The Energies of Bonding of Carbon, Oxygen and Hydrogen Atoms of Organic Molecules With Anhydrous Yittrium Oxide—Calculated from Heats of Adsorption

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The energies of bonding of carbon, hydrogen, and oxygen atoms with anhydrous yittrium oxide at the catalytically active sites (determined by kinetic method) of the surface were calculated from the differential heats of adsorption of the reaction products and of isopropyl alcohol. On the basis of these calculated values, present a discussion as to the reasons for the ability of $Y_2O_3 \cdot nH_2O$ to dehydrogenate tetralin as opposed to Y_2O_3 alone.

Investigation of Catalytic Oxidation of Hydrogen Over Vanadium Pentoxide and of Oxidation-Reduction Processes in the Catalyst by the Components of a Gaseous Mixture

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Investigated were the kinetics of: reduction of vanadium pentoxide by hydrogen; oxidation of the lower oxides formed—by air, and of catalysis of the hydrogen-oxygen mixture over V_2O_5.

The results obtained contradict the catalysis mechanism concepts of alternate oxidation-reduction of the catalyst. An electrochemical scheme is offered to explain the mechanism of catalysis over vanadium pentoxide.

Comparison of Activities and EPR Spectra of Chromium Oxide Catalysts

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In this study a comparison is made of the electron paramagnetic resonance spectra of chromium oxide catalysts with their activities. A relationship is noted between the changes in intensity of the narrow spectral lines and the activities due to the effects of certain factors.

Investigation by the EPR Method of the Nature of the Active Component of Chromium Oxide Polymerization Catalysts

By F. M. Bookanayeva, Yu. E. Piecherskaya, V. B. Kazanskii, and V. A. Dzeesko

A comparison is made between the catalytic activity of chromium oxide—on aluminosilicate catalysts with their EPR spectra. Show that the catalytic activity is not related to the intermediate states of oxidation of chromium in the catalysts, nor to the presence of hexavalent chromium in them. The activity depends upon presence of Cr^{5+} ions stabilized on the carrier surface.

Catalytic Activity of Organic Polymers. II. Catalytic Activity of the Polymer Formed by Dehydrochlorination of Polyvinylidenechloride

By N. P. Keiyer and I. V. Astafiev
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Investigated was catalytic activity of the polymer produced by dehydrochlorination of polyvinylidenechloride. The polymer exhibits dehydrogenation-inclined catalytic activity in decomposition of formic acid and of isopropyl alcohol. Hydrazine is decomposed into ammonia and nitrogen with a 90% yield. The polymer is characterized by high chemisorption capacity.

Application of Infra-Red Spectroscopy to a Study of Catalytic Polymerization of Ethylene Oxide

By Z. A. Markova
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Investigated were the infra-red adsorption spectra of ethyleneoxide molecules adsorbed on MgO, $Mg(OH)_2$, BeO and $Be(OH)_2$. From the changes in the analytical data for the adsorption-desorption processes, some conclusions are made regarding the nature of adsorbed ethylene oxide molecules and the mechanism of the polymerization process.

Catalytic Activity of Iron-Nickel Alloys in Ammonia Synthesis

By M. V. Tovbeen and V. Ya. Zabooga
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An investigation was made of the catalytic activity of iron-nickel alloys in the ammonia synthesis reactions. It was established that catalytic activity of these alloys depends upon their phase composition. The results also confirm a hypothesis as to the role of these polymorphic preparations in the mechanism of heterogeneous catalytic processes.

Interaction of Oxygen with Complex Organic Compounds of Cobalt

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Presented are the results of a study covering the kinetics of interaction of oxygen with complex organic compounds of cobalt, namely, bis-(N,N′-disalicylalethylenediamine)-μ-aquodicobalt and bis-(N,N′-di-(3-nitrosalicylal)-ethylenediamone)-μ-aquodicobalt. It was established that raising the temperature alters the reaction rates in a complex manner and that pressures of 0.5 to 1 atmospheres have practically no effect on the rates. In all of the cases investigated the reaction rates were found to be limited by the diffusion velocities of the oxygen within the crystalline particles of the complexes.

Kinetics of Autocatalytic Reactions in Continuous-Flow Processes

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Various kinetic functional correlations of an autocatalytic reaction were investigated under continuous-flow conditions (at constant pressure). Also, the addition of the reaction products to the raw feed was a complicating condition.

Generalized macrokinetic equations are proposed to calculate the ratios of the raw feed passed and of the raw feed consumed per unit reactor volume, at various concentrations of the recycle products in the raw feed. These generalized kinetic correlations are valid for any concentration of the recycle in the total feed stream, including the cases of ideal displacement and of ideal mixing.

The technique of recycling the product stream is suggested as a possible means to control some of the autocatalytic processes and of the chain conversions, which are characterized by appreciable induction periods.

Investigation of Structures of Natural Sorbents By a Dynamic Solution Flow Method

By V. T. Bikov and O. E. Priesnyakova
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Using own dynamic method to adsorb phenol from the stream of its solution in carbon tetrachloride, the authors determined the structural types and specific surfaces of 33 natural and synthetic sorbents.

The structures of natural substances depend on the source and extent of weathering.

Mechanism of Catalytic Action of Molybdena-Alumina Catalyst on High Temperature Hydrogenation of 1,3,5-Trimethylbenzene

By A. A. Kreechko and L. S. Sovietova
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The results are presented for hydrogenation of 1,3,5-trimethylbenzene at the following conditions: temperature, 520°–700°; pressure, 100 atmospheres; liquid hourly space velocity, 12.5 moles/liter-hour; molybdena-alumina catalyst of commercial grade. A parallel study without a catalyst was also carried out for comparative purposes.

Show that under the experimental conditions employed the basic reactions in converting 1,3,5-trimethylbenzene are demethylation and formation of benzene, toluene, and 1,3-dimethylbenzene. At a temperature of 600°, the conversion is 100% and the yield of benzene is 41.5%. Without the catalyst, analogous results are obtained at a temperature of 700°.

Chemical Reactions of Gases With Solids in a Fluidized Bed. II. Reactions in Processes With Fixed Composition of the Gas

By A. L. Rosental
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An investigation was made of the reactions of fixed composition gases with solids in fluidized beds.

Assuming regularity of moving particles, as would be the case normally, the distribution of probable residence times of the particles were calculated for a model unit with ordinary geometric and hydrodynamic properties. A comparison of these calculations with the published ex-