عنوان مقاله:

Investigation with rheological behavior of liquid paraffin/Al2O3 nanofluid: Experimental approach

محل انتشار:

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نویسندگان:

Rouhollah Yadollahi Farsani - *Department of Mechanical Engineering, Shahrekord Branch, Islamic Azad University, Shahrekord, Iran*

Afrsiab Raisi - *Shahrekord University, Engineering Faculty, PO Box ۱۱۵, Shahrekord, Iran*

Afshin Ahmadi Nadooshan - *Shahrekord University, Engineering Faculty, PO Box ۱۱۵, Shahrekord, Iran*

Amin Shahsavar - *Department of Mechanical Engineering, Kermanshah University of Technology, Kermanshah, Iran*

خلاصه مقاله:

Liquid paraffin can be used as a coolant fluid in electronic and cutting devices due to its suitable capabilities such as electrical insulating, high heat capacity, chemical, and thermal stability, and high boiling point. In this study, the dynamic viscosity of paraffin containing the alumina nanoparticles has been examined experimentally. The nanofluids with different composition of alumina (0, 1, 2, and 3%) with the diameter of 20 nm were prepared by two-step method and tested by professional Brookfield rheometer in the temperature range of 20 oC to 60 oC and the shear rates of 12 s-1 up to 200 s-1. Experimental results indicated that the nano-lubricant behaves as Newtonian fluid in the volume fraction of 0 and 1% only at the temperatures of 50 and 60 oC. While it behaves as non-Newtonian fluid in the volume fraction of 2 and 3% for all measured temperatures. The results showed that the power law model represents the best curve fitting of the experimental data. Therefore, the coefficient values of power-law model including, consistency index and flow index were reported. Finally, an equation of relative viscosity based on the volume fraction and temperature of the combination was proposed by applying the curve fit technique on the experimental data.

کلمات کلیدی:

Experimental Correlation, Al2O3, Liquid Paraffin, nanofluid, Rheological Behavior