

**Study the effect of volume fraction concentration and particles materials on thermal conductivity and thermal diffusivity of nanofluids.**

ABSTRACT

Nanofluids, a mixture of nanoparticles and fluids, have exceptional potential to improve their effective thermal conductivity and thermal diffusivity, aluminum and aluminum oxide nanofluids with five different volume fractions of nanoparticle suspensions in different base fluids, i.e., distilled water, ethylene glycol (EG), and ethanol were prepared by mixing nanopowder and base fluids. Sonication with high-powered pulses was used to ensure the dispersion of nanoparticles in good uniformity in the base fluids. The hot wire-laser beam displacement technique was used to measure thermal conductivity and thermal diffusivity of the prepared nanofluids. The effects of the volume fraction concentration and particle materials on the thermal conductivity and thermal diffusivity of nanofluids were determined. The results showed that the thermal conductivity and thermal diffusivity increased linearly with increasing volume fraction concentration of nanoparticles in the respective base fluids. In addition, the thermal conductivity and thermal diffusivity increased faster in the Al<sub>2</sub>O<sub>3</sub> nanofluids than in all the three base fluids.

**Keyword:** Nanofluid; Thermal conductivity; Thermal diffusivity.