Phase change solar container of packaging film

How can a phase change energy storage material improve photo-thermal conversion?
In this study, we integrated a phase change energy storage material (Na 2 SO 4 ·10H 2 O) into a solar evaporator encapsulated within a dual-network hydrogel composed of sodium alginate and polyacrylamide. Additionally, Chinese ink was utilized as a light absorber to improve the efficiency of photo-thermal conversion.

What is a phase-change material-integrated dual-mode Janus Film?
Here,a phase-change material-integrated dual-mode Janus film with enhanced radiative cooling and SH for thermal managementis demonstrated. The Janus film is developed by integrating a paraffin-type phase-change material (PCM) and carbon nanotube (CNT)-modified poly (dimethylsiloxane) (PDMS),enabling both PRC and SH.

Can liquid-solid phase change materials be used for multi-temperature control?
Reliable transportation of multiple goods with different temperature requirements can logistically challenging. Here,the authors propose an adaptive multi-temperature control system using liquid-solid phase change materialsto achieve effective thermal management using just a pair of heat and cold sources.

Can multiple phase-change materials be used as heat/cold sources?
Cutting-edge technologies,utilizing multiple phase-change materials (PCMs) as heat/cold sources with advantages in energy storage and mobility,have considerable potentialin achieving this aim by controlling one zone per PCM 4,5,8,9,10,11.

How can packaging materials improve food temperature management?
To achieve refrigeration using packaging materials,it is necessary to control the temperature via the material's properties and structural design. This study focuses on materials that combine latent heat storage with radiative refrigeration propertiesto enhance food temperature management.

How can stable supercooling and phase-change hysteresis improve energy storage convenience?
The development of stable supercooling and phase-change hysteresis technologies,which can provide stable temperature boundaries for AMTC,can expand the range of PCM candidates for mobile heat sources and increase energy storage convenience with the seasonal storage characteristics35,36,37,38,62,64,65,66,67,68.

Abstract 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, ...

These services use insulated containers for delivering hot foods. However, such containers are not helpful for

longer journey hours. Inclusion of latent heat storing and form-stabilized phase change ...

Herein, we prepare a multifunctional, gelatin-based smart packaging film engineered for dual-mode thermal management, integrating phase change thermal buffering and passive ...

In this study, we developed an electrostatically spun package for food temperature management, in which fatty acid eutectic microcapsules were doped into poly(vinyl alcohol) fibers to achieve a ...

Results of the review study recommends some suitable phase change materials for solar cookers, solar stills, solar ponds, air heaters, PV systems and water heaters on the basis of ...

The present work deals with the review of containers used for the phase change materials for different applications, namely, thermal energy storage, electronic cooling, food and drug ...

In this paper, cellulose nanofibers (CNF) incorporate molybdenum disulfide (MoS 2) has been self-assembled into a flexible layered porous film, which has been used to encapsulate polyethylene ...

Numerical Simulation of Thermal Packaging is critical to reducing design time and cost. The specific techniques for macro encapsulation include ...

Packaging with heat management capabilities is a relatively new idea for packaging construction that actively contributes to food preservation. Phase change materials (PCMs) can be utilized in active ...

Encapsulating phase change materials (PCMs) or nano enhanced PCMs can serve as thermal batteries for storing solar energy, whereby it is important to consider the energy ...

The use of renewable energy sources as solar energy for substituting fossil fuels in the industry proved to be viable. Concentrating solar power plants with a thermal storage system (both ...

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), ...

This review presents the development of different geometrical of phase change material (PCM) containers and their design parameters for thermal energy storage (TES) systems developed ...

Solar energy is widely acknowledged as a renewable and environmentally friendly energy source. Efficient storage of heat energy is a crucial challenge in solar thermal applications. ...

The fabrication and formulation of phase change materials (PCMs) aim to improve their performance by increasing heat transfer, avoiding supercooling, accommodating the volume ...

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Schematic illustrating solar-driven interfacial evaporation of hydrogel-integrated phase change materials for energy conversion, storage and utilization in desalination.

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 ...

In this study, we present an adaptive multi-temperature control system using liquid-solid phase transitions to achieve highly effective thermal management using a pair of heat and cold sources.

Thermal energy storage improves the productivity of solar collectors. Phase change materials (PCM) are employed to store thermal energy in solar collectors, heat pumps, heat recovery, ...

In this paper, a simple computational model for isothermal phase change of phase change material (PCM) encapsulated in a single container is presented...

Compared with conventional electronic packaging materials, after packing our novel phase-change-based electronic packaging materials, the cooling effect of 13 ? can be achieved.

Inclusion of latent heat storing and form-stabilized phase change materials (PCMs) in such containers is an effective way of maintaining the required temperature for longer hours.

This research introduces hybrid cooling films by incorporating phase change capsules (PCCs) into polypropylene (PP) films treated with a lysozyme-phytic acid coating to enhance ...

In comparison to traditional emitters, PCM-incorporated colourful coolers provide energy storage capacity and colourful appearances. Our phase-transition-based colourful flexible film ...

In this study, tetradecane was selected as a phase change material (PCM) to provide a thermal buffering system for meat packaging. Firstly, tetradecan...

Nanocomposite flexible food packaging films that prolong the time that frozen or chilled food products stay cold are demonstrated. Nanohybrids of phase change materials (PCMs) and ...

These studies illustrate that active solar dryer gives better performance compare to passive one. The studies show that constant temperature drying provides better dried food quality but ...

In this study, we have developed a novel distributed packaging of solar interfacial evaporated hydrogel with phase change materials (PSSC), using polyacrylamide (PAM) and sodium ...

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The on-going search for increasingly sustainable and efficient thermal energy management across a wide range of sectors leads to continuous exploratio...

The Janus film is developed by integrating a paraffin-type phase-change material (PCM) and carbon nanotube (CNT)-modified poly (dimethylsiloxane) (PDMS), enabling both PRC and SH. ...

Phase change materials (PCMs) offer various benefits such as a wide temperature range, high energy density, low cost, and abundance in nature [7], [8]. Therefore, the thermal energy ...

The development of energy saving methods and energy storage materials is an emerging hot topic in various fields including the food industry. Thermal energy storage can be ...

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