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Unidimensional Model of Reaction of Diatomic Radicals With Solid Surfaces

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The exchange energy between diatomic radicals and a solid surface was analyzed with the aid of a unidimensional mathematical model based on a harmonic approximation. A relationship was established between the critical dissociation energy of the radicals and their energy of bonding with the "wall." The results show that well potentials have practically no effect on the energy transfer from a diatomic radical to a solid. The probability of dissociation of diatomic molecules was evaluated in "one-point" adsorption.

Phenomenology of Atomic Oxygen Flames

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For atomic oxygen flames a correlation was established between conversion and the ratios of the initial reaction rates, W , of atomic oxygen to the critical auto-heating rates, W_{crit} . The conversion increases with increasing ratio values. Formation of atomic flames and the extent of conversion within them can be explained in terms of the limiting thermal phenomena.

The Upper Ignition Limit in Fluorine-Hydrogen Reaction

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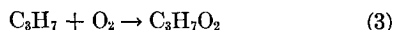
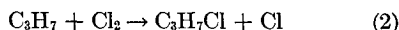
In fluorine-hydrogen reactions the upper limit of ignition varies with pressure. It is concluded that the reaction proceeds along a branched-chain route. Apparently, the branching is associated with the dissociation of the fluorine due to oscillating energy of the excited HF molecules.

Photochemical Oxidation of Propane in Presence of Cl₂

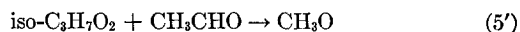
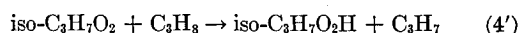
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The nature of the initiators has but little effect on the mechanism of oxidation of propane when the reaction is photoinitiated by excited atomic Hg or by decomposition of NH₃, H₂S, and Cl₂. In the case of Cl₂, some decrease in formaldehyde yield is attributed to competition between the iso-C₃H₇ and the n-C₃H₇ radicals in the reactions below:



At a temperature of 180°, the ratio k_2/k_1 is 13. Since n-C₃H₇O₂ radical is present in only relatively small concentrations, the ratio of the reaction constants, k_2/k_1 , can be evaluated for the reactions below:



Here, $k_2/k_1 = 10^{24.3} \exp\left(\frac{-13,200 \pm 1,000}{RT}\right)$
molecules/cm³.

Use of Chemiluminescence Technique in Study of Decomposition of Azo-bis-Isobutyronitrile in Presence of Oxygen

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The quantities of decomposed azo-bis-isobutyronitrile (AIBN) and of the O₂ reacting with the radicals produced in the decomposition were compared by observing the "oxygen decreases" due to the chemiluminescence. The cyanisopropyl radical was found to react faster with the O₂ than