

The rapid development of electrochemical energy storage (EES) devices requires multi-functional materials. Nickel (Ni)-based materials are regarded as promising candidates for EES devices owing to their unique performance characteristics, low cost, abundance, and environmental friendliness.

This editorial summarizes the performance of the special issue entitled Advanced Energy Storage Technologies and Applications (AESA), which is published in MDPI's Energies journal in 2017. The special issue includes a total of 22 papers from four countries. Lithium-ion battery, electric vehicle, and energy storage were the topics attracting the most attentions. New methods have ...

Advanced Functional Materials, ... Shaowen Zhou. College of Energy, Soochow Institute for Energy and Materials Innovation, Key Laboratory of Advanced Carbon Materials and Wearable Energy Technologies of Jiangsu Province, Soochow University, Suzhou, 215006 P. R. China ... Highly reversible Li-ion storage capacities up to 540 mAh g<sup>-1</sup> are ...

Polymer dielectrics with a high energy density and an available energy storage capacity have been playing an important role in advanced electronics and power systems. Nevertheless, the use of polymer dielectrics in harsh environments is limited by their low energy density at high temperatures. Herein, zirconium dioxide (ZrO<sub>2</sub>) nanoparticles were decorated ...

Ziyan Gao 1, Yang Zhou 1, Jin Zhang 1, Javad Foroughi 1, Shuhua ... With a key focus on advanced materials that can enable energy harvesters to meet the energy needs of WIMDs, this review examines the crucial roles of advanced materials in improving the efficiencies of energy harvesters, wireless charging, and energy storage devices ...

MITEI's three-year Future of Energy Storage study explored the role that energy storage can play in fighting climate change and in the global adoption of clean energy grids. Replacing fossil fuel-based power generation with power generation from wind and solar resources is a key strategy for decarbonizing electricity. Storage enables electricity systems to remain in... [Read more](#)

His research mainly focuses on energy-storage materials and devices. He has published over 90 papers, and first-authored 33 papers published in Nature Nanotechnology (2), Chemical Reviews (1), Nature Communications (3), PNAS(2), Advanced Materials (4), etc. His publications have been cited more than 18000 times with an H-index of 54 (Google Scholar).

Aqueous Zn-based hybrid energy storage devices (HESDs) exhibit great potential for large-scale energy storage applications for the merits of environmental friendliness, low redox potential, and high theoretical capacity of Zn anode. However, they are still subjected to low specific capacities since adsorption-type

cathodes (i.e., activated carbon, hard carbon) have limited capability to ...

Increasing research interest has been attracted to develop the next-generation energy storage device as the substitution of lithium-ion batteries (LIBs), considering the potential safety issue and the resource deficiency [1], [2], [3] particular, aqueous rechargeable zinc-ion batteries (ZIBs) are becoming one of the most promising alternatives owing to their reliable ...

Dielectric ceramic capacitors, with the advantages of high power density, fast charge-discharge capability, excellent fatigue endurance, and good high temperature stability, have been acknowledged to be promising candidates for solid-state pulse power systems. This review investigates the energy storage performances of linear dielectric, relaxor ferroelectric, ...

Power storage technology serves to cut the peak and fill valley, regulate the power frequency, improve the stability, and raise the utilization coefficient of the grid in the power system. This paper introduces various types of storage technology such as superconducting magnetic energy storage, super capacitor energy storage, sodium sulfur battery, lithium ion, ...

1 Introduction. The 100% renewable energy targets and Smart Energy City impose new requirements on resource allocation and demand distribution. Gradual transition to carbon-neutral EU needs to comprehensively consider economic, eco, and social impact. [] Smart and energy-resilient cities with sustainability call for advanced energy system design, energy ...

Critical developments of advanced aqueous redox flow battery technologies are reviewed. Long duration energy storage oriented cell configuration and materials design strategies for the developments of aqueous redox flow batteries are discussed Long-duration energy storage (LDES) is playing an increasingly significant role in the integration of intermittent and unstable ...

