

Reactions of Atomic Hydrogen in an $\text{H}_2\text{O} + \text{H}_2\text{SO}_4$ + FeSO_4 System

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An EPR study was made to determine the nature of the radicals formed in interaction of atomic hydrogen with molecules of acetylene, ethylene, propylene, allyl alcohol, and carbon dioxide in an $\text{H}_2\text{O} + \text{H}_2\text{SO}_4 + \text{FeSO}_4$ system at temperatures of 120° and 90°K. The results show that at low temperatures atomic hydrogen combines with the molecular compounds, above, to form the corresponding radicals.

Kinetics of Heterolytic Rearrangement of Cumyl- perbenzoate and of Some of Its Derivatives

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Rearrangement reactions of cumylperbenzoate and of its derivatives with the $-\text{CH}_3$, $-\text{Br}$, and $-\text{NO}_2$, as the *para*-position substituents in the benzoate group, were studied in absolute alcohol and in glacial acetic acid media. The rearrangements of the peresters are reactions of the first order. Substitution of the experimentally-determined data into Hammett's equation yields ρ of 1.21. The values of activation enthalpies, ΔH^\ddagger , of the reaction are 19.3–20.9 kcal/mol. In either solvent, the negative activation entropies, ΔS^\ddagger , of the peresters-substituents reactions increase in the following order: $-\text{NO}_2 < -\text{Br} < \text{H} < -\text{CH}_3$. It is believed that the changes in the ΔS^\ddagger values are due to different degree of solvation of the peresters by the solvents.

Kinetics of Alkaline Hydrolysis of Trimethylamine- sulfotrioxide

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Alkaline hydrolysis of $(\text{CH}_3)_3\text{NSO}_3$ is a reaction of the second order. Activation energy and entropy of the reaction are 18.31 kcal/mol and -11 entropy units. Comparative kinetic data are listed for hydrolysis of $(\text{CH}_3)_3\text{NSO}_3$ in alkaline and in aqueous media.

Oxidation of Ammonia Over Metal Oxides

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Catalytic activity of metal oxides of different composition was evaluated in ammonia oxidation. The aggregate results show that pure cobalt(ous)-cobalt(ic) oxide is the most active catalyst composition. Addition of up to 3% (wt) of nickel- or copper oxide has no effect on performance characteristics of the catalyst. Addition of chromic oxide increases the limiting conversion capacity of the catalyst but decreases its selectivity. Precalcination of the catalysts at a temperature of 950° decreases their limiting conversion capacities.

Mechanism of Conversion of 2-Methylpentene-1 over a Silica-alumina Catalyst

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The kinetics of isomerization of 2-methylpentene-1 to 2-methylpentene-2 and of dimerization of the two olefins in liquid phase were investigated over silica-alumina catalyst samples of different acidity. A linear relationship exists between the isomerization rate constants and the degree of acidity, h_0 , of the catalysts. The probable mechanism of the reaction is discussed.

Determination of Concentration of Active Centers by Catalyst Poisoning and Pulse Microanalytic Methods

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Usefulness of a catalyst poisoning technique to determine concentration of active centers on a solid catalyst surface was evaluated by a pulse microanalytic method. The study shows that at certain specified conditions the poisoning technique yields sufficiently reliable results. In cracking of cumene over a decationized Y-zeolite, the evaluated number of participating active centers is 4×10^{19} per gram of the catalyst.