

Simultaneously improving the energy density and power density of electrochemical energy storage systems is the ultimate goal of electrochemical energy storage technology. An effective strategy to achieve this goal is to take advantage of the high capacity and rapid kinetics of electrochemical proton storage to break through the power limit of batteries ...

Rechargeable metal ion batteries (MIBs) are one of the most reliable portable energy storage devices today because of their high power density, exceptional energy capacity, high cycling stability, and low self-discharge [1, 2]. Lithium-ion batteries (LIBs) remain the most developed and commercially viable alternative among all rechargeable batteries, and graphite ...

The focus of the special issue will be on the fascinating field of micro/nano energy. This encompasses not only the application of micro/nanoparticles for enhancing the performance of energy systems, but also the examination of energy systems at a micro scale, such as micro turbines and micro combustors. The overarching objective of this special issue ...

Energy Storage. As a part of the DOE-wide Energy Storage Grand Challenge, AMO aims to develop a strong, diverse domestic manufacturing base with integrated supply chains to support U.S. energy-storage leadership support of this goal, AMO is using nanotechnology to explore new materials that can address energy-storage material ...

The theory of obtaining high energy-storage density and efficiency for ceramic capacitors is well known, e.g. increasing the breakdown electric field and decreasing remanent polarization of dielectric materials. ... This nano-micro engineering results in a high energy density of  $13.5 \text{ J cm}^{-3}$  together with a ... This material design strategy ...

**ABSTRACT.** The structural engineering of metastable nanomaterials with abundant defects has attracted much attention in energy-related fields. The high-temperature shock (HTS) technique, as a rapidly developing and advanced synthesis strategy, offers significant potential for the rational design and fabrication of high-quality nanocatalysts in an ...

Nano-/Micro-confined Water in Graphene Hydrogel as Superadsorbents for Water Purification Dec 12, 2019.  
2 . Yiran Sun, Fei Yu, Cong Li, Xiaohu Dai, Jie Ma ... Energy Storage Materials Batteries Supercapacitors Nano Biomedicine Nano-Micro Devices Solar Cells Address Number 800 Dongchuan Road Shanghai, China 200240 ...

Nano-energetic materials can be interfaced very well with micro-/nano-scale devices which can generate power, pulse or thrust. The art of fabrication of nano-energetic materials is the key to meet the energy demand

created in micro-scale energy actuators and power drivers. Nano-energetic materials in prin-

DOI: 10.1007/s40820-020-00522-1 Corpus ID: 226946819; DFT-Guided Design and Fabrication of Carbon-Nitride-Based Materials for Energy Storage Devices: A Review @article{Adekoya2020DFTGuidedDA, title={DFT-Guided Design and Fabrication of Carbon-Nitride-Based Materials for Energy Storage Devices: A Review}, author={David Adekoya and ...

Lithium-ion batteries (LIBs) are very popular electrochemical energy-storage devices. However, the current LIBs still have limitations in terms of energy density, power density, cyclability, safety, and temperature adaptability [1,2,3,4,5]. Especially, both low and high temperatures reduce the energy and power densities of LIBs, rendering them less practical in ...

The booming wearable/portable electronic devices industry has stimulated the progress of supporting flexible energy storage devices. Excellent performance of flexible devices not only requires the component units of each device to maintain the original performance under external forces, but also demands the overall device to be flexible in response to external ...

The architectural design of electrodes offers new opportunities for next-generation electrochemical energy storage devices (EESDs) by increasing surface area, thickness, and active materials mass loading while maintaining good ion diffusion through optimized electrode tortuosity. However, conventional thick electrodes increase ion diffusion ...

The development of a nation is deeply related to its energy consumption. 2D nanomaterials have become a spotlight for energy harvesting applications from the small-scale of low-power electronics to a large-scale for industry-level applications, such as self-powered sensor devices, environmental monitoring, and large-scale power generation. Scientists from around the world ...

In response to global energy problems, industrial waste heat storage systems are a useful strategy as important as clean energy. Slow magnesium oxide hydration rate and incomplete hydration are the main obstacles to the application of  $\text{MgO}/\text{Mg}(\text{OH})_2$  to heat storage systems. In this study, porous structures are introduced into pure magnesium oxide materials ...

Electrostatic capacitors with the fastest charge-discharge rates and the highest power densities among the electrical energy storage devices are essential for advanced pulsed power systems and electrical propulsions [1,2,3,4,5]. Polymers are preferred dielectrics for high-energy-density capacitors because of their inherent advantages including high ...

The extremely high demand of energy management within very less spatial domains coupled with the current, different micro-scale energy storage solutions provides energy management needs in terms of high storage/release densities, and thus researchers explore solutions away from the conventional nano-energetic (fuel-oxidizer composite) material ...

Provides special emphasis on the energy storage, propellant and defense applications; Discusses challenges and future perspectives for the field; Part of the book series: Energy, Environment, and Sustainability (ENENSU) ... nano-energetic materials, micro and nanofabrication technologies, water remediation using visible light photocatalysis and ...

Rechargeable batteries of high energy density and overall performance are becoming a critically important technology in the rapidly changing society of the twenty-first century. While lithium-ion batteries have so far been the dominant choice, numerous emerging applications call for higher capacity, better safety and lower costs while maintaining sufficient cyclability. The design ...

Nano-Micro Letters - Phase change materials (PCMs) offer a promising solution to address the challenges posed by intermittency and fluctuations in solar thermal utilization. ... /MXene-derived hybrid scaffolds for excellent electromagnetic interference shielding and superior solar/electro-thermal energy storage. Nano Res. 15, 8524-8535 (2022 ...

From mobile devices to the power grid, the needs for high-energy density or high-power density energy storage materials continue to grow. Materials that have at least one dimension on the nanometer scale offer opportunities for enhanced energy storage, although there are also challenges relating to, for example, stability and manufacturing.

Therefore, the design of cost-saving and highly efficient micro/nano materials in the field of energy storage and conversion is still very significant. Numerous papers have been reported in this Research Topic, and herein we introduce the representative advances in the collected papers that discuss how micro/nano materials work in the area of ...

Nano-Micro Devices Nano Biomedicine Announcements About Aims and Scope Editorial Board Home / Energy Storage Materials Energy Storage Materials 47 Items All Items High-Entropy Electrode Materials: Synthesis, Properties and Outlook Sep 27, 2024. 22 . Dongxiao Li, Chang Liu, Shusheng Tao, Jieming Cai, Biao Zhong, Jie Li, Wentao Deng, Hongshuai ...

Emerging additive manufacturing methods have enabled the fabrication of novel 3D nano- and micro-architected lattice materials, allowing researchers to investigate previously unexplored phenomena and property spaces. This new class of materials, which are mainly made from polymers, can be further functionalized through the deposition of ceramic and metallic ...

Investigating the energy storage performance of amorphous micro-nano materials is an important topic in the field of materials science [76, 77]. Meanwhile, the emerging data analysis technique of ML has been widely applied in materials design and performance predictions [78]. ML is a discipline that explores how computers can simulate human ...

