Phase change energy storage fiber technology

What is a phase change fiber?

1. Introduction Phase change fibers,fibers that contain phase change materials (PCMs),can help create a comfortable microclimate with almost constant temperature through storing and releasing a large amount of thermal energy during the reversible phase-transition of PCMs [,,].

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.

Can phase change materials be integrated into stimuli-responsive fibers?

Integrating phase change materials (PCMs) into stimuli-responsive fibersoffers exciting opportunities for smart clothing to realize instant energy conversion/storage and temperature regulation. However,the production of flexible and efficient smart energy storage fiber is still challenging.

What are phase change fibers containing PCMS used for?

The phase change fibers containing PCMs could provide the surroundings relatively constant temperature through absorbing and releasing heat during phase transition process,which is widely used for thermal energy storage,electrical/solar energy harvesting and smart thermoregulatory textiles .

Are phase change fibers suitable for wearable thermal management textiles?

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.

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.

Phase change materials (PCMs) are such a series of materials that exhibit excellent energy storage capacity and are able to store/release large amounts of latent heat at ...

Phase change materials (PCMs) can act as effective heat reservoirs due to the high latent heat associated with the phase change process (typically a solid-liquid transition). PCMs have been developed and integrated ...

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Her research interests mainly focus on the synthesis and applications of flexible phase change materials for thermal energy storage and conversion. Ge Wang received her Ph.D. in ...

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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 ...

Energy storage technology is one of the key technologies for using solar energy, which mainly consists of sensible heat storage, latent heat storage and chemical heat storage. ...

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

In recent years, the use of phase change energy storage and thermal insulation building materials has gradually expanded. In order to effectively control the use effect of phase change energy ...

Phase change materials (PCMs) are ideal carriers for clean energy conversion and storage due to their high thermal energy storage capacity and low cost. During the phase ...

Magnetic-thermal energy conversion and storage technology is a new type of energy utilization technology, whose principle is to control the heat released during material phase change ...

The phase change thermal storage performance is crucial in the practical application of MEPCM capsules/fibers. ... signifying effective photoheat conversion and storage along the single fiber ...

Phase change material (PCM)-based thermal energy storage significantly affects emerging applications, with recent advancements in enhancing heat capacity and cooling power. This perspective by Yang et al. ...