of the contacts themselves. The hydrothermal activation treatment substantially increases the strength of the interglobular contacts. The increase in strength accompanying the calcining is largely due to strengthening of individual contacts.

Control of Reaction Temperature by Introduction of a Cold Stream as a Means of Producing Optimal Condition for an Exothermic Reaction

A. V. Fedotov, V. S. Beskov,
and M. G. Slin'ko
The Institute of Catalysis, Siberian Department, Academy of Sciences, USSR

The problem of optimal temperature for a catalytic process in which the cold stream is introduced at a uniform rate was solved by the Pontryagin maximum principle. This gave the conditions necessary for the optimality of the temperature, as well as the boundary conditions for the quantity and feed rate of the cold stream and the maximum process temperature. The results are applied to the case of the reversible exothermic oxidation of SO_2 with continuous feed of cold air, where the theoretically-optimum conditions were determined.

Notes

The Calculations of the Orienting Effect of Substituents in the Addition of Atomic Hydrogen to Substituted Benzenes (MO-LCAO approximation)

P. V. Schastnev and G. M. Zhidomirov
Institute of Chemical Kinetics and Combustion, Siberian Department, Academy of Sciences, USSR

The simple MO-LCAO approximation was used to evaluate the orienting effect of substituents on the addition of atomic hydrogen to various substituted benzenes; the effect of superconjugation of the CH_2 group with the π-system of the ring is discussed.

The Role of Additives in Radiolysis

K. M. Salikhov
Institute of Chemical Kinetics and Combustion, Siberian Department, Academy of Sciences, USSR

The author formulates the quantum-mechanical condition under which it is possible to localize excitation in molecules of the main substance near the impurity particles. It is shown that most of the radiolysis of the main substance will take place near the impurities.

Kinetics of Decomposition of Copper Benzoates

G. D. Kharlampovich
and N. C. Dyachenko
The Ural Polytechnic Institute

The authors have studied the kinetics of the thermal decomposition of copper benzoates, toluates, as well as *o*- and *p*- chlorobenzoates. This is a first-order reaction;

$$k_{\text{toluates}} > k_{\text{benzoate}};\ k_{p\text{-toluate}} < k_{m\text{-toluate}};$$
$$< k_{o\text{-toluate}};\ k_{o\text{-chlorobenzoate}} \gg k_{p\text{-chlorobenzoate}}.$$

Magnesium oxide promotes the rate of decomsosition of copper *o*-toluate to cresol and the starting acid.

Catalysis of Ammonium Nitrate Radiolysis by Semiconducting Oxides

V. A. Nevostruyev and Yu. A. Zakharev
The Kirov Polytechnic Institute, Tomsk

The authors have studied the effect of mechanical admixtures of ThO_2, ZnO, NiO + ZnO, doped Li_2O and Al_2O_3 on the X-ray induced radiolysis of NH_4NO_3 *in vacuo*. It was shown that the activity of these oxides correlates with their $\Delta\phi$ (where ϕ = electron work function), and that oxides with the lowest ϕ are the best catalysts. As far as oxide concentration is concerned, the greatest effect was obtained at a relatively low concentration.

Participation of Channel Black in the Chain Termination in Polyethylene Oxidation

Ya. P. Kapachauskene, R. P. Jurevichene,
and Yu. A. Shlyapnikov
Institute of Chemical Physics, Academy of Sciences, USSR; Institute of Chemistry and Chemical Engineering, Academy of Sciences, Lithuanian SSR

The authors have studied the oxidation of high-pressure polyethylene in the presence of the antioxidant 2, 4, 6 tri-*tert*-butylphenol, as well as an antioxidant of moderate activity (phenyl-β-naphthylamine), and channel black. Channel black decreases the rate of oxidation in all cases where the $RO_2^{\bullet}$ concentration is high (whether in the absence of the antioxidant, or whether in the presence of the weak antioxidant, or subcritical concentrations of the moderate-activity compound). This phenomenon is probably due to chain termination on the surface of the channel black, a reaction which of substantially higher than first order in terms of $RO_2^\bullet$.

