Power Solutions

Superhydrophobic surface solar container

Overview

Inspired by the self-cleaning properties of the lotus leaf, this review proposes the use of superhydrophobic surfaces as an effective solution for soiling mitigation in solar cell applications. The multifaceted applications of superhydrophobic surfaces arising out of their unique surface architecture have gained significant attention in the solar photovoltaic industry as it addresses the challenges in light conversion efficiency at an industrial scale due to the soiling of surfaces. In this study, a super-hydrophobic copper foam with hierarchical micro-nanostructures exhibited temperatures greater than 66 °C under solar illumination of 1 kW·m −2. Significantly, the modified copper foam acting as a solar interface evaporator had a water harvesting efficiency of 1.76 kg·m −2 ·h.

Superhydrophobic surface solar container

Comparison of Dust Deposition Reduction Performance by Super

The results showed that, because of low surface energy and surface micro-structure, the coating obviously reduces dust deposition rate, even without water. At the same time, the authors ...

Superhydrophobic route of fabricating antireflective, self-cleaning

Inspired by the self-cleaning properties of the lotus leaf, this review proposes the use of superhydrophobic surfaces as an effective solution for soiling mitigation in solar cell applications. The ...

Superhydrophobic surfaces: A promising strategy for addressing food

Due to the extremely low surface energy and unique structural properties, superhydrophobic surfaces exhibit exceptional water repellent, self-cleaning...

Durable superhydrophobic surface with highly antireflective and self

Download Citation , Durable superhydrophobic surface with highly antireflective and self-cleaning properties for the glass covers of solar cells , In this study, a superhydrophobic surface

...

Anti-Reflective superhydrophobic coatings with excellent durable and

To make the coatings superhydrophobic, firstly, the coatings should have low surface energy; Secondly, the coating needs to have a micro-nano structure, and the rougher the surface, ...

Design of robust superhydrophobic surfaces

We suggest that this transparent, mechanically robust, self-cleaning glass could help to negate the dust-contamination issue that leads to a loss of efficiency in solar cells.

Solar-assisted icephobicity down to -60°C with superhydrophobic

We report on a superhydrophobic selective surface constructed with a hierarchical architecture to enable stable superhydrophobicity and high-efficiency solar-thermal conversion. The ...

Superhydrophobic sand evaporator with core-shell structure for long

Herein, a superhydrophobic sand solar (FPPSD) evaporator was proposed by designing and optimizing the core-shell structure (Scheme 1). The rough surface of the etched sand (SD) ...

A review of transparent superhydrophobic materials and their research

In fact, part of the solar energy absorbed by photovoltaic cells is absorbed by the material and manifested as an increase in thermodynamic temperature, if there is dust accumulation, it will ...

Comparison of Dust Deposition Reduction Performance by Super

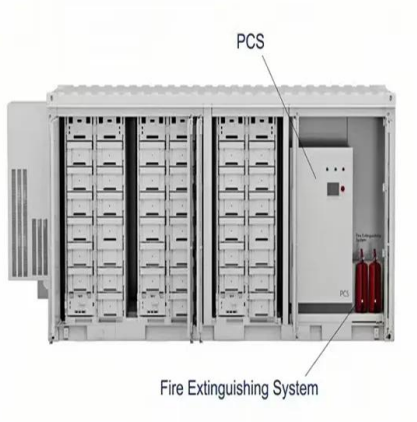
The results showed that, because of low surface energy and surface micro-structure, the coating obviously reduces dust deposition rate, even without water. At the same time, the authors [35] also ...

Sol gel self cleaning superhydrophobic nanocoating for glass ...

Sol-gel self cleaning superhydrophobic nanocoating for glass surface of solar cell Juntima Chungsiriporn*, Prukraya Pongyeela, and Nirana Chairerk Department of Chemical Engineering, ...

Preserving exposed hydrophilic bumps on multi-bioinspired slippery

A slippery surface with exposed hydrophilic bumps is developed, achieving high fog collection rates and addressing the nucleation vs. transportation balance in fog water collection. It ...



