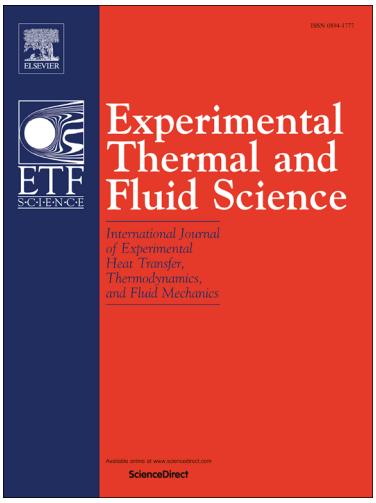

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Ji Wang, Jun Ming Li

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Pressure Drop of R134a and R1234ze(E) During Condensation in Horizontal Microchannel Arrays Cooled Symmetrically and Asymmetrically

Ji Wang[a], Jun Ming Li[a,*]

[a] Key Laboratory for Thermal Science and Power Engineering of Ministry of Education, Department of Thermal Engineering, Tsinghua University, Beijing 100084, China

* Corresponding author. Tel.: +86 10 62771001; E-mail: lijm@tsinghua.edu.cn

ABSTRACT

An experimental investigation was conducted for pressure drop of R134a and R1234ze(E) condensing in horizontal oval microchannel arrays with a hydraulic diameter of 301.6 μm, an aspect ratio of 2.46 and a length of 50 mm. The refrigerant saturation temperatures of 31°C, 37°C, 41°C and 45°C, mass fluxes of 60, 120, 180, 250 kg/(m^{2}s), qualities of 0.1-0.9 were taken into account and their effects on the frictional pressure drop were analyzed. Specially, the effects of microchannel arrays cooling methods, including symmetric cooling and asymmetric cooling, were studied. The frictional pressure drops of R134a and R1234ze(E) were compared. The results showed that the frictional pressure drop increases with increasing mass flux, inlet quality and cooling water inlet temperature, and decreases with increasing refrigerant saturation temperature. The frictional pressure drop under symmetric cooling is lower than that under asymmetric cooling. The frictional pressure drop of R134a is slightly lower than that of R1234ze(E) for higher mass fluxes and inlet qualities. Six available correlations in the literature were used to predict the present data. All the correlations