temperature have been carried out by X-ray diffraction analysis and electron microscopy. It was found that the amount of crystallisation occurring at a given time and temperature reaches a maximum of about 0.005% Pt when the heating time is short. With longer heating or increase of temperature, the amount of crystallisation becomes greater as the Pt content is increased to 0.025%. Electron microscopy revealed that prior to any heat treatment, the glass contained a fine structure.

TEMPERATURE MEASUREMENT

A Survey of Temperature Measuring Techniques

W. A. SEATHERTON, *Brit. Commun. & Electronics*, 1959, **6**, (10), 700–709

The basic capabilities and limitations of various techniques for measuring temperatures encountered in industrial processes are outlined. Both contact and non-contact methods of measurement are discussed and classified. The principles of operation and applications of electrical resistance thermometers and thermocouples made of base metals and Pt metals are given in some detail. Charts have been prepared indicating the applications of each type of instrument.

The Vacuum Casting of Uranium

J. STEPHENSON, *J. Brit. Nucl. Energy Conf.*, 1959, **4**, (4), 335–341

The design of a furnace developed by the U.K.A.E.A. for melting and casting U under vacuum is described. In experiments to establish the relationship between temperature and pressure, the casting temperature was measured by a 13% Rh-Pt:Pt thermocouple in the side wall of the crucible. A second thermocouple shielded by a mullite sheath was fitted through the sighting hole above the graphite crucible in order to measure the temperature below the metal surface. Details of the casting assemblies and techniques are given.

NEW PATENTS

New Dioxolane Derivatives

SOC. DES USINES CHIMIQUES RHONE POULENC *British Patent* 815,968

2-piperidyl-dioxolanes are prepared by reducing 2-pyridyl-dioxilanes of given general formula by means of hydrogen in the presence of an Adams' platinum catalyst.

Saturated Aldehydes

THE DISTILLERS CO. LTD. *British Patent* 816,151

An ethylenically unsaturated aldehyde is hydrogenated in the vapour phase at elevated temperature to the corresponding saturated aldehyde by reaction with hydrogen in the presence of a platinum group metal catalyst. The catalyst is made by treating an alumina, magnesia, titania or chromia support with a solution of a compound of the platinum group metal in an organic solvent to deposit the oxide of the metal, treating the resulting product with an aqueous solution of the hydroxide, carbonate or bi-carbonate of an alkali metal and finally reducing the oxide.

Isomerisation of Alkanes

ENGELHARD INDUSTRIES INC. *British Patent* 820,140

A normal alkane is isomerised by bringing it, in admixture with 1–5 moles of hydrogen per mole of alkane, into contact with a platinum metal-alumina catalyst at 800–900°F, a pressure of 200–500 psig and a wt. hourly space velocity of 2-20. The feed catalyst is characterised by large pore, high area base structure composed of gamma alumina modifications resulting from the drying and calcining of a mixture of precursor hydrous alumina phases containing 65-95% of tri-hydrate. The catalyst contains 0.1-1% by wt. of a platinum metal, preferably platinum, in sufficiently finely divided form as to exhibit, by X-ray diffraction, the absence of crystallites and crystals of larger size than 50 Å.

Reforming of Naphthas

ESSO RESEARCH & ENGINEERING CO. *British Patent* 821,210

A naphtha boiling at 170–340°F is reformed in the presence of a platinum-alumina-halogen catalyst and added hydrogen at 850–900°F, using a naphtha residence time in the reforming zone of 15–50 sec. A heart-cut fraction boiling at 175–290°F is recovered from the products and is reformed at 925–1000°F for 100–200 sec to produce a gasoline. A material containing alkyl aromatics and boiling above 290°F is recovered from at least the first reforming zone and this is thermally reformed to recover a gasoline.

Isomerisation of Alkanes

ENGELHARD INDUSTRIES INC. *British Patent* 822,670

Alkanes are isomerised by contacting the alkane(s) and hydrogen with a catalyst composed of sulphided rhodium supported on alumina at 650–1000°F, a pressure of 200–1000 psig, a hydrogen to alkane molar ratio of 1:1 to 20:1 and a weight hourly space velocity of 0.5–20. The catalyst is prepared by contacting a calcined composition of rhodium on the support with a sulphiding agent, e.g. hydrogen sulphide, at 70–1000°F and a pressure of up to 100 psig.

Novel Hydrazine Derivatives

F. HOFFMANN-LA ROCHE & CO. A.G. *British Patent* 822,796

A platinum oxide or palladium/charcoal catalyst is used in the hydrogenation of a hydrazone produced at an intermediate stage in the manufacture of novel hydrazine derivatives of given general formula.

