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SINGLE-PHASE AND TWO-PHASE TREATMENTS OF CONVECTIVE HEAT TRANSFER ENHANCEMENT WITH NANOFLUIDS –A REVIEW

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Abstract

Nanofluids have been investigated for their enhancements, advantages and potentials in improving convective heat transfer rates since they can be used as working fluids in various thermal systems. Thermal researchers have gained their attentions to focus on the nanofluids experimentally and numerically. This work provides nanofluid investigations of theoretically and experimentally. In the numerical analysis, the thermal dispersion model is further investigated through a single-phase, temperature-dependent thermal conductivity with Brownian motion approach. Numerical analysis of hydrodynamically fully developed laminar forced convection of Al_2O_3(20 nm)/water nanofluid inside a circular tube under various boundary conditions has been carried out. Results of the numerical solution are compared with the experimental data available in the literature. The experimental parts presented some measured viscosity and thermal conductivity values of nanofluids, as well as important correlations obtained from experimental data. The theoretical parts expressed into two main considerations as the single- phase modeling and the two - phase modeling; the former occupies steady properties of nanofluids and the latter distinguishes nano particle properties from base-fluid properties.