

عنوان مقاله:

Experimental Investigation of the Alumina/Paraffin Thermal Conductivity Nanofluids with a New Correlated Equation on Effective Thermal Conductivity

محل انتشار:

مجله تحقیقات انتقال حرارت و توده, دوره 6, شماره 2 (سال: 1398)

تعداد صفحات اصل مقاله: 9

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خلاصه مقاله:

Liquid paraffin as a coolant fluid can be applied in electronic devices as a result of its suitable capabilities such as electrical insulating, high heat capacity, chemical and thermal stability, and high boiling point. However, the poor thermal conductivity of paraffin has been confined its thermal cooling application. Addition of high conductor nanoparticles to paraffin can fix this drawback properly. In this article, the influence of the nanoparticles on the thermal conductivity of base material was assessed. Temperature ($20-50^{\circ}\text{C}$) and volume fractions ($0-3\%$) effect on the thermal conductivity of paraffin/alumina nanofluids have been considered. Nanofluid samples were prepared applying the two-step method. The thermal conductivity was measured by a KD γ instrument. The results indicated the thermal conductivity augments smoothly with an increase in volume fraction of nanoparticles as well as temperature. Moreover, it observed that for nanofluids with more volume-fraction the temperature affection is more remarkable. Thermal conductivity enhancement (TCE) and effective thermal conductivity (ETC) of the nanofluid was calculated and new correlations were reported to predict the values of them based on the volume fraction of nanoparticles and temperature of nanofluid accurately.

کلمات کلیدی:

Experimental correlation, Alumina, Liquid paraffin, Nanofluid

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