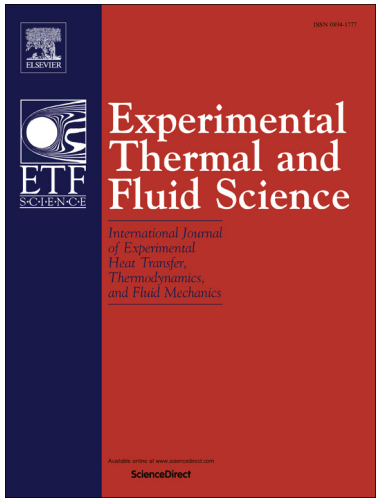
Accepted Manuscript



Experimental investigation of thermo-hydrodynamic behavior in a closed loop oscillating heat pipe

Qin Sun, Jian Qu, Xiaojun Li, Jianping Yuan

PII: S0894-1777(16)30356-9
DOI: http://dx.doi.org/10.1016/j.expthermflusci.2016.11.040
Reference: ETF 8962

To appear in: *Experimental Thermal and Fluid Science*

Received Date: 27 July 2016
Revised Date: 18 October 2016
Accepted Date: 30 November 2016

Please cite this article as: Q. Sun, J. Qu, X. Li, J. Yuan, Experimental investigation of thermo-hydrodynamic behavior in a closed loop oscillating heat pipe, *Experimental Thermal and Fluid Science* (2016), doi: http://dx.doi.org/10.1016/j.expthermflusci.2016.11.040

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Experimental investigation of thermo-hydrodynamic behavior in a closed loop oscillating heat pipe

Qin Sun[1], Jian Qu[2,*], Xiaojun Li[2], Jianping Yuan[1]

1. Research Center of Fluid Machinery Engineering and Technology, Jiangsu University, Zhenjiang 212013, China

2. School of Energy and Power Engineering, Jiangsu University, Zhenjiang 212013, China

Abstract

A simultaneous visualization and temperature measurement has been performed to investigate the interaction of bubble size distribution, bubble movement, temperature variation in a glass oscillating heat pipe (OHP) with an internal diameter of 2.5 mm. Ethanol was used as the working fluid with volumetric filling ratios of 50%, 60% and 70%. Fluid temperatures were recorded under four different heating power inputs of 38, 50, 75, and 110 W with thermocouples inserting into tube inside. The experimental results show that a higher heating power input or filling ratio usually leads to larger oscillation frequency and amplitude of bubble movement, contributing to better OHP performance. The quasi-sine oscillation wave of bubble movement was occasionally observed and its appearance also depends on the filling ratio and power input. Visual observation indicates that the bubble size distribution is associated with bubble movement and temperature variation, which is available to indirectly evaluate the OHP performance. This study provides a new approach to understand the thermo-hydrodynamic behavior of OHPs.

Keywords**:** Oscillating heat pipe; Bubble size distribution; Thermo-hydrodynamic behavior; Heat transfer performance

* Corresponding author. Tel.: +85 511 88780215

E-mail address: rjqu@mail.ujs.edu.cn (J. Qu)

ACCEPTED MANUSCRIPT

Download English Version:

https://daneshyari.com/en/article/4992786

Download Persian Version:

https://daneshyari.com/article/4992786

Daneshyari.com