thesis 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

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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

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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 experimental data validates the original assumptions made.

A differential equation is proposed for the kinetics of the process and a general method of its solution is described. Techniques for solution of specific problems are also discussed.

Catalytic Effect of H-Ions of "Sulfocationites" On Dehydration of Chlorotetracycline In a Sorbed State

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An investigation was made of the reaction mechanism in dehydration of chlorotetracycline (CTC) adsorbed on various "sulfocationites," with the reaction occurring as a result of the catalytic effect of the unsubstituted H-ions of resin. For the resins investigated, the kinetics of dehydration of sorbed CTC from resins alone, as well as from their aqueous solutions, can be described by the equation for the first order reactions.

At equal volumetric concentrations of the H-ions, the dehydration rates over the "cationites" from various source-substances were found to differ in value by as much as twelve-fold. The activation energies of the dehydration reaction with a strongly swelling "cationite" and with an aqueous solution of CTC are equal; however, with weakly-swelling "cationites" the energy values are somewhat smaller.

The Mechanism of Aldiminic Hydrogenation of Dinitrile of Adipic Acid and the Effect of the Nickel Catalyst Carriers on the Course of the Process

By L. H. FREYDLEEN, T. A. SLADKOVA, AND F. E. ENGLEENA
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Show that in hydrogenation of adiponitrile over nickel catalysts, formation of secondary and tertiary amines is favored when using acidic carriers as well as the carriers able to activate atomic nitrogen in the substances containing it. The change in the course of the reaction in presence of the carriers of the above types is explained as due to the aldiminic mechanism for formation of secondary and tertiary amines.

On the same carriers, nickel-boron catalysts are appreciably more active than nickel catalyst alone.

Adsorption of Thiophene-n-Heptane Solutions on 5A Molecular Sieves

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At a temperature of 20°, contacting liquid solutions of thiophene—n-heptane over the entire range of equilibrium concentrations with 5A crystalline zeolite results in positive adsorption of n-heptane alone; at the same time, filling of the zeolite cavities by the n-heptane molecules 5A in diameter is completed at very low equilibrium concentrations (maximum N_2 of 0.01). At relative pressures in intermediate range, adsorption of vaporized n-heptane approaches the maximum value for adsorption of n-heptane from its liquid mixture with thiophene. From the adsorption measurement data for gaseous nitrogen, argon and krypton at a temperature of $-195°$, water vapor and vaporized n-heptane at 20°, and from the data of this study for n-heptane—thiophene solutions, the number of molecules in each large cavity of the 5A zeolite was evaluated for each of the aforesaid substances. Their quantity per cavity was found to depend greatly upon the configuration of adsorbed molecules.

Utilization of Frost's Equation to Calculate Kinetics of Heterogeneous Catalytic Reactions

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Evaluated was the effect of the constant absolute error, incurred in determining the extent of conversion,—upon the results for reaction kinetics as developed with the aid of Frost's equation.

In presence of such errors, the conversion plots, expressed in terms, $(F/W)\ln(1 - x_A)^{-1} - (F/W)x_A$ as the coordinates, are curved, rather than straight, and these in some cases pass through the origin of the coordinates.

For moderate conversion values, the curves may be replaced by straight lines without introducing a large error. The angular coefficient of the straight lines so produced may be greater than unity. The temperature function, corre-