

reduce friction and wear between contact metals is discussed. Data are given for the coefficient of friction, wear track width and contact resistance of several unlubricated metal pairs (Au on Pd, Pt on Pd, Au on Au, Pt on Au, Au on Rh, Pt on Rh, and Pt on Ag) for loads of 2-50 g. Octadecylamine hydrochloride, octadecylamine, stearic acid, and iodide films were evaluated as lubricants for various noble metal pairs.

TEMPERATURE MEASUREMENT

Precision Method of Measurement for Testing the Thermal-E.M.F. Temperature Dependence of Platinum - Rhodium : Platinum Thermocouples by Comparison with a Standard Thermocouple

W. HEYNE, *Feingerätetechn.*, 1962, **11**, (9), 400-402
A method of measurement suitable for use with noble metal thermocouples is described and contrasted with the conventional method. It is claimed that the new method of comparison of similar thermocouple limbs is the quicker and more accurate of the two.

Effect of Thermal Neutron Irradiation on Thermocouples and Resistance Thermometers

C. W. ROSS, *A.I.E.E. Trans., Part 1, Communications & Electronics*, 1962, (July), 192-196

The results are given of a study of the effect of

transmutations due to neutron adsorption on the accuracy of Pt:10% Rh-Pt thermocouples and of Cu, Pt and Ni resistance thermometers. It was found that the thermal e.m.f. of a Pt:10% Rh-Pt thermocouple is decreased by thermal neutron irradiation, largely as a result of the transmutation of Rh. Increases in resistance of Cu, Pt and Ni due to transmutations are in the order: Cu>Pt> Ni. Methods for estimating the resulting errors in temperature measurement are given.

Thermoelectric Instability of Some Noble Metal Thermocouples at High Temperatures

B. E. WALKER, C. T. EWING and R. R. MILLER, U.S. Naval Research Laboratory Report NRL 5792, June 1962, 19 pp.

The thermoelectric instabilities of Al₂O₃-sheathed individual thermoelements and thermocouples of Pt, Rh, Ir, 50% Ir-Rh, and some Rh-Pt alloys were studied in the temperature range 1000°-1700°C in argon and in air. Compositional changes in the thermal gradient zone of the thermocouple material are the main cause of instability. Fe originating in the Al₂O₃ sheathing tubes is the main contaminant of Rh-Pt thermocouples and the resulting instability is greater in argon than in air. Internal changes are the main cause of instability of pure Rh, Ir, and 50% Ir-Rh thermoelements; Ir and 50% Ir-Rh have excellent resistance to Fe contamination. In argon, stability of Rh-Pt thermocouples is increased by increasing the wire size, but in air it is independent of wire size.

NEW PATENTS

Cathodic Protection of Ships

H. S. PREISER *British Patent* 902,667

An anodic assembly for use in cathodic protection of a ship's hull consists of a rod of platinum or of copper, or a silver-copper alloy, coated with platinum or palladium connected to an insulated cable so that the rod can trail behind the ship.

Production of Aromatic Nitriles

CALIFORNIA RESEARCH CORP. *British Patent* 902,880

Aromatic nitriles are made by contacting in the vapour phase an alkyl substituted aromatic hydrocarbon (7-15 carbon atoms per molecule) with ammonia and air at 300°-650°C in the presence of a composite catalyst consisting of at least 1% of a heavy metal oxide, e.g. vanadium pentoxide and at least 0.01% by wt. of platinum.

Hydrocarbon Conversion Catalyst

STANDARD OIL CO. *British Patent* 903,773

A reforming catalyst is made by impregnating an

alumina and/or silica support with compounds of germanium and of platinum and heating the support at over 800°F (900°-1800°F) to form a solid solution comprising germanium and platinum and containing at least 5% each of germanium and platinum, the finished catalyst containing 0.1-10% by wt. of the solid solution.

Reduction of Pyridine and Salts thereof

ABBOTT LABORATORIES *British Patent* 904,117

Piperidine or a salt thereof is made by hydrogenating pyridine or a salt thereof in the presence of rhodium (0.05-2% by wt. based on wt. of starting material) at a pressure below 125 p.s.i. and a temperature between room temperature and 150°C.

Hydrogenation of Aromatic Hydrocarbons

UNIVERSAL OIL PRODUCTS CO. *British Patent* 904,732

In the hydrogenation of aromatic hydrocarbons with hydrogen at elevated temperature of not

over 427°C, substantially complete saturation of the aromatic hydrocarbons with hydrogen is effected in the presence of a catalyst consisting of an alumina-containing refractory oxide carrier and containing 0.1-2% by wt. of platinum (or another platinum group metal) and one or more alkali or alkaline earth metals (0.01-0.7% of alkali metal).