Manufacture of Platinum Metal Catalysts

E.I. DU PONT DE NEMOURS & CO. *German Patent* 1,052,366

In the manufacture of a catalyst by impregnating activated alumina with a compound of a platinum group metal and subsequently reducing to the metal, activated alumina is treated with an aqueous solution of a strong inorganic oxidising medium, which is removed from the alumina before impregnation thereof.

Separation of Noble Metal Salts

ROHM & HAAS G.m.b.H. *German Patent* 1,053,482

In a method of separating platinum metal salts from gold and/or lead salts with polymeric hydrocyanic acid from a mixture of these salts, polymeric hydrocyanic acid is charged to saturation with the salt or salts of the same platinum metal or metals as are present in the mixture to be treated, and the so-treated polymerisate is contacted with the solution containing the salts whereby a complete absorption of the gold and/or lead salts results, so that the separated solution contains only the salt or salts of the platinum metal or metals.

Electrodeposited Rhodium

SEL-REX PRECIOUS METALS INC. *U.S. Patent* 2,895,889

Rhodium metal under low internal stress is electrodeposited on a basis metal from an aqueous bath composed essentially of 20–100 cc/l. of free sulphuric acid, 2–5 g/l. of rhodium as rhodium sulphate and 10–100 g/l. of magnesium sulphate, remainder water, at a current density of 4–20 amp/sq. ft. at 20–25°C.

Electrodeposited Rhodium

SEL-REX PRECIOUS METALS INC. *U.S. Patent* 2,895,890

Rhodium is electrodeposited from an aqueous bath containing rhodium sulphate and 10–100 g/l. of magnesium sulphamate dissolved therein.

Catalyst Activation

ENGELHARD INDUSTRIES INC. *U.S. Patent* 2,893,948

A petroleum hydrocarbon is reformed by contacting it under reforming conditions of elevated temperature and pressure in the presence of hydrogen and a palladium-alumina reforming catalyst, which has been previously heated to at least 1200°F in an atmosphere of a free-oxygen-containing gas for about 15 hours.

Catalyst

THE M.W. KELLOGG CO. *U.S. Patent* 2,897,137

A hydrocarbon reactant is contacted at 600–1250°F, a pressure of 1 atm–2000 psig and a wt. space velocity of 0.01–15 with catalyst particles containing 1–25% by wt. of platinum on a carrier material in physical admixture with particles of a carrier material in amount sufficient to provide an average platinum concentration of 0.05–0.95% by wt. of the mixture.

Catalyst Particles

ESSO RESEARCH & ENGINEERING CO. *U.S. Patent* 2,898,289

Hydrocarbons are hydroformed by contacting them, mixed with hydrogen, under active conversion conditions, with catalysts obtained by submerging preformed bodies of adsorptive alumina in a large amount of water, circulating through a bed of the particles, slowly adding a solution of a platinum group metal compound sufficient to incorporate the desired amount of platinum metal, continuing the circulation for at least half hour after addition of the platinum metal compound, separating the impregnated bodies and drying and calcining them.

Hydroforming Hydrofined Naphtha

STANDARD OIL CO. *U.S. Patent* 2,899,378

In a method of producing high octane fuel from a low octane naphtha containing sulphur and chloride, in which the naphtha is hydrofined to remove the sulphur and chloride, fractionated and then hydroformed in the presence of a platinum-alumina catalyst, catalyst deactivation, caused by removal of the chloride, is eliminated by introducing into the hydrofined naphtha, after fractionation, 0.1–10 parts per million of chloride, at least part being added to the effluent stream from the first hydroforming stage, contacting the naphtha with the catalyst at a pressure of 150–400 psi at inlet temperatures of 850–950°F until the activity of the catalyst declines and then regenerating the catalyst in each stage when its activity declines below the required level.

Hydrocarbon Conversion Process

PHILLIPS PETROLEUM CO. *U.S. Patent* 2,899,382

A petroleum distillate boiling at 90–400°F is reformed by contacting it at 700–1000°F, a pressure of 100–1000 psig and a hydrogen to hydrocarbon mol ratio of 1–20 with a catalyst consisting of 0.01–10% by wt. of platinum deposited on a support formed of 5–50% silica-alumina and an inert support (alumina or silica), one or both of which components has been calcined before mixing.

Brazing Alloy

THE TRANE CO. *U.S. Patent* 2,900,251

A high temperature brazing alloy consists of 30–60% nickel, 20–45% tin, 10–30% palladium and 4–8% silicon.

