Public Abstract

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Graduation Term:FS 2015

Department:Mechanical & Aerospace Engineering

Degree:PhD

Title:Wettability and Nanostructure Effect on Oscillating Heat Pipes

As electronics technologies rapidly develop with a demand for more power and miniaturization, effective thermal management of these systems becomes much more important. The oscillating heat pipe (OHP) is a promising highly efficient heat transfer device that is great for high heat flux applications common in the electronics industry. In the current investigation, the wettability effect on the heat transfer performance of OHPs has been conducted.

- 1). The overall performance of configuration of hydrophilic evaporator/ hydrophobic condenser and hydrophobic evaporator/ hydrophilic condenser was worse than the nontreated OHP, however; the oscillations were much damper when comparing the amplitudes.
- 2). High oscillating motion occurs in the OHP with the hydrophilic surface while low oscillating motion occurs in the untreated OHP.
- 3). A mathematical model shows that contact angle increases the oscillating motion decreases.
- 4). A theoretical model predicting operating limit is developed. Results show that radius and charging ratio has a large effect on the maximum heat transfer limit. Working fluids changes the operating limit.