

Solid-solid phase change energy storage materials



Overview

Comprehensive review of the 4 major types of solid-solid phase change materials.

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Preparation of flexible solid-solid phase change materials with simultaneously thermal energy storage capability, reprocess ability and dual-actuated shape memory performance.

Herein, the aim is to provide a holistic analysis of solid-solid PCMs suitable for thermal-energy harvesting, storage, and utilization. The developing strategies of solid-solid PCMs are presented and then the structure-property relationship is discussed, followed by potential applications.

This study offers a new solution for TES system design and highlights the significant potential of the synergistic interaction between organic and inorganic phase change materials.

The present work may inspire the discovery of advanced high-performance solid-state thermal energy storage materials in a broad range of metallic phase-transforming materials.

Solid-solid phase change energy storage materials



Flexible solid-solid phase change material with zero ...

Composite phase change material (CPCM) has great potential in addressing the challenges associated with thermal energy storage and thermal management. ...

Tuning the flexibility and thermal storage capacity of ...

Polyurethane (PU) based phase change materials (PCMs) undergo the solid-solid phase transition and offer state-of-the-art thermal energy storage ...



Polyurethane-based solid-solid phase change materials with in ...

Polyurethane-based solid-solid phase change materials with in situ reduced graphene oxide for light-thermal energy conversion and storage

Mechanically strong, healable, and recyclable supramolecular solid

Organic phase change materials (PCMs), with inherent capability to charge and discharge latent heat via solid-liquid phase transformation, have obtained significant progress ...



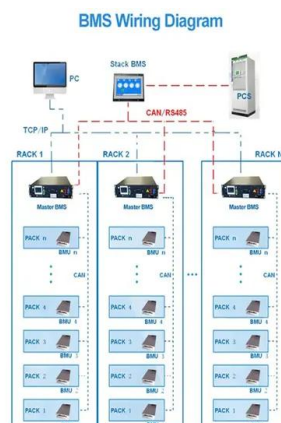
Ultrahigh-enthalpy solid-solid phase change materials

The Innovation Energy 1(3): 100036. Phase change materials (PCMs) have been broadly researched in thermal energy storage fields due to their high latent heat and reversible ...



Recent developments in solid-solid phase change materials for ...

Preparation of flexible solid-solid phase change materials with simultaneously thermal energy storage capability, reprocess ability and dual-actuated shape memory ...



Highly stable solid-solid phase change materials for battery ...

A composite solid-solid phase change material (SSPCM-CNT) with high thermal conductivity and stability was then prepared by incorporating CNT-OH. A battery thermal ...

Super tough and stable solid-solid phase change material based ...

The solid-solid phase change materials (SSPCMs) have become the preferred materials in thermal energy storage via absorbing latent heat from ambient environment. ...



Recyclable, Self-Healing, and Flame-Retardant ...

Polyurethane solid-solid phase change materials based on triple dynamic bonds with excellent mechanical and self-healing properties for ...

High energy storage density titanium nitride-pentaerythritol solid

To achieve the goal of carbon neutrality, efficient use of solar energy is feasible and imminent. The selection of phase change materials (PCMs) as energy storage media is an ...



Flexible solid-solid phase change materials with high stability for

In conclusion, the composite solid-solid phase change material prepared in this paper has good thermodynamic and mechanical properties, and is expected to become a ...



Thermally reliable, recyclable and malleable ...

Conventional solid-solid phase-change materials (SSPCMs) exhibit good thermal energy storage (TES) ability and shape stability, but they cannot be recycled ...



Tough and sustainable solid-solid phase change ...

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

High-performance and stress-controllable solid-solid phase change

Abstract Phase change materials (PCMs) show substantial promise in regulating the supply and demand of renewable energy and in recovering and utilizing waste heat. ...



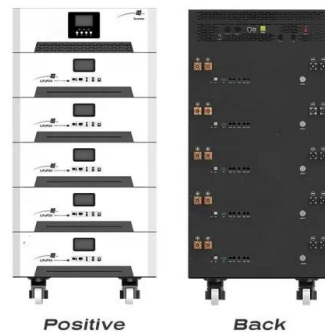


Multiple H-Bonding Cross-Linked Supramolecular ...

A supramolecular polymeric solid-solid phase change material with high latent heat storage and superior mechanical strength is developed for ...

Oriented High Thermal Conductivity Solid-Solid ...

As the global energy crisis intensifies, the development of solar energy has become a vital area of focus for many nations. The utilization of phase change ...



A polyurethane solid-solid phase change material for flexible use ...

Phase change materials (PCMs) have received great attention in thermal management of electronic devices due to their high energy storage density and no need for ...

One-Step and Solvent-Free Synthesis of Polyethylene ...

Polyethylene glycol (PEG)-based solid-solid phase change materials (SSPCMs) were first synthesized using PEG and hexamethylene ...



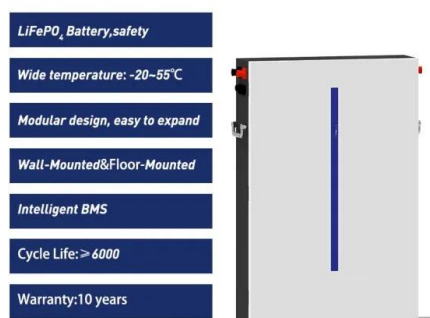
Solid-solid phase change fibers with enhanced energy storage

...

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 ...

Emerging Solid-to-Solid Phase-Change Materials for ...

Phase-change materials (PCMs) offer tremendous potential to store thermal energy during reversible phase transitions for state-of-the-art applications.



Synthesis and thermal energy storage characteristics of polystyrene

A series of polystyrene graft palmitic acid (PA) copolymers as novel polymeric solid-solid phase change materials (PCMs) were synthesized. In solid-solid PCMs, ...

Emerging Solid-to-Solid Phase-Change Materials for ...

Herein, the aim is to provide a holistic analysis of solid-solid PCMs suitable for thermal-energy harvesting, storage, and utilization. The ...



Ultrahigh-performance solid-solid phase change material for ...

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



Experimental study on solid-solid phase change energy storage materials

Compared to solid-liquid phase change energy storage, solid-solid phase change energy storage offers better volumetric stability, thermal stability, a...



An intrinsic antistatic polyethylene glycol-based ...

Polyethylene glycol (PEG) is an important and popular phase change material (PCM), but is not a good antistatic material, which would ...



Tuning the flexibility and thermal storage capacity of solid-solid

Polyurethane (PU) based phase change materials (PCMs) undergo the solid-solid phase transition and offer state-of-the-art thermal energy storage (TES). Nevertheless, the exploration ...



Recyclable Solid-Solid Phase Change Materials with ...

Phase change materials (PCMs) with energy-saving and sustainable energy potential are widely available for energy storage technologies. At present, ...

Advanced solid-solid phase change thermal storage material

The practicality of conventional solid-liquid phase change materials (PCMs) is adversely restricted by liquid phase leakage, large volume expansion, shape instability, and severe ...





Molecular Regulation of Flexible Composite ...

In recent years, graphene has been introduced into phase change materials (PCMs) to improve thermal conductivity to enhance the heat transfer efficiency ...

Preparation and performance of a novel thermoplastics ...

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, ...



Recent developments in thermo-physical property ...

Phase change materials (PCM) have a potential role in thermal energy storage applications. Recent progress has shown notable work on solid ...

Recent developments in solid-solid phase change materials for ...

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 ...



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