Mechanism of low-temperature ignition of acetaldehyde-oxygen gas mixtures, initiated by peroxy radicals

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During the low temperature ignition of acetaldehyde-oxygen mixtures, initiated by peroxide compound, adsorbed on the reactor surface, at its heating, a decrease of the ignition temperature, depending on the surface nature, has been detected. In the case of H_3BO_3, it drops to the room temperature, but in the case of NaCl it was remarkably higher. The reason of such heterogeneous nature of the ignition of aldehyde-oxygen mixtures was not clear. Taking into account the possibility of the interaction of adsorbed peroxy radicals with acetaldehyde and methane the comparison and the analysis data of has been made. The general attention has been focused on the comparison of data, received in the case of H_3BO_3 and NaCl. The correlation between the rate of heterogeneous interaction of peroxy radicals and the ignition temperature of above mentioned mixtures has been established. Taking into account the experimental fact, that the rate of peroxy radicals (CH_3O_2) reaction with organic compound (methane, aldehyde) on the H_3BO_3 surface is more than on the NaCl surface and that this is in accordance with lower ignition temperature in the case of H_3BO_3 surface than in the case of NaCl surface, it was concluded, that the essence of the heterogeneous nature of the initiation of the ignition process of $CH_3CHO + O_2$ mixtures consists in set of the fire by a radical process going on the surface. Bearing in mind the possibility of heterogeneous interaction of $C_2H_5O_2$ radicals with C_2H_5CHO, it is possible to consist that this explanation is available and for the ignition of C_2H_5CHO-O_2 mixtures.

Biography

I A Vardanyan is working under chemistry department as a professor at A B Nalbandyan institute of chemical physics , Armenia

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