NUMERICAL ANALYSIS OF COMBUSTION PROCESSES OF AVIATION KEROSENE SURROGATE IN THE SCRAMJET MODEL COMBUSTOR

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Abstract: Numerical analysis of ignition and combustion of n-$C_{10}H_{22}$ and H_2 in the combustion chamber of the model scramjet was conducted. It has been shown that at parameters of air flow at the engine inlet: $T_0 = 1300$ K and $P_0 = 0.5$ atm, the ignition delay length at n-$C_{10}H_{22}$ burning is essentially longer as compared with H_2 burning. At air parameters $T_0 = 1000$ K and $P_0 = 0.3$ atm, n-$C_{10}H_{22}$ does not ignite at all while pure hydrogen ignites at a distance of ~ 1 m. Retarded ignition of n-$C_{10}H_{22}$ cannot ensure a high value of combustion completeness at the outlet of scramjet combustor.

Keywords: model combustor; n-decane; hydrogen; ignition and combustion; numerical simulation

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