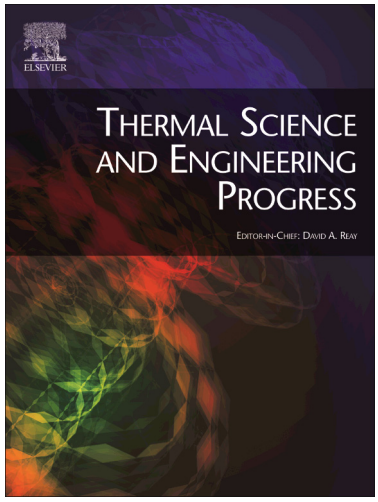

Investigation of finned heat sink performance with nano enhanced phase change material (NePCM)

Milad Bayat, Mohammad Reza Faridzadeh, Davood Toghraie

PII: S2451-9049(17)30335-9
DOI: https://doi.org/10.1016/j.tsep.2017.10.021
Reference: TSEP 85

To appear in: *Thermal Science and Engineering Progress*

Received Date: 30 September 2017
Revised Date: 18 October 2017
Accepted Date: 28 October 2017

Please cite this article as: M. Bayat, M.R. Faridzadeh, D. Toghraie, Investigation of finned heat sink performance with nano enhanced phase change material (NePCM), *Thermal Science and Engineering Progress* (2017), doi: https://doi.org/10.1016/j.tsep.2017.10.021

Investigation of finned heat sink performance with nano enhanced phase change material (NePCM)

Milad Bayat[1], Mohammad Reza Faridzadeh[1], Davood Toghraie[1*]

[1*]Department of Mechanical Engineering, Khomeinishahr Branch, Islamic Azad University, Khomeinishahr, Iran

[*]**Corresponding author:** Davood Toghraie, Department of Mechanical Engineering, Islamic AzadUniversity, Khomeinishahr Branch, Khomeinishahr 84175-119, Iran.
Email: Toghraee@iaukhsh.ac.ir

Abstract

In this research, the performance of a finned heat sink with phase change material (PCM) is numerically simulated for two cases: with and without PCM. The results showed an improvement in heat sink performance when using PCM. One of the defects of PCMs is their low thermal conductivity. One solution to deal with this problem is the addition of high thermal conductivity nanoparticles to PCMs. For this purpose, the effects of adding copper oxide and aluminum oxide nanoparticles to paraffin PCMs were investigated. The results show that the performance of heat sink is improved by adding a low percentage of nanoparticles (2%). However, by increasing volume fraction of nanoparticles to 6%, not only the heatsink performance does not improve, but also decreases.

Keywords: Heat sink, Performance, Nano enhanced phase change material**,** Paraffin