that either there is no attraction between the adsorbed cyclohexane molecules — in which case the reaction on the film surface must be of the order higher than the first, or that the molecular attraction is significant and, therefore, the surface reaction can be of the first order.

In dehydrogenation of cyclohexane over two palladium films with drastically different activities, the values of the activation energies and of the heats of adsorption — calculated by use of the experimental data in Hill's equation, agree satisfactorily with the experimental values calculated by Langmuir's equation.

Effects of Structure and Methods of Preparation on Catalytic Activity of Aluminum Oxide

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The effects of methods of preparation of crystalline aluminum hydroxides, their structural characteristics, and of the calcination temperatures were determined in decomposition of isopropyl and of n-butyl alcohols.

In decomposition of isopropyl alcohol, catalytic activity of the samples of γ-θ aluminas is proportional to the surface area. Specific activity of the finished samples remains approximately constant, regardless of the preparation history, crystal structure, and temperature of calcination of the alumina hydroxides.

In decomposition of n-butyl alcohol over these catalysts, the product composition varies with the degree of the alcohol conversion. In dehydration of n-butyl alcohol, the primary product is α-butylene.

The preparation history and crystal structure of the γ- and θ-aluminas have no effect on their specific activity and selectivity characteristics in processing n-butyl alcohol at a like degree of conversion in the region subject to the kinetic laws.

Infrared Spectroscopic Study of Photocatalyzed Oxidation of Vaporized Organic Compounds over Titanium Dioxide

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The character of photocatalyzed oxidation of vaporized isopropanol, methanol, n-heptane, and methane was studied by analyzing for composition the infrared adsorption spectra of the gas mixtures over the system TiO_2 and, also, by determining the changes in the infrared adsorption spectra due to the TiO_2 and of the spectra due to the adsorbed molecules. The results show that exposure to light of an isopropanol (or n-heptane)-TiO_2-O_2 reaction system results in formation of acetone, whereas the exposure of a methanol-TiO_2-O_2 system leads to formation of methylformate.

Kinetic correlations were determined for the photooxidation of isopropanol. A hypothesized mechanism of the reaction is described. This assumes that the isopropanol is oxidized by the TiO_2 oxygen, the resulting oxygen vacancies being filled by the oxygen atoms produced by dissociation of the gaseous O_2 molecules on the TiO_2 surface. The oxidation of the organic molecules is accompanied by the formation of stably-adsorbed compounds with ionic structure of acid carbonates.

Homomolecular and Isotopic Exchange of Oxygen on Cerium Dioxide

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A study of homomolecular oxygen exchange reaction was carried out over titanium dioxide at temperatures of 410°–545°; a study was also made of isotopic exchange of the oxygen in the gas phase with the oxygen of TiO_2 at temperatures of 365°–440°. The results show that the rate of the homomolecular exchange is 1.5 times greater than that of the isotopic exchange, although activation energies of the two reactions are practically equal (28 and 29 kcal/mol) and the orders of the two reactions with respect to the oxygen are identical (0.84). The results obtained lead to the conclusion that the limiting stages of the two processes are identical.

Pretreatment of the TiO_2 in vacuum at a temperature of 700°, followed by shock-cooling, yields a catalyst of high activity and poor stability in the operation at a room temperature.

Investigation of Catalysts for Oxidation of Ethylene to Ethylene Oxide

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A number of catalysts were evaluated to determine their effectiveness in oxidation of ethylene to ethylene oxide in pseudo-fluidized catalyst beds. The results show that silver on the surface