not complete by either route, the rate by Route (1) is greater.

Empirical and theoretical equations are proposed to calculate the reaction rates. The theoretical equation is based on the reaction mechanism proposed by the authors. The results calculated by use of these equations are in close agreement.

Decomposition of Monomethylamine Over Metallic Molybdenum and Nickel Catalysts

S. L. Dobicheen, V. V. Forsheena,
and G. N. Smoleena
State University for Applied Chemistry

Interaction of monomethylamine (MMA) with molybdenum and nickel surfaces was studied at temperatures of 200°–1500° by a mass spectrometric method. The results show that MMA decomposition rates depend upon the rates of metal surface fouling with carbon formed in the reaction. With molybdenum, the extent of surface fouling—by carbide—depends on the extent of carbon diffusion into the metal; with nickel, the degree of fouling—by carbon—is, probably, a function of atomic carbon migration rates on the metal surface. In either case the products of MMA decomposition are N_2, H_2, C, NH_3, HCN, and CN. However, with Mo, the principal products are N_2, H_2, and C; but with Ni: HCN, H_2, NH_3, and C.

Catalytic Activity of Metal Oxides in Propylene Oxidation Reactions

M. Ya. Roobaneek, K. M. Khol'yavenko,
A. V. Gersheegoreena, V. I. Lazookeen
L. V. Peesarjevsky Institute of Physical Chemistry of the Academy of Sciences of Ukrainian SSR

Specific rates of propylene oxidation over different metallic oxides were determined by a recycle—continuous method. The oxidation temperatures to attain constant specific oxidation rates with various fixed concentrations of the reactants were chosen as activity characterization factors. In descending order, catalytic activities of the metal oxides in partial and complete oxidation of propylene are, respectively: Cu > Co > Fe > Ni > V *and* Mn > Cu > C > Co > Fe > U > Cd > V > Ni > Mo > Zr > Pb > W. Depending on position of these metals in the Periodic Table the shapes of their activity curves in the subject, reaction resemble the shapes of the curves obtained in oxidation of hydrogen and in homomolecular and isotopic oxygen exchange reactions. The observed similarity of these curves is, apparently, due to oxygen participation in the formation of the activated complexes, the intermediate products in these processes.

Catalytic Dehydrogenation of 2,2-Dimethylbutane

E. A. Teemofei'yeva, N. I. Shooy'keen,
and G. S. Petr'yayeva
N. D. Zeleensky Institute of Organic Chemistry of the Academy of Sciences of USSR

Dehydrogenation of 2,2-dimethylbutane over a potassium aluminochromate catalyst at atmospheric pressure and a temperature of 500° results in 8.5 mole % (on charge) yield of 3,3-dimethylbutene-1. Addition of helium as an inert diluent increases the yield of neohexene to 10–11 mole % (on charge).

Effect of Chemical Composition and Methods of Preparation of Complex Oxide Catalysts Upon Their Physico-Chemical and Catalytic Properties: Silica-Zirconia Catalysts

V. A. Dzeesko, M. S. Boreesova, N. V.
Akeemova, and A. D. Makarov
Institute of Catalysis of Siberian Division of the Academy of Sciences of USSR.
L. Ya. Karpov Physico-Chemical Institute

A study was made of the effect of methods of preparation and thermal pretreatment upon activity of silica-zirconia catalysts. The results show that catalytic activity of the samples tested for dehydrogenation of isopropyl and ethyl alcohols is a direct function of the number of acid centers, but that the activity of the centers is not affected either by the SiO_2/ZrO_2 ratios, nor by the methods of preparation and thermal pretreatment of the samples. The following properties are affected by the catalyst preparation histories: pore structure, impurity content, extent of interaction among its components.

Effect of Chemical Composition and Methods of Preparation of Complex Oxide Catalysts Upon Their Physico-Chemical and Catalytic Properties: Alumino-silicate Catalysts

V. A. Dzeesko, M. S. Boreesova,
and N. V. Akeemova
Institute of Catalysis of Siberian Division of the Academy of Sciences of USSR.
L. Ya. Karpov Physico-Chemical Institute

The extent of interaction of aluminum oxide with silicic acid and the resulting number of acid centers in the catalyst samples vary with the composition and methods of their preparation. Of the catalysts with identical composition, those prepared by coprecipitation have the greatest number of surface acid centers. With increasing Al_2O_3

content, their concentration on the surface increases up to a plateau of maximum values.

In the catalysts with 0.1–90% Al_2O_3 content, catalytic activity of individual acid centers is, roughly, a fixed value, regardless of the catalyst methods of preparation and ratios of the components.

