International J. of Engg. Research & Indu. Appls. (IJERIA).
ISSN 0974-1518, Vol.6, No. II (May 2013), pp 203-220

NANOFLUID: FUTURE WORKING FLUID FOR HEAT EXCHANGING DEVICES

B. K. SONAGE AND P. MOHANAN
Department of Mechanical Engineering, National Institute of Technology Karnataka,
Surathkal, Mangalore, Karnataka-575025, India,

Abstract

Theoretical study of published research work related with thermophysical properties and heat transfer for Nanofluid has been presented in this paper. Nanofluid is a colloidal solution of base fluid and solid nanoparticles having size less than 100 nm. Due to Addition of nanoparticles in a base fluid, thermophysical properties of resulting fluid, such as thermal conductivity, specific heat, viscosity, density gets altered. The volume fraction of solid nanoparticles in a base fluid varies from 1 to 5%. Alteration in thermophysical properties decreases the Prandtl number of the fluid. Nanofluids having nanoparticle volume fraction less than 1% have been recommended as working fluid in heat exchanging devices. The PH of the nanofluid and laser irradiation of nanoparticle before dispersion also affects the thermal properties. The dielectric constant of nanoparticles and base fluid decides the combination of nanoparticle and base fluid. The literature indicates 10 to 75% increase in thermal conductivity of the nanofluid and 4% to 36% enhancement in heat transfer coefficient. Nanofluids can be used as a working fluid in heat exchanging devices due to enhanced thermal properties.

Keywords : nanofluid, Synthesis, thermal conductivity, Viscosity, PH, Heat transfer.