

## ON THE SELECTION OF KINETIC MODEL FOR HYDROGEN BURNING IN NUMERICAL SIMULATION OF SUPERSONIC NON-EQUILIBRIUM FLOW

The non-equilibrium efflux of a supersonic air-hydrogen jet in a supersonic cocurrent flow through axisymmetrical variable-area channel is simulated using a march algorithm in the framework of stationary viscous-layer equations. The research aim is to select a rational kinetic model of hydrogen oxidizing in air oxygen for determination of the basic thermogasdynamic parameters of a turbulent non-equilibrium flow through channel with the minimum of computations. The kinetic models for hydrogen oxidizing in air oxygen in the framework of 8-9 chemical reactions are examined. The considered models are pretested in the framework of the model of an ideal reactor. Selection of a rational kinetic model of hydrogen combustion under the supersonic non-equilibrium flow through channel is grounded on comparison with the experimental data. The effects of water vapour content on the value of the induction period are studied. It is shown that addition of water vapour results in a decrease in delay of oxygen ignition. From the research results it is found that the kinetic model of hydrogen combustion involving 9 chemical reactions allows an adequate determination of the induction period and value of heat generation in the process of combustion through supersonic flow. The accuracy of setting an initial component content of a non-equilibrium gas mixture affects significantly the value of the induction period.

*Keywords: kinetic model of burning, ignition delay, model of viscous layer, march algorithm, experimental data.*

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