

Dielectric capacitors deliver the highest power density and operating voltage among known energy storage devices that are integrable in modern electronic and electrical systems. Ferroelectric polymers are promising dielectric energy storage media for film capacitors due to their superiority in excellent dielectric properties, high breakdown strength, and flexibility.

To meet the miniaturization demands of next-generation electronics and electrical systems, energy storage capacitors with both high energy density and efficiency have become a research hotspot.

The rapid development of clean energy provides effective solutions for some major global problems such as resource shortage and environmental pollution, and full utilization of clean energy necessitates overcoming the randomness and intermittence by the integration of advanced energy storage technologies. 1-4 For this end, dielectric energy-storage capacitors ...

Xing Zhou [...] Hua Xu; View +1. ... -67) represents an important metal-organic framework material that has shown promising applications in electrochemical energy storage. However, poor ...

The thermal storage efficiency of the working substance in the CPCMs reaches as high as 95.6%, maintaining a tremendously high energy storage density. More importantly, the CPCMs exhibit prominent shape stability when heated at 80 °C, higher than the phase change temperature, for 60 h.

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The development of sodium-ion batteries (SIBs) calls for a cathode material with high specific capacity to store energy, long lifespan to reduce maintenance cost, and flexible power storage capability to adapt climate change [[1], [2], [3], [4]]. Sodium super-ionic conductor (NASICON) materials have attracted great attention due to their distinctive crystallographic ...

The upsurge of electrical energy storage for high-temperature applications such as electric vehicles, underground oil/gas exploration and aerospace systems calls for dielectric ...

For capacitive energy storage at elevated temperatures 1-4, dielectric polymers are required to integrate low electrical conduction with high thermal conductivity. The coexistence of these seemingly contradictory properties remains a persistent challenge for existing polymers.

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For capacitive energy storage at elevated temperatures^{1,2,3,4}, dielectric polymers are required to integrate low electrical conduction with high thermal conductivity. The coexistence of these seemingly contradictory properties remains a persistent challenge for existing polymers. We describe here a class of ladderphane copolymers exhibiting more than one order of magnitude ...

3 · This review explores the recent advancements in biomass-derived materials for energy storage system (ESS), including supercapacitors and electrocatalytic reactions. ... Feng T, ...

<p>Dielectric energy storage materials that are extensively employed in capacitors and other electronic devices have attracted increasing attentions amid the rapid progress of electronic technology. However, the commercialized polymeric and ceramic dielectric materials characterized by low energy storage density face numerous limitations in practical ...

With ever-increasing energy crisis and environmental pollution issues [1, 2], lithium-sulfur (Li-S) batteries have gained growing number of attention and are considered as one of the most promising next-generation energy storage systems owing to their remarkably high energy density (2600 Wh kg⁻¹), as well as the nontoxicity, low cost, large theoretical specific ...

Film-based dielectric capacitors featured with small size, high breakdown field, and high energy storage density enable the application for integrated and miniaturized electronic devices. So far, kinds of dielectrics have been explored for higher energy storage performance. Linear-like dielectrics can endure a high breakdown field but the polarization is too small.

Electrostatic energy storage capacitors based on dielectrics have attracted much attention due to their wide applications in advanced electrical technology and electronic devices. Generally, high energy density is achieved at a high electric field, while conduction loss becomes nonnegligible, which harms practical applications. Here distinctly suppressed ...

It is generally regarded that the electrodeposition of Na metal can be divided into four steps: (a) Solvated Na + transports from bulk electrolyte to electrode surface. (b) Solvated Na + is desolvated on the electrode surface. (c) Desolvated Na + migrates through the SEI. (d) Na + combines with electrons and reduces to Na atom. In contrast to process (a), the interfacial ...

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, ...

The pioneering lead-free energy storage materials are linear dielectrics with high breakdown strength and energy storage efficiency, represented by titanium dioxide [14]. However, its low dielectric constant makes the polarization energy storage density generally not exceed 1 J cm^{-3} , which is gradually eliminated by the technical development in the industry [15].

