Energy storage super hydrophobic

Are flexible supercapacitors good for portable energy storage?
Portable energy storage is developing rapidly with the miniaturization and integration of devices,and flexible supercapacitors are one of the important development directions. Nevertheless,the performance of most supercapacitors will be dramatically degradedafter being eroded by water droplets or repeatedly stretched.

Are superhydrophobic surfaces mechanically robust?
The mechanical robustnessof our superhydrophobic surfaces was demonstrated using tape-peeling tests,Taber abrasion tests (American Society for Testing and Materials standard) and scratch tests using an ultra-sharp object (Supplementary Figs. 24 - 26).

What are superhydrophobic surfaces used for?
Provided by the Springer Nature SharedIt content-sharing initiative The ability of superhydrophobic surfaces to stay dry,self-clean and avoid biofouling is attractive for applications in biotechnology,medicine and heat transfer1-10.

What is the optimum regime for superhydrophobicity and mechanical stability?
As shown in Fig. 1f,an optimum regime emerges around a ? 120°in which both superhydrophobicity and mechanical stability can be balanced and guaranteed. The second and third design features of this strategy are therefore a low f micro and an a value of approximately 120°.

How were superhydrophobic nanostructures constructed?
The superhydrophobic nanostructures were constructed using hydrophobic fumed silica nanoparticles(7 nm diameter,AEROSIL RX300,NIPPON AEROSIL CO.,LTD.,Tokyo,Japan) dispersed in acetone (Kanto Chemical Co. Inc.,Tokyo,Japan).

What is a superhydrophobic supercapacitor?
The integrated superhydrophobic supercapacitor has a specific capacitance of 97.2 F/gat a current density of 0.8 mA/cm 2,and a capacitor retention rate of 95.5% after 3500 cycles. Furthermore,it can withstand bending 2000 times and 24 h of immersion with either strong acid or alkali and can achieve long-term underwater work (3500 h).

The composite not only heats up quickly to 97.5 °C under 1 sunlight intensity, but also has super hydrophobic properties and can be applied to a variety of substrates. Download ...

This transition from super-hydrophilic to highly hydrophobic is most probably rooted in the proportion of silicone species (Table 2). However, the alkoxy groups are hydrolyzed over ...

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 ...

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Mussel-inspired, hydrophobic association-regulated hydrogel electrolytes with super-adhesive and self-healing properties for durable and flexible zinc-ion batteries Energy ...

The thermally conductive and hydrophobic TSC made from 3D graphene and paraffin wax enhances solar-thermal conversion and storage, while the thermally insulative ...

Superhydrophobicity is the tendency of a surface to repel water drops. A surface is qualified as a superhydrophobic surface only if the surface possesses a high apparent contact angle (>150°), low contact angle ...

A New Composite Material with Energy Storage, Electro/Photo-Thermal and Robust Super-Hydrophobic Properties for High-Efficiency Anti-Icing/De-Icing

Besides self-cleaning, SH surface can also be used for energy storage in wet and humid environments [103]. SH surfaces have also been employed for medical applications. ...

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

Herein, super-hydrophobic hollow silicon dioxide/titanium dioxide (H-SiO 2 @TiO 2) microspheres with large size (10 mm) and small size (1 mm) are prepared using polystyrene ...

In this context, energy storage are widely recognised as a fundamental pillar of future sustainable energy supply chain [5], due to their capability of decoupling energy ...

" "(High storage capacity and high formation rate of carbon dioxide hydrates via ...

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 ...

Super-hydrophobic and photo-thermal anti-icing coatings comprising small-quantity tungsten carbide with liquid repellency, self-cleaning and anti-fouling properties ... Therefore, designing ...

Self-luminous wood composite for both thermal and light energy storage, Energy Storage Materials, 18 (2019) 15-22. 2. Guoliang Cao, Yonggui Wang, Chengyu Wang*, Shih-Hsin Ho*. ... A method for preparing super ...

Up to now, considerable endeavors have been committed to developing self-healing GPEs and corresponding

energy storage systems based on hydrogen bonding, metal-ligand ...

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 ...

Super-liquid-repellent thin films (STFs) may be able to reduce solidifying PCM adhesion on HX surfaces during discharging, delay PCM solidification to lower temperatures, and by modifying ...

Rechargeable aqueous zinc-ion batteries (AZIBs) have been regarded as promising candidates for large-scale energy storage system due to their inherent safety, affordability, low ...

Wan Y, Liu Z, Dong B, et al. Orthogonal experiment on super-hydrophobic aluminum surface by high-speed wire electrical discharge machining. In: 2016 IEEE international conference on ... Effect of Weave Geometry on ...

Nevertheless, this strategy enables the development of mechanically safe and deformable Li-ion batteries and could potentially be suitable for other energy storage devices such as supercapacitors (59, 60), Zn ...

After that, the application scenarios for superhydrophobic materials in various fields of daily life are systematically presented, from transportation, architecture/building protection, oil/water separation, and seawater ...

Traditional methods, such as mechanical and chemical de-icing, are often associated with high energy consumption and environmental concerns for anti-icing [10], ...

Super-hydrophobic has excellent anti-icing performance, so it has been widely studied. As the most promising anti-icing technology, superhydrophobic anti-icing surface ...

Energy storage super hydrophobic. The porous 3D structure of zinc-doped carbon aerogel is created from cellulose precursor extracted from banana stem--a biomass waste that is ...

The springtail surface has highly ordered rhombic or hexagonal honeycomb-like patterns, composed of three different hierarchical layers. 3 The resulting structure forms nanocavities (0.3-1mm) covering the entire body, but in cross section ...

Polydimethylsiloxane-modified super hydrophobic porous graphene filled with palmitic acid as a phase change energy storage material Carbon (IF 10.5) Pub Date : 2016-03 ...

Rechargeable aqueous Zn-ion batteries (AZIBs) stand out among different batteries due to their ideal specific capacity, low cost, bountiful zinc reserves, and the inherent safety of ...

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Using organic solid-liquid phase change materials (PCMs) to achieve thermal energy storage has become one of the most promising thermal energy storage techniques ...

ABSTRACT This study presents an approach for fabricating durable superhydrophobic surfaces on 3D-printed structures inspired by the architectural design of ...

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