



Functional materials for energy storage

Can functional organic materials be used for energy storage and conversion?

The review of functional organic materials for energy storage and conversion has revealed several key findings and insights that underscore their significant potential in advancing energy technologies. These materials have demonstrated remarkable promise in meeting the increasing demand for efficient and sustainable energy solutions.

Are functional materials effective for energy-harvesting/conversion & storage applications?

In conclusion, this chapter summarizes recent developments of numerous functional materials/devices efficaciously employed for abundant mechanical energy-harvesting/conversions and storage applications. These wide varieties of functional materials can be synthesized by following different cost-effective green protocols.

Can organic materials be used for energy storage?

By incorporating organic materials that passivate defects, the longevity and reliability of these devices can be greatly enhanced, making them more viable for commercial applications (Padam et al. 2014; Wang et al. 2024). Additionally, the exploration of organic materials extends to the development of flexible and wearable energy storage devices.

Can organic materials be used for wearable energy storage devices?

Additionally, the exploration of organic materials extends to the development of flexible and wearable energy storage devices. Organic-based materials can be processed into thin films or coatings, making them ideal for integration into wearable devices, smart textiles, and flexible displays.

What are functional organic materials?

Generally, functional organic materials hold tremendous promise for commercial conversion across various industries. Their unique properties, including flexibility, lightweight nature, lower material costs, and environmental sustainability, make them well-suited for applications ranging from flexible electronics to energy generation and storage.

What types of energy storage systems are used?

Conventionally, two categories of energy storage systems (supercapacitors and batteries) have been exploited extensively for electrochemical energy storage and conversions.

Special Issue Information Dear Colleagues, This Special Issue is dedicated to exploring cutting-edge advancements in functional materials designed for energy harvesting ...

MOF-related materials have been demonstrated as potential candidates for essential components in electrochemical energy storage and conversion devices, such as electrode materials, electrocatalysts, and



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electrolytes.

Low energy consumption and environmentally friendly extraction of high value-added elements from waste aluminum electrolytes are crucial for developin...

Covers the importance of energy conversion and storage systems and the application of nanostructured functional materials toward energy-relevant catalytic processes

Advanced Functional Materials Research Article Superior Energy Storage Performance Induced by Cross-Scale Electric Field Modulation Utilizing Hybrid Hierarchical ...

College of Materials Science and Engineering, Sichuan University, Chengdu 610064, China Interests: structural functional materials such as piezoelectric, ferroelectric, ...

Energy storage and conversion are vital for addressing global energy challenges, particularly the demand for clean and sustainable energy. Functional organic ...

Abstract Electrochemical energy storage and conversion with high efficiency and cleanliness is unquestionably one challenge for the sustainable development of the society of ...

This smart fabric combines energy storage, self-heating, and triboelectric power generation at low temperatures, providing a feasible solution for creating flexible wearable devices for complex environments.

Carbon-based functional materials represent the most investigated ORR catalysts and electrode materials for the energy conversion and storage because they not only exhibit excellent electrochemical ...

Functional Materials for Energy Storage, Conversion and Environmental Sustainability Print Special Issue Flyer Special Issue Editors Special Issue Information Keywords Benefits of ...

Advanced Functional Materials Review Characteristics, Encapsulation Strategies, and Applications of Al and Its Alloy Phase Change Materials for Thermal Energy ...

The scope of this Special Issue encompasses a broad range of advanced functional materials, spanning from dielectrics, piezoelectrics, thermoelectrics, and ferroelectrics for energy storage ...

This review is conducted to address the limita-tions and challenges of conventional energy storage and conversion technologies by exploring the potential of functional organic materials.

Thermal energy storage technologies based on phase-change materials (PCMs) have received tremendous attention in recent years. These materials are capable of reversibly storing large amounts of ...



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College of Materials Science and Engineering, Sichuan University, Chengdu 610064, China Interests: structural functional materials such as piezoelectric, ferroelectric, pyroelectric, and dielectric energy ...

Driven by the growing demand for carbon neutrality, advanced functional materials serve as pivotal facilitators for the creation of sustainable energy technologies due to their tunable ...

Due to the unique properties of MOFs like highly tunable frameworks, huge specific surface areas, flexible chemical composition, flexible structures and a large volume of pores, they are being used to ...

Abstract This chapter looks at the recent research trends and future development of low-dimensional carbon-based nanomaterials with particular focus on various energy conversion ...

Functional materials play a vital role in thermal energy conversion and storage. For example, high temperature materials can increase the efficiency of traditional power generation cycles, such as gas ...

This Issue will focus on functional materials with specific electrical, thermal, magnetic, chemical, or electrochemical properties as a foundation for designing and fabricating new, desired materials enabling ...

In this chapter, we highlight concisely on recent developments of several functional materials/devices exploited for ambient mechanical energy-harvesting/conversions ...

A comprehensive overview of the current progress on porous carbon materials is presented from traditional synthesis, machine learning-assisted design to their energy storage and conversion applicatio...

The energy sector relies on synthesis methods, which comprise a number of processes necessary for the creation of novel materials and technology [6]. To create ...

In this Mini Review, we first briefly summarize the material design strategies to show the rich possibilities of the chemical compositions and physical structures of MOFs derivatives.

Advanced Functional Materials Research Article A Tiron Redox Mediator Enabling Dominant Two-Electron Transfer Energy Storage in MnO₂ Cathode Materials for Aqueous Zn ...

Carbon-based functional materials represent the most investigated ORR catalysts and electrode materials for the energy conversion and storage because they not only ...

Abstract In addition to their conventional uses, metal-organic frameworks (MOFs) have recently emerged as an interesting class of functional materials and precursors of inorganic materials for electrochemical energy storage ...



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