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POTENTIAL OF USING NANOFLUIDS AS A WORKING FLUID FOR ENHANCED HEAT TRANSFER IN LOOP HEAT PIPES FOR THERMAL MANAGEMENT OF ELECTRONIC DEVICES IN SPACE

Abstract

The loop heat pipe (LHP) is a passive two-phase heat transfer device that operates on a closed two-phase fluid-flow cycle, sustained by a capillary medium in the evaporator. LHPs are used to remove excessive waste heat that is released from the heat source (e.g., electronic units) and transfer it to the heat sink (e.g., deployable radiators) to maintain the temperature of the heat source within certain reasonable ranges. Traditional working fluids (e.g. alcohols) encounter certain heat transfer limitations due to their lower thermal conductivity. Nanoparticles due to enhanced thermal properties can overcome this limitation by providing better heat transfer performance. The evaporator temperature will be evaluated using different nanoparticles suspended in basefluid numerically in order to show the potential of nanofluids for thermal management of electronic devices.