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شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



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شبكة المعلومات الجامعية



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



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شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكرو فيلم

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بالرسالة صفحات

لم ترد بالأصل





Ain Shams University
Faculty of Engineering
Mechanical Power Department

Nanoparticles Effects on Heat Transfer Characteristics

A Thesis submitted in partial fulfillment of the requirements of the degree of Master of
Science in Mechanical Engineering
(Mechanical Power Engineering)

By

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Bachelor of Science in Mechanical Engineering
(Mechanical Power Engineering)

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Statement

This thesis is submitted as a partial fulfilment of Master of Science in Mechanical Engineering (Mechanical power Engineering), Faculty of Engineering, Ain Shams University.

The author carried out the work included in this thesis, and no part of it has been submitted for a degree or a qualification at any other scientific entity.

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Abstract

A comparative study and results analysis performed, for evaluating the average heat transfer rate, overall heat transfer coefficient, convective heat transfer coefficient and Nusselt number, through corrugated plate heat exchanger, by using Nano particles of MWCNT dispersed in DI water, using three different concentrations of Multi-Walled Carbon Nanotubes (MWCNT) of 0.25 g/liter (0.00961 vol.%), 0.5 g/liter (0.0192 vol.%) and 1 g/liter (0.0384 vol.%). Besides, the variation of the hot Nano-DI water inlet temperature to the heat exchanger at 50 °C, 60 °C, 70 °C and 80 °C, and by varying the volume flow rate of the hot Nano-DI water side at 1 LPM, 2 LPM, 3 LPM, 4 LPM and 5 LPM, and varying volume flow rate of the cold water side at 1 LPM, 2 LPM, 3 LPM, 4 LPM and 5 LPM. It is observed that average heat transfer rate, overall heat transfer coefficient, convective heat transfer coefficient and Nusselt number of nanofluid increase, by increasing the volume flow rate of the hot fluid side, and by increasing the volume flow rates of the cold fluid side, and by increasing the inlet temperature of the hot fluid side, and by increasing the Nano particles concentration in the DI water. The 1 g/liter concentration reaches 47.5% enhancement in average heat transfer rate, 53.5% enhancement in overall heat transfer coefficient, 68.8% enhancement in convective heat transfer coefficient and 33.3% enhancement in Nusselt number, over the DI water at 80 °C and $\dot{V}_h = 5$ LPM, to become higher than that of DI water, 0.25 g/liter and 0.5 g/liter samples. New correlations for estimating the Nu number and friction factor are obtained. Comparisons with previous researches were done also

Keywords: MWCNT/DI water, Nanofluids, Plate heat exchanger, Nusselt number

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