

International Conference on

Green Energy & Expo

September 21-23, 2015 Orlando, USA

Particle size effect on thermal conductivity of nano-engineered fluids

Mohammadreza Behi¹, Fariba Dehghani² and Masud Behnia¹

The University of Sydney, Australia

Nanofluids are conventional fluids containing nanoparticles smaller than 100 nm. Nanofluidic suspensions have rapidly grown in different applications such as solar energy and heat transfer in the last decade. Thermophysical properties and heat transfer enhancement of Nanofluids (NFs) are part of the major interests of researchers in this field. The present paper investigates one of the critical parameters that influence the thermal conductivity of nano-coolant. The impact of particle size of nanofluids was studied using Transient Plane Source (TPS) method. The Al₂O₃ Nanofluids with three different particle sizes (40 nm, 150 nm, and 250 nm) were used at the ambient temperature. The particle weight fraction of the nanoparticles was kept constant at 9 wt% in basefluids that is water and Ethylene glycol mixture (50:50 weight ratio). Furthermore, a theoretical study conducted to compare the experimental results with some of existing classical models. From the data analysis, the effect of nanoparticle size is identified as a critical factor on thermophysical properties, increasing the particle size led to decreasing the thermal conductivity.

Biography

Mohammadreza Behi was born in Iran in 1984. He received the B.Sc. Degree from the Shahrood University of Technology, Shahrood, Iran, in 2008 and his M.Sc from University of Gavle/ Royal Institute of Technology (KTH), Sweden, in 2012, and Professional Doctorate in Engineering (PDEng.) from Technical University of Eindhoven (TU/e), the Netherlands, in 2014. He worked as a researcher in the *NanoHex* (The world's largest collaborative nanotechnology project in EU) at Department of Energy Technology at KTH during his M.Sc studies. From 2013 to late 2014, as part of his PDEng, he involved in the *LIFE EU* Project Called *SUNCOOL* to manufacture and develop solar cooling modules, at ClimateWell AB, Stockholm, Sweden. Currently, he has started a Ph.D. on Nanofluidic and Nano-engineered coolants in the School of Chemical and Biomolecular Engineering at The University of Sydney. His main areas of research interest are Micro/Nanoscale heat transfer, Nanofluidic, and Solar thermal energy. He is a member of the American Society of Mechanical Engineers (ASME) and the Association of Professional Engineers in Australia. He is also a reviewer of Journal of Energy, Elsevier.

mrh.hig@gmail.com

Notes: