Phase change energy storage fiber

What are phase change fibers?

Over the last 30years,phase change fibers (PCFs) have been extensively investigated and applied as high-performance nonwoven fabrics and coatings. As a prospective renewable and clean material,PCFs with micro-scale have been successfully prepared by melt/wet spinning for applications in thermal energy storage (TES) and temperature regulation.

Are phase change fibers reusable?

Moreover,the fibers showed quite high heat density of 122.5 J/g,much higher than that of the previously reported phase change fibers with a solid-solid phase-transition,and high reusability,with heat density of 102.0 J/g preserved after 100 heating-cooling cycles.

Are phase change materials a viable alternative to energy storage?

Phase change materials (PCMs) can alleviate concerns over energy to some extentby reversibly storing a tremendous amount of renewable and sustainable thermal energy. However,the low thermal conductivity,low electrical conductivity,and weak photoabsorption of pure PCMs hinder their wider applicability and development.

Are S-S phase change fibers a good tensile structure?

Conclusions S-S phase change fibers with enhanced heat energy storage density have been successfully fabricated from coaxial wet spinning and subsequent polymerization-crosslinking. The resulting fibers showed core-sheath structures,high flexibility and good tensile properties,with an elongation of 629.1 % and stress at break of 3.8 MPa.

Are phase change fibers suitable for wearable thermal management textiles?

E-mail: zhangxh@dhu.edu.cn Phase change fibers with abilities to store/release thermal energy and responsiveness to multiple stimuli are of high interestfor wearable thermal management textiles. However,it is still a challenge to prepare phase change fibers with superior comprehensive properties,especially proper thermal conductivity.

What is a core-sheath phase change fiber (PCF)?

Core-sheath phase change fibers (PCFs) were prepared with polyurethane (PU) as the sheath material and octadecane (OD) as the core materials by coaxial wet spinning. Titanium carbide (Ti 3 C 2), as excellent solar absorber, was added into the sheath layer to achieve efficient photo-to-thermal conversion.

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Phase change fibers (PCFs) can effectively store and release heat, improve energy efficiency, and provide a basis for a wide range of energy applications. Improving energy storage density ...

Phase change materials (PCMs) have attracted tremendous attention in the field of thermal energy storage owing to the large energy storage density when going through the isothermal phase transition process, and the functional PCMs have been deeply explored for the applications of solar/electro-thermal energy storage, waste heat storage and utilization, ...

Preparation of electrospun LA-PA/PET/Ag form-stable phase change composite fibers with improved thermal energy storage and retrieval rates via electrospinning and ...

A hierarchical porous carbon fiber-based phase change sheet is fabricated in large-scale. ... The phase change energy storage material in the composites did not leak significantly after 100 cycles, indicating that the activated carbon fiber felt has good encapsulation performance. 3.4. The potential application for food logistics. The use of phase change energy ...

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Preparation of electrospun LA-PA/PET/Ag form-stable phase change composite fibers with improved thermal energy storage and retrieval rates via electrospinning and followed by UV irradiation photoreduction method

High thermostability of phase change materials is the critical factor for producing phase change thermoregulated fiber (PCTF) by melt spinning. To achieve the production of PCTF from melt spinning, a composite phase change material with high thermostability was developed, and a sheath-core structure of PCTF was also developed from bicomponent melt spinning. ...

DSC curves of TPU-0.28 phase change energy storage before and after fifty thermal cycles: (a) heating curve and (b) cooling curve. Changes of pre-stretched HEO/TPU fiber before and...

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1. Introduction. With the blooming of the population and the accelerated development of industrialization, the global energy demand has risen sharply [] order to meet the heat demand, excessive burning of fossil energy such as coal, natural gas, or petroleum products has caused severe energy shortages and serious environmental pollution [2,3].

Phase change energy storage fiber

Advances toward fibers or fabrics for thermo regulation are developed, but leakage of phase change medium is a concern when directly coated or filled with fibers or fabrics. Thus, different spinning methods have appeared to integrate phase change materials into copolymer fiber to prepare phase change fiber. The present review has been divided ...

Phase change materials (PCMs) are capable of absorbing and releasing heat through the phase change procedure, thereby achieving local environmental temperature regulation [1]. Energy storage technology based on PCM has a potential approach for thermal energy storage and thermal management [2, 3].

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Carbon nanotube graphene multilevel network based phase change fibers and their energy storage properties ... resulting in a CNT/GO/PEG composite phase change fiber. The presence of GO plays a more important role in increasing the interfacial contact and space volume, resulting in the characteristics of high loading (up to 96.8-98.4%), phase change ...

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