Catalytic Reforming

SOCONY MOBIL OIL CO. INC. *U.S. Patent* 2,902,435

A hydrocarbon reforming process involves the use of a catalyst consisting of a mechanical mixture of particles of less than 100 microns diameter of (1) a porous carbonaceous carrier on which is deposited 0.05–5% by wt. of platinum and (2) alumina activated by the presence therein of an acidic promoter and composed of a mixture of the dehydration products of beta alumina trihydrate in which eta alumina predominates.

Brazing Alloys

LITHIUM CORP. OF AMERICA INC. *U.S. Patent* 2,903,352

A self-fluxing, air-proof brazing alloy contains 0.25–8% lithium, 0.25–2.5% boron, 5–50% nickel and balance palladium.

Brazing Alloys

LITHIUM CORP. OF AMERICA INC. *U.S. Patent* 2,903,353

The alloy of No. 2,903,352 may contain 1–80% copper, in which case the palladium comprises not less than 14.5% of the alloy.

Hydrocarbon Detection

NATIONAL LEAD CO. *U.S. Patent* 2,904,406

In a method of testing gas samples for hydrocarbon content involving catalytic combustion at the surface of a hot wire, use is made of a temperature calibrated wire composed of platinum or palladium alloyed with rhodium, iridium or ruthenium.

Selection of Corn Steep Liquor

AMERICAN CYANAMID CO. *U.S. Patent* 2,904,473

Selection of a corn steep liquor, giving an improved yield during growth of a particular type of organism, is made by measuring the potential of a platinum electrode immersed in the liquor against a saturated calomel electrode and choosing a liquor having a potential more positive than −170 millivolts at 22°C.

Hydrocarbon Reforming

UNIVERSAL OIL PRODUCTS CO. *U.S. Patent* 2,906,699

A catalyst capable of promoting hydrocracking of paraffins and dehydrogenation of naphthenes and containing one or more refractory oxides and platinum or palladium is used in a method of reforming a hydrocarbon fraction containing sulphur compounds, paraffins and naphthenes.

Catalysts

THE STANDARD OIL CO. *U.S. Patent* 2,906,700

A reforming catalyst is made by impregnating a support with platinum and germanium compounds, and heating at 900–1800°F in a reducing atmosphere to form a solid solution of the platinum and germanium, the wt. ratio of platinum to germanium in the finished catalyst ranging from 5–95%.

Reforming of Hydrocarbons

THE STANDARD OIL CO. *U.S. Patent* 2,906,701

Discloses the reforming of a petroleum naphtha boiling in the gasoline range with the catalyst of No. 2,906,700 (above).

Hydrogenated Lecithin

THE GLIDDEN CO. *U.S. Patent* 2,907,777

Phosphatides are hydrogenated by contacting them with hydrogen and a platinum or palladium catalyst at a pressure of 0–12 lb. gauge and a temperature of 32–175°F. The phosphatides are in the form of a solution in which 10% or more of the total solvent for the phosphatides consists of chloroform, chlorobenzene or methylene chloride or mixtures thereof.

Hydroforming Process

ESSO RESEARCH & ENGINEERING CO. *U.S. Patent* 2,908,636

Virgin petroleum naphtha fractions are hydroformed by contacting the fractions mixed with hydrogen-rich gas with a fluidised bed of finely divided platinum-on-alumina catalyst particles in a reaction zone at 800–975°F and a pressure of 50–100 lb/sq. in. long enough to produce a C_5+ hydroformate and periodically regenerating the deactivated catalyst particles.

Preparation of Catalysts

HOUDRY PROCESS CORP. *U.S. Patent* 2,908,654

A non-acidic single function hydrogenation catalyst is made by impregnating sorptive high area alumina (minimum dimensions 2–13 mm) with an aqueous solution of chlorplatinic acid to deposit compounds corresponding to 0.2–1.9% platinum, treating with hydrogen to form platinum and then with an oxygen-free gas for 1–36 hours at 700–1000°F to reduce the chloride content of the particles to below 0.1%.

Hydroforming Process

GULF RESEARCH & DEVELOPMENT CO. *U.S. Patent* 2,909,480

Naphtha range hydrocarbons are reformed by contacting the hydrocarbons, pre-heated to below their thermal cracking temperature, mixed with hydrogen with a platinum-alumina reforming catalyst in a fixed-bed reforming zone under reforming conditions of temperature and pressure including a temperature above 900°F (which is substantially above the pre-heat temperature), separating a hydrogen-rich gas from the product, recycling part of this gas to the reforming zone, burning another part and introducing the hot resultant combustion gas directly into the reforming zone separately from the naphtha in amount, and at a temperature, sufficient to maintain the reforming zone at above 900°F.