

Phase change materials (PCMs) have emerged as a viable technology for thermal energy storage, particularly in solar energy applications, due to their ability to efficiently store and ...

Solid-solid phase change materials (SSPCMs) are among the most promising candidates for thermal energy storage and management. Excellent shape stability, high heat storage ...

Phase change materials (PCM) are employed to store thermal energy in solar collectors, heat pumps, heat recovery, hot and cold storage. PCMs are encapsulated primarily in shell-and-tube, ...

The decomposition of TPUPCM starts and reaches a maximum at 323.5 °C and 396.2 °C, respectively. Furthermore, the solid-solid phase-change material is dissolvable, meltable and can ...

Thermal energy storage using phase change materials (PCMs) offers enormous potential for regulation of unmatched energy supply and demand of renewable energy resources, ...

Phase change material for solar-thermal energy storage is widely studied to counter the mismatch between supply and demand in solar energy utilization. Here, authors introduce optical ...

On the other hand, "solid-solid phase change materials" prepared by physical blending methods exhibit a large rigidity [15], which leads to poor contact with heat sources and brittle fracture ...

Abstract: Solid-solid phase change materials (SSPCMs) are a new class of materials capable of efficiently ...

Solar energy is a renewable energy source that can be utilized for different applications in today's world. The effective use of solar energy requires ...

Abstract This study deals with the preparation and characterization of the composites of polyethylene glycol (PEG)/the synthesized polymeric solid-solid phase change material (SSPCM) as ...

Abstract In this study, two components based polyethylene glycol (PEG)/thermosetting solid-solid phase change material composites as novel form stable phase change material (FSPCM) ...

In this article, a solar-thermal conversion material, Fe₂O₃-rGO, is integrated into the matrix of recyclable solid-solid phase change materials ...

Phase change materials comprising solid and liquid phases are frequently utilized in solar energy applications

owing to their superior energy storage capacity and minimal volume ...

With the rapid advancement of artificial intelligence, smart sensing technologies, and batteries with high power density, thermal ...

In this work, a new system of MXene-integrated solid-solid PCMs is presented as a promising solution for a solar-thermal energy storage and electric conversion system with high ...

Phase change materials (PCMs) exhibit significant potential for overcoming the issues related to thermal energy storage and management. ...

Phase change materials (PCM) have been widely used in thermal energy storage fields. As a kind of important PCMs, solid-solid PCMs possess unique advantages of low subcooling, low ...

It is concluded that the crosslinking density of SSPCMs is a crucial factor significantly influenced the free movement and crystallization of PEG segments, and then affects phase transition ...

Polyurethane polymers (PUs) have been synthesized as solid-solid phase change materials for thermal energy storage using three different kinds of diisocyanate molecules and polyethylene glycols ...

This paper proposes, for the first time, the use of solid-solid PCMs (SSPCMs) to cool solar PV panels, addressing the issues of liquid leakage and large volume changes related to solid ...

Abstract Three strategies for enhancing the melting rate of phase change materials (PCMs) are analyzed numerically: natural convection, thermocapillary convection, and variations in ...

Fabrication and characterization of polyurethane-grafted reduced graphene oxide as solid-solid phase change materials for solar energy conversion and storage

Inherent low thermal conductivity of organic phase change materials reduces the heat transfer efficiency of latent thermal energy storage (TES) systems. In order to improve the ...

Phase change materials are substances which interact with different conditions of environment and change their property by showing different phases. The phases refers to the ...

During the cooling process, the modified asphalt cooled relatively slow before the phase transition of the polyurethane solid-solid PCM. With continued decrease in the temperature, ...

Over-exploitation of fossil-based energy sources is majorly responsible for greenhouse gas emissions which causes global warming and climate change. T...

Solid-solid phase change solar container

Benefiting from high fusion enthalpy, narrow storage temperature ranges, and relatively low expansion coefficients, solid-liquid phase change ...

ABSTRACT The use of phase change materials (PCMs) in various applications, such as brick walls, cold thermal energy storage systems, solar water heating, and photovoltaic-thermal (PVT) systems ...

When matter changes from one state (i.e. a solid) to another state (i.e. a liquid), we call that a change of state or a phase transition. For matter to change from a solid to a liquid, or a liquid to a gas, requires ...

Emerging solid-solid PCMs (SSPCMs) enable their application independently without requiring complex encapsulation or additional supporting materials. SSPCMs are mainly prepared by chemical grafting, ...

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