

Numerical simulation of a pulse detonation engine

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Further improvement of modern engines based on traditional circuits is becoming an increasingly difficult task. It is necessary to improve structures and materials, as well as fuel improvement and the creation of equipment in which the characteristics of power units are improved when using standard fuels. A three-dimensional numerical simulation a pulse detonation engine work cycle is carried out. The traction characteristics are estimated. The effect of activation energy on chemical processes in the combustion chamber is investigated. Four variants of activation energy 65, 75, 85, 95 Kcal/mol are considered. It is established that the combustion mode depends significantly on this parameter. An increase in the activation energy first brings to an increase of the stabilization time during the passage of various transition states. The further increase of the activation energy brings to the displacement of the combustible mixture from the chamber: it does not have time to catch fire. This work was supported by the subsidy given to the Federal Science Center Scientific Research Institute for System Analysis of the Russian Academy of Sciences to implement the state assignment on the topic No. 1021061509701-5-1.2.1 ‘Development of algorithms and codes for multiscale processes and combustion simulations’ (FNEF-2022-0021).