Title :
Experimental investigation of the thermal conductivity of nanofluids hybrid silicon carbide Carbon-nanotubes / water-ethylene glycol at different temperature and volume fraction and provide an empirical relationship

Abstract :
Abstract Nanofluiuds, which results from the suspend of nano-sized particles in conventional fluids, is a new generation of highly efficient fluids in industrial mills. The particle size used in nanofluids is from 1 nm to 100 nm. These particles made from metal particles such as copper, silver or metal oxide such as aluminum oxide (Al_2 O_3), copper oxide. Common heat transfer fluids have a low thermal conductivity coefficient. Since carbon nanotubes create marvelous thermo-physical properties in nano-fluids, adding them to the base fluid can have a significant effect on the thermal conductivity of the fluids. The use of nanoparticles along with a carbon nanotube, due to their high conductivity coefficient and distribution in the base fluid, increases the thermal conductivity coefficient of the fluid, which is one of the fundamental parameters of heat transfer. In this work, the effects of solid volumes of nanoparticles on SIC-MWCNT / H_2O-EG nanofluid thermal conductivity were investigated experimentally. Experiments were carried out on samples with solid volume fractions of 0 to 0.6% and in the range of 25°C to 50°C. The results of the experiments indicated that with increasing the amount of nanoparticles and increasing the temperature of the base fluid, the thermal conductivity coefficient increased to 23.9%. At the end, an experimental relationship was proposed to predict the thermal conductivity coefficient and the margin of deviation analysis for proposed relationships was investigated. The results of these analyzes indicate that the maximum margin of deviation is 1.3%, which indicates the acceptable accuracy of the proposed relationships for predicting the values of SIC-MWCNT / H_2O-EG nano-fluid thermal conductivity coefficients.

Keywords :
SIC nanoparticle, Thermal conductivity, MWCNT, Water - Ethylene glycol, Hybrid nanofluid.