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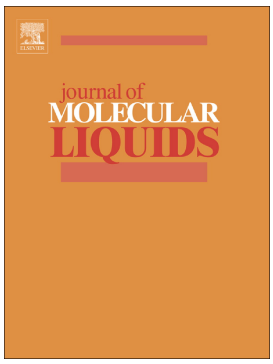

Forced convective heat transfer of nanofluid as a coolant flowing through a heat sink: Experimental and numerical study

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PII: S0167-7322(17)32887-8
DOI: doi:10.1016/j.molliq.2017.10.062
Reference: MOLLIQ 8024

To appear in: *Journal of Molecular Liquids*

Received date: 30 June 2017
Revised date: 9 October 2017
Accepted date: 13 October 2017

Please cite this article as: Seyed Ebrahim Ghasemi, A.A. Ranjbar, M.J. Hosseini , Forced convective heat transfer of nanofluid as a coolant flowing through a heat sink: Experimental and numerical study. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Molliq(2017), doi:10.1016/j.molliq.2017.10.062

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Forced convective heat transfer of nanofluid as a coolant flowing through a heat sink: Experimental and numerical study

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Abstract

In this paper, effect of using nanofluid as a coolant on heat dissipation from electronic components is investigated experimentally. Also, numerical simulation of the problem is performed using Computational Fluid Dynamics (CFD). The governing equations for nanofluid flow and heat transfer are solved using Finite Volume Method (FVM). Comparing the experimental and numerical results show that numerical results are in a good agreement with experimental data. The results indicate that, using of nanofluid instead of pure fluid as a coolant leads to enhanced heat transfer performance by increasing the amount of heat dissipated. Also, influences of some important parameters such as nanoparticle concentration and Reynolds number on the thermal and hydrodynamic characteristics of the heat sink are discussed in details. Furthermore, only a slight increase in the pressure drop across the nanofluid heat sink is found compared with the pure water-cooled heat sink.

Keywords: Experimental study, Nanofluid, Heat sink, Numerical simulation, Cooling performance.

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