

420°K (the low-temperature reference conductivity, σ_{420}) of a Pt-cored assembly increases almost linearly with increase of conditioning temperature. The function σ_{420} also increases with increase of chemical activity of the core metal. There is a definite relationship between the high-temperature vacuum conductivity, σ_{1020} , and σ_{420} . In the temperature range 420–300°K, the conductivity is rapidly and almost completely destroyed by oxygen. σ_{420} is constant over a wide range of applied voltage and current and shows a high degree of electrical stability with time.

TEMPERATURE MEASUREMENT

Spotting Reaction Hot Spots

J. F. LOVETT, *Instrumentation*, 1959, 12, (4), 23

A travelling Pt:Rh-Pt thermocouple is used to detect reaction hot spots produced in a heat exchanger tube during the oxidation of naphthalene. The thermocouple, surrounded by ceramic insulating material, is sheathed with stainless steel.

High-Temperature Resistance Thermometry

ANON., *U.S. Nat. Bur. Stds. Tech. News Bull.*, 1959, 43, (12), 233

A Pt resistance thermometer has been developed for measurement of temperatures between

630.5° and 1063°C, fixed points on the International Temperature Scale. Use of high purity Pt wire for the resistor has reduced thermometer drifts to less than 0.001 deg/hr at 1000°C. In one design, the resistor wire is supported by four synthetic sapphire discs through holes in which are threaded eight heavy lengths of Pt wire. Four leads of Pt wire are joined to the resistor. The assembly is protected by a fused Al_2O_3 tube.

Techniques of Cathode Temperature Measurements as Applied to Commercial Cathode-Ray Tubes

P. P. COPPOLA, *Rev. Sci. Instr.*, 1960, 31, (2), 137–143

Thermocouple, optical pyrometer and retarding potential techniques of measurement were investigated and the relative merits and limitations are discussed. Corrections necessary for each method are given. The design is given of an electron-gun planar-disc cathode structure used for making thermocouple measurements. Pt:10%Rh-Pt thermocouples are used.

Radiation Effects on Thermocouples

M. J. KELLY and W. W. JOHNSTON, *U.S.A.E.C. Instrumentation and Controls Div.*, Report ORNL-2787, 1959, Nov., 77–79

Data obtained on the effect of neutron flux on Pt:Rh-Pt thermocouples are shown graphically. The percentage error at 1900°F is shown as a function of neutron exposure. A deviation curve of thermocouple error vs output for a Pt:10% Rh-Pt thermocouple is given.

NEW PATENTS

Grain-stabilising of Metals and Alloys

JOHNSON, MATTHEY & CO LIMITED *British Patent* 830,628

A grain-stabilised platinum group metal or alloy material is made by compacting and sintering a mixture of the powdered metal or metals and 0.005–5% by wt. of the total mixture of a refractory metal carbide, preferably tungsten carbide, also in powder form.

Reforming Catalysts

ENGELHARD INDUSTRIES INC. *British Patent* 830,838

In making a platinum-alumina catalyst (0.2–1.5% by wt. platinum), part of the platinum is incorporated by reaction in aqueous medium of a halogen platinum acid with hydrogen sulphide in the presence of an alumina hydrate catalyst base precursor. Another part of the platinum is incorporated by mixing the precursor with an

aqueous platinum sulphide sol. The resulting product is dried and calcined. At least 0.1% of platinum is added in each case.

Gas Analysis

H. MAIHAK A.G. *British Patent* 831,039

Carbon dioxide analysis apparatus includes an absorption chamber and an electrolytic vessel having an anode of platinum and cathode of iron or nickel separated from the anode by a diaphragm of aluminium oxide so as to prevent passage of carbon dioxide produced during electrolysis from the anode to the cathode.

Hydrogenation of Acetylene

ENGELHARD INDUSTRIES INC. *British Patent* 831,406

A catalyst for use in the selective hydrogenation of acetylene is composed of palladium on activated alumina, the weight of palladium metal

being below 0.001% of the total catalyst weight, but at least 0.00001% (preferably about 0.0001%).

Platinum Group Metal Catalysts

NORTON GRINDING WHEEL CO. LTD. *British Patent* 832,031

A catalyst for chemical reactions consists of a base metal or solid refractory having a flame-sprayed coating of alumina, zirconia or other oxide refractory on which has been flame-sprayed a coating of platinum or another platinum group metal, particularly rhodium or palladium. An alloy, e.g. 90% Pt and 10% Rh may also be used.

