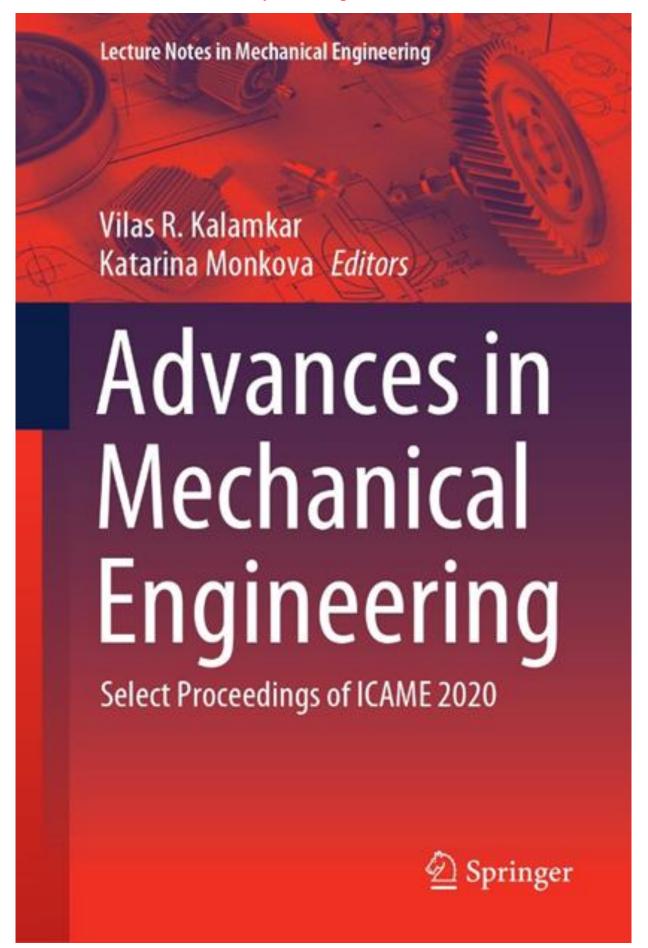
Dr. K.R. Nemade: Experimental Investigation of Effect of Nanoparticle Concentration On Thermo- Physical Properties Of Nanofluids



Editors
Vilas R. Kalamkar
Department of Mechanical Engineering
Visvesvaraya National Institute
of Technology
Nagpur, India

Katarina Monkova Faculty of Manufacturing Technologies Technical University of Kosice Presov, Slovakia

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Experimental Investigation of Effect of Nanoparticle Concentration on Thermo-physical Properties of Nanofluids



Prashant Maheshwary , C. C. Handa , K. R. Nemade , and N. N. Gyanchandani .

Abstract Present comparative study has experimentally investigated the effect of nanoparticle concentration on thermo-physical properties of nanofluids. This study was carried out with five different metal oxide (Al₂O₃, TiO₂, MgO, CuO and ZrO₂) nanoparticles. To analyze concentration effect, the concentration of nanoparticles was altered from 0.5 to 2.5 wt% by an interval of 0.5 wt%. The two-step method without any surfactant was employed for the preparation of nanofluids. All metal oxides were characterized by using X-ray diffraction analysis, scanning electron microscopy and ultraviolet-visible spectroscopy. To examine the stability of nanofluids, different parameters like velocity and Brownian velocity were computed by using dynamic light scattering technique (NanoZS, Malvern). Based on the results, it is concluded that thermal conductivity and viscosity are strongly influenced by concentration of nanoparticles in base fluids. The stability data also shows good dependence on concentration of nanofluids. In this comparative work, Al₂O₃-H₂O nanofluid depicted highest enhancement in thermal conductivity and heat transfer ratio among all nanofluids.

Keywords Heat transfer · Thermal conductivity · Viscosity · Stability · Nanofluid

1 Introduction

The researchers from across globe identified some parameters such as concentration, particle size and shape, which have great influence on heat transfer characteristics of nanofluids. Out of these parameters, concentration has significant effect on thermophysical properties of nanofluid. Bhuiyan et al. demonstrated the role of nanoparticle

P. Maheshwary (EE) · N. N. Gyanchandani J D College of Engineering and Management, Nagpur 441501, India e-mail: prashantmaheshwary51@gmail.com

C. C. Handa

KDK College of Engineering, Nagpur 440009, India

K. R. Nemade

Indira Mahavidyalaya, Kalamb 445401, India

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