MODELING OF SELF-IGNITION DELAYS OF METHANE–ALKANE–AIR MIXTURES

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Abstract: High content of methane homologues in associated petroleum gases (APG) with low resistance to detonation makes them unsuitable for use as fuel for power plants. To create effective technologies to reduce the concentration of methane homologues in APG, data on the detonation characteristics of these complex mixtures of hydrocarbon gases are needed. One of the most informative characteristics that determines the detonation resistance of gas mixtures is the delay of their self-ignition. The paper presents the results of computer simulation of self-ignition delays in stoichiometric binary and triple mixtures of methane with C_2–C_5 alkanes and air. Satisfactory agreement of calculations with experimental data is obtained. Analytical expressions for estimating the self-ignition delay of the mixtures under consideration are proposed.

Keywords: methane; alkanes; combustion; self-ignition delay; computer modeling

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