

Multi-responsive form-stable phase change materials (FSPCMs) can convert various forms of energy to latent heat for storage and have attracted extensive attention. Superhydrophobic surfaces are garnering constant interest and can improve the long-term solar energy utilization and environmental adaptability of multi-responsive FSPCMs. However, a ...

We propose a facile and effective route for large-scale fabrication of a superhydrophobic thermal energy storage (STES) sprayable coating with heat storage capacity and superhydrophobicity based on polydivinylbenzene (PDVB) nanotubes (NTs). Herein, the STES coating was applied on wood by convenient spraying, and the PDVB NTs played an ...

The development of efficient solar photothermal conversion and energy storage composite (SPCSC) is of great significance in solving the imbalance between supply and demand of solar energy utilization in time and space. Herein, we prepare multi-shell hollow spheres by selecting glucose as the template and magnesium carbonate trihydrate ($\text{MgCO}_3 \cdot 3\text{H}_2\text{O}$) and ...

DOI: 10.1016/j.apenergy.2019.114481 Corpus ID: 214161811; Wood-based composite phase change materials with self-cleaning superhydrophobic surface for thermal energy storage @article{Yang2020WoodbasedCP, title={Wood-based composite phase change materials with self-cleaning superhydrophobic surface for thermal energy storage}, author={Haiyue Yang and ...

We reported an innovative design for a novel type of superhydrophobic thermal energy-storage material by microencapsulation of phase change material (PCM) with a nanostructured ZnO/SiO_2 shell. This hierarchical microcapsule system was constructed through emulsion-templated interfacial polycondensation of silica precursor and structure-induced ...

This phase transition involves ODA transitioning from solid to liquid (or vice versa), converting light into heat, and simultaneously storing it while maintaining a constant ...

Organic phase change materials (PCMs) play an important role in heat energy storage, but they are also limited by the leakage problem in the process of phase change. Herein, shape-stabilized composite PCMs (ssPCMs) are successfully obtained by impregnating paraffin (PA) into the polymethylsilsesquioxane (PMSQ) aerogels. Due to abundant porosity, light ...

Young [11] was the first to specify the CA-surface tension relationship for sessile droplets on flat surfaces. A century later, Young's equation was modified, and the modified equation showed the dependence of the CA on droplet volume. The existence of line tension was suggested by Gibbs [12], [13], and it acts on the three-phase interface and accounts for the ...

Request PDF | Superhydrophobic, multi-responsive and flexible bottlebrush-network-based form-stable phase change materials for thermal energy storage and sprayable coatings | Multi-responsive form ...

All weather, high-efficiency, energy-saving anti-icing/de-icing materials are of great importance for solving the problem of ice accumulation on outdoor equipment surfaces. In this study, a composite material with energy storage, active electro-/photo-thermal de-icing and passive super-hydrophobic anti-icing properties is proposed. Fluorinated epoxy resin and ...

Electrochemical energy storage cells: Electrically tunable membranes through electrowetting [101] 4. Lab on chip devices: Electrically adjustable adhesive property [102] 5. Solar cell: ... Even though, the superhydrophobic surfaces display promising antibacterial results, the destabilization phenomenon is a challenging task that also needs to ...

DOI: 10.1016/J.APENERGY.2019.01.043 Corpus ID: 116615647; Innovative design of superhydrophobic thermal energy-storage materials by microencapsulation of n-docosane with nanostructured ZnO/SiO₂ shell

Through a further surface modification with a low-surface-energy alkane chains, the resultant microencapsulated n-docosane was expected to achieve a superhydrophobic surface as well as good thermal energy-storage performance. The aim of this study is to open the door for design and development of superhydrophobic thermal energy-storage materials.

Multi-responsive form-stable phase change materials (FSPCMs) can convert various forms of energy to latent heat for storage and have attracted extensive attention. Superhydrophobic ...

With high energy storage density, enhanced thermal conductivity, and good scalability, our superhydrophobic ss-PCM coating should find potential use in energy-saving building materials and thermal management of electrical devices, as ...

@article{Li2024SuperhydrophobicMH, title={Superhydrophobic multi-shell hollow microsphere confined phase change materials for solar photothermal conversion and energy storage}, author={Jiyan Li and Yong Long and Yanju Jing and Jiaqing Zhang and Silu Du and Rui Jiao and Hanxue Sun and Zhaoqi Zhu and Weidong Liang and An Li}, journal={Applied ...

