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European Solar Energy Storage

Flexible energy storage polyurethane

Overview

In this study, the novel flexible polyurethane/MXene solid–solid phase change materials (SSPCMs) with improved solar-to-thermal conversion efficiency and mechanical strength were constructed using polyethyle.

Are flexible polyurethanes a promising material for energy harvesting applications?

Flexible polyurethanes (FPUs) exhibit high elasticity, a three-dimensional pore network, and diverse densities that make them a promising material for energy harvesting applications. This review explores the materials, chemistry, recycling, and limitations of FPUs with a focus on their application in TENG devices.

Are polyurethane-based flexible phase change composites suitable for thermal storage?

In our research, polyurethane-based flexible phase change composites (PUFPCCs) with flexibility and thermal storage properties were successfully synthesized by physical blending of PUPCM with PUA.

Why is polyurethane used as a thermal storage medium?

As the thermal storage medium of the TES, PCM plays a unique role in the heat accumulating and energy storage processes [7]. Polyurethane (PU) have attracted wide attention to be used as PCMs due to the highlights of good thermal stability, low cost and high enthalpy.

Are polyurethanes suitable for Teng applications?

Polymeric materials with porous structures have proved particularly effective for TENG applications. Among these, polyurethanes (PUs) stand out as a versatile class of materials with significant potential across various applications, owing to their unique structure–property relationships.

Should recycled FPU foam be used in energy harvesting applications?

The use of recycled FPU foam instead of virgin PU foam in energy harvesting

applications should be encouraged as it offers additional energy savings linked to the substantial impact of virgin materials on the total embodied energy in PU foam.

Can polyurethane based adhesive support pufpccs?

And polyurethane-based adhesives (PUA) were chosen to provide a support structure for PUFPCCs by physically blending and casting with prepared PUPCM. PUFPCCs showed good flexibility attributed to the film-forming performance of polyurethane-based adhesive in the composites.

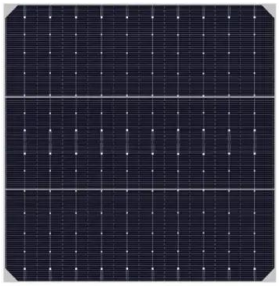
Flexible energy storage polyurethane

Flexible and Inherently Photothermal Waterborne ...

Flexible, nanoparticle-free, industrially adaptable waterborne polyurethane (WPU) foams with light-to-thermal energy conversion and latent heat storage capacity are presented. WPU particles ...

Flexible self-healing phase change film with high transition ...

Herein, a flexible self-healing PVP/PVA/Ery phase change film has been designed by in situ doping erythritol into the hydrogen-bonded network constructed with PVP and PVA. ...



Flexible and Inherently Photothermal Waterborne Polydopamine

Flexible, nanoparticle-free, industrially adaptable waterborne polyurethane (WPU) foams with light-to-thermal energy conversion and latent heat storage capacity are ...

Thermoplastic polyurethane (TPU) based high-performing solid ...

Polyurethane is produced from a wide range of starting materials and thus helps tailor the polymer to be flexible or rigid [28], [29], [30]. They find applications in apparel to ...

Flexibility and Thermal Storage Properties of Polyurethane ...

Polyurethane phase change materials (PUPCMs) have been extensively applied in smart textiles and wearable electronic devices because of their excellent energy storage ...

Flexible phase change materials for thermal energy storage

Phase change materials (PCMs) have been extensively explored for latent heat thermal energy storage in advanced energy-efficient systems. Flexible PCMs are an emerging ...

Flexible Membrane Device Constructed Based on Azopyridine ...

The novel flexible energy storage device is integrated by employing the synthesized novel azopyridine derivatives as solar thermal fuels layer and the synthesized ...

Advances of self-healing flexible energy storage devices

Flexible electronics have attracted a broad attention according to their desirable mechanical deformation capabilities, such as bend, fold and stretch. The flexible ...

Highly flexible, healable and degradable polyurethane phase ...

In this paper, flexible, healable and degradable polyurethane phase change materials (PU-PCMs) with high mechanical properties have been constructed through a ...

Shape-memory and self-healing polyurethane-based solid ...

The extreme deformation and external damage of electrolyte materials during the working period limit its further development in flexible wearable electronics. Thus, the ...

Phase change and thermal energy storage properties of polyurethane

Highlights A polyurethane phase change material(PUPCM) with mixed soft segment and crosslinking structure has been proposed. Thermal and mechanical properties of linear and ...

Dual-Encapsulated Highly Conductive and ...

Dual-Encapsulated Highly Conductive and Liquid-Free Phase Change Composites Enabled by Polyurethane/Graphite Nanoplatelets Hybrid Networks for Efficient Energy Storage and Thermal Management

Flexible engineering of advanced phase change ...

