中文摘要

本研究使用的奈米流體以水作爲基礎溶液，乙二醇爲分散劑；將兩者以適當比例調配混合使用超音波震盪法，讓奈米碳管表面能被削弱，使其有效地分散於水溶液中。製作過程中添加適當的界面活性劑及高分子聚合物(阿拉伯膠)可有效減少奈米碳管因凡德瓦力所造成團聚現象而沉澱。平板散熱器爲質輕且幾何結構簡單的密閉容器，內部抽取真空，並注入工作流體(working fluid)後，流體在加熱端吸收熱量，並使工作流體由液態轉變爲氣態，當蒸氣壓會逐漸升高，氣體會流往壓力低的冷凝端形成蒸氣流，最後蒸氣在冷凝端釋放熱量並沿壁面凝結成液體，隨即沿溝槽回流於加熱端產生自然對流。由熱阻抗測試機在 20W、40W、60W、80W、100W 電功率所量測之平板式熱管以奈米流體爲工作流體的阻抗值，其數據分別爲 0.54℃/W、0.48℃/W、0.45℃/W、0.47℃/W，結果顯示可有效增加熱功率減少熱能損耗。

英文摘要

In this study, a nanofluid with water as a basis of solution was used for experiments by adding ethylene glycol to disperse of carbon nanotubes (CNT) and applying the ultrasonic shock to reduce nanotube surface energy. Thus, CNT can be effectively dispersed in aqueous solution. Also, to appropriate add surfactants and polymers(e.g., the gum Arabic) can reduce Van der Waals forces attract and aggregate phenomenon of CNT and prevents its precipitation of nanofluid. A plat-type heat sink is a light and simple geometry of the closed container. Inside the vacuum chamber contains the work fluid when the fluid was heated and intent to evaporator. Vapor pressure will gradually increase, and the steam will flow to the low-pressure of condenser section. During this section, steam will condense into liquid and release of heat along the wall. By using the heat resistance test stand, the thermal impedance of flat-type heat sink with the nanofluid is measuring based on electric power test as 20 W, 40W, 60W, 80W, and 100W. The data is 0.54?aC/W, 0.48?aC /W, 0.45?aC /W, and 0.47?aC/W, respectively. The results indicate that the flat-type heat sink with the nanofluid can effectively increase the thermal efficiency.