All weather, high-efficiency, energy-saving anti-icing/de-icing materials are of great importance for solving the problem of ice accumulation on outdoor equipment surfaces. In this study, a composite material with energy storage, active electro-/photo-thermal de-icing and passive super-hydrophobic a ...

The integrated superhydrophobic supercapacitor has a specific capacitance of 97.2 F/g at a current density of 0.8 mA/cm², and a capacitor retention rate of 95.5% after 3500 cycles. ...

The experimental results showed that fluorinated graphene with superhydrophobic nanostructure had the strongest gas storage effect by promoting hydrate nucleation and opening up channels for hydrate sustainable growth. ... resulting in additional energy consumption, while the storage capacity needed to be further improved. In this ...

Semantic Scholar extracted view of "Enhanced thermal conductivity of a superhydrophobic thermal energy storage coating based on artificially cultured diatom frustules" by Dandan Li et al. Skip to search form Skip to main content Skip to account menu. Semantic Scholar's Logo. Search 222,183,359 papers from all fields of science ...

Multi-responsive form-stable phase change materials (FSPCMs) can convert various forms of energy to latent heat for storage and have attracted extensive attention. Superhydrophobic surfaces are garnering constant interest and can improve the long-term solar energy utilization and environmental adaptability of multi-responsive FSPCMs.

A fully biomass-based ss-PCM, superhydrophobic thermal energy storage (STES) coating by employing beeswax (BW) as phase change materials (PCMs) and DFs as supporting materials via a facile spraying method is prepared. Diatom frustules (DFs) with delicate hierarchical pores and a large specific surface area are extracted from artificially cultured ...

Yang et al. prepared a superhydrophobic TD/DW composite, and found that the calculated energy storage efficiency of the superhydrophobic TD/DW composite can reach 449.84% (Figure 16(b1-b3)) [147]. ...

Superhydrophobic coatings have tremendous potential for applications in different fields and have been achieved commonly by increasing nanoscale roughness and lowering surface tension. Limited by ...

The robust fluoride-free superhydrophobic thermal energy storage coating for efficient energy storage and thermal management Xiaoyue Qin¹, Lingbo Kong², Di Mu¹, Minghui Liu³, Dong Liu⁴, Jiwei Zhao⁴, Xiaomei Wang^{1,*}, and Xu Zhang^{1,*} ¹ Hebei Key Laboratory of Functional Polymers, School of Chemical Engineering and Technology, Hebei University of ...

Herein, a novel flexible superhydrophobic thermal energy storage (FSTES) coating without fluoride is prepared by spraying mesoporous ² nanotubes (NTs) supporting materials, PCMs ...

Moreover, the superhydrophobic composite phase change materials possess excellent thermal reliability and stability, efficient solar-to-thermal energy conversion and self-cleaning property, which ...

If the superhydrophobic features can be functionalized on various metal surfaces, it will be significant and beneficial in many industrial applications for saving energy and energy storage . For example, it can drag reduction, anti-fouling, and enhance heat transfer performance. Figure 1.

Fig. 5 visually elucidates the intricate preparation mechanism underlying the development of the photothermal superhydrophobic energy storage wood. The initiation of LDH construction involves the initial insertion of Co-MOF into the wood. Notably, the treatment of NW by delignification serves a dual purpose, augmenting the permeability of the ...

Furthermore, the superhydrophobic composite phase change materials have suitable phase change temperature at 35.66 °C, large energy storage capacity (125.4 J/g), ...

The above results indicate high oil adsorption and energy storage capabilities of Zn-BS-CA. ... Superhydrophobic banana stem-derived carbon aerogel for oil and organic adsorptions and energy storage. Original Article; Published: 17 April 2023; Volume 14, pages 20089-20103, (2024)

Herein, we successfully prepared a fully biomass-based ss-PCM, superhydrophobic thermal energy storage (STES) coating by employing beeswax (BW) as phase change materials (PCMs) and DFs as supporting materials via a facile spraying method. DFs can adsorb as much as 65 wt % BW without leakage, accompanied with a high heat storage capacity of 112. ...

In this study, a composite material with energy storage, active electro-/photo-thermal de-icing and passive super-hydrophobic anti-icing properties is proposed. Fluorinated epoxy resin and MWCNTs/PTFE particles are used to prepare the top multifunctional anti-icing/de-icing layer, which exhibited super-hydrophobicity with water contact angle ...

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