

Thermophysical Properties of Water-Based Carboxylated Multi-Wall Carbon Nanotubes Nanofluids

Authors : Ahmad Amiri, Hamed Khajeh Arzani, Md. Salim Newaz Kazi, Bee Teng Chew

Abstract : Obviously, the behavior of thermophysical properties of covalently functionalized MWNT-based water nanofluids cannot be predicted from the predicted models. We present a study of the specific heat capacity, effective thermal conductivity, density and viscosity of coolants containing functionalized multi-wall carbon nanotubes (MWNT-COOH) with carboxyl groups at different temperatures. After synthesizing of MWNT-COOH-based water, measurements on the prepared coolants were made at various concentrations by different experimental methods. While thermal conductivity of nanofluids illustrated a significant increase, the specific heat capacity of the samples showed a downward behavior with increasing temperature. The viscosity was investigated in different shear rates and temperatures. Interestingly, the specific heat capacity of all prepared nanofluids was decreased with increasing concentration. Also, the density of the MWNT-COOH-based water nanofluids increased and decreased smoothly with increasing MWNT-COOH concentration and temperature, respectively.

Keywords : carbon nanotubes, coolant, heat capacity, density, viscosity, thermal conductivity

Conference Title : ICNNE 2016 : International Conference on Nanoscience, Nanotechnology and Engineering

Conference Location : London, United Kingdom

Conference Dates : September 29-30, 2016