Kinetics of Steam-Methane Reaction on Nickel Surface

I. M. Bodrov, L. O. Apelba'oom,
and M. I. T'yomkeen
L. La Karpov Physico-Chemical Institute

A study of methane-steam reaction kinetics was made at 800°–900° in a recycle-continuous unit. Activation energy of this reaction is 31 kcals/mole. At equilibrium, the p_{CO_2}/p_{CO} ratios of the reaction products are in line (or smaller) with the corresponding concentrations of the reacting steam. The kinetic equation presented is based on a reaction scheme which assumes that decomposition of CH_4 to chemisorbable CH_2 radicals is the process limiting step.

Diffusion Kinetics of Chemical Reactions

I. P. Virodov
Agricultural Institute of Kooban Province

The product concentration distributions were determined for the solid-liquid first order reactions over the reacting surfaces localized within small volumes ($\rho_0 \ll R$); the distributions were also determined for the reactions with the rates so fast that the limiting product concentrations on a reacting surface are attained almost instantaneously. Some of the calculated results are compared with the results based on experimental data.

Mechanism and Kinetics of Catalytic Hydrogenation in Liquid Phase: Macrokinetics of Reduction Reactions Over Colloidal Palladium Catalyst

A. B. Fasman, Ya. A. Dorfman,
and D. V. Sokol'sky
S. M. Keerov State University of Kazakhsk

A study was made of the effect of the type and intensity of mixing, catalyst concentration, reaction temperature, and nature of solvent—on the rates of reduction of cinnamic acid, allyl alcohol, and n-benzoquinone in presence of a colloidal palladium in polyvinyl alcohol stabilizer.

At the "ideal" displacement conditions, i.e. in absence of mixing, the hydrogenation reaction is catalyzed primarily by thin surface layers of the catalyst particles. The gradient of hydrogen concentration in each test solution was determined by layer-to-layer measurement of catalyst potential along the vertical axis of the reactor.

NOTES:

T. J. Andree'yanova: Esterification in Liquid Phase of Acetic Acid with Ethyl Alcohol over Various Sulfonated Cationic Exchange Resins of KY-2 Type.

V. M. B'yelo'oosov, Ya. B. Gorokhovatsky, A. V. Gersheengoreena, M. Ya. Roobaneek: Adsorption Capacity and Reactivity of a Copper Oxide Catalyst in Oxidation of Structurally-Different Olefins.

L. P. Yer'yomeen, V. G. Shestakov, V. V. Boldir'yev: Automatic Vacuum-Actuated Thermal Balance.

S. M. Shein, L. A. Kozor'yetz, N. N. Vorojtzov: Displacement of Chlorine Attached to an Aromatic Ring—by an Amine Radical: Kinetics of o-Nitrochlorobenzene and of Trinitro-4-Chlorobenzene Trifluoride Reactions with Aqueos Ammonia.

V. N. Beeben, L. A. Kasatkeena: Variation of V_2O_5 Oxygen Mobility in Presence of Alkali Metal Salts.

V. I. Trofeemov, J. J. Chkhe'eedzé, N. Ya. Booben: Limiting Concentrations of the Radicals from Low Temperature Radiolysis of Aromatics.

R. I. Z'yusman, Yu. I. Nab'yerookheen, V. V. Voyevodsky: A Method to Determine Percentage of True Extinction of Stable Radicals.

L. G. Karakcheeyev: Properties of Silica-Alumina Catalysts.

V. S. Moozikantov, V. V. Popovsky, G. K. Bor'yeskov, N. I. Meekeechoor: Mechanism of Isotopic Oxygen Exchange on Vanadium Pentoxide.

E. V. Meekhey'yeva, N. P. Keiyer: Effect of a Constant Electric Field on Absorption Capacity of Germanium.

LETTERS TO THE EDITOR:

A. V. Mashkeena, T. S. Sookhar'yeva: Catalytic Dehydrocyclization of Sulfur-Containing Aliphatic Hydrocarbons.

Yu. A. Yershov, A. F. Lookovneekov, A. A. Batooreena: Decomposition of Polypropylene Hydroperoxide by Sunlight.

A. I. Shatenshtein, I. O. Shapeero, F. S. Yakoosheen, G. G. Eesa'yeva, Yu. I. Ranneva: Determination of Acidity of Organic Compounds by Measurement of Hydrogen Exchange Rates in Presence of Ammonia, Dimethylsulfoxide, and Cyclohexylamine.