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Temperature—Conversion Rate Correlation in Radiolysis of Hydrocarbons

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The decomposition rates of various hydrocarbons by radiolysis were studied at various reaction temperatures. Present detailed results of thermocacking a straight-run gas oil in a nuclear reactor.

The results obtained show the fundamental effects of the reaction temperature upon the direction and rate of these reactions. This information is of both theoretical and practical interest.

The Role of Reactor Surface in Oxidation of Methane

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List the results of oxidation of methane at 700°–800°C in a quartz reactor, using a quenching technique.

Plating the reactor surface with copper, brass, or platinum demonstrates that quartz selectively directs the reaction toward predominant formation of formaldehyde, which, as a component of the reaction mixture, promotes the chain oxidation process. Present a scheme for a heterogeneous-homogeneous catalytic process of oxidation of methane over quartz.

Oxidation-Reduction Reactions of Acceptors in Organic Solvents Due to Ionizing Irradiation: Conversion of Copper Compounds Dissolved in Acetone

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In absence of oxygen, x-ray irradiation of acetone solutions of CuCl_2 and Cu_2Cl_2 results in the reduction of Cu^{II} to Cu^{I} . Here, the limiting yield of Cu^{I} is 17.3 ± 0.5 ions/100 ev. Oxidation of Cu^{I} does not occur.

In presence of oxygen, Cu^{I} is oxidized to Cu^{II} in high yields.

Mechanism and Kinetics of Iodizing Aniline in Aqueous Iodine Solutions

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The kinetics of iodizing aniline by aqueous iodine solutions was investigated in the solution pH range of 1.5 to 9.7. The reaction follows the acceptor-donor mechanism, with the base serving as the proton acceptor and not as a component of an iodizing complex.

In absence of the added buffer solutions, some of the aniline molecules serve as the proton acceptors. (In this case, the energy of activation is 7.5 keals/mole). In presence of a carbonate salt, the CO_3^{2-} ion is the acceptor; in aqueous HCl solutions, the water molecules perform this function.

In aniline iodization, the kinetic effect due to the isotopes is independent of the solution pH and nature of the proton acceptor. However, the effect decreases with a decrease in the iodine anion concentration and with an increase in the dioxane content.

In water-dioxane solutions, the rate of aniline iodization decreases as a complex function of increasing concentration of dioxane in the reaction mixture.

Investigation of Interaction of Oxygen with NiO, Fe₂O₃ and Cr₂O₃ with the Aid of Spectral Absorption in Infra-Red Region

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The interaction of samples of finely divided NiO, Fe₂O₃, and Cr₂O₃ when heated in vacuum and in oxygen atmosphere was studied by means of spectral analyses in the infra-red region. After interacting with oxygen these oxides develop absorption bands of the order of 1,150–820 cm⁻¹. Their presence could be explained by the formation on the oxide surfaces of double-bond metal-