIDEANSTALT *German Patent* 1,086,106

Catalytically-active metal coatings on finely divided carrier materials, e.g. supported platinum metal catalysts, are produced by sweeping the carrier particles, freely falling in a vertical reaction tube, with plating-gas which is heated to its decomposition temperature, the carrier particles being held by the gas stream in suspension so that the plating reaction takes place in a vortex. For example, finely divided aluminium silicate is platinised at 400°C with platinocarbonyl chloride and nitrogen or carbon dioxide as carrier gas in the vortex.

Electrical Contacts

DEUTSCHE GOLD-UND-SILBER-SCHEIDEANSTALT *German Patent* 1,086,441

An alloy of 1–20% preferably 5–15%, rhodium and remainder palladium is used as material for electric contacts, particularly breaker contacts for low voltage technique.

Spinneret Material

W. C. HERAEUS G.m.b.H. *German Patent* 1,086,442

An alloy of 25–50%, particularly 25–42% rhodium and remainder palladium, is used for making spinnerets for production of artificial filaments.

Hard Soldering

DEUTSCHE GOLD-UND-SILBER-SCHEIDEANSTALT *U.S. Patent* 2,958,937

A soldering alloy is composed of 1–10% cobalt, 55–90% copper, 4–35% manganese and 1–30% palladium.

Platinum-Alumina Catalysts

STANDARD OIL CO. *U.S. Patent* 2,959,536

A catalyst for hydroforming petroleum naphthas is prepared by mixing an aluminium hydrosol, made by digesting amalgamated aluminium in water acidulated with a weak organic acid, with sufficient ammonia to raise the pH of the mixture to 8.5–12, which is insufficient to convert any considerable proportion of the alumina into aluminate salts, maintaining the mixture at this pH and at a temperature of 70°–100°F for 6–24 h to form a filterable slurry of solid hydrous alumina which is then dried at below 400°F to a volatiles content of 15–50% by wt., wet basis. The dried alumina is then impregnated with an aqueous platinum solution to a platinum level of 0.05–1% by wt., based on dry alumina, dried and calcined.

Brazing Alloy

THE INTERNATIONAL NICKEL CO. INC. *U.S. Patent* 2,964,398

An easily workable solder having good wetting and flowing properties in contact with chromium-containing metals, good oxidation resistance, creep resistance, mechanical strength and a low diffusion potential is formed of an alloy of 10–60% copper, 10–50% nickel, 1–30% manganese and balance of at least 10% palladium.

Bonded Article

CORNING GLASS WORKS. *U.S. Patent* 2,964,839

A delay line includes a fused silica transmission element and a quartz crystal transducer, the crystal and silica being bonded by means of indium diffused through a gold-platinum alloy on the crystal and indium diffused through a platinum film on the silica.

Hydrodesulphurisation

ESSO RESEARCH & ENGINEERING CO. *U.S. Patent* 2,965,564

Petroleum fractions containing aromatic and sulphur compounds boiling in the 300–650°F range, are upgraded by hydrogenating the fractions to cause hydrogenation of the aromatics and removal of sulphur at 500–675°F and a pressure of 100–1000 p.s.i.g. in the presence of 5000–8000 standard cu. ft. of hydrogen per barrel of feed in contact with a catalyst composed of platinum supported on eta alumina.

Electron Device

WESTINGHOUSE ELECTRIC CORP. *U.S. Patent* 2,965,793

A cathode is formed of a nickel core, on which is a coating of platinum, with a layer of electron emissive material on the platinum.

Isomerisation Catalyst

THE PURE OIL CO. *U.S. Patent* 2,967,207

An isomerisation catalyst having acidic properties and hydrocarbon cracking activity consists of silica-alumina co-promoted with 0.01–1% by wt., based on total composition, of metallic palladium and a small amount of a Group VIII metal of the iron series in amount not over 0.6% by wt. of the other constituent.

Hydrogenation Catalyst

GENERAL ANILINE & FILM CORP. *U.S. Patent* 2,967,835

A hydrogenation catalyst is made by treating an aqueous dispersion containing a copper compound and metallic palladium with a reducing agent to precipitate metallic copper *in situ* on the palladium.