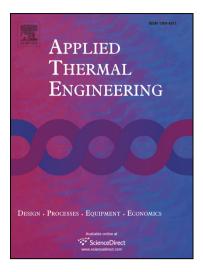
## Accepted Manuscript

Enhanced condensation heat transfer in air-conditioner heat exchanger using superhydrophobic foils

Shanlin Wang, Xinquan Yu, Caihua Liang, Youfa Zhang

PII:	S1359-4311(17)35946-X
DOI:	https://doi.org/10.1016/j.applthermaleng.2018.04.020
Reference:	ATE 12017
To appear in:	Applied Thermal Engineering
Received Date:	13 September 2017
Revised Date:	22 March 2018
Accepted Date:	5 April 2018



Please cite this article as: S. Wang, X. Yu, C. Liang, Y. Zhang, Enhanced condensation heat transfer in air-conditioner heat exchanger using superhydrophobic foils, *Applied Thermal Engineering* (2018), doi: https://doi.org/10.1016/j.applthermaleng.2018.04.020

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**

### Enhanced condensation heat transfer in air-conditioner heat

#### exchanger using superhydrophobic foils

Shanlin Wang<sup>a,b</sup>, Xinquan Yu<sup>a</sup>, Caihua Liang<sup>c</sup>, Youfa Zhang<sup>a,\*</sup>

<sup>a</sup> Jiangsu Key Laboratory of Advanced Metallic Materials, School of Materials Science and Engineering, Southeast

University, Nanjing 211189, P. R. China

<sup>b</sup> School of Material Science and Engineering, Southwest University of Science and Technology, Mianyang 621010, P.

R. China

<sup>c</sup> School of Energy and Environment, Southeast University, Nanjing 210096, P. R. China

\*corresponding author: E-mail: <u>yfzhang@seu.edu.cn</u>

**ABSTRACT** Air-conditioners have the highest energy consumption among the household appliances because of the improved thermal resistance by the filmwise condensation in summer and frosting in winter on the surface of hydrophilic foils of condensers. The wet foils are also easy to adsorb dirts and reproduce bacteria, further affecting people health in the room. Here, through chemical oxidation and subsequent chemical modification, we fabricated a novel air-conditioner fin-tube heat exchanger with superhydrophobic foils, which showed high performance in self-cleaning, anti-condensation, anti-frosting, anti-corrosion and environment stability, promising a good candidate for improving energy efficiency of air-conditioners in future. Enhanced condensation heat transfer were demonstrate on indoor and outdoor condenser in summer and winter, respectively. The results of testing revealed that the cooling capacity and heat transfer coefficient from superhydrophobic Fan Coil Unit (indoor condenser) increasing over 8 and 2 percent than conventional hydrophilic one under rated output working conditions. Moreover, the superhydrophobic outdoor condenser under the condition of frosting has higher energy conversion (over 85%) than the conventional hydrophilic one after 60 min.

KEYWORDS: heat exchanger, condensation, frosting, superhydrophobicity

Download English Version:

# https://daneshyari.com/en/article/7045505

Download Persian Version:

https://daneshyari.com/article/7045505

Daneshyari.com