

Experimental investigation of the effect of graphene nanofluids on heat pipe thermal performance - DTU Orbit (08/11/2017)

Experimental investigation of the effect of graphene nanofluids on heat pipe thermal performance

An experimental investigation has been carried out to examine the thermal performance of a sintered wick heat pipe using aqueous graphene nanoplatelets (GNP) nanofluids. The study focuses on changes in the effects of GNP concentration, heat pipe inclination angle and input heating power. The maximum reduction in the thermal resistance of a sintered wick heat pipe filled with 0.1 wt% of GNP is determined to be 48.4% compared with distilled water (DW). The results show that the maximum effective thermal conductivity enhancements for the heat pipe at a GNP concentration of 0.1 wt% and a tilt angle of 60° for heat input rates of 20, 40, 60 and 80 W are 23.4, 29.8, 37.2 and 28.3%, respectively, compared with a horizontal position ($\theta=0^\circ$). It is observed after the experiments that the deposition of GNP creates a coating on the sintered wick surfaces in the evaporator section. This coating layer increases the surface wettability, thereby enhancing the thermal performance of the heat pipe.

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