

The development of wearable heat supply textiles in cold conditions utilizing the photothermal conversion effect is crucial for the advancement of wearable thermal ... Multi-field driven thermochromic films with phase change energy storage properties. Yuzhen Zhao Jiasong Zheng +7 authors Z. Miao. Materials Science, Physics. Dyes and Pigments ...

Phase change materials (PCMs) play an important role in thermal management technology due to their thermal storage capacity and stable phase change temperature 1, 2, 3. However, PCM-based wearable devices for personal thermal management are prone to problems such as liquid leakage and the lack of flexibility, solutions to which are necessary for ...

Introduction. Rapidly growing demand for wearable thermal energy management systems in various applications [1, 2], such as wearable sensors [3, 4], supercapacitors [5, 6] and clothing [7, 8], has accelerated the development of flexible multifunctional phase change materials (PCMs) [] particular, organic PCMs (such as polyethylene glycol (PEG) [], paraffin wax (PW) ...

Therefore, this study develops a wearable phase-change film (FSPCF) that addresses these issues while providing high flexibility, superior solar thermal conversion efficiency and sensitive motion detection. ... A comprehensive review of phase change film for energy storage: Preparation, properties and applications. 2023, Journal of Energy Storage.

Phase change materials (PCMs) are extensively employed as media for thermal energy storage and temperature regulation due to their remarkable capacity to absorb or release significant amounts of latent heat at constant phase transition temperatures. However, the inherent low thermal conductivity, solid-state rigidity and electric insulation issues of PCMs ...

An intrinsically flexible phase change film for wearable thermal managements ..., Y.-Y. Zhao, X.-Y. Li, Y.-l. Zhang, Y.-P. Dong, J.-l. Zhao, H. Zhang, B.o. Wang. Preparation of the polyvinyl alcohol thermal energy storage film containing the waste fly ash based on the phase change material ... Flexible graphene aerogel-based phase change film ...

Semantic Scholar extracted view of "Flexible phase change materials for thermal energy storage" by Jinming Shi et al. ... {Flexible phase change materials for thermal energy storage}, author={Jinming Shi and Mulin Qin and Waseem Aftab and Ruqiang Zou}, journal={Energy Storage Materials}, year={2021}, volume={41}, pages={321-342}, url={https ...

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 ...

The development of multifunctional composite phase change materials has emerged as a popular research field to achieve efficient thermal energy storage and management across diverse application scenarios. Herein, a novel flexible reversible thermochromic phase change film (TC-PCMs/nBN/OBC) has been proposed. The film comprises a thermochromic ...

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}, ...

A flexible phase-change film with thermal management and microwave absorption capabilities was developed for use in wearable devices. ... A particularly promising avenue within solar energy lies in the utilization of phase-change materials for thermal energy storage and release due to their remarkable capacity to absorb ... This film is ideal ...

Phase change materials (PCMs) are ideal candidates for PTM technologies due to their high energy storage density and isothermal phase transition process [18], [19], [20]. PCM-based PTM materials can effectively regulate the surface temperature of the human body through latent heat storage/release process, creating an excellent thermal sensation ...

Aerogel-phase change material (PCM) host-guest composites (A-PHCs) [4], [12], [13] can absorb and release a large amount of thermal energy reversibly at a constant temperature via solid-liquid phase transition, and have attracted great attention in the fields of thermal regulation, thermal stealth, thermal management of electronics, etc. [14], [15], [16].

2.3. Material characterizations. The crystal structures of pure erythritol, PVP/PVA, and PVP m /PVA/Ery n phase change films were examined by an X-ray diffractometer (XRD) with a Cu Ka radiation (PANalytical Co. Empyrean-100, Netherlands) operated under a voltage of 40 kV and a current of 40 mA. The molecular interaction between erythritol and PVP/PVA was ...

Phase change materials (PCMs) involving significant amounts of latent heat absorbing and releasing at a constant transition temperature have been extensively utilized for thermal management of electronic devices. However, it is still a great challenge to apply thermal management for wearable devices using PCMs due to their solid rigidity and liquid leakage.

Personal thermal management materials integrated with phase-change materials have significant potential to

Wearable phase change energy storage film

satisfy human thermal comfort needs and save energy through the efficient storage and utilization of thermal energy. However, conventional organic phase-change materials in a solid state suffer from rigidity, low thermal conductivity, and ...

Energy storage: Phase change material based thermal energy storage applications for air conditioning: 2022 [38] Zheng et al. ... To demonstrate the flexibility and temperature control properties of the composite film, a wearable device based on the PCM film was attached to a finger and the temperature change was captured by an IR thermal camera ...

DOI: 10.1016/j.cej.2024.153271 Corpus ID: 270600423; Flexible phase change film with motion sensing and tactile recognition for wearable thermal management @article{Liu2024FlexiblePC, title={Flexible phase change film with motion sensing and tactile recognition for wearable thermal management}, author={Lu Liu and Yuang Zhang and Yanan Wu and Shufen Zhang and ...

A flexible wearable phase change composite with electro-/photo-thermal heating for personal thermal management and human body motion detection ... (50.48 \pm 176;C) and T_c (35.24 \pm 176;C) of neat PEG. The relatively lower T_m facilitates heat storage in EP50 film to use for body heat management. Fig. 5 b shows the melting curves of EVA/PEG films with 30 ...

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 ...

Semantic Scholar extracted view of "Hexagonal Boron Nitride-Induced Lamellar-Structured Flexible Phase Change Film for Temperature-Controlled Information Storage and Wearable Thermal Regulation" by Yukai Yang et al. ... Converting solar energy into storable thermal energy within organic phase change materials has emerged as a promising way to ...

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