

**Abstracts of Articles in the Russian Journal, "Kinetics and Catalysis,"  
Volume V, Issue 6, pages 961-967. Published by the Siberian  
Division of the Academy of Sciences of USSR**

**Average Time of Formation of Splinter Ions  
from *n*-Hexane**

L. V. SOOSHEEN, M. V. GOOR'YEV,  
AND N. N. TOONEETZKY

*L. Ya. Karpov Physico-Chemical Institute*

A method based on analyses of mass-spectral lines was developed and used to determine the average times of formation of splinter ions. The mean square root periods were determined for formation of  $C_3H_3^+$ -type ions from *n*-hexane. Despite exaggerating the contributions due to the slow processes, the method proposed yields accurate unbiased decomposition time data. The use of more precise measurements leads to accurate information regarding the nature of the decomposition mechanism.

**The Mechanism of Initial Reaction in Oxidation  
of Methane**

A. A. BOREESOV AND G. I. SKACHKOV

*Institute of Chemical Physics of the  
Academy of Sciences of USSR*

The experimental data of ignition and isothermal oxidation of methane in air-methane mixtures at atmospheric pressure were analyzed kinetically for small  $CH_4$  conversion values. The results show that at temperatures of about 1,300°, and higher, the rates of  $CH_4$  cracking and oxidation are equal. Comparisons of the rates of oxidation, cracking, and of bimolecular formation of methyl radical indicate that at the temperatures employed the reaction proceeds by the  $CH_4 \rightarrow CH_2 + H_2$  route. The curve to correlate the hypothetical average length of the chain produced in the transformation per methyl radical with the reaction temperature, shows a break at about 800°. This is apparently due to changes in the branching and initial oxidation mechanisms for the reacting mixture composition used.

**Oxidation-Reduction Reactions of Acceptors in  
Organic Solvents Exposed to Ionizing Radiation:  
Reactions of KI and  $I_2$  in Acetone  
Solutions**

M. RODER, GO KOON, N. A. BAKH,  
AND L. T. BOOCAYENKO

*M. V. Lomonosov State University  
in the City of Moscow*

A study was made of the effect of X-rays upon KI and  $I_2$  (in presence of KI) solutions in acetone. The results of irradiation show that in absence of oxygen oxidation of the  $I^-$  ions does not occur. Irradiation of the  $I_2 + KI$  solutions in vacuum results in disappearance of the iodine, the maximum disappearance,  $G(-I_2)$ , of  $2.1 \pm 0.1$  eqv./100 ev occurring at  $I_2$  concentrations of  $2 \times 10^{-4}$  M. Irradiation of the KI solutions in presence of oxygen results in oxidation of  $I^-$  ions to form  $I_2$ . Here, the maximum yield, which occurs at the  $I_2$  concentration of  $2 \times 10^{-3}$  M, is  $5.2 \pm 0.2$  eqv./100 ev. In all cases, the terminal concentrations of  $I_2$  differ from the initial concentrations.

**Formation of Free Radicals in Hydrogen Peroxide-Cyclohexanol Reactions**

E. T. D'YENEESOV, V. V. KHAREETONOV,  
AND E. N. RASPOFOVA

*Institute of Chemical Physics of the  
Academy of Sciences of USSR*

The formation of free radicals from hydrogen peroxide in hydrogen peroxide-cyclohexanol reaction systems was studied with the aid of inhibitors. The results show that hydrogen peroxide adds-on to cyclohexanol on a mol-for-mol basis. The equilibrium constant,  $k$ , of this reversible reaction is  $5.4 \times 10^{-6} \exp(7,800/RT)$  l/mol. The peroxide addition product formed is "more" rapidly decomposed into free radicals.