is believed that the promoters serve to decrease concentrations of the surface-deactivating intermediates chemisorbed on the catalyst surface.

Adsorption and Isotopic Exchange of CO_2 on MgO and $Mg(OH)_2$

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The results of differential isotopic analyses show that in terms of the activation energies the surface of MgO is homogeneous but that in terms of the heats of adsorption, it is heterogeneous. The kinetics of isotopic exchange between gaseous and adsorbed phases of a CO — COO^{18} system shows that the rate of isotopic exchange is increased by increasing the reaction temperature and by addition of water; variation of partial pressure of CO_2 has little effect on the rate.

Inspection of the infrared spectra discloses presence of three different forms of CO_2 bonding to $Mg(OH)_2$, corresponding to three distinct mechanisms of adsorption and exchange of CO_2.

The types of active centers present in alkaline catalysts are speculated upon and their functions in acid-base catalysis are discussed.

Effects of Sintering and Oxygen Sorption by Nickel Catalyst on Kinetics of Para-Ortho Conversion and Isotopic Exchange of Hydrogen

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The effects of oxygen preadsorption on a nickel catalyst upon different kinetic factors were determined in para-ortho conversion of hydrogen and in deuterium-hydrogen exchange reactions. The effects uncovered are attributed to stable adsorption of oxygen by the portions of the catalyst surface with high adsorption properties; the gas diffuses through the rest of the catalyst surface into the interior of the surface layer. The results obtained are in good agreement with the adsorption-chemisorption equilibrium data for oxygen by the catalyst.

Processes of Catalytic Conversion of Ethanol to Butadiene

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A systematic study of conversion of ethanol to butadiene was carried out in one-stage and two-stage units, using static and fluidized beds of catalysts of different composition. In the systems of either type, a 60/40 Al_2O_3/ZnO catalyst was found to be the most active. In one-stage boiling-bed systems, the butadiene yields are very high, the optimum yield being 72.8%. The optimum yield for the one-stage static bed unit is only 55.8%. The results show that processing of ethanol in two-stage fluidized bed units does not improve the butadiene yields per unit of fresh feed; however, it does significantly improve the through-put rates.

An analysis of the experimental data indicates that use of fluidized catalyst beds is advantageous in one-stage operation; on the other hand, the use of static beds is probably preferable in two-stage processing systems.

Decomposition of Hydrogen Over Germanium Catalyst

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Catalytic decomposition of hydrazine over a powdered germanium catalyst is a reaction of zero order. The reaction activation energy is 20–22 kcal/mole. The decomposition products are ammonia and nitrogen. Catalytic properties of germanium are not predictable from the character of its conductivity.

BRIEF COMMUNICATIONS

Effect of Preparation Methods on Porous Structure of Beryllium Oxide

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The character of porous structure of beryllium oxide is strongly influenced by the reactions occurring during formation and maturation of the suspended product. Precipitation at pH values of 7.7 to 8.5 results in beryllium oxide xerogels of high specific surfaces. The xerogels precipitated at a pH of 5.5 have small specific surfaces, relatively small pore adsorption capacity, and a relatively large number of macropores. Increasing calcination of beryllium oxide from 150° to 400° increases its specific surface somewhat.

Porosity of the end product is affected by the nature of the anion ($SO_4^=$ or NO_3^-) of the salt used to precipitate beryllium hydroxide. The $SO_4^=$ ion promotes formation of beryllium oxide of high specific surface.

Electroconductivity of Vanadium Catalysts in Oxidation of Methyl Alcohol

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Electrical resistance of vanadium catalysts containing added potassium sulfate was determined in air and in oxidation of methyl alcohol to formaldehyde. The results show that small dosages of added potassium sulfate decrease electrical resistance of vanadium pentoxide and that large amounts of this additive increase it.

On the basis of chemical analyses *and* activity and electrical resistance measurements of the vanadium catalysts studied, a concept of alternate oxidation-reduction is proposed to explain their properties in the reaction studied.

The Active Component of Vanadic Oxide in Catalytic Oxidation of Naphthalene

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The results of activity–phase composition correlations for different vanadium oxide catalysts show that the active components of vanadic oxide catalyst in oxidation of naphthalene to phthalic anhydride are V_2O_4 and V_6O_{13} *and* that V_2O_5 serves merely as a source for their production.

Mechanism of Oxidation of Propylene and Propylene Oxide Over Silver Metal Catalyst

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The mechanism of oxidation of propylene and propylene oxide over a silver metal catalyst was studied by partition calorimetry at temperatures of 185° to 416° and at gaseous reaction mixture pressures of 30 to 70 mm Hg. The results show that the process is of heterogeneous type. Presence of two maximum points on the heat loss curves is characteristic of the two-stage processes.

The results also show that at the conditions studied the propylene oxide formed by oxidation of propylene over silver catalyst is subsequently isomerized to acetone and propyone aldehyde. Addition of propylene oxide to the propylene being oxidized increases temperature of the catalyst, probably because of concomitant oxidation of these substances.

Calculation of Rate Constants for Three-Stage Parallel-Series Reactions of Second Order

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and V. A. Pooneena

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A method is described to calculate the rate constants of three-stage parallel-series second order reactions involving monoorganosilanes. A program is described for use in computers of Ural-1 type. A procedure to calculate the rate constants is presented in detail.

A Reactor for Thin-Layer Catalytic Reactions in Liquid Phase

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and D. V. Sokol'sky

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A novel reactor is described to study reactions in liquid phase. In this reactor mixing of any type can be carried out, from a simple shaker-type mixing to complex mechanical stirring to form thin-layer homogeneous suspensions.

Letters to the Editors

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3. V. M. Masteekheen, L. M. Kef'yelee, N. P. Ke'yer: EPR Spectra Formed in Oxygen Adsorption on Rutile. Institute of Catalysis of Siberian Division of the Academy of Sciences of USSR.