Phase change solar container fiber

Can solar-thermal phase change composites harness solar energy?
To clarify future research directions, this study first analyzes the heat transfer process of solar-thermal conversion and then reviews solar-thermal phase change composites for high-efficiency harnessing solar energy. The focus is on enhancing heat absorption and conduction while aiming to suppress reflection, radiation, and convection.

How are phase change fibers made?
Phase change fibers are primarily prepared by utilizing various spinning techniquesto fabricate phase change materials into fibers,including melt spinning,17,18 electrospinning,19 and wet spinning,20,21 in which polymers play the roles of supporting structure.

Are ultrafine composite fibers a form-stable phase change material?
He,et al.,Electrospun ultrafine composite fibers consisting of lauric acid and polyamide 6 as form-stable phase change materialsfor storage and retrieval of solar thermal energy,Sol. Energy Mater. Sol. Cells,2012,103,53-61 CrossRef CAS.

Are pristine phase change materials adequate for optical capture and absorption?
Learn more. The efficient capture,conversion,and storage of solar energy present significant promise for advancing green energy utilization. However,pristine phase change materials (PCMs) are inherently inadequatefor optical capture and absorption.

What is phase change composite?
The phase-change composite not only exhibits excellent solar-thermal, thermoelectric, electrothermal, and magnetothermal energy conversion performance, but also achieves high electromagnetic interference shielding effectiveness of 66.2 dB in the X -band.

Can a phase-change material be used in smart textiles?
This study introduces a promising phase-change material for advanced applications in smart textiles,enabling efficient temperature regulation and energy conservation while ensuring comfort during wear. Article subjects are automatically applied from the ACS Subject Taxonomy and describe the scientific concepts and themes of the article.

Integrating phase change materials (PCMs) into stimuli-responsive fibers offers exciting opportunities for smart clothing to realize instant energy conversion/storage and temperature ...

Metallic foams, especially copper foams (CF), have been investigated to solve the problems of leaking and low thermal conductivity of phase change materials (PCMs), which helps to ...

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Abstract Using phase change fibers (PCFs) will help buffer the changes in ambient temperature, improve the utilization of natural energy, and ease the energy crisis. However, the poor ...

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, ...

This study evaluates the effectiveness of phase change materials (PCMs) inside a storage tank of warm water for solar water heating (SWH) system through the theoretical simulation ...

It has a suitable phase-change temperature, relatively high latent heat, negligible supercooling, good thermal reliability, and no phase separation at high temperatures. It can ...

Abstract Solid-solid phase change fibers are advantageous for thermal management and latent heat storage, because they don"t have the issue of liquid leakage facing those common ...

The efficiency of photovoltaic (PV) solar panels decreases with increasing operating temperature, necessitating effective thermal management solutions. Phase change materials (PCM"s) ...

Phase change material (PCM) has attracted considerable attention as thermal energy management technology for thermal storage. However, the low thermal conductivity and poor solar-thermal ...

The phase change fibers containing PCMs could provide the surroundings relatively constant temperature through absorbing and releasing heat during phase transition process, which is ...

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 ...

In this study, the phase change cold storage materials, cold storage units and diversified cold storage box applied to cold chain logistics are reviewed. Besides, based on the state ...

Assembling halloysite nanotubes in nickel foam with silica fibers as scaffold for efficiently encapsulating phase change materials towards solar-thermal-electric energy conversion ...

In this study, a novel composite phase change material (TD@CKF-PVA) was designed. It utilizes a three-dimensional network structure constructed from cross-linked polyvinyl alcohol (PVA) and kapok ...

Abstract In this research, a new bio-based phase change material (PCM) composed of oleic acid and beeswax is synthesized to absorb excess heat from the PV panel. Metal matrix sheets ...

Phase change materials (PCMs) have shown promising applications for thermal energy storage and management. With the purposes of solving the critical leakage problem and improving ...

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Abstract Latent heat thermal energy storage (LHTES) is often employed in solar energy storage systems to improve efficiency. This method uses phase change materials (PCM) as ...

Smart and robust phase change cellulose fibers from coaxial wet-spinning of cellulose nanofibril-reinforced paraffin capsules with excellent thermal management Kang Yang a

The study of anisotropically thermal conductive phase change composites (PCCs) with shape-stability is of great importance to improve the intermittent issues in solar thermal utilization, ...

A flexible hollow polypropylene (PP) fiber was filled with the phase change material (PCM) polyethylene glycol 1000 (PEG1000), using a micro-fluidic filling technology. The fiber"s latent heat storage and ...

Abstract Nowadays, converting and storing solar energy is crucial in contemporary society. Thermal energy storages (TESs) can be vital in harnessing solar energy effectively. Phase ...

Solid-liquid phase change materials (SLPCMs), with their high latent heat storage capacity and chemical stability, can efficiently store solar energy during periods of strong irradiation ...

In this study, directional chitosan/carbon fiber powder aerogels were successfully prepared as a support matrix by directional freezing technique for encapsulation of phase change ...