Effect of nitrogen-doped graphene nanofluid on the thermal performance of the grooved copper heat pipe - DTU Orbit (09/11/2017)

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Thermal performance of a grooved heat pipe using aqueous nitrogen-doped graphene (NDG) nanofluids was analysed. This study in particular focused on the effect of varying NDG nanosheets concentrations, heat pipe inclination angles and input heating powers. The results indicated that the inclination angle had a major influence on the heat transfer performance of heat pipes and the inclination angle ($\theta$) of 90° was corresponded to the best thermal performance. The maximum thermal resistance reduction of 58.6% and 99% enhancement in the evaporator heat transfer coefficient of the heat pipe were observed for NDG nanofluid with concentration of 0.06wt%, inclination angle of $\theta=90^\circ$ and a heating power of 120W in comparison to DI-water under the exact same condition. Additionally, the surface temperature distribution was decreased by employing NDG nanosheets, which can in return increase the thermal performance of a grooved heat pipe. The present investigation indicated that the thermal performance of the grooved heat pipe can be improved significantly by using NDG nanofluids.

General information
State: Published
Organisations: Department of Micro- and Nanotechnology, Colloids and Biological Interfaces, University of Malaya, Massachusetts Institute of Technology
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Pages: 459-473
Publication date: 2016
Main Research Area: Technical/natural sciences

Publication information
Journal: Energy Conversion and Management
Volume: 118
ISSN (Print): 0196-8904
Ratings:
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 6.04 SJR 2.287 SNIP 2.065
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 2.09 SNIP 2.092 CiteScore 5.24
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.854 SNIP 2.835 CiteScore 5.35
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.669 SNIP 2.558 CiteScore 4.49
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.732 SNIP 2.277 CiteScore 3.72
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.292 SNIP 1.846 CiteScore 3.03
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.372 SNIP 1.75
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.339 SNIP 1.797
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Graphene, Nanofluid, Heat pipe, Thermal resistance, Heat transfer coefficient, Effective thermal conductivity

DOIs:
10.1016/j.enconman.2016.04.028

Source: FindIt

Source-ID: 2303515807

Publication: Research - peer-review › Journal article – Annual report year: 2016