a luminophor (e.g., n-terphenyl or 2,5-diphenyl axazole) were studied. The protective action of luminophors against the radiation-sensitized decomposition of the peroxide and extinguishing by the peroxide of the photo- and radio-luminescence of luminophors can be explained by hypothesizing the existence of a competing transfer of energy from the solvent to the two acceptors and from a luminophor to the peroxide. The energy transfer from toluene to benzoyl peroxide and to luminophors occurs by a "remote-action" mechanism although displacement of the interacting molecules by diffusion also exerts substantial effect. The transfer of energy from a luminophor to the peroxide apparently occurs by a diffusion mechanism, via the formation of an intermediate complex from the peroxide and the excited molecules of a luminophor.

Reduction of Uranium Trioxide by Mixtures of Nitrogen and Hydrogen

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Kinetics of reduction of uranium trioxide by hydrogen-nitrogen mixtures was investigated at temperatures of 350°–500° and pressures of 25–600 mm. Hg. Apparent activation energy of this reaction was found to be 26.5–31.7 kcals/mole. Show comparative characteristic data for reduction of uranium trioxide by pure hydrogen and ammonia.

Comparative Kinetic Properties of Kationites KU-1, SDV-3, SM-12 and SBS

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The kinetics of ion exchange was studied by contacting 0.01–1.0 *N* NaCl solutions at temperatures of 6°–35° with thin layers of H-type cationites: SDV-3, SM-12, KU-1, and SBS.

Catalysis of Solid Phase Reactions: Thermal Decomposition of Ammonium Perchlorate in Presence of Ferric Oxide

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Catalytic action of ferric oxide upon ammonium perchlorate at various stages of decomposition was investigated at identical operating conditions. At 210°–240° ferric oxide exerts only minor effect upon the reaction rate, but at 245–270°, and at elevated temperatures, its catalytic action is significant. Consideration of the kinetic data leads to the conclusion that ferric oxide accelerates the anion-to-cation electron transfer, the reaction controlling step.

Kinetics of Solid Phase Reactions: II. Hydrogenation of Iron Carbides

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A study of the kinetics of hydrogenation of the iron carbide formed in an iron catalyst for synthesis of CO and H_2 shows that the kinetic concepts developed earlier also apply to this reaction. The specific reaction rates and activation energies were determined using pertinent calculation methods employed in the earlier study. The value of the activation energy so obtained agrees with that determined independently from a reaction rate-temperature correlation at various fixed conversion values.

Correlation of Catalytic Activity of Semiconductors with the Constants Characterizing Their Photoconductivity and Photoconductivity Kinetics

By V. A. Jooravliov and V. N. Kooleetzkii

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The constants characterizing photoconductivity and kinetics of photoconductivity of semiconductors are correlated with their catalytic activity. This correlation study shows that only the photoconductivity relaxation periods are correlatable with the activity values. Existence of this correlation follows from the electronic theory of catalysis and the assumption that catalytic reactions are preceded by desorption of the adsorbed particles.

Reactions of α-Oxides: II. Kinetics of Reaction of Ethylene Oxide with Acetic and Monochloroacetic Acids

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Kinetics of reaction of ethylene oxide with acetic and monochloroacetic acids was studied with and without initiators. The initiators, when used, were present either as integral components of the acids, or as added water or some other solvent. The results show that this reaction is typical of an acid catalyzed reactions with a number of others superposed upon it. The reaction is catalyzed by the undissociated molecules of the acids and by the conjugated acid-base molecules, the latter being present in the reaction mixture. The undissociated acid molecules and acetate ions attack the initially formed acid-ethylene oxide complexes. The kinetic equation, based on the proposed reaction mechanism, predicts with satisfactory accuracy potential experimental data.

Reaction Sequence in Hydrogenation of Piperylene Over Skeletal Nickel Catalyst

By L. H. Freidleen, E. F. Leetveen,
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The stereoisomers of piperylene undergo selective hydrogenation to monoolefins over a skeletal nickel catalyst. Hydrogen adds to both dienes in all positions, but principally in the 3,4-position. Mixtures of piperylene isomers are hydrogenated simultaneously and at equal rates. No cis- or trans-conversion of the initial dienes is observed. The ratio of the cis- to the trans-isomers of pentene-2 in the hydrogenation products depends on the concentration of the stereoisomers in the charge stock. In hydrogenation of the monoolefin mixtures formed in the reaction the hydrogen first of all combines with pentene-1. The observed sequence of hydrogen addition is attributed to the adsorptive displacement of the monoolefins by the diene and of the β-olefin by the α-olefin.

Heats of Activation in Decomposition of Ammonia Over Catalysts Differing in Chemical Composition. I. Catalysts with Iron Base

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The mechanism of ammonia synthesis was studied by the decomposition route in a recycle-continuous unit, using an iron catalyst with promoters of various chemical composition. The results show that the activation energy values for ammonia decomposition depend upon chemical composition of the promoters. For example, activation energy is changed only slightly by the addition of potassium oxide alone; however, simultaneous addition of potassium and aluminum oxides decreases activation energy from 65 kcal/mol for the unpromoted iron catalyst to 54 kcal/mol for the doubly promoted carrier. Similarly, a four-fold promotion of the iron catalyst significantly decreases its activation energy.

Effects of Regeneration and Activation Upon Structure and Surface Hydration of Aluminochromic Catalysts

By A. M. Roobeenshtein,
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Summarize the effect of heat treating with hydrogen, vaporized n-hexane, and air on structural changes of aluminochromic catalysts for use in hydrogenation-dehydrogenation of paraffins. The extent of surface hydration at these conditions is evaluated.

Determination of Interaction of Activated Carbon with Oxygen by a Contact Potential Difference Method

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Adsorption of oxygen on a degassed activated carbon was determined by a contact potential difference method. At room temperatures and low pressures adsorption of oxygen, which is irreversible, increases work function of the electron by 0.5 volt at 0.16% coverage of the surface. Heating the oxygen-containing carbon under vacuum, removes the surface oxygen as CO and CO_2 and, at the same time, decreases work function of the electron, which at 350° is equal to the value for a degassed sample.

Heating the carbon in gaseous oxygen up to 350°, increases work function of the electron to 1.25 v.

At equal coverages the relationship between the contact potential differences and the heats of oxygen adsorption is linear.