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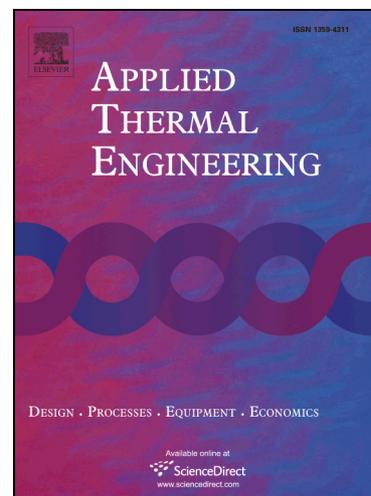
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Thermal properties and stabilities of the eutectic mixture: 1, 6–hexanediol/lauric acid as a phase change material for thermal energy storage

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Abstract: Thermal properties and stabilities of the eutectic mixture: 1, 6–hexanediol (HE) and lauric acid (LA) as a new phase change material (PCM) for latent heat thermal energy storage (TES) were investigated. Differential scanning calorimetry (DSC) results indicated that the aforementioned HE/LA mixture with eutectic composition (70/30 wt.%) was a suitable PCM in terms of melting point ($T_{\text{peak}} = 36.92 \pm 0.71$ °C) and latent heat of fusion ($\Delta H_m = 177.11 \pm 7.93$ J g⁻¹). After 1000 thermal cycles, the change in melting point for the eutectic mixture was in the range of -0.49% to -1.19%, and the change in latent heat of fusion was in the range of -0.22% to -3.24%. The eutectic mixture was thermally and chemically stable according to results of thermogravimetric analysis (TGA), volatile test and Fourier Transform Infrared (FT-IR) spectroscopic analysis. Therefore, the HE/LA eutectic mixture is an effective TES material to reduce energy consumption.

Keywords: Eutectic mixture; 1, 6–hexanediol; Lauric acid; Phase change material; Stability

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