Cross-linked phase change energy storage

Can H-bonding cross-linking be used for phase change materials?
Phase Change Materials via H-Bonding Cross-Linking for Cold Energy Storage and ManagementPhase change materials (PCMs) offer great potential for realizing zero-energy thermal management due to superior cold storage and stable phase change temperatures.

Can phase change materials be used in thermal energy storage?
Here we simply demonstrate the potentialof our phase change materials and composites for applications in thermal energy storage and thermal management of electronic devices. Some key engineering problems,such as device and system design,require the collaborative efforts of multidisciplinary researchers and engineers. Fig. 5.

Can polymer-based phase change composites be used for thermal storage?
Specially, it also has great potentials for battery thermal management, solar photothermal conversion and thermal storage. In summary, we propose a cost-effective chemical cross-linking method to synthesize polymer-based phase change composites with ultraflexibility and high thermal storage density.

Is polyurethane a solid-solid phase change material for thermal energy storage?
Phase change temperature between 20 °C-36 °C and latent heat between 76-103 J/g. Crosslinked PCM can be reduced into powder thanks to specific physical properties. PCMs show excellent long-term stability through 500 cycles. In this study polyurethanes (PU) are considered as solid-solid phase change material(s-s PCM) for thermal energy storage.

How does crosslinker affect enthalpy of phase transition?
Both the amount of crosslinker and the content of C28 have an effect on the enthalpy of phase transition with the highest latent heat of about 163.8 J/g. The dynamic characteristics of Si O bond induced by ammonium silanate ion pair enable the materials can be recycled by simple hot pressing at a relatively low temperature.

What is thermal energy storage utilizing organic phase change materials (PCMs)?
Thermal energy storage (TES) utilizing organic phase change materials (PCMs) is regarded as a highly effective solution for energy storage and management,which offers several benefits,including a high energy storage density,nearly isothermal conditions during the energy storage process,and excellent long-term stability [,,,].

Reprocessable form-stable phase change materials with high latent heat via dynamically cross-linked polysiloxane networks for efficient thermal energy storage

The thermal stability, densification, chemical structure, phase change properties and surface morphology of

the two types of microcapsules were characterized and analyzed, ...

Herein, we developed a recyclable form-stable phase change materials (FSPCMs) with high latent heat for efficient thermal storage from utilizing the dynamically cross-linked polysiloxane ...

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

In this study polyurethanes (PU) are considered as solid-solid phase change material (s-s PCM) for thermal energy storage. Linear PU (PUL) and cross-linked PU (PUX) ...

Solid-solid phase change materials (SSPCMs) are considered among the most promising candidates for thermal energy storage and management. However, the application of SSPCMs ...

Here we simply demonstrate the potential of our phase change materials and composites for applications in thermal energy storage and thermal management of electronic ...

In Situ Encapsulation of Phase-Change Thermal-Storage Material using 3D Polymer-Aided Cross-Linked Porous Carbon Tong Xiao, Qingyi Liu, Yixuan Lin, Tingyu Lin, Jiateng Zhao,* Wenjie ...

Abstract Solid-solid phase change materials (SSPCMs) are considered among the most promising candidates for thermal energy storage and management. However, the application of SSPCMs ...

Polymeric solid-solid phase-change materials (SSPCMs) possessing excellent shape stability and adaptability are able to store renewable thermal energy in an economically feasible and ...

The fabric finished with the cross-linked microcapsules had a great phase change properties and wash resistance, the whiteness was significantly higher than that of the ...

Hydrogen bond cross-linked photo-healable multifunctional phase change materials for thermal management Journal of Energy Storage (IF 8.9) Pub Date : 2024-11-29, DOI: ...

This paper presents the thermal and mechanical characterizations of a composite material made of plaster and home-made solid-solid Phase Change Material (s-s PCM) to be ...

A Cross-linked microencapsulated phase change material (MEPCM) was prepared using butyl stearate as the core material and isophorone diisocyanate (IPDI) and triethanolamine (TEA) as ...

Abstract In this study polyurethanes (PU) are considered as solid-solid phase change material (s-s PCM) for thermal energy storage. Linear PU (PUL) and cross-linked PU (PUX) are ...

Cross-linked phase change energy storage

Herein, we develop a cost-effective chemical cross-linking method to synthesize leakage-proof, ultraflexible, and thermally insulating polymer-based phase change composites ...

Synthesis and characterization of phase change materials microcapsules with paraffin core/cross-linked hybrid polymer shell for thermal energy storage

As one of the important directions of solar energy utilization, the construction of composite photothermal phase change materials (PCM) with reasonable network support and low ...

Thermally reliable, recyclable and malleable solid-solid phase-change materials through the classical Diels-Alder reaction for sustainable thermal energy storage

Dynamically cross-linked polyurethane solid-solid phase change materials constructed by introducing dynamic bonds have not only overcome the defect of solid-liquid phase change ...

Organic solid-liquid phase change materials (PCMs) show broad prospects in thermal regulation applications due to their salient thermal energy storage capacity and nearly ...

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

To improve the homogeneity of phase-change materials (PCMs) composites for thermal energy storage, the poly (ethylene glycol monomethyl ether)-based trimethylolpropane ...

Processable and recyclable crosslinking solid-solid phase change materials based on dynamic disulfide covalent adaptable networks for thermal energy storage

Jing et al. report a cost-effective chemical cross-linking method for synthesizing ultraflexible polymer-based phase change composites with 3D crosslinked networks and ...

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