

A major contribution of this work lies in highlighting the originality of concrete batteries as a transformative approach to integrating energy storage within concrete structures, ...

In this review, we discuss the research progress regarding carbon fibers and their hybrid materials applied to various energy storage devices (Scheme 1). Aiming to uncover ...

The rapid progress of smart and sustainable cities has led to an increased demand for construction materials that possess functional capabilities in energy storage and ...

How to reduce the environmental footprint of concrete and address energy storage challenge? Near future: \$200 per ton carbon tax [2] The pace of the transition from fossil fuel-based ...

Thermal energy storage (TES) in concrete provides environmental benefits by promoting energy efficiency, reducing carbon emissions and facilitating the integration of ...

Carbon fiber hydrogen storage tanks are seriously shaking up the advanced materials game. With the world chasing cleaner energy and futuristic cars, demand is only ...

Request PDF | On Apr 1, 2025, Ji-Hua Zhu and others published Advanced Industrial-Grade Carbon-Fiber-Reinforced Geopolymer Cement Supercapacitors for Building-Integrated Energy ...

Concrete-based energy storage: exploring electrode and Introduction Given the recent decades of diminishing fossil fuel reserves and concerns about greenhouse gas emissions, there is a ...

Recent pioneering efforts [11,12] have explored the use of cement as an energy storage medium, leading to the concept of cement-based structural supercapacitors (CSSC). ...

With the rise of sustainable energy generation, the need for integrated building energy storage solutions increases. Supercapacitors have not yet been considered a viable ...

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 ...

The energy-efficient reinforcement-integrated concrete heating systems consist of a textile fiber reinforcement to increase strength, a carbon fiber roving to generate thermal power through ...

The integration of energy storage capabilities into building materials represents a revolutionary advancement

in sustainable energy solutions. This study introduces and explores a carbon ...

Steel fiber cement pastes show higher volume electrical resistivity than carbon fiber cement pastes even when steel fiber content is raised to 1% by mass of cement. Hence, ...

This study introduces and explores a carbon-fiber-reinforced cementitious supercapacitor, marking a pioneering step in leveraging construction materials for dual ...

The results demonstrated that the nickel foam electrodes significantly outperformed the carbon fiber mesh electrodes in terms of discharge capacity, efficiency, and ...

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