tion of alcohol approximate the corresponding apparent values. Qualitatively, the relationship of the bonding energies, which were evaluated, is as follows: $K_{Alc.App.} < K_{Napth.App.} < K_{Olef.App.}$

In dehydrogenation of tetralin and isopropyl alcohol and in dehydration of the alcohol, the relative adsorption coefficients of the reaction products vary with the temperature. Except for propylene, the reaction products are adsorbed more strongly than the feed components.

Of the reaction inhibitors tested, acetone and water are the strongest.

Kinetics of Hydrogenation of Carbon Monoxide Over a Nickel Catalyst

V. I. Vlas'yenko, G. E. Yuz'yefoveetch, M. T. Roosov

L. V. Peesarjevsky Institute of Physical Chemistry of the Academy of Sciences of Ukrainian SSR

A study of kinetics of hydrogenation of carbon monoxide over a nickel catalyst was carried out at atmospheric pressure. In the kinetic region, the reaction rate is defined by the equation for zero order reactions. The corresponding activation energy of the reaction is 16.2 kcal/mol and the coverage of the monomolecular layer of the active catalyst surface by carbon monoxide is 0.3.

The results show that the effect of the mass transfer processes on the reaction rates is a function of the CO concentration. For example, at the experimental conditions and the CO concentrations smaller than those specified, the hydrogenation process occurs at kinetically reversible conditions. The temperature-CO concentration correlations, which are given, define for the process the points of transition from the kinetically-controlling region to the internal diffusion-controlling region, and, finally, to the region where external diffusion controls. The assumption is made that the interaction of the chemisorbed hydrogen and CO is the limiting step of the process.

Oxidation of Hydrogen on Platinum Metal

V. I. Popov, S. Z. Rog'eensky

Institute of Chemical Physics of the Academy of Sciences of USSR

The mechanism of hydrogen oxidation on platinum was studied by measuring the kinetic isotopic effects and the reaction kinetics at static conditions and pressures of the order of 10^{-1} mm Hg. At a temperature of 20°, the reaction rate is proportional to the square root of the oxygen concentration and is not affected by the hydrogen concentration. These observations and the finding that the rates of individual H_2 and D_2 oxidation reactions are equal—demonstrate that the hydrogen does not participate in the over-all rate-determining step of the process. On the other hand, presence of the oxygen concentration term in the kinetic equation argues in favor of its participation in the rate-controlling step. The half-order of the reaction with respect to the oxygen is interpreted to be the result of the O_2 dissociation during adsorption on Pt.

Oxidation of Carbon Monoxide Over Titanium Dioxide and Over Its Solid Solutions With Tungsten and Iron Oxides

I. L. Meekhailova, I. S. Sazonova, N. P. Keyer

Institute of Catalysis of Siberian Division of the Academy of Sciences of USSR

Catalytic activity of titanium dioxide and of its solid solutions in oxidation of CO shows that the changes in the volumetric and electronic properties of these solids are paralleled by alterations in their catalytic properties.

With the aid of the kinetic data for oxidation of CO, of the earlier results of O_2 and CO chemisorption, and of the data on the electron work functions of these catalysts,—a multi-step CO oxidation mechanism is considered via the formation of an intermediate complex of CO_3 type.

Investigation of Adsorption Processes With Aid of Messbauer Effect

A. N. Karas'yov, L. S. Polak, E. B. Shleekhter, V. S. Shpeenel'

A. V. Topcheeyev Institute of Petrochemical Synthesis of the Academy of Sciences of USSR

Adsorption of $(CH_3)_4$ Sn by γ-Al_2O_3, silica gel, and other adsorbents was investigated with the aid of Messbauer effect. The results show that the surface of these adsorbents has active centers of at least two different types.

The kinetic principles governing the interaction of $(CH_3)_4$ Sn with the alumina surface were determined. The Messbauer spectra distinctly reflect changes in the adsorption temperatures as well as the donor-acceptor characteristics of the adsorption centers.

Adsorption Methods of Evaluation of Catalysts for Vinyl Acetate Synthesis in Vapor Phase

M. I. Seeleeng, A. J. Gelbshtein

L. Ya. Karpov Physico-Chemical Institute

The mechanisms of adsorption of acetylene and vaporized acetic acid were determined, using the catalysts which are effective in syntheses of vinyl acetate, such as the acetates of Hg(II), Cd, and Zn—with carbon and silica gel as the carriers.

