VAPOR GENERATING IN THE LOOP HEAT PIPE EVAPORATORS. MODELING AND ANALYSES

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Abstract

The non-stationary one-dimensional mathematical model of vaporization in capillary-porous media (CPM) evaporators of loop heat pipes is presented. The model contains the equation of skeleton CPM thermal conductivity, the equation of working fluid stream energy, the equations of liquid and vapor filtration and can be used for CPM with various distribution of pores size. Examples of calculations results are presented, the basic mechanisms of heat transfer, revealed during the settlement analysis are described. It is shown, that in case of CPM with inverted meniscus near to section of heat input there are the pulsations of the working fluid accompanied by periodic CPM drying and filling up to full filling of section by liquid. The analysis of CPM thermal conductivity influence on heat and mass transfer processes is carried out. Features of processes are defined at the heat flux close to the maximum.