Hydrogenation Catalyst

GENERAL ANILINE & FILM CORP. *British Patent* 832,141

A hydrogenation catalyst (for the hydrogenation of 1,4-butynediol to 1,4-butanediol) is made by treating a liquid dispersion containing a copper compound, e.g. copper acetate, and metallic palladium with a reducing agent, e.g. hydrogen or hydrazine, to precipitate metallic copper *in situ* on the palladium. The palladium may be supported on alumina or charcoal.

Catalytic Hydrogenation of the Dinitro Derivatives of Toluene

ALLIED CHEMICAL CORP. *British Patent* 832,153
A platinum or palladium catalyst may be used in a method of reducing dinitrotoluene to the corresponding diamine by catalytic hydrogenation of the dinitrotoluene while in the molten state.

Production of Alumina Hydrate Compositions

ENGELHARD INDUSTRIES INC. *British Patent* 832,200

A platinum metal-alumina catalyst is made by forming an alumina hydrogel, converting it to a hydrate, mainly alumina trihydrate, incorporating platinum, rhodium, palladium or iridium in the hydrate composition in finely distributed form, drying and calcining. Method of preparing the alumina hydrate described and claimed.

Analysis of Gaseous Hydrocarbons

FARBENFABRIKEN BAYER A.G. *British Patent* 832,423

Gaseous hydrocarbon mixtures are analysed by gas-chromatography using hydrogen as carrier gas, by converting the unsaturated constituents of a sample of the gas mixture into saturated hydrocarbons by hydrogenation in a hydrogenation column containing platinum or palladium as catalyst, and separating the gas mixture so obtained in a gas-chromatographic column.

Catalytic Dehydrogenation of N-Methylpyrrolidine

IMPERIAL CHEMICAL INDUSTRIES LTD. *British Patent* 832,855

N-methylpyrrolidine is dehydrogenated to N-

methylpyrrole by passing it in vapour form together with hydrogen at elevated temperatures, e.g. 200–500°C, over a catalyst composed of platinum or palladium supported on silica gel. 1% to 10% by wt. of the gel of platinum or palladium is used.

Alloy for Nuclear Reactor Control Rods

U.S. ATOMIC ENERGY COMMISSION *British Patent* 832,959

An alloy suitable for making a nuclear reactor control rod is composed of 0.5–1.5% by wt. of platinum, ruthenium, rhodium, osmium or palladium, 0–10% by wt. of cadmium, 2–20% by wt. of indium and balance silver. Numerous examples given.

Production of Hexahydroterephthalic Acid

HERCULES POWDER CO. *British Patent* 833,185

Hexahydroterephthalic acid is prepared by subjecting terephthalic acid to the action of hydrogen at elevated temperature (150–300°C) and pressure (at least 3,000 p.s.i.g.) in the presence of a palladium or ruthenium catalyst and of an inert liquid medium in which the acid is at least partly soluble under the reaction conditions.

Concentration of Hydrogen

UNIVERSAL OIL PRODUCTS CO. *British Patent* 833,837

A gas stream of increased hydrogen concentration is produced from a hydrogen-containing gas mixture by passing the mixture at elevated pressure and temperature through a diffusion zone separated into upstream and downstream portions by a membrane of a hydrogen-permeable metal of Group VIII. The membrane is supported against the upstream pressure by a rigid porous matrix comprising compressed sintered steel particles. The stream of higher hydrogen concentration is collected on the downstream side. The membrane may be formed of platinum or palladium or alloys thereof, e.g. silver-palladium, gold-palladium or boron-palladium alloys are referred to.

Producing Nitro and Polyamides

COMMERCIAL SOLVENTS CORP. *British Patent* 834,155

An amine of specified structural formula is produced by catalytically hydrogenating, in the presence of a fatty acid having 1–5 carbon atoms in its molecule, a nitride of specified formula. A palladium-on-charcoal catalyst is used.

Production of Aromatics

THE BRITISH PETROLEUM CO. LTD. *British Patent* 834,912

Aromatics are produced from feedstocks, consisting of or containing non-aromatic hydrocarbons having at least 6 carbon atoms in the molecule, by contacting the feedstock with a

catalyst comprising platinum on a support of alumina or silica, with or without halogen and up to 5% wt. of sodium or lithium in combined form, sufficient to suppress side reactions. 0.01–5% wt. of platinum may be used. Temperature of 400–600°C and 0–200 p.s.i.g. pressure are employed.

