Phase change energy storage material film

Are phase change materials suitable for thermal energy storage?
Phase change materials (PCMs) having a large latent heat during solid-liquid phase transition are promisingfor thermal energy storage applications. However,the relatively low thermal conductivity of the majority of promising PCMs (<10 W/(m ? K)) limits the power density and overall storage efficiency.

Can phase change materials be used for zero-energy thermal management?
Nature Communications 14,Article number: 8060 (2023) Cite this article Phase change materials (PCMs) offer great potentialfor realizing zero-energy thermal management due to superior thermal storage and stable phase-change temperatures.

What is a flexible phase change material based on PA/tpee/EG?
A shape-memory, room-temperature flexible phase change material based on PA/TPEE/EG for battery thermal management. Chem. Eng. J.463, 142514 (2023). Qi, X., Shao, Y., Wu, H., Yang, J. & Wang, Y. Flexible phase change composite materials with simultaneous light energy storage and light-actuated shape memory capability. Compos. Sci.

Are phase change materials suitable for wearable thermal regulation?
Phase change materials (PCMs) offer great potential for realizing zero-energy thermal management due to superior thermal storage and stable phase-change temperatures. However,liquid leakage and solid rigidity of PCMs are long-standing challengesfor PCM-based wearable thermal regulation.

What is thermal management using phase change materials (PCMs)?
Thermal management using phase change materials (PCMs) is a promising solution for cooling and energy storage7,8,where the PCM offers the ability to store or release the latent heat of the material.

Are polyethylene glycol/polyurethane acrylate-based flexible phase-change films cured using UV curing technology?
In this study, we prepared novel polyethylene glycol (PEG)/polyurethane acrylate (PUA)-based flexible phase-change films (PCFs) using ultraviolet (UV) curing technology to solve these problems.

Latent heat thermal energy storage based on phase change materials (PCM) is considered to be an effective method to solve the contradiction between solar energy supply and demand in time and space. The development of PCM composites with high solar energy absorption efficiency and high energy storage density is the key to solar thermal storage ...

With the sharp increase in modern energy consumption, phase change composites with the characteristics of rapid preparation are employed for thermal energy storage to meet the challenge of energy crisis. In this study,

a NaCl-assisted carbonization process was used to construct porous Pleurotus eryngii carbon with ultra-low volume shrinkage rate of 2%, ...

Phase change materials (PCMs) are a class of thermoresponsive or thermoregulative materials that can be utilized to reduce temperature fluctuations and provide cutting-edge thermal storage. PCMs are commercially used in a variety of important applications, such as buildings, thermal engineering systems, food packaging, and transportation. The ...

Conventional phase change materials struggle with long-duration thermal energy storage and controllable latent heat release. In a recent issue of Angewandte Chemie, Chen et al. proposed a new concept of spatiotemporal phase change materials with high supercooling to realize long-duration storage and intelligent release of latent heat, inspiring the design of ...

Developing phase change materials (PCMs) with solar-thermal energy conversion and storage for wearable personal thermal management is of significance but challenging, due to the difficulty of overcoming the liquid phase leakage, weak light adsorption, and solid phase rigidity of conventional phase change materials.

A 3D self-floating evaporator loaded with phase change energy storage materials for all-weather desalination. Author links open overlay panel Yuqin Teng a, Shuai Li b, Yanxia Luo a, Xin Yi a, Libang Feng a, Dianming Li a, Yanping Wang a. ... Fig. 3 d illustrates the light absorption performance of the PAN/C film reaching 94 % at wavelengths of ...

Compared with other energy storage materials, phase change materials (PCMs) are drawing widespread attention because of their high enthalpy and low temperature change. However, its low thermal conductivity, low photo/electro-thermal conversion characteristics, phase separation and easy leakage are still urgent problems.

The 0.2PPL-2 film exhibits solid-solid phase change behavior with energy storage density of 131.8 J/g at the transition temperature of 42.1 °C, thermal cycling stability (500 cycles), wide-temperature range flexibility (0-60 °C) and self-healing property. Notably, the PPL film can be recycled up to 98.5% by intrinsic remodeling.

Phase change film (PCF) has been extensively studied as a novel application form of energy storage phase change material (PCM). The emergence of PCF has made possible the application of PCM in highly flexible and space-constrained fields, which was hard to ...

Phase change materials (PCMs) have attracted significant attention in thermal management due to their ability to store and release large amounts of heat during phase transitions. However, their widespread application is restricted by leakage issues. Encapsulating PCMs within polymeric microcapsules is a promising strategy to prevent leakage and increase ...

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Solid-liquid phase-change materials (PCMs) are a type of latent heat-storage material. They can absorb and store a large quantity of thermal energy from different heat sources, such as solar and waste heat, and release it in a small range of temperature fluctuation through reversible solid-liquid phase transitions [1, 2] ch a distinguished feature enables ...

DOI: 10.1016/j.nanoen.2024.109437 Corpus ID: 268233324; Composite Phase-Change Materials for Photo-Thermal Conversion and Energy Storage:A review @article{Chai2024CompositePM, title={Composite Phase-Change Materials for Photo-Thermal Conversion and Energy Storage:A review}, author={Zongce Chai and Minghao Fang and Xin Min}, journal={Nano Energy}, ...

DOI: 10.1016/j.ensm.2020.10.014 Corpus ID: 225122354; An intrinsically flexible phase change film for wearable thermal managements @article{Kou2021AnIF, title={An intrinsically flexible phase change film for wearable thermal managements}, author={Yan Kou and Keyan Sun and Jipeng Luo and Feng Zhou and Haibo Huang and Zhong-Shuai Wu and Quan Shi}, ...

As one of the important directions of solar energy utilization, the construction of composite photothermal phase change materials (PCM) with reasonable network support and low leakage in the simple method is important to solve the transient availability of solar energy and achieve long-lasting energy output.

Materials to be used for phase change thermal energy storage must have a large latent heat and high thermal conductivity. They should have a melting temperature lying in the practical range of operation, melt congruently with minimum subcooling and be chemically stable, low in cost, non-toxic and non-corrosive.

Thermal management has become a crucial problem for high-power-density equipment and devices. Phase change materials (PCMs) have great prospects in thermal management applications because of their large capacity of heat storage and isothermal behavior during phase transition. However, low intrinsic thermal conductivity, ease of leakage, and lack ...

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