

# Mathematical modeling of nonequilibrium flow in a sublimation channel

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The paper presents a mathematical model and the results of calculations of nonequilibrium flow in a channel, the walls of which sublimate as a result of exposure to high temperatures (up to 2300 K). A parametric study of the influence of the temperature and composition of the gas phase, the thermophysical properties of the sublimation channel material on the distribution of mass flow and temperature of the gas along the channel has been carried out. The method of criterion assessment of the possibility of realization of the sublimation and quasi-sublimation process in the flow path is presented.

As a result of the study, the requirements for sublimation modes that minimize melting and loss of shape of the channel surface. It is shown that the key parameter is the value of the heat flux density. The quasi-sublimation mode occurs in the range of heat flux density more than  $0.6 \times 10^4$  W/m<sup>2</sup>. The obtained data can be used in the analysis of experimental studies of the flow in the sublimation channel.