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The Thermal Decomposition of Hexane at High Pressures

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THE INFLUENCE OF SALTS ON THE VELOCITY OF INVERSION OF SUCROSE AT 25°

J. N. PEARCE AND MARGARET THOMAS

The velocity of inversion of sucrose has been determined in the presence of salts of different ion-types at 25°. In the solutions used the concentrations of three components are definitely fixed, namely: sucrose 0.1 m., hydrochloric acid 1.0 m., and water 1000 grams. The salt concentration is the only variable. The salts used were LiCl, NaCl, KCl, BaCl₂ and Al(NO₃)₃. For equal molal concentrations of the different salts the velocity coefficients increase in the order: KCl < NaCl < LiCl < BaCl₂ < Al(NO₃)₃. The salt effect appears to be explained best on the basis of ionic hydration due to the attraction between the ions and the water dipoles. While it was not possible at the time to determine the activity of the solvent in the inversion solutions, the reaction velocity increases inversely and practically linearly with decrease in the activity of the solvent due to the salt alone.

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THE CHEMICAL BOND IN GENERAL CHEMISTRY

BEN H. PETERSON

A Discussion of Application of Electro-Valent and Co-valent Types of Chemical Bond Adapted to Beginning Students.

DEPARTMENT OF CHEMISTRY,
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THE THERMAL DECOMPOSITION OF HEXANE AT HIGH PRESSURES

J. N. PEARCE AND J. W. NEWSOME

The thermal decomposition of n-hexane has been studied at pressures between 14,000 and 15,000 lbs., at temperatures between 430° and 520°, and for heating periods varying from a few minutes to two hours.

Previous investigators have found that at low pressures of one atm., or less about one-half of the gaseous decomposition products are unsaturated hydrocarbons with no products boiling higher than hexane itself. It has been found that under high pressures the low boiling olefins are practically completely converted by polymerization and hydrogenation either to saturated aliphatic hydrocarbons or to cyclic and aromatic hydrocarbons.

The percentages of CH_4 , C_2H_6 , C_3H_8 and C_4H_{10} in the gaseous products remain practically constant at ten-degree intervals between 460° and 490° , namely, 25, 47, 15 and 7 per cent, respectively. At 460° the respective proportions of H_2 , C_2H_4 , C_3H_6 and butenes in the gaseous products are 2.1, 1.4, 1.5 and 2.1 per cent. These decrease with further rise in temperature.

497° both hydrogen and ethylene have completely disappeared, and the percentages of propane, butanes, propene and butene have dropped to 5.5, 4.0, 0.04 and 0.16 percent, respectively. At this temperature the abundant formation of carbon begins; the proportion of methane is noticeably increased and continues to increase with further rise in temperature. Irrespective of time or temperature, the proportion of ethane takes a sudden jump at this point and then drops back to its original practically constant value.

Owing to the small capacity of the bomb it was not possible to obtain at this time sufficient quantity of the liquid products to make an accurate quantitative analysis of the liquid products. However, microdistillations and other qualitative tests showed the presence of cycloparaffins, benzene, substituted benzenes, and unsaturated higher forms.

THE ADSORPTION OF CERTAIN KETONES AND ESTERS BY ACTIVATED CHARCOAL

J. N. PEARCE AND A. C. HANSON

The adsorption of acetone, methyl-ethyl ketone, diethyl ketone, ethyl formate, ethyl acetate, *n*-propyl acetate and methyl propionate by activated charcoal has been measured for temperatures between 0° and that of decomposition. The Langmuir isotherms, obtained by plotting $p/\frac{x}{m}$ against the pressure p , are rectilinear at the lower temperatures and up to 60 mm. pressure. At higher temperatures and pressures the isotherms tend to deviate from the straight line and bend toward the pressure axis. The amount of vapor adsorbed per gram of charcoal decreases with increase in the