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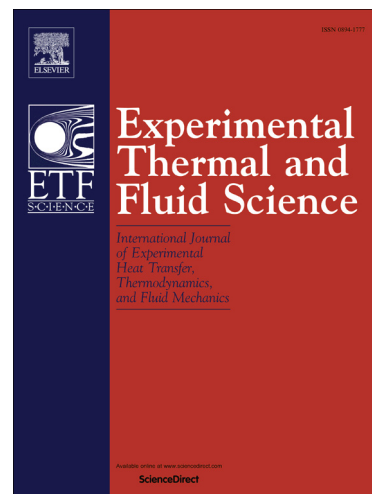
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Experimental study of boiling heat transfer and flow characteristics in fin channels with variable cross section

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Abstract

The object of this work is to investigate the boiling heat transfer performance of transverse serrated fin (TSF) channel and triangle perforated fin (TPF) channel in compact plate-fin heat exchanger. A series of boiling heat transfer performance tests are carried out for volume flow rate range of 0.03~0.3 m³/h and heat flux of 10~20 kW/m². The local and average heat transfer coefficient of TSF channel and TPF channel are examined. It indicates that both local and average boiling heat transfer coefficient of TSF channel was higher than that of TPF channel. The boiling heat transfer occurs in TSF channel at lower wall superheat. The growth rate of wall temperature significant declines significantly when heat flux is up to ONB point, which means the boiling heat transfer has happened. The rising rate of average boiling heat transfer coefficient h_{ave} is smaller than that of the local boiling heat transfer coefficient h_{out} .

Keywords: triangle perforated fin; transverse serrated fin; experimental study; heat transfer; boiling

1 Introduction

Heat transfer performance is directly affecting the energy consumption and economic benefits of equipment. However, single-phase heat transfer efficiency is not sufficient for cooling in many cases. Recently, a growing attention has been paid to the enhanced boiling heat transfer method. The insertion of twisted tape in circular tubes is an effective way to enhance heat transfer, some experimental investigations on boiling flow in circular tubes with twisted tape inserts were conducted [1, 2]. Based on the coolant fluid component(s), some researchers [3, 4] studied the subcooled flow boiling heat transfer characteristics for

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