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Experimental Investigation of Temperature-Dependent Thermal Stability of Eicosane-Based Nano-Enhanced Phase Change Materials

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Abstract

Recently, studying phase change materials (PCMs) has brought many researchers' attentiveness to be applied in thermal energy storage and battery thermal management (BTM) applications. According to this fact that PCM requires to be thermally stable. Hence, the principal aim of this study is to analyze the thermal stability of PCMs composites by loading different mass fractions of CuO nano-particles. Results demonstrated that 0.5 wt% is the best value of additive nano-particle which showed a remarkable increment in thermal stability. Therefore, all the presented results indicate the importance of selecting an optimal PCM nanocomposite for various applications including NePCM-based thermal energy storage and BTM systems. The brand and model of the device used in this study are Hitachi and STA7000 respectively.

Keywords: Phase change material; CuO nano-particles; Nano-enhanced phase change materials; Thermal stability.