

Thermal and electrical conductivity of silicon dioxide – ethylene glycol nanofluids

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ABSTRACT

Nanofluids is a group of novel engineering materials with many potential industrial applications particularly in the processes of heat exchange [1, 2]. The paper presents results of experimental investigation of thermal and electrical conductivity of suspensions of silicon dioxide (SiO₂) nanoparticles in ethylene glycol (EG).

Thermal conductivity of nanosuspensions with various mass fraction of particles was measured with use of a KD2 Pro Thermal Properties Analyzer (Decagon Devices Inc., Pullman, Washington, USA) with 2% standard uncertainty at constant temperature 298.15 K. To investigate an electrical conductivity of nanosuspensions, a MultiLine 3410 (WTW GmbH, Weilheim, Germany) conductivity meter with TetraCon 925 probe was used, and standard uncertainty of this system was estimated at 1%.

It was presented that with increasing concentrations of nanoparticles in nanofluids both the thermal and electrical conductivity increase.

References

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- [2] Taylor, Robert, Coulombe, Sylvain, Otanicar, Todd, Phelan, Patrick, Gunawan, Andrey, Lv, Wei, Rosengarten, Gary, Prasher, Ravi and Tyagi, Himanshu. *Small particles, big impacts: A review of the diverse applications of nanofluids*. **Journal of Applied Physics**, 113(1):011301, 2013.