The peroxide radical concentrations were determined at various fixed reaction initiation rates. These experimental values agree closely with the values calculated for various known initiation rates, using an appropriate recombination rate constant.

Kinetics of Pinacoline Interaction with Ethyl Magnesium Bromide

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A thermographic method was developed to determine the interaction kinetics of pinacoline with ethyl magnesium bromide. The rate constants for the reaction were determined in diethyl ether at 20.5°. The pseudo-molecular rate constant is a linear function of ethyl magnesium bromide solutions of 0.17 to 0.40 mol/l concentrations.

Reduction with Ammonia of Uranous and Uranic Oxides

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The kinetics of reduction of uranium (-ous; -ic) oxides by ammonia were studied at temperatures of 500°–650° and P_{NH_3} pressures of 25 to 600 mm Hg, using one sample of each oxide. The apparent activation energy, E, was determined to be 50.5 ± 4.5 kcal/mol. At constant reaction temperatures, the relationship between P_{NH_3} and the reaction rate, v, is, $v = kP^{n}_{NH_3}$, where n is 0.35 and 0.42. The ideas as to the possible reaction limiting stage are supported by the experimental data. The phase transformations occurring during reduction of U_3O_8 with NH_3 at the stated temperatures, may be represented by the following reaction scheme:

$$U_3O_8 \rightarrow U_3O_{8-x_{max}} \rightarrow U_4O_9 \rightarrow UO_{2+x_{max}} \rightarrow UO_{2+x}$$

Oxidation of Alkyl Radicals in γ-Transitions of Amorphous Substances

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Thermoluminescence and EPR spectra of several amorphous organic compounds were studied in irradiation at 77°K with fast electrons. On reheating of the irradiated samples, the stabilized alkyl radicals react with the oxygen dissolved in the amorphous substances. In reactions of this type, the rate of oxidation sharply increases at the γ-transition temperature. The results obtained help to explain the shape of the thermal fluorescence curves for the irradiated amorphous substances and, at the same time, demonstrate that in the radiolysis the alkyl radicals serve as the ion stabilization centers.

Effect of Nuclear Radiation on Catalytic Properties of Nickel Oxide

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The permanent defects due to irradiation of NiO (containing 2.5 mol % of Li_2O) increase its catalytic activity and electroconductivity. The transitory defects produced during irradiation at temperatures of 300°–400° have no effect on the catalytic activity; but at a room temperature the temporary defects increase electroconductivity of NiO.

The permanent defects also decrease the activation energy in catalytic oxidation of CO with oxygen.

To maximize the changes in electroconductivity and catalytic activity, the reaction must be carried out at the lowest possible temperature, using catalysts with a very small conductivity characteristic.

Interactions of Oxygen and Ethylene with Atomic Hydrogen Adsorbed on Silica Gel Surface

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Recombination of the atomic hydrogen initially produced on a silica gel surface by radiolysis of its hydroxyl groups and reactions of the hydrogen atoms at low temperatures (−170° to −100°) with oxygen and ethylene were investigated by an EPR method. The results indicate increased reactivity and thermal stability for the hydrogen atoms adsorbed on the silica gel surface.

Kinetics of Chromatographic Reactions Over Non-Homogeneous Surfaces

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Equations are derived for the chemical reaction kinetics in chromatographic systems, using a statistical theory of adsorption and catalysis as the basis. Some of the qualitative and quantitative characteristics of these reactions are described. The correlations to determine kinetic constants