

<div class="df_qntext">Are nature-inspired materials eco-friendly?

Nature-inspired materials offer eco-friendly alternatives to traditional electrode materials, aligning with sustainability goals [5,,]. The transition to renewable energy sources such as solar and wind energy requires efficient and scalable energy storage solutions.

<div class="df_qntext">How can nature-inspired materials improve the performance of energy storage systems?

The transition to renewable energy sources such as solar and wind energy requires efficient and scalable energy storage solutions. Nature-inspired materials can enhance the performance of energy storage systems for renewable energy applications.

<div class="df_qntext">Are Photoelectrochemical Systems a viable alternative to solar energy?

Provided by the Springer Nature SharedIt content-sharing initiative Photoelectrochemical (PEC) systems offer a promising approach to harness solar energy for producing essential chemicals and sustainable fuels. This perspective highlights their potential for generating hydrogen, oxygen, chlorine, ammonia, hydrogen peroxide, and carbon-based fuels.

<div class="df_qntext">Can nature-inspired nanomaterials be used in energy storage systems?

In energy storage systems, nature-inspired nanomaterials have been highly anticipated to obtain the desired properties. Such nanostructures of nature-inspired nanomaterials include porous carbon, metal oxides/sulfides/phosphides/selenides/hydroxides, and others that have shown exemplary performance in electrochemical energy storage devices.

<div class="df_qntext">How are energy systems based on nanomaterials?

Therefore, through decades of research and development, today's energy systems are majorly based on nanomaterial-based electrodes which are fabricated by designing nanostructure and nano-scale-based electrode materials such as metal, metal oxides nanomaterials, carbon materials, etc.

<div class="df_qntext">Are natural materials a good choice for energy storage?

Natural materials often possess hierarchical structures that enhance ion diffusion and charge storage. The rise of wearable technology and flexible electronics demands lightweight, conformable, and biocompatible energy storage solutions. Natural materials are well suited for such applications, offering flexibility and biodegradability.

The integration of nature-inspired materials holds promise in addressing energy storage challenges sustainably and efficiently. By addressing both electrochemical efficiency and ...

In this review, we summarize the latest developments in the field of nature-inspired electrochemical energy-storage materials and devices. Specifically, the nature-inspired exploration, ...

This latter aspect is particularly relevant in electrochemical energy storage, as materials undergo electrode formulation, calendaring, electrolyte filling, cell assembly and formation ...

Recently, research all over the world is being carried out to develop eco-friendly supercapacitors (SCs) using biopolymeric materials like proteins or polysaccharides.

Among nature-inspired catalysts, microbe-based catalysts represent a relatively new research direction in recent years and are self-sustaining natural resources, which could be ...

By addressing both electrochemical efficiency and sustainability aspects, this review provides critical insights into the potential of nature-inspired materials for next-generation ...

In the face of ubiquitous corrosion threats, the development of high-performance elastomer protective materials with active self-healing functions is extremely challenging and significant.

The review ends with addressing the challenges and future perspectives of nature-inspired nanostructures toward their commercialization in electrochemical energy storage and ...

Poor mechanical stability under high humidity remains a critical challenge for flexible perovskite solar cells. Here, the authors develop a bioinspired dopamine containing polymer to ...

Beyond biomimicry, recent advances adopt nature-inspired design principles and use synthetic chemistry techniques to develop innovative hybrids that merge the strengths of biological ...

In this review, we summarize the latest developments in the field of nature-inspired electrochemical energy-storage materials and devices. Specifically, the nature-inspired exploration, preparation and ...

This review highlights significant progress in the nature-inspired design and fabrication of energy storage materials and devices, including the exploration, preparation, and modification of ...

The investigation on the catalytic properties of porous organic cages is still in an initial stage. Herein, the heterogeneous photocatalytic superiority of microporous porphyrin organic cage ...

The current needs of finding more efficient materials with tunable properties have served as a motivation for the scientific community to move toward nature-inspired hierarchical ...

In this review, we summarize the latest developments in the field of nature-inspired electrochemical

energy-storage materials and devices. Specifically, the nature-inspired exploration, preparation and ...

Fabricating high-performance perovskite solar cells under ambient conditions -- without strict humidity or atmospheric controls -- paves the way for scalable, low-cost photovoltaics. ...

It is imperative that sustainability issues are considered throughout the life cycle of modern organic electronic devices. Here McCulloch and colleagues evaluate the status of embedded ...

Qu et al. report a self-assembled material with π -expanded conjugation to form hydrophilic ordered bilayer as hole selective layer for inverted perovskite solar cells.

Photoelectrochemical (PEC) systems offer a promising approach to harness solar energy for producing essential chemicals and sustainable fuels. This perspective highlights their ...

In recent years, there has been increasing interest in integrating nature-inspired fractal designs into engineering applications including optoelectronics, stretchable electronics, antenna design ...

Nature-Inspired Electrochemical Energy-Storage Materials and Devices Selected Technologies of Electrochemical Energy Storage--A Review Chemistry and potential candidature of ...

Nature-inspired strategies, drawing from billions of years of evolution, offer innovative solutions. This review focuses on how biomolecule-based electrode materials, green biobatteries, ...

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