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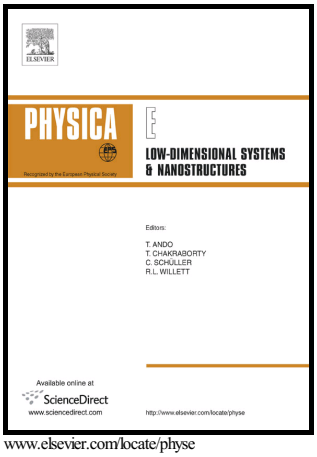

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How the dispersion of magnesium oxide nanoparticles effects on the viscosity of water-ethylene glycol mixture: experimental evaluation and correlation development

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Abstract

In this paper, the effect of dispersion of magnesium oxide nanoparticles on viscosity of a mixture of water and ethylene glycol (50%-50% vol.) was examined experimentally. Experiments were performed for various nanofluid samples at different temperatures and shear rates. Measurements revealed that the nanofluid samples with volume fractions of less than 1.5% had Newtonian behavior, while the sample with volume fraction of 3% showed non-Newtonian behavior. Results showed that the viscosity of nanofluids enhanced with increasing nanoparticles volume fraction and decreasing temperature. Results of sensitivity analysis revealed that the viscosity sensitivity of nanofluid samples to temperature at higher volume fractions is more than that of at lower volume fractions. Finally, because of the inability of the existing model to predict the viscosity of MgO/EG-water nanofluid, an experimental correlation has been proposed for predicting the viscosity of the nanofluid.

Keywords: Experimental evaluation; Nanofluid; Magnesium oxide nanoparticles; EG-water; Correlation