Vitreous Enamels

E. I. DU PONT DE NEMOURS & CO. *British Patent* 904,936

A vitreous enamel composition intended for firing on to a ceramic dielectric to form an electrical resistor is composed of 8-90% of finely divided palladium oxide or rhodium oxide and 10-92% of finely divided vitreous enamel flux. Up to 50% of gold, silver or platinum may be included with a minimum of 4% of palladium or rhodium oxide.

Electrolytic Cells

IMPERIAL CHEMICAL INDUSTRIES LTD. *British Patent* 905,141

An electrolytic cell for manufacture of chlorine and caustic alkali comprises a non-conducting porous diaphragm held between, and in contact with, a perforated sheet metal cathode and a perforated sheet titanium anode support carrying an anode in the form of a coating thereon of a platinum group metal.

Electrolytic Capacitors

THE TELEGRAPH CONDENSER CO. LTD. *British Patent* 905,323

The negative member of an electrolytic capacitor is made by chemically depositing hydrogen-absorbing material, e.g. palladium or platinum black, on a basis body of conductive material, e.g. silver. For example, a silver body may be boiled in an acidified solution of palladium chloride.

Activating a Catalyst

UNIVERSAL OIL PRODUCTS CO. *British Patent* 905,499
Platinum—and/or palladium—on alumina catalyst composite is activated by passing an oxide of nitrogen at 25°-1000°C through the dry composite, which is then subjected to separate treatments of oxidation with a free oxygen-containing gas and of reduction with a hydrogen-containing gas.

Alloys

UNION CARBIDE CORP. *British Patent* 905,673

An alloy which is resistant to hydrogen embrittlement resulting from electrochemical action consists of tantalum, a tantalum-titanium alloy or a 10% chromium stainless steel, and 0.05-5.0% by wt. of a platinum group metal, gold, rhenium or alloys thereof. Examples: (1) 99.5% tantalum and 0.5% platinum; (2) 49.5% titanium, 0.5% platinum and balance tantalum.

Hydrogenation of Marine Oils

ENGELHARD INDUSTRIES INC. *British Patent* 906,392

Marine oils are hydrogenated by treatment with hydrogen in the presence of a palladium-containing catalyst as sole catalytically active metal. 0.01-10% by wt. palladium supported on carbon is used.

Coating a Molybdenum Grid

PHILIPS ELECTRICAL INDUSTRIES LTD. *British Patent* 906,961

A discharge tube grid of molybdenum to be coated with platinum, is first coated with an intermediate layer of iron, cobalt or nickel having a rough surface and a platinum layer is then electrodeposited thereon.

Purification of Propylene

ENGELHARD INDUSTRIES INC. *British Patent* 906,994

A propylene-containing gas is purified by mixing the gas with hydrogen and passing the mixture over a catalyst containing palladium, rhodium or platinum metal or a mixture of two of them at a temperature above 120°C. Palladium on activated alumina may be used.

Catalytic Reduction of Dinitrotoluenes

IMPERIAL CHEMICAL INDUSTRIES LTD. *British Patent* 907,154

Dinitrotoluenes are reduced to diaminotoluenes by gradually adding the dinitrotoluenes and hydrogen to a suspension of palladium or platinum catalyst in an aqueous solution of the diaminotoluenes at a temperature of 110°-140°C. The amount of catalyst used is such that from 15-150 parts by wt. of palladium or platinum are present for every 1,000,000 parts by wt. of total dinitrotoluenes to be reduced.

Thermocouples

ENGELHARD INDUSTRIES INC. *British Patent* 908,528

A thermocouple has a positive element formed of an alloy of 3-15% gold, 55-83% palladium and 14-34% platinum. The negative element consists of an alloy of 60-65% gold and 35-40% palladium.

Hydrogenation of Aldehydes and Ketones

ENGELHARD INDUSTRIES INC. *British Patent* 908,639

A saturated or unsaturated aldehyde or ketone (other than an alpha-beta unsaturated aldehyde or ketone) is hydrogenated by treating it in liquid phase with hydrogen in the presence of a rhodium-containing catalyst. A 5% rhodium on carbon powder catalyst is referred to.

Thermoelement Alloy

DEUTSCHE GOLD-UND SILBER-SCHNEIDANSTALT

German Patent 1,127,091

An alloy of 24-40% palladium, 0.5-7% nickel and 55-71% gold is used to form the negative limb of a thermoelement.