Activation of Platinum-containing Catalysts

N.V. DE BATAAFSCHE PETROLEUM MAATSCHAPPIJ
German Patent 1,065,384

In the activation of platinum-containing catalysts on alumina or a carrier consisting mainly of alumina and containing chlorine and/or fluorine, before activating the catalyst at a temperature of 250–550°C, the catalyst is pre-activated with a mixture of hydrochloric or hydrofluoric acid, as well as water vapour and oxygen, or an oxygen-containing gas at 200–225°C, the mole ratio of water vapour to hydrogen halide being at least 50.

Brush for Tinning Metal Surfaces

TILTMAN LANGLEY LTD. *German Patent 1,065,688*

A brush for use in tinning metal surfaces, e.g. of aluminium or alloys thereof and for producing a solder joint between two surfaces tinned with solder, has bristles made of glass threads, quartz threads or another non-metallic material of similar strength and flexibility, coated with a layer of platinum.

Platinum Apparatus

DEUTSCHE GOLD-UND SILBER-SCHNEIDANSTALT

German Patent 1,066,028

Laboratory apparatus and like chemically resistant apparatus is formed of an alloy of 3–8% gold and balance platinum.

Bath for Electrodeposition of Rhodium

SEL-REX CORP. *German Patent 1,068,081*

An electrolytic bath for depositing rhodium with low internal stress and containing free sulphuric acid and rhodium as rhodium sulphate comprises, per litre of solution, 20–100 ml (preferably 50 ml) of free sulphuric acid, about 2–5 g of rhodium, 10–100 g (preferably 50 g) magnesium sulphate and remainder water.

Ceramic Composition

E.I. DU PONT DE NEMOURS & CO. *U.S. Patent 2,924,540*

An electrical resistor is formed of a ceramic dielectric carrying a vitreous enamel resistor element comprising 8–50% by wt. of finely divided palladium embedded in a glass matrix.

Catalyst

STANDARD OIL CO. *U.S. Patent 2,925,395*

A platinum-alumina catalyst is made by adding ammonia, ammonium hydroxide or a water-soluble amine to a Heard-type alumina hydrosol in sufficient amount to raise the pH to 8.5–12, maintaining the mixture at this pH for over 1

hour, separating solid hydrous alumina from the resulting slurry, repeatedly re-slurrying the alumina with aqueous ammonia solution (pH at least 9), again separating solid hydrous alumina and finally impregnating the alumina with 0.05–1% by wt. of platinum, drying and calcining.

Preparation of Methylene-bisphenols

INDUSTRIAL RAYON CORP. *U.S. Patent 2,925,444*

A bis-(hydroxyphenyl) methane is made by reacting at ambient temperature a bis-(hydroxyphenyl) ketone with hydrogen at 1–5 atm pressure in the presence of a relatively small amount of palladium supported on an inert carrier.

Catalyst for Isomerisation of Hydrocarbons

THE PURE OIL CO. *U.S. Patent 2,925,453*

A catalyst consists of a silica-alumina hydrocarbon-cracking composite containing 50–95% by wt. of silica, in which is incorporated a small amount of palladium and rhodium, each being present in amount to improve the isomerisation activity of the catalyst. More palladium is present than rhodium.

Catalyst

ENGELHARD INDUSTRIES INC. *U.S. Patent 2,927,141*

Acetylene is selectively hydrogenated by passing a gaseous mixture containing up to 2% by wt. of acetylene together with hydrogen in amount at least stoichiometrically equivalent to the acetylene content and at elevated temperature and pressure over a catalyst composed of palladium, a promoter metal (rhodium, silver or iron) and activated alumina. 0.001–0.035% by wt. of palladium and 0.001–5% by wt. of promoter metal are used.

Catalyst

UNIVERSAL OIL PRODUCTS CO. *U.S. Patent 2,930,765*

A catalyst for hydrocarbon conversion consists of alumina, 0.01–1% by wt. platinum, 0.1–1% by wt. combined halogen and 0.01–1% by wt. of an alkali metal.

Fluidised Platinum Reforming Process

ESSO RESEARCH & ENGINEERING CO. *U.S. Patent 2,933,446*

In the continuous hydroforming of a naphtha, the naphtha and hydrogen first contact in a reaction zone maintained at 900–975°F and 50–500 p.s.i.g., a large size catalyst in the form of "shot" having a platinum content of 0.3–0.6 wt.% and a chlorine content of 0–0.4 wt.% to convert the naphthene constituents to the corresponding aromatic, and then the partially converted feed contacts, in the same reaction zone, a fluidisable sized catalyst containing 0.03–0.1 wt.% platinum and 0.7–1.0 wt.% chlorine, whereby the hydroforming is completed and an improved yield product is recovered overhead from the reaction zone.