Structural engineering research on carbon-based energy storage materials

In response to the growing demand for complex, curved geometries, this review systematically examines recent progress in the development of carbon fiber-based electrodes and structural ...

The structural engineering of pitch-based porous carbon is reviewed from four aspects: pore structure adjustment, morphology design, heteroatom doping and transition ...

Carbon-based materials, for example, graphene, activated carbon, carbon nanotubes, have gained massively focus because of their essential electrical, thermal and ...

The exploration of concrete-based energy storage devices represents a demanding field of research that aligns with the emerging concept of creating multifunctional ...

Recently, researchers have proposed several methods to control the structure of carbon materials produced from pitch for energy storage. The latest advances in the structural ...

Finally, the review summarizes key insights, outlines the implications for sustainable energy systems, and offers specific recommendations for future research and ...

Abstract The electrification of transportation, such as aviation and electric vehicle, demands advanced energy storage systems that are lightweight with high energy and power ...

Structural energy storage composites present advantages in simultaneously achieving structural strength and electrochemical properties. Adoption of carbon fiber ...

Over the last decade, there has been significant effort dedicated to both fundamental research and practical applications of biomass-derived materials, including ...

The development of light-weight batteries has a great potential value for mobile applications, including electric vehicles and electric aircraft. Along with increasing energy ...

This review explores the emerging role of cement-based materials in energy storage applications, with a specific focus on cement-based structural supercapacitors ...

The designs of SCESDs can be largely divided into two categories. One is based on carbon fiber-reinforced polymer, where surface-modified high-performance carbon fibers are ...

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Sodium-ion batteries (SIBs) have received extensive research interest as an important alternative to lithium-ion batteries in the electrochemical energy storage field by ...

<p>Carbon materials are key components in energy storage and conversion devices and most directly impact device performance. The need for advanced carbon materials has become ...

Biomass-based functional carbon materials (BFCs) with renewability, flexible structural tunability and diverse physicochemical properties have shown encouraging and ...

Current energy storage devices are delicate, hold limited capacity, and struggle to achieve maximum energy conversion efficiency. While breakthroughs are unlikely in the ...

The development of new energy storage technology has played a crucial role in advancing the green and low-carbon energy revolution. This has led to si...

The development of multifunctional composites presents an effective avenue to realize the structural plus concept, thereby mitigating inert weight while enhancing energy ...

The main goal in this research is to develop a computationally optimized bioinspired structural design based on the biomechanics principles and the latest statistical ...

A new study led by researchers from the Department of Materials Science and NanoEngineering at Rice has introduced an innovative solution that could impact ...

Abstract Carbon materials, being of pivotal significance in energy storage, have garnered considerable attention for their surface oxygen-containing functional groups ...

With the increasing demand for energy and the ongoing depletion of fossil fuels, the development of novel electrochemical energy storage devices has become an urgent ...

The exploration of concrete-based energy storage devices represents a demanding field of research that aligns with the emerging concept of creating multifunctional and intelligent ...

Although recent advancements have shown that appropriate fillers, additives, and fabrication strategies can be used to optimize OPC-based materials for SSCs, continued ...

To improve further storage ability and stability of these devices, researchers have explored number of materials like carbon-based materials, metal oxides, composite, and ...

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