Hydrogenation Process

STANDARD OIL CO. *U.S. Patent 3,042,197*

A hydrogenatable feed stock is contacted with hydrogen gas under hydrogenation conditions with a catalyst composed of 0.05-1% by wt. of platinum, 0.05-6% by wt. of thiocyanate ion on an alumina support.

Platinum-alumina Catalyst

ENGELHARD INDUSTRIES INC. *U.S. Patent 3,042,627*

A platinum-alumina catalyst having a low halogen ion content is prepared by commingling alumina in an aqueous medium with a platinum metal halogen-containing compound (halogen selected from Group VIIB with atomic number from 35-53), drying, heating to calcination temperature of at least 800°F in an inert atmosphere and then further calcining the product in an oxidising atmosphere to reduce halogen to a low concentration.

Production of 3-amino-propyl Isocyanurates

ALLIED CHEMICAL CORP. *U.S. Patent 3,042,672*

3-aminopropyl isocyanurates are produced by reacting bis-(or tris)-(2-cyanoethyl) isocyanurate in the presence of a platinum or palladium hydrogenation catalyst.

Hydrocracking of Polynuclear Hydrocarbon Oils

ESSO RESEARCH & ENGINEERING CO. *U.S. Patent 3,043,770*

A hydrocarbon oil feed boiling at about 350°F rich in polynuclear aromatics is hydrocracked at 875°-1050°F and a pressure of 200-1000 p.s.i.g. in the presence of platinum on eta alumina, produced from aluminium alcoholate, as catalyst and at a feed rate between 0.5 and 3 w/h/w in presence of 1000-5000 s.c.f. of hydrogen per barrel to convert the feed to high octane gasoline.

Spinnerette

ENGELHARD INDUSTRIES INC. *U.S. Patent 3,044,155*

A spinnerette is made of an alloy of 70% gold and 30% platinum by wt., which has been electroplated with rhodium or ruthenium.

Hydrocracking of Liquid Alkanes

PHILLIPS PETROLEUM CO. *U.S. Patent 3,046,317*

A normally liquid normal alkane (at least 5 atoms per molecule) is hydrocracked by contacting it, admixed with hydrogen, and under hydrocracking conditions, with a catalyst composed of 0.1-10 wt. % of a platinum metal mixed with boria and zirconia.

Recovery of Rare Metals

E. R. WOLCOTT *U.S. Patent 3,049,422*

Platinum or platinum compounds are recovered from finely divided ore containing them by treating the ore with a gaseous mixture of nitrosyl chloride and chlorine produced from aqua regia at a high enough temperature to cause

only these metals to form volatile compounds, which are then separated from the ore.

Thermocouple

ENGELHARD INDUSTRIES INC. *U.S. Patent 3,049,577*

A thermocouple comprises a negative element formed of a platinum group metal core within a sheath also of a platinum group metal. The core consists of a number of compacted interfused elongated bodies in direct contact with the sheath. The positive element is formed of a platinum group metal alloy bonded to the negative element.

Spinnerette

ENGELHARD INDUSTRIES INC. *U.S. Patent 3,049,753*

The material defining the extrusion orifices in a spinnerette plate is composed of a sintered mixture of tungsten carbide powder and 1-20% of a platinum group metal powder.

Brazing Alloy

GENERAL ELECTRIC CO. *U.S. Patent 3,053,652*

A high temperature brazing alloy contains

- 10-20% chromium
- 5-15% palladium
- 10-40% manganese
- 1-5% silicon
- Balance nickel.

Deposition of Metal

LEESONA CORP. *U.S. Patent 3,053,741*

A non-porous layer of palladium-silver alloy is electrodeposited on an article from an ammoniacal nitrate solution of palladium and silver having a pH of 7.5-11.

Anode for Electrolysis

UNIVERSAL OIL PRODUCTS CO. *U.S. Patent 3,055,811*

A platinum-plated titanium anode is made by electrodepositing on a titanium base a coating of amorphous platinum and activating the latter by heating at above 600°F in the presence of an air stream containing hydrocarbon vapours, for a long enough period to initiate catalytic oxidation of the vapours on the platinum surface.

Catalyst

ENGELHARD INDUSTRIES INC. *U.S. Patent 3,055,840*

A catalyst consists of a support carrying a deposit of ruthenium and, as a promoter, platinum, rhodium or palladium. The ruthenium constitutes at least 20% of the catalytically active metal content of the catalyst.

Catalytic Contact of Gases

ENGELHARD INDUSTRIES INC. *U.S. Patent 3,056,646*

The ignition and combustion of a mixture of methane, oxygen and inert gases is effected by contacting the mixture at above its ignition temperature, but not over 400°C, with a catalyst consisting of rhodium or rhodium and another platinum group metal.