

Investigation on thermophysical properties of metallic oxide nanoparticle dispersed in fatty acid

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ABSTRACT

The energy sector is witnessing a gradual shift towards renewable energy sources in the past few decades. Solar energy is the most widely harnessed one although it exhibits unevenness in distribution. Integrating latent heat storage materials into Photovoltaic systems could function as thermal storage batteries which can regulate the intermittency in solar radiations. The effective heat management of the thermal energy storage system is greatly affected by the poor thermal conductivity of phase change materials. To improve the thermal conductivity of palmitic acid (phase change material), metal oxide nanoparticles (copper oxide having size 30-50 nm) were added in various concentrations ranging 0.1% and 0.5% weight. The thermal conductivity was found to be enhanced by 3.55%, 8.86% respectively. Thermal stability was also improved with nanoparticle addition. Transmittivity decreased by 9.6% with 0.5% addition of nanoparticles. These results suggest that the novel composite could be effectively employed in thermal energy storage applications.

KEYWORDS

Latent Heat Energy Storage System; Material Characterization; Nano-Enhanced PCM; Solar Absorption

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