In terms of the cations of these catalytic salts, their orders of affinity for C_2H_2 and CH_3COOH are $Hg > Zn > Cd$ and $Cd > Hg > Zn$, respectively.

At the reaction conditions, the acetates are generally present as $Me(OAc)_3$ complex.

BRIEF COMMUNICATIONS:

Effects of Electron Energy and of Other Conditions of Ionization of Ion Producers on Mass Spectra of Carbon Tetrachloride and Methane

S. E. Koopreeyanov
L. Ya. Karpov Physico-Chemical Institute

The results demonstrate that in ionization processes changes in electrical fields may significantly alter the mass spectra. This is primarily due to the differences in the initial kinetic energies of the ions. Increasing electronic energy beyond 200 ev leads to a minor depletion of the mass spectra due to the splinter ion effect.

Kinetics of Oxidation-Reduction Reactions With $AuCl_4^-$ Ions

V. P. K'azanov, A. M. Erenboorg,
B. I. P'yeshcheveetzky
Institute of Inorganic Chemistry of Siberian Division of the Academy of Sciences of USSR

The reaction rate constants were determined for interaction of $AuCl_4^-$ with NaCNS, $CS(NH_2)_2$, and NH_2OH in aqueous solutions at a temperature of 20°. The heats of activation, $\Delta H^\ddagger$ (kcal/mol) and entropies of activation, $\Delta S^\ddagger$ (entropy units), were calculated. The results show that a proportionality relationship exists between $\Delta H^\ddagger$ and $\Delta S^\ddagger$ (the compensation effect).

Formation of Metallic Nickel by Thermal Decomposition of Nickel Carbonate

Yu. N. Roofov, Z. A. Markova
Institute of Chemical Physics of the Academy of Sciences of USSR

Broad EPR signals are observed with samples of NiO made by decomposition of nickel carbonate in vacuum. These signals are ascribed to metallic nickel. The infrared adsorption spectra for the samples show presence of a metallic phase. The conditions to initiate formation of metallic nickel in NiO are considered.

Effect of Partial Pressure of Water on Growth Rate of Nucleation Crystals in Thermal Decomposition of Ammonium Perchlorate

V. V. Boldir'yev, Yu. P. Saveentzev,
V. F. Komarov
Institute of Chemical Kinetics and Combustion of the Siberian Division of the Academy of Sciences of USSR. V. V. Kooĭbishev State University of the City of Tomsk

A microstudy was made of the initial stage of thermal decomposition of ammonia perchlorate crystals at a temperature of 230° and different partial pressures of water in the surrounding air. The results show that the water vapor primarily affects the rate of growth of the nucleation crystals.

Mechanism of Catalytic Dehydrogenation of Alcohols Over Radioactive Magnesium Sulfate

Victor E. Speetzin, I. E. Meekhail'yenko,
F. M. P'yetrova
Institute of Physical Chemistry of the Academy of Sciences of USSR

Dehydrogenation of n-$C_5H_{11}OH$, n-$C_{10}H_{21}OH$, n-$C_{12}H_{25}OH$, and $C_6H_{11}OH$ was determined over Mg_2SO_4 catalyst samples differing in specific radioactivity. The results show that introduction of the radioactive isotope into the catalyst significantly alters its energy of activation.

An explanation is proposed for the extremely great effect of the specific radioactivity on the yields of olefins.

Polarographic Study of Interaction of Aniline With Benzaldehyde and Its Derivatives

V. D. B'yezoogly, V. N. Dmeetreeyeva,
L. V. Skvortzova
The All-Union Scientific Research Institute for Monocrystals in the City of Kharkov

A study of interaction of aniline and aldehydes with the electron-donor and electron acceptor n-position substituents shows that the values of the reaction rate constants vary with properties of the substituents: the rates are decreased by the donors and increased by the acceptors. This phenomenon is accompanied by parallel alternation of the electron density on the carbon atom of the aldehyde group. Based on kinetic data, the activation energies for the formation of Schiff's bases were calculated.