Effect of Small Additions of Platinum on the Formation and Growth of New-Phase Nuclei in V_2O_5 Reduction by H_2

N. I. Ilchenko

The Pisarzhevskiy Institute of Physical Chemistry, Academy of Sciences, Ukr. SSR

Small (0.001–0.01 wt %) concentrations of Pt not only accelerate the V_2O_5 reduction by H_2 (higher k_{specific}), but also alter the process of the metal nuclei. Below the maximum formation rate, the rate of formation of the nuclei in the absence of Pt obeys an exponential function with a constant exponent; however, if Pt is present, the rate is an exponential function with a variable exponent.

Kinetics of the Catalytic Hydrolysis of Allyl Chloride in the Presence of Metals of Group VIII

R. M. Fleed and Yu. M. Treger

Hydrolysis of allyl chloride in an alkaline medium is catalyzed Ni, Pt, Pd, and Rh. The k_{specific}, as well as the activation energies decrease in the order $\text{Rh} > \text{Ni} \approx \text{Pd} > \text{Pt}$. This series correlates with the corresponding work functions and ionization potentials. It appears that the donor-acceptor bond plays a substantial role in the activation of allyl chloride. It also appears that the transformation of the intermediate π-allyl complex is the controlling step of the reaction.

Alkylation, Conjugated Alkylation, and Disproportionation of Ethylisopropylbenzenes

E. P. Babin, N. L. Zotova, M. S. Beginina, and V. P. Marshtupa

The Donets Section of the All-Union Research Institute of Reagents and Superpure Compounds

Ethylisopropylbenzenes and ethyldiisopropylbenzenes were disproportionated at various temperatures on $AlCl_3$. The $K_{\text{eq. dispr.}}$ for ethylisopropylbenzene is 28. Tris compound can be obtained by conjugated alkylation of ethylbenzene by ethyldi- or ethyltriisopropylbenzenes over $AlCl_3$ (yields of 75 and 44.5%, respectively). However, alkylation with propylene at 60°C in the presence of $AlCl_3$ is accompanied by disproportionation, and the maximum yield of ethylbenzene does not exceed 11–12%.

The Energies of the Bonds between Some Oxide Catalysts and Oxygen, Hydrogen, and Carbon Atoms

S. M. Reshetnikov and A. M. Sokolskaya

The S. M. Kirov Kazakh State University

The kinetic technique for calculating the energies of bonds between an oxide catalyst and the oxygen of a reacting molecule does not hold in the case of isotopic oxygen exchange, as well as in oxidation of hydrogen and propylene. These reactions cannot be encompassed by the multiplet theory of catalysis.

Study of the Reaction of Germanium with Oxygen by Mass Spectrometry

G. F. Romanova, I. I. Stepko, and V. I. Perepelitsa

Semiconductor Institute, Academy of Sciences, Ukr. SSR

Mass spectrometry has shown that it is possible to regenerate an oxidized germanium surface by heating in high vacuum,, whereby oxygen is removed above 520°C.

In a steady stream of oxygen, the oxidation of germanium below 500°C is accompanied by vaporization, but above 600°C oxidation slows down. The most probable reason for this slow down is formation of a protective film of GeO_2.

Chemisorption of *n*-Butane on a Chromia-Alumina-Potassium Dehydrogenation Catalyst

K. I. Slovetskaya, T. P. Bruyeva, R. V. Dmitriyev, and A. M. Rubinshteyn

The Zelinskiy Institute of Organic Chemistry, Academy of Sciences, USSR

Between 100° and 150°C. *n*-butane absorbs only physically on the above catalyst. Between 170° and 240°C, there is chemisorption without decomposition of the butane. Above 250°C, the chemisorbed *n*-butane is dehydrogenated to butylenes, which in some complex consecutive reactions transform to benzene and toluene.

Chemisorption of Organotin Compounds on γ-Al_2O_3

A. N. Karasev, Yu. A. Kolbanovskiy, L. S. Polak, and E. B. Shlikhtev

The Topchiev Institute of Petrochemistry, Academy of Sciences, USSR

Using $(CH_3)_4$ Sn as a type compound, the authors examined the structure of the Mössbauer