

## Accepted Manuscript

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PII: S0093-6413(17)30116-7  
DOI: <http://dx.doi.org/doi:10.1016/j.mechrescom.2017.06.009>  
Reference: MRC 3177

To appear in:

Received date: 28-2-2017  
Revised date: 30-5-2017  
Accepted date: 9-6-2017

Please cite this article as: Ghasemi, Seyed Ebrahim, Ranjbar, A.A, Hosseini, M.J., Experimental evaluation of cooling performance of circular heat sinks for heat dissipation from electronic chips using nanofluid. Mechanics Research Communications <http://dx.doi.org/10.1016/j.mechrescom.2017.06.009>

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# Experimental evaluation of cooling performance of circular heat sinks for heat dissipation from electronic chips using nanofluid

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## Highlights

- Nanofluid flow in a heat sink is investigated experimentally.
- By addition of nanoparticles the heat dissipation is improved.
- Thermal resistance decreases with increase of nanoparticles volume fraction

## Abstract

In this work, an experimental investigation on cooling performance of using nanofluid to replace the pure water as the coolant in a minichannel heat sink is conducted. The heat sink comprises of four circular channels with hydraulic diameter of 6 mm. Thermal and hydraulic performances of the nanofluid cooled minichannel heat sink are evaluated from the results obtained for the Nusselt number, friction factor, thermal resistance and pumping power, with the volume flow rate ranging from 0.3 to 1.5 L/min. The experimental results show that the nanofluid cooled heat sink outperforms the water-cooled one, having significantly higher average heat transfer coefficient. Despite the marked increase in dynamic viscosity due to dispersing the nanoparticles in water, the friction factor for the nanofluid-cooled heat sink is found slightly increased only.

**Keywords:** Experimental evaluation, Cooling performance, Heat sink, Nanofluid, Electronic chips.

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