Decomposition of Dicyanodiamide in Aqueous Alkaline Media

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A study of kinetics of decomposition of dicyanodiamide in aqueous solutions of potassium hydroxide was carried out at various temperatures and pH values. An equation was developed to relate the decomposition rate constant to the reaction temperature. The study demonstrates that at the conditions investigated decomposition of dicyanodiamide proceeds via a parallel-series route. The approximate values of the decomposition rate constants were determined for each parallel course as functions of pH and temperature—but neglecting the effect of the amide concentration in the reaction mixture. The equations to relate these constants to the pH and temperature of the system are also presented.

Kinetics of Hydrazine Oxidation by Nitrous Acid

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Scientific Institution—Not Shown

A study of kinetics of hydrazine reaction with nitrous acid at temperatures of 9°–40° was carried out in solutions of nitric and hydrochloric acids. The reaction is of the first order with respect to the reactants and the H^+ ions, the reaction rate increasing with increasing ionic strength of the solutions.

The reaction mechanism proposed assumes interaction of the $N_2H_5^+$ and NO^+ ions as the rate-determining step.

Formation of Radicals in Radiolysis of Organic Solids: EPR Spectra and Yields of Radicals in Radiolysis of Some Organosilicon Compounds

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The yields, G_R, of the radicals formed in a fast electron radiolysis of certain organosilicon compounds at temperatures of $-130°$ to $-180°$ were determined by an EPR technique. The results show that with saturated- and aromatics-substituted tetramethylsilane, the yields, G_R, of $(4-5)(10^{-2})$ and $(0.2-0.6)(10^{-2})$ ev, respectively, do not differ from the G_R values of other hydrocarbons of analogous strucure. With the compounds of general formula, $(CH_3)_3Si(CH_2)_nCH{=}CH_2$ (where $n = 0$, 1, or 2), the radiative yields G_R, are approximately (1×10^{-2}) ev, or roughly 4 times smaller than those with the hydrocarbons having only one double bond. Analyses of the EPR spectra lead to the conclusion that insertion of one atom of silicon into an aliphatic chain does not alter noticeably the radiolysis mechanism.

Interaction of Atomic Oxygen Generated in the Gaseous Phase with Solid Hydrocarbons: Reaction of Atomic Oxygen with Solid Ethylene at Temperatures of 65°–69°K

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An analytical method developed is described to determine small amounts of oxygen in various substances, using a chromatograph of capillary type and a mass-spectrometer, type MX-1302, arranged in series. The analytical data show that at temperatures of 65°–69°K the principal products of interaction of atomic oxygen with solid ethylene are ethylene oxide and acetaldehyde. At the temperatures, above, the product distribution remains practically unchanged regardless of the degree of conversion.

A General Principle Governing Catalytic Activity of Metals

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A correlation was established between catalytic properties of metals (activity, reaction order, etc.) in different reactions and the volumetric thermodynamic parameter, the heat of formation of a metal oxide in the highest state of oxidation per gram-atom of the metal.

Effect of Properties of a Salt Cation on Kinetics of Formation of Pheophytinates in Ethanol Solutions

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Based on the experimentally-determined kinetic data of formation of pheophytinates, Ph, of Fe^{+2}, Ca^{+2}, Ni^{+2}, Pd^{+2}, and Ag^+ in absolute ethanol—via the reaction, $H_2(Ph) + MX_2 \rightarrow M(Ph) + 2HX$, a relationship was established between in-