Two-dimensional (2D) boron nitride nanosheets (BNNS), with exceptional thermoconductive properties and wide band gap, hold a great promise as candidate fillers for the preparation of the functional...

The thus-fabricated hybrid supercapacitors exhibit excellent flexibility with a capacitance retention of 96% after 5000 bending-unbending cycles, and good weavability with a high volumetric capacitance of 36.3 F cm^{-3} at a current density of 0.4 A cm^{-3} , and an energy density of 11.3 mWh cm^{-3} at a power density of 0.3 W cm^{-3} . As a ...

A class of dielectric copolymers called ladderphanes is shown to outperform existing dielectric polymers and composites, with high discharged energy density and charge-discharge efficiency even at temperatures up to $200 \text{ }^\circ\text{C}$. For capacitive energy storage at elevated temperatures¹⁻⁴, dielectric polymers are required to integrate low electrical ...

@article{Gao2024ImprovingES, title={Improving energy storage properties of polyarylene ether nitrile with coral-like $\text{CaCu}_3\text{Ti}_4\text{O}_{12}$ nanorods}, author={Feng Gao and Lingyun Zhou and Kexin Liu and Zhihua Feng and Qi Huo and Cui Yang and Tian Zhang and Yu Mao and Dong Li and Lingling Wang and Xiufu Hua and Renbo Wei}, journal={Chemical Engineering ...

The spread of portable electronics and electric vehicles has prompted the development of energy storage systems with high-energy density and long-cycle life [1, 2]. Among various alternatives, lithium-sulfur (Li-S) battery is the most potential candidate due to the abundant resource, low cost and high theoretical capacity [3], [4], [5] spite these ...

Author links open overlay panel Yang Hua a, Sida Zhou a, Yi Huang a, Xinhua Liu a b, Heping Ling c, Xinan Zhou a, Cheng Zhang d, Shichun Yang a. Show more. Add to Mendeley. ... energy storage system (ESS), photovoltaic (PV) energy, and residential services depending on the evaluation results [14, 15]. Due to economic and environmental ...

DOI: 10.1016/j.scriptamat.2024.115968 Corpus ID: 267013271; Optimized energy storage performance in bilayer heterogeneous films @article{Zhou2024OptimizedES, title={Optimized energy storage performance in bilayer heterogeneous films}, author={Zhifang Zhou and Yiqian Liu and Shun Lan and Bingbing Yang and Ce-Wen Nan and Yuan-Hua Lin}, journal={Scripta ...

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Intelligent electronics, particularly flexible, wearable, and body-attachable devices, have gained significant attention and market potential in various fields, such as healthcare monitoring, robotics, and the Internet of Things [1]. To meet the power requirements of these intelligent systems, energy storage devices must possess comprehensive advantages in ...

Zinc-air batteries deliver great potential as emerging energy storage systems but suffer from sluggish kinetics of the cathode oxygen redox reactions that render unsatisfactory cycling lifespan. The exploration on bifunctional electrocatalysts for oxygen reduction and evolution constitutes a key solution, where rational design strategies to ...

With the ultrahigh power density and fast charge-discharge capability, a dielectric capacitor is an important way to meet the fast increase in the demand for an energy storage system such as pulsed power systems (PPS). The BaTiO₃-based capacitor is considered as one of the candidates for PPS due to its high permittivity. However, with the continuous ...

The optimization of high-energy-storage dielectrics will have far-reaching impacts on the sustainable energy and will be an important research topic in the near future. The demand for dielectric capacitors with higher energy-storage capability is increasing for power electronic devices due to the rapid development of electronic industry. Existing dielectrics for ...

The increasing of world population and social economic development has given rise to a series of energy and environmental crises. Searching for clean and renewable energy sources, e.g., solar and wind energies, is of significant importance [1,2,3,4]. But with consideration of the intermittent of nature energies, developing high-efficiency energy storage devices is in ...

This work exhibits the potential application of the low-cost and environmentally-friendly clay as the 2D heterostructure interlayer material for realizing high-energy-density, ...

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