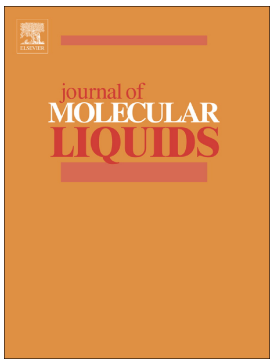

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Experimental study on rheological behavior of monograde heavy-duty engine oil containing CNTs and oxide nanoparticles with focus on viscosity analysis

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Abstract

In present work viscosity of an engine oil containing MWCNT and TiO2 having ratio of 50%-50% is experimentally studied. This study is performed at solid volume fractions of 0.0625%, 0.125%, 0.25%, 0.5%, 0.75% and 1%, and temperatures between 25℃ and 50℃. Studying the relation between viscosity and shear rate at the aforementioned conditions showed that behavior of nanofluid is similar to behavior of non-Newtonian fluids. In order to reduce number and cost of the viscosity measurement experiments, a new three variable empirical correlation is proposed for predicting the viscosity of MWCNT-TiO_2 (50%-50%)/SAE40. The proposed correlation coefficient of determination (R^2) was 0.9985 which shows the high accuracy for viscosity prediction. In addition, response surface method is used to analyze the terms of proposed correlation. Sensitivity of viscosity against temperature and solid volume fraction variations is another part of present study to check the level of the sensitivity of viscosity against unwanted changes in effective parameters on