

Thermo-physical properties of metal oxides composite nanolubricants

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ABSTRACT

Thermal conductivity and viscosity of the different combination of composite nanolubricants for 0.02% volume concentrations at a temperature range of 30 to 80 °C were investigated. Al₂O₃, SiO₂ and TiO₂ nanoparticles were dispersed in the Polyalkylene Glycol (PAG 46) lubricant using the two-step method of preparation. Thermal conductivity and viscosity were measured using KD2 Pro Thermal Properties Analyzer and LVDV-III Rheometer, respectively. The result shows that the thermal conductivity and viscosity of composite nanolubricants decrease with temperature. Composite nanolubricants behaved as Newtonian in the range of the temperatures studied. The most optimum combination of composite nanolubricant is Al₂O₃-SiO₂/PAG as it yields higher enhancement in thermal conductivity but lower in viscosity.

Keywords: composite nanolubricant; thermal conductivity; viscosity