

Thermal Conductivity and Viscosity Measurement of ZnO Nanoparticles Dispersing in Various Base Fluids

In this paper, the Zinc oxide (ZnO) nanopowders suspended in three various base fluids water, Ethylene glycol (EG), and 50%EG+50%W are prepared experimentally. Both nanofluids and base fluids thermal conductivity and viscosity have measured and validated with available experimental and standard data. The hot wire mode and viscometer were utilized to measure the thermal conductivity and viscosity of ZnO nanofluid volume fraction with the range of 0.3 to 1.7% under initial condition temperature of preparation from 25oC to 55oC. Results offer the thermal conductivity enhancement and viscosity increasing by 23% and 52% respectively as increasing in volume fraction whereas, the thermal conductivity enhancement and viscosity decreasing with temperature increasing by 27% and 18% respectively. It observes that the measured data have good agreement with other researchers' data available in the literature with deviation less than 6%. The ZnO nanoparticle suspended in water has the elevated values of thermal conductivity and lowest worth of viscosity while, ZnO nanoparticle suspended in EG has the lowest values of thermal conductivity and highest values of viscosity.