DEVELOPMENT OF 2D ONE-TEMPERATURE MODEL OF COMBUSTION WITHIN POROUS BODY WITH VARIABLE CROSS-SECTION IN STEDY-STATE REGIME. COMPARISON WITH PREDICTIONS OF 1D ANALYTICAL MODEL

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Studying combustion processes in porous medium by one-dimensional models allows to reveal main mechanisms of this process and estimate such basic parameters as maximal temperature and combustion front propagation rate. Moreover, created techniques allows to derive rather simple analytical formulae which includes basic parameter of combustion chemistry, heat transfer and gas flow. Analytical results coincide well with numerical solution using 1D models. However, all real technical devices operate in conditions rather far from direct application of one-dimensional models Creating two-dimensional models is a simpler step to verily and clarify conclusions of onedimensional models, simulate 2-D effects and estimate the borders of hydrodynamic stability

The 2D one-temperature models of V-shape geometry devices are created for two cases with direct (Fig.a) and U-turn (Fig.b) of gas flow. Numerical results are compared with predictions of analytical solution Comparison was made by position of combustion front and value of its cross- section.

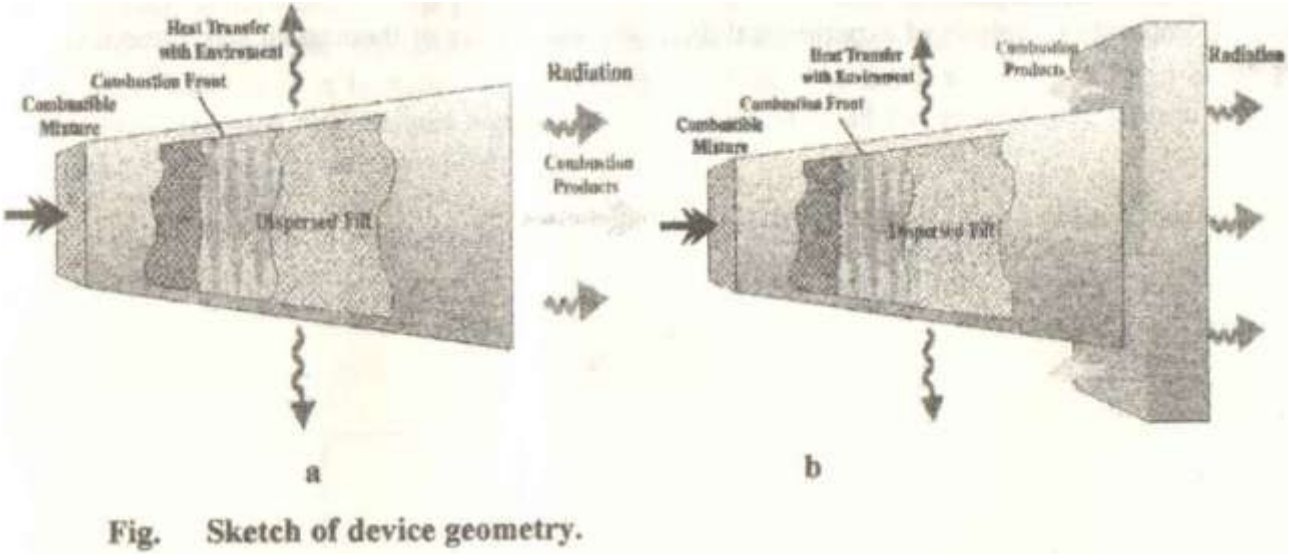

Fig. Sketch of device geometry.

Developed two-dimensional model allows to analyze stability and heat regimes of

V-shape geometry devices with direct and U-turn of gas flow. In case the system is stable, surface area at which combustion takes place coincides with good accuracy with analytical estimation obtained in one-dimensional theory.