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Surfactant effects in functionalized multiwall carbon nanotube-filled phase change materials

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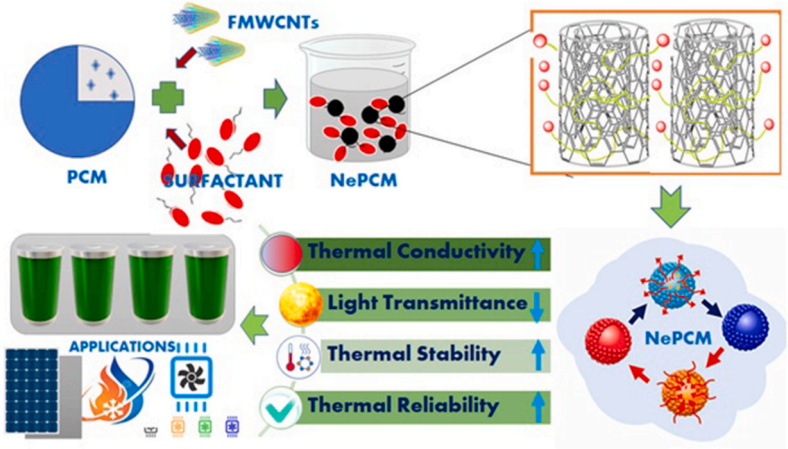
HIGHLIGHTS

- Influence of surfactant on FMWCNT enhanced PCM properties studied.
- Formulated nanocomposites exhibit thermally and chemically stable up to 405 °C.
- Enhancement in thermal conductivity by 150.7 % with A70F-1 nanocomposite.
- Light transmission reduced 84.56 % with A70-0.7FS composite compared to pure PCM.
- Thermal and chemical reliability of NePCM was analyzed up to 500 thermal cycles.

GRAPHICAL ABSTRACT



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ABSTRACT

Energy storage using phase change materials (PCM) is an efficient way to harness thermal energy from solar energy due to its higher storage density, particularly for medium-temperature applications. However, the PCMs have lower thermal conductivity; owing to this, the thermal performance and heat transfer rate are inadequate. To address this challenge, the current work explores the integration of carbon-based nanoparticles into the PCM

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