

SPACE PROPULSION SYMPOSIUM (C4)  
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THE COMPARISON OF THE DIFFERENT MODELS OF THE BURNING REGRESSION RATE IN  
THE HYBRID ROCKET MOTOR**Abstract**

The processes in chamber r of the hybrid rocket motor are the subject of this paper. The aim of this research is to compare different zero-dimensional models of the regression rate in the case of their using in the numerical simulation of processes in the hybrid rocket motor.

Numerical model is constructed on the base of one-dimensional equations of non-steady compressible gas dynamic. Original compact high order finite difference approach is used for the numerical approximation of the initial system of equations. The source term considers the burning process and the friction losses.

Two well-known models of the regression rate were used for comparison. In the first regression rate depends on oxidizer mass flow rate only

$$r = a G_o$$

In the second influence of chamber pressure and coordinate on the regression rate is taken in account also

$$r = a p^{0.5} G_o x^{-m}$$

Both models were adopted for local using in the numerical model.

The calculations of processes in the hybrid propellant motor RattWorks "K240H" were conducted for the comparison of different regression rate models. Results of thrust calculation are compared with existing experimental data and results of calculation of other researcher. The comparison shows, that results of this paper correspond better to experimental data.