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[摘要]

本研究使用以直接混合製備方式來獲得三氧化二鋁奈米流體，進行實驗分析探討添加三氧化二鋁奈米流體其熱傳導
換器及儲冷冰球，評估奈米流體應用於熱交換器及儲冷系統的可行性。研究結果發現：在奈米流體重量濃度影響方
當重量濃度上升到2.0%wt時，則能上升到19.1%。在實驗樣本溫度影響方面，重量濃度2.0%wt時，樣本10℃時能
到19.1%，因此不論重量濃度或者溫度對於熱傳導係數的增進率均呈現正比關係。在黏滯係數方面，奈米流體黏滯
熱交換器應用方面，發現奈米流體之熱對流係數與熱傳導係數在相同溫度下亦會隨濃度上升而增加。結冰成核方面
的過冷度與水比較時皆有提升的趨勢，但1.0%wt時，過冷度卻較水低，因此0.5%wt實驗樣本是提升過冷度效能最
都下降，且發現其過冷度趨向一致之現象。

[英文摘要]

This study investigates the relationship between thermal conductivity and heat convention of aluminum oxide nar
prepared by two step method. The aluminum oxide nanofluids apply to water-cooled heat exchanger and ice nuc
exchanger and the feasibility of ice capsules in thermal storage system.
The experimental results showed when sample temperature was set at 40℃, an increase in weight fraction of Al
the enhanced thermal conductivity ratio from 2.5% to 19.1%. Similarly, when the concentration of sample was se
nanoparticles from 10℃ to 40℃ can increase the enhanced thermal conductivity ratio from 11.1% to 19.1%There
nanofluids are linearly related to thermal conductivity. The viscosity of the Al2O3 nanofluids with the raising conc
The aluminum oxide nanofluids apply in the water-cooled heat exchanger. Experimental results show that the he
with the concentration of sample at a fixed temperature. Results of ice nucleation, when the concentration of sam
enhanced compared with water when temperature set at -11℃, the subcooling were lower than water at 1.0%wt.
subcooling efficiency is the best concentration. The temperature of sample at -15℃, when water, 0.1%wt, 0.5%w
phenomenon.

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