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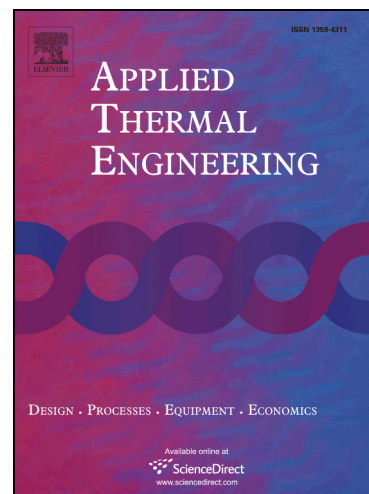
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Visualization study on the instabilities of phase-change heat transfer in a flat two-phase closed thermosyphon

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Abstract: This paper presents systematic experiments and visualization on the instabilities of phase-change heat transfer for water, ethanol and acetone in a flat evaporator of a two phase closed system, respectively. The effects of the heat flux, filling ratio, coolant temperature and working fluid type on the instabilities and their mechanisms have been systematically investigated. The experimental results show that the instabilities of phase-change heat transfer are strongly related to the corresponding heat transfer modes. The instabilities of temperature and heat transfer coefficient (HTC) of the evaporator are mainly caused by the bubble behaviors, the physical properties and the operation pressures. Natural convection, intermittent boiling and fully developed nucleate boiling are the main heat transfer modes in the present study. The condensate droplets may affect the instabilities due to inducing periodic boiling at lower heat fluxes. The maximum standard deviations of the evaporator

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