Recent progress on transparent and self-cleaning surfaces by

Superhydrophobic transparent coatings have recently gained significant attention in the solar energy field due to their ease of preparation, low cost, self-cleaning process, and high ...

Novel Superhydrophobic Surface with Solar-Absorptive Material for

This superhydrophobic surface reduces the power consumption by the heating element. Further power consumption reduction in these systems can be achieved through an increase in ...

Superhydrophobic route of fabricating antireflective, self-cleaning

The foundations of superhydrophobic coatings including transmittance, porosity, and refractive index of coatings, thickness and surface roughness in addition to the commonly reported surface tension and ...

Durable, Transparent, and Superhydrophobic Film Design for Flexible

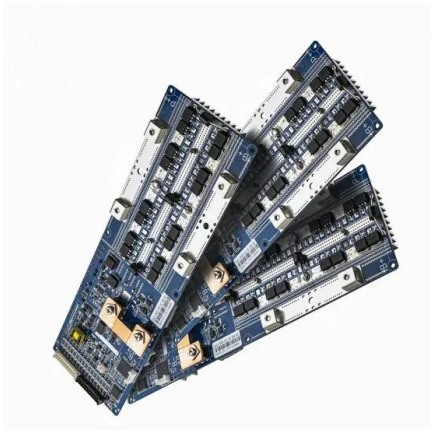
Abstract Transparent superhydrophobic films/coatings have recently gained significant attention in the solar energy field due to their ease of preparation, low cost, self-cleaning process, ...

Spherical-chain silica with super-hydrophobic surface and ultra-low

Solid surface super-hydrophobicity is mainly achieved by increasing porosity, improving surface roughness and using organic molecules with low surface free energy for surface modification. ...

Super Hydrophilic Surface Coating for PV Modules

This research talks about the super hydrophilic surface coating for the solar PV module. Some of the main roles that super hydrophilic coating contributes are being discussed here, such as ...



Reducing the effect of dust deposition on the generating efficiency of

Li et al. (2012) formed porous silicon-nanoparticle (Si-NP) films on the solar cell surface to increase the light absorption rate, thereby increasing the efficiency of their PV power generation, but ...

Sustainable Preparation of a Superhydrophobic and Low-Reflective

In recent years, some researchers have prepared a superhydrophobic surface by constructing rough microstructures, utilizing their self-cleaning and anti-icing functions to improve this ...

Natural and synthetic superhydrophobic surfaces: A review of the

A hydrophilic surface has a CA lower than 90°, and surfaces with a CA close to 0° are ultra-hydrophilic. When the surface CA exceeds 90°, the surface is termed hydrophobic. Further, ...

Solar-assisted icephobicity down to -60°C with superhydrophobic

We demonstrated a high-performance solar-thermal icephobic surface that integrates high solar absorption, superior spectral selectivity, and stable superhydrophobicity.

A review on transparent superhydrophobic coatings for ...

To address this issue, transparent superhydrophobic coatings have the potential to provide self-cleaning abilities as well as transparency enable sunlight to reach solar cells.

Self-Cleaning, Superhydrophobic, and Transparent Silicone/Nanosilica

Relying on its micro/nanoscale rough structure and low surface energy, the coating enables water droplets to easily remove surface contaminants, thereby maintaining the cleanliness of ...

Super-Hydrophobic Photothermal Copper Foam for Multi-Scenario ...

The copper foam features a microscale porous structure coupled with nanoscale spikes, which act as water vapor transport channels and enhance the interaction between solar energy and ...

Novel Superhydrophobic Surface with Solar-Absorptive Material for

In this work, a superhydrophobic surface with increased solar radiation absorption is proposed and characterized. An existing icephobic surface based on a polytetrafluoroethylene (PTFE) ...

Sustainable Preparation of a Superhydrophobic and Low-Reflective

The actual photoelectric conversion efficiency of solar cells that work outdoors for a long time is easily affected by adverse environmental factors, including dust, rain, ice, and snow ...

Robust and UV-durable superhydrophobic SiO

This transparent, robust, UV-durable and self-cleaning superhydrophobic glass surface could help to solve the problem of reduced efficiency of solar cells due to dust accumulation.

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