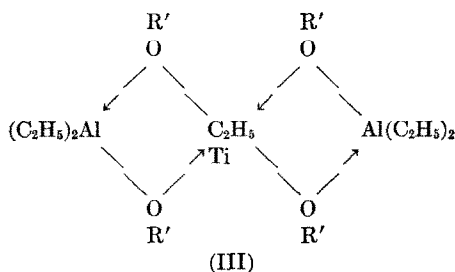


and



Complex III is catalytically active.

The hyper-fine structure of the EPR spectrum of the reaction product points to the interaction of the unpaired electron with the nuclei of two atoms of Al. The complex responsible for this EPR spectrum—and for about 10% of the titanium charged—structurally resembles Complex III, except that OR', rather than C₂H₅, stands next to Ti. As would be expected, an identical spectrum was observed in reacting Ti(OR')₃ with (C₂H₅)₂AlOR'.

Reactions of α -Oxides: Investigation of Catalysis by Acids and of the Intermediates of Ethylene Oxide-Carboxylic Acids Interactions

By N. N. L'YEB'YED'YEV AND K. A. GOOSKOV

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The mechanism of ethylene oxide interaction with carboxylic acids was investigated, using kinetic and spectroscopic analytical techniques. The infrared spectra of an ethylene oxide-acetic acid-potassium acetate system confirmed the formation of binary compounds and of a triple complex. New kinetic data were obtained for the reactions catalyzed by conjugated acids. A mechanism to explain the interaction of ethylene oxide with carboxylic acids is described.

Mechanism and Kinetics of Acid Catalyzed Conversions of 2-Methylpentene-1

By V. SH. FELDBL'YUM, S. I. KR'YUKOV,
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The kinetics of isomerization, dimerization, and hydration of 2-methylpentene-1 were investigated in presence of sulfuric acid as the catalyst. Ex-

perimentally-determined conditions are described for rapid and selective isomerization of 2-methylpentene-1 into 2-methylpentene-2. The isomerization rate constants of the forward and reverse reactions are linear functions of the acidity. This finding agrees well with the concept regarding the course of the reaction in the aqueous phase of the system, assuming: rapid distribution of the olefins between the phases, rapid formation of the π -complexes by the dissolved olefins with protons, and a slow transition of the π -complexes into alkyl cations.

Catalytic Conversion of Acetylene: Some of the Principles Governing Catalysis by Salts of Acetylene Addition Reactions in Vapor Phase

By A. J. GELBSHTEIN, M. I. SEELENG,
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Some of the general principles were investigated which govern the character of the heterolytic vapor phase acetylene addition reactions catalyzed by the salts of Hg(II), Cd, Zn, Bi, and of other metals. The discussion presented is based on the experimental data of catalyzed addition to acetylene of molecules of water, HCl, CH₃COOH, etc.—in vapor phase. The properties of the cations of the catalytic salts are described. The salts whose cations can additively interact with acetylene are the most active catalysts. Taking into account the role of the dative interaction, a study was made of the effects upon the process of the character of the adding molecules, the anions of the salts, and the catalyst carriers.

The possibility of catalysis by protonated acidic complexes is also discussed.

Kinetics of Oxidation of Ethylene to Ethylene Oxide Over a Selenium-Promoted Silver Catalyst

By V. E. OSTROVSKY, N. V. KOOLKOVA,
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A study was made of the kinetics of ethylene oxidation over a silver catalyst promoted by selenium (0.002 atom %) to stabilize catalytic activity. The procedure of thermally pretreating the catalyst is described. A scheme of the reaction mechanism is presented, along with the support-

ing kinetic equations. The experimental data are utilized to evaluate the kinetic constants used in these equations.

An Extensive Investigation of Iron Catalysts for Use in Ammonia Synthesis

By S. S. LACHEENOV, A. M. ROBEENSHTEIN, V. M. AKEEMOV, A. N. KL'YATCHKO-GORVEECH, I. N. KON'YUKHOVA, L. D. KOZNI'YETZOV, T. T. LEVEETZKAYA, N. A. PREEBITKOVA, A. A. SLEENKEEN, AND R. V. CHESNOKOVA

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A study was made of the effect of concentration (0-88 wt. %) of aluminum oxide in CO-precipitated iron catalysts—for use in high pressure ammonia syntheses—upon their phase composition, texture, catalytic activity, and magnetic properties. The structure, texture, composition, and activity of the catalysts were determined, using both the oxidized fresh- and the reduced used catalysts. The effects of these properties and of the reaction temperature upon specific catalytic activity were determined. Also investigated was the relationship between the reducing characteristics of the catalysts and their phase compositions.

Investigation of Catalytic Dehydrogenation of n-Butylenes at Pulsed Flow Conditions

By E. I. SEEM'YEN'YENKO, S. Z. ROG'EENSKY, AND M. I. YANOVSKY

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Catalytic dehydrogenation of n-butylenes to divinyl was studied by a pulsed chromatographic technique, using an aluminum-chromium catalyst. Consecutive contacting of the test samples with the catalyst gradually changes the character of the resulting chromatograms: initially only pure divinyl is present; subsequently, along with divinyl, there gradually appear α -butylene, β -cis-, and β -trans-butylenes; later, the character of the chromatograms changes but little.

At low reaction temperatures (85°-200°) the actual yields of divinyl are 1.5-2.0 times greater than the equilibrium yields calculated for the conditions employed. The heats of adsorption of the butylenes and of divinyl on the aluminum-chromium catalyst were determined chromatographically. The feasibility of evaluating activated adsorption processes by chromatographic techniques is pointed out.

Study of Ammonia Oxidation Over a Platinum Catalyst by a Secondary Ion Emission Method

By YA. M. FOGEL, B. T. NADIKTO, V. F. RIBALKO, V. I. SHVACHKO, AND I. E. KOROBCHANSKAYA

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A new method was developed by the authors to study heterogeneous catalytic reactions. Its effectiveness in studying catalytic oxidation of ammonia over a platinum catalyst is described. The new method involves running cross-comparisons of the slopes of the I(T) curves (I, intensity of a certain line in the mass-spectrum; T, catalyst temperature) for the secondary ions, displaced from the catalyst surface by the primary ion beams, and for the ions formed by ionization of the gaseous media around the catalysts. The nature of some of the elementary processes occurring in catalytic oxidation of ammonia are described. Some of the phenomena resulting from poisoning of the platinum catalyst by hydrogen sulfide are also described.

Determination of Surface Areas of Supported Silver Catalysts by Chemisorption

By K. M. KHOL'YAV'YENKO, M. YU. ROOBANEK, AND N. A. CHERNOOKHEENA

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Chemisorption of oxygen by catalytic substances was investigated at a temperature of 200° and pressures of 0.1-5 mm Hg. The catalysts studied were tableted silver, silver deposited on fragments of porcelain and on corundum, and silver with added Be(OH)₂. The results show that the chemisorbed oxygen reaches saturation at pressures of 2-3 mm Hg.

Based on the results of chemisorption of oxygen and physical adsorption of krypton, the calculated surface areas of the various tableted silver catalysts were found to be nearly equal. This finding formed the basis upon which the method for determination of the surface areas of complex silver catalysts was developed.

Adsorption of Hydrogen on the Oxygen-Covered Surface of Tungsten

By YU. G. POOSHEENSKY AND B. A. CHOIIKOV

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A study was made of the effect of preadsorbing oxygen on a tungsten surface upon the condensa-