EXPERIMENTAL INVESTIGATION INTO CONVECTIVE HEAT TRANSFER OF NANOFLUID AT THE ENTRANCE REGION UNDER LAMINAR FLOW CONDITIONS

MOHAMMAD FIRDAUS BIN CHE MAT

(2006882168)

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Faculty of Mechanical Engineering

Universiti Teknologi Mara (UiTM)

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ABSTRACT

Nanofluids are suspensions of metallic or nonmetallic nanopowders in base liquid and can be used to increase heat transfer rate in various applications. Because of its enhanced heat transfer capability as compared to normal based fluids such as water, its was offered the engineer opportunities for development in heat transfer and thermodynamic areas. This project reports an experimental investigation of work on the convective heat transfer of nanofluids flowing through a copper tube in the laminar flow regime compare with water. The nanoparticles that use in this experiment was made of Aluminium Nitrate ($Al(NO_3)_3.9H_2O$) and Tin Chloride Hydrated ($SnCl_2$). These nanoparaticles is then mixed with water (H_2O). Experimental results proved that the enhancement of heat transfer coefficient is due to the nanoparticles present in the fluid. Heat transfer coefficient increases by increasing the concentration of nanoparticles in nanofluid which use 0.6% vol,1.0% vol and 1.6% vol of water. The use of the nanoparticles that mixed with water can significantly enhance the convective heat transfer in the laminar flow regime. The increase in heat transfer coefficient due to present of nanoparticles is much higher than the prediction of single phase heat transfer correlation used with nanofluid properties.

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