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: \( T_0 = 1300 \text{ K} \) and \( P_0 = 0.5 \text{ atm} \), the ignition delay length at \( n-C_{10}H_{22} \) burning is essentially longer as compared with \( H_2 \) burning. At air parameters \( T_0 = 1000 \text{ K} \) and \( P_0 = 0.3 \text{ atm} \), \( n-C_{10}H_{22} \) does not ignite at all while pure hydrogen ignites at a distance of \( \sim 1 \text{ m} \). 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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