

عنوان مقاله:

The Role of Aldehydes as Degenerate Branching Intermediate in the Oxidation of Hydrocarbons

محل انتشار:

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خلاصه مقاله:

The thermal oxidation of propane in the temperature range ۳۵۰-۴۲۵°C was studied in order to elucidate the role of higher aldehydes as degenerate branching intermediates in the oxidation of hydrocarbons. In the slow combustion of propane, the high yield of propylene and methanol as the primary products, the formation of hydrogen peroxide, carbon monoxide, carbon dioxide, formaldehyde and steam as the final products and the presence of propylperoxy radicals and acetaldehyde as the branching intermediate are confirmed. The effect of the addition of small quantities of acetaldehyde to propane/oxygen mixtures was being monitored for the reduction and removal of the induction period and also changes in the maximum rate using mass spectrometry. It is concluded that the higher aldehydes and, in particular, acetaldehyde, are the degenerate branching agents in the combustion of hydrocarbons. An activation energy of ۱۶۱ KJ mole⁻¹ was measured for propane oxidation which decreased when the reaction was initiated by acetaldehyde. The reaction kinetics as well as the mechanistic feature of the propane/oxygen mixture and the competitive oxidations of propane-acetaldehyde system have been investigated. The kinetics data obtained by the mass spectrometer have been analysed by computer programming and the results were represented by the appropriate kinetics plots.

کلمات کلیدی:

Combustion, Thermal Oxidation, Degenerate Branching, Organic Fuels, Ignition

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