Experimental investigation of thermophysical properties, entropy generation and convective heat transfer for a nitrogen-doped graphene nanofluid in a laminar flow regime - DTU Orbit (08/11/2017)

Experimental investigation of thermophysical properties, entropy generation and convective heat transfer for a nitrogen-doped graphene nanofluid in a laminar flow regime

Nitrogen-doped graphene (NDG) nanofluids are prepared using a two-step method in an aqueous solution of 0.025. wt% Triton X-100 as a surfactant with various nanosheets at several concentrations (0.01, 0.02, 0.04, 0.06. wt%). The results are reported of experiments on the thermal conductivity, viscosity and convective heat transfer behavior of NDG nanofluids undergoing laminar flowing in a circular tube. The results indicate that, compared to the base liquid, the thermal conductivity is enhanced for NDG nanofluids by between 22.15% and 36.78%, and the heat transfer coefficient of the NDG nanofluids is increased by 7-50%. The measurements also show that the pressure drop of the nanofluids increased by between 0.08% and 14.4%. In addition, the overall performance of the tested nanofluids are assessed based on the performance index and optimum work conditions, demonstrating that the nanofluids can be advantageous in practical applications.

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