Advanced Materials, ... Xianlong Zhou. School of Chemical Engineering and Advanced Materials, The University of Adelaide, Adelaide, SA, 5005 Australia ... Here, methods of coordination bond scission to tailor the structure are critically appraised and the application to energy storage and conversion is assessed. MOF structures synthesized by ...

DOI: 10.1016/J.ENERGY.2019.115993 Corpus ID: 202091775; A review of thermal energy storage in compressed air energy storage system @article{Zhou2019ARO, title={A review of thermal energy storage in compressed air energy storage system}, author={Qian Zhou and Dong Mei Du and Chang Lu and Qing He and Wenyi Liu}, journal={Energy}, year={2019}, ...

From the above results, supercapacitor prototypes are successfully fabricated by introducing PANI as the active component and organohydrogels as electrolytes. High-performance supercapacitors for energy storage and release may be achieved by further optimizing the structure and composition. 3 Conclusion

Although ceramic dielectric materials have been extensively explored owing to their numerous advantages, there are still obstacles in the collaborative enhancement of recoverable energy density ( $W_{rec}$ ) and efficiency (i) this work, a combinatorial optimization strategy is proposed to optimize energy storage properties of (K, Na)NbO<sub>3</sub>-based ceramics, ...

The special issue covers various types of advanced energy storage involving electrochemical energy storage, thermal energy storage, mechanical energy storage, etc. The mission of the special issue is to communicate the most cutting-edge research in energy storage to the research community, policy decision-makers, and other types of stakeholders.

Currently, realizing a secure and sustainable energy future is one of our foremost social and scientific challenges [1]. Electrochemical energy storage (EES) plays a significant role in our daily life due to its wider and wider application in numerous mobile electronic devices and electric vehicles (EVs) as well as large scale power grids [2]. Metal-ion batteries (MIBs) and ...

Xu Zhang and Zhen Zhou, Key Laboratory of Advanced Energy Materials Chemistry (Ministry of Education), Renewable Energy Conversion and Storage Center (ReCast), Nankai University, Tianjin 300350, China. ... His research interest mainly focuses on materials design for energy storage and conversion. Zhen Zhou received his BSc (applied chemistry) ...

Advanced Energy Materials is your prime applied energy journal for research providing solutions to today's global energy challenges. Abstract Zn metal anodes, the key to aqueous zinc-based energy storage, are plagued by dendrites and sluggish kinetics, which are closely related to the Zn plating process and restricted charge transfer...

ESDs can store energy in various forms (Pollet et al., 2014). Examples include electrochemical ESD (such as batteries, flow batteries, capacitors/supercapacitors, and fuel cells), physical ESDs (such as superconducting magnets energy storage, compressed air, pumped storage, and flywheel), and thermal ESDs (such as sensible heat storage and latent heat ...

The growth of energy storage devices has prompted the work of multidisciplinary researchers, and MXene-based flexible materials rely on the associated design of material science, chemistry, and mechanics, which has spurred significant advancements in the fields of batteries and supercapacitors. ... Yunlei Zhou received a Ph.D. degree in ...

Accompanied by the development and utilization of renewable energy sources, efficient energy storage has become a key topic. Electrochemical energy storage devices are considered to be one of the most practical energy storage devices capable of converting and storing electrical energy generated by renewable resources, which are also used as the power source of ...

Conspectus Cellulose is the most abundant biopolymer on Earth and has long been used as a sustainable

building block of conventional paper. Note that nanocellulose accounts for nearly 40% of wood's weight and can be extracted using well-developed methods. Due to its appealing mechanical and electrochemical properties, including high specific ...

Advanced Functional Materials, part of the prestigious Advanced portfolio and a top-tier materials science journal, publishes outstanding research across the field. Abstract Flexible electronic devices (FEDs) based on hydrogels are attracting increasing interest, but the fabrication of hydrogels for FEDs with adhesiveness and high robustness in ...

Dielectric capacitors are essential components of advanced high-power electrical and electronic systems for electrical energy storage. The drastic reductions in the energy density and the charge-discharge efficiency of dielectric polymers at elevated temperatures, owing to sharply increased electrical conduction, remain a major challenge.

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