

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 (θ) 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.

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