

Electrochemical energy storage cells: Electrically tunable membranes through electrowetting [101] 4. Lab on chip devices: Electrically adjustable adhesive property [102] 5. ... It has been reported that while subjecting the super-hydrophobic material in a wetting state for a longer period of time, the surface model changes from the Cassie ...

Abstract Over the years, researchers have been working to mimic the nature by inducing superhydrophobic properties into a variety of material surfaces so that they exhibit non-wetting properties. Ma...

Advanced Materials. Volume 14, Issue 24 p. 1857-1860. Research News. Super-Hydrophobic Surfaces: From Natural to Artificial. L. Feng, ... Super-hydrophobic surfaces, with a water contact angle (CA) greater than 150°;, have attracted much interest for both fundamental research and practical applications. Recent studies on lotus and rice leaves ...

Currently, although the long afterglow luminescent materials and super-hydrophobic materials have been increasingly employed in the industrial applications owing to their excellent properties, and several researches have been undertaken to establish influence toward their luminescent properties and hydrophobicity, few have been utilized in road ...

As a momentous part of green energy resource, solar energy is widely researched and devoted to practical applications [[1], [2], [3]], such as power generation systems [[4], [5], [6]], building energy conservation [[7], [8], [9]] and photo-thermal utilization [[10], [11], [12]]. Among various forms of solar energy utilizations, latent heat thermal storage via phase ...

She also worked as a research fellow at the University of Wollongong and MIT in the US, specializing in actuators, surface coatings, and metal separation. Notably, she innovated the shear thickening battery in 2013. Currently, her research focuses on multifunctional superhydrophobic surfaces and energy storage materials.

Herein, superhydrophobic thermal energy storage coating is realized by spraying mesoporous superhydro-phobic C@SiO<sub>2</sub>-HDTMS nanotubes (NTs), industrial parafin wax (IPW), and ethyl ...

Super-elastic phase change materials (SPCMs), as brand-novel smart materials, have a wide range of potential applications in stress induction, thermal energy storage and temperature control. Polyacrylamide-based HAH@PEG<sub>12h</sub> SPCMs with an ultimate tensile ratio greater than 500% were synthesized for the first time by a popular molecular self ...

Figure 4 Schematic showing the three types of hydrophobic materials: G1: Si and F containing organic

materials have a smooth surface and low surface energy and the contact angle is between  $90^\circ$  and  $119^\circ$ ; G2: periodic micro/nanostructures with alternate Si, and F containing organic materials and air form a super hydrophobic surface and the ...

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 MWCNTs/PTFE ...

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 ...

Finally, the applications of super-hydrophobic materials in the field of coatings, fabric and filter material, anti-fogging, and antibacterial were introduced, and the problems existing in the ...

Super-hydrophobic surfaces, on the other hand, exhibit remarkable anti-icing properties that can delay or even prevent the formation of ice [12], ... A new composite material with energy storage, electro/photo-thermal and robust super-hydrophobic properties for high-efficiency anti-icing/de-icing. Small, 20 (2024), p.

Generally, solid particulate matter suspended in the air with a particle size of less than 500 nm is called dust. The dust gathered on the surface of the panel mainly comes from two aspects, one is the dust floating in the atmosphere, and the other is the dust originally deposited on the ground due to natural activities or human factors are brought into the atmosphere [[18], ...

Herein, we report a microcapsule (MC) with a micro/nano-hierarchical shell and a phase change material (PCM) core by a low-cost one-pot method. The resulting microcapsules (MCs) ...

In this context, hydrophobic modification of cement-based materials is a promising approach to prevent water permeation. The preparation methods can be divided into two kinds: surface hydrophobic modification (post-treatment) and integral hydrophobic modification (pre-treatment) [9]. The former refers to the surface hydrophobic post-treatment of ...

Introducing the capability of self-healing to superhydrophobic materials is an effective strategy for improving their durability. This study examined self-healing superhydrophobic coatings based on diatom frustules and paraffin wax, and systematically compared coatings based on diatom frustules with those prepared by using diatomite and synthesized silica.

1. Introduction. Superhydrophobic materials maintain air at the solid-liquid interface when in contact with

water. These surfaces possess high apparent contact angles, by definition exceeding  $150^\circ$ , as a result of the composite solid-air surface formed under a water droplet (Figure 1a). An additional stipulation sometimes included in the superhydrophobic definition, depending on the ...

The states of droplets on roughness surface. (a) The Wenzel model. (b) The Cassie-Baxter model. Reprinted from Ref [1]. Both the micro-nano roughness structures and modification with low surface energy on the surface are the important factors influencing the superhydrophobicity of a surface, while superhydrophobic surface cannot be obtained only modified by low surface ...

The value of  $D$  (fractal dimension) in three-dimensional space is 2.2618 7. For the modified glass surface (Fig. 1b), the average value of  $f_s$  was estimated to be 0.2 ( $f_v = 0.8$ ),  $L$  is 10 mm and  $l$  ...

Superhydrophobic materials, known for their exceptional water-repellent properties, have found widespread applications in diverse fields such as self-cleaning surfaces, anti-icing coatings, and water-resistant textiles. In recent years, researchers have explored a sustainable approach by repurposing waste materials to create superhydrophobic surfaces. This eco-friendly approach ...

Superhydrophobic nanocomposite coatings, prepared using adhesive and fillers, offer advantages including ease of fabrication and suitability for large-scale applications, but compared with other types of artificial superhydrophobic surfaces, poor durability still limits these surfaces from practical applications. The utilization of micro/nanoscale particles with both ...

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 ...

Hydrophobic porous 3D materials and their outstanding absorption performance towards oils and organic solvents have investigated recently [15]. 3D hydrophobic materials, which have a large storage ...

Download Citation | On Mar 10, 2024, Zehui Zhao and others published A New Composite Material with Energy Storage, Electro/Photo-Thermal and Robust Super-Hydrophobic Properties for High-Efficiency ...

However, many hydrogel electrolytes resulting from fossil energy with the disadvantage of being non-biodegradable and their wastes will cause environmental pollution, there is an urgent need to develop renewable biomass-based materials and corresponding energy storage/conversion applications [9], [10], [11]. Benefiting from the advantages of ...

Ajayaghosh started with alumina - an inherently hydrophilic material. His team has been working on covalent-organic frameworks, a class of crystalline porous polymers, and realised that these materials could self-assemble into hydrophobic coatings. They coated the alumina surface with an azobenzene based ligand (AzPBA) and then covered this ...



# Super hydrophobic energy storage materials

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