Liquid phase leakage, intrinsic rigidity, and easy brittle failure are the longstanding bottlenecks of phase change materials (PCMs) for thermal energy storage, which seriously hinder their widespread applications in ...

Highly flexible GO-polyurethane solid-solid phase change ...

Solid-solid phase change materials (SSPCMs) are considered one of the most promising candidates for thermal energy storage due to their efficient heat storage and ...

Intrinsic Self-Healing Chemistry for Next-Generation Flexible Energy

The introduction of self-healing mechanism into flexible energy storage devices is expected to solve the problems of mechanical and electrochemical performance degradation ...

Flexible Membrane Device Constructed Based on Azopyridine ...

Polymer-based solid-solid phase change materials are capable of storing and releasing thermal energy through surroundings temperature regulation without experiencing ...

Progress and prospect of flexible MXene-based energy storage

The demand for flexible electronics like smartwatches and foldable displays exposes limitations in traditional energy storage. MXenes exhibit promise due to their large surface area, excellent ...

Flexible, all-solid-state supercapacitors derived from waste

Recently, flexible energy storage devices have attracted increasing interests for their promise in wearable electronic devices. In this study, the waste polyurethane foam ...

Flexible PW/PU@CuNWs-MXene composite phase change ...

To overcome these challenges, we have successfully designed and prepared flexible PW/PU/CuNWs/MXene (PPCuM) composite phase change materials with high thermal ...

Flexible, Recyclable, and Highly Conductive ...

Moreover, the flexible PCCs-based energy device demonstrates effective thermal regulation in electronic devices and wearable thermal management. This work provides a cost-effective avenue for the ...

Elastic Polyurethane as Stress-Redistribution

With fundamental analysis using the Finite Element Analysis (FEA) method, we demonstrate that the SRAL enables direct, and reliable integration of rigid energy storage components with flexible substrates by ...

Low-cycle fatigue behavior of flexible 3D printed thermoplastic

Thermal energy storage (TES) materials constituted by a microencapsulated paraffin having a melting temperature of 6°C and a thermoplastic polyurethane (TPU) matrix ...

A review on poly (vinylidene fluoride)/thermoplastic polyurethane

A review on poly (vinylidene fluoride)/thermoplastic polyurethane blends and their nanocomposites: a conceptual on smart behavior in energy-harvesting and storage ...

A novel hyperbranched polyurethane solid electrolyte for room

Low room temperature ionic conductivity of solid polymer electrolytes (SPE) greatly constraints its application in the solid lithium-ion batteries. Hy...

Novel flexible polyurethane/MXene composites with sensitive ...

In addition, our group [21] have already synthesized PEG-based polyurethane solar energy storage SSPCMs using a simple one-step solvent-free method, which showed ...

Flexible polyurethane-based phase change materials with ...

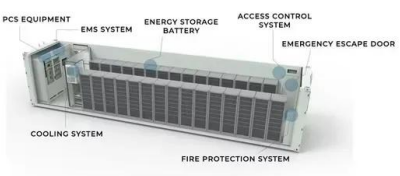
Phase change materials with high energy storage density and stable phase change temperature are ideal choices for personal thermal therapy and heat management. ...

Novel flexible polyurethane/MXene composites with sensitive ...

Novel flexible polyurethane/MXene composites with sensitive solar thermal energy storage behavior Shang Gong a b, Yang Ding a b, Xiaolong Li a b, Shuang Liu a b, ...

A Minireview on Polyurethane-Based Flexible ...

In this review article, we discuss the salient features of polyurethane (PU)-based flexible electrodes, particularly for application in wearable supercapacitors where PU is used as both an electrolyte ...



Multifunctional 3D-Printed Thermoplastic ...

In this work, multiwalled carbon nanotubes (MWCNTs) were melt-compounded into a novel thermal energy storage system consisting of a microencapsulated paraffin, with a melting temperature of 6 ...

Highly flexible GO-polyurethane solid-solid phase ...

Solid-solid phase change materials (SSPCMs) are considered one of the most promising candidates for thermal energy storage due to their efficient heat storage and discharge capabilities. However, ...

Polyurethane Storage Modulus: The Secret Sauce Behind Durable, Flexible

Ever wondered why your car seats bounce back after heavy use or why silicone phone cases survive daily drops? Meet the unsung hero: polyurethane storage modulus. This ...

Development of Self-Healing Polyurethane and Applications in ...

1 ??· This review systematically examines the healing mechanisms, structural characteristics, and performance metrics of self-healing polyurethanes, with in-depth analysis of their repair ...

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