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**Thermal performance and operational attributes of the startup characteristics of flat-shaped heat pipes using nanofluids.** (English) Zbl 1235.80005

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Summary: Thermal performance, transient behavior and operational start-up characteristics of flat-shaped heat pipes using nanofluids are analyzed in this work. Three different primary nanofluids namely, $CuO$, $Al_2O_3$, and $TiO_2$ were utilized in our analysis. A comprehensive analytical model, which accounts in detail the heat transfer characteristics within the pipe wall and the wick within the condensation and evaporation sections, was utilized. The results illustrate enhancement in the heat pipe performance while achieving a reduction in the thermal resistance for both flat-plate and disk-shaped heat pipes throughout the transient process. It was shown that a higher concentration of nanoparticles increases the thermal performance of either the flat-plate or disk-shaped heat pipes. We have also established that for the same heat load a smaller size flat-shaped heat pipe can be utilized when using nanofluids.

### MSC:

80A20 Heat and mass transfer, heat flow (MSC2010)
80A22 Stefan problems, phase changes, etc.

### Keywords:

heat pipe; nanofluid; thermal performance; flat-shaped; disk-shaped

### Full Text: DOI

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