Deliberate design of advantageous nanostructures holds great promise for developing high-performance electrode materials for electrochemical energy storage. However, it remains a tremendous challenge to simultaneously gain high gravimetric, areal, and volumetric capacities as well as high rate performance and cyclability to meet practical requirements ...

Dielectric ceramics are highly desired for electronic systems owing to their fast discharge speed and excellent fatigue resistance. However, the low energy density resulting from the low breakdown electric field leads to inferior volumetric efficiency, which is the main challenge for practical applications of dielectric ceramics.

Electric energy storage technologies play an essential role in advanced electronics and electrical power systems 1,2,3,4,5.Many advanced electrical devices call for energy storage with ...

DOI: 10.1016/j.nanoen.2022.107326 Corpus ID: 248471346; CoSe2 Nanodots Confined in Multidimensional Porous Nanoarchitecture towards Efficient Sodium Ion Storage @article{Xiao2022CoSe2NC, title={CoSe2 Nanodots Confined in Multidimensional Porous Nanoarchitecture towards Efficient Sodium Ion Storage}, author={Qian Xiao and Qilin Song ...

High-performance dielectric energy-storage ceramics are beneficial for electrostatic capacitors used in various electronic systems. However, the trade-off between reversible polarizability and breakdown strength poses a significant challenge in simultaneously achieving high energy density and efficiency. Here a strategy is presented to address this ...

Here, we report a high-entropy stabilized Bi 2 Ti 2 O 7-based dielectric film that exhibits an energy density as high as 182 J cm-3 with an efficiency of 78% at an electric field of 6.35 MV cm-1. ...

An effective route to improve the energy storage performance by constructing polymorphic nanostructures in (1-x)BaTiO 3-xBi(Zn 1/2 Zr 1/2)O 3 (BT-BZZ) films was proposed. The finite element simulation method was used to simulate the impacts of amorphous/crystalline phase and volume fraction on the electric field and polarization distributions.

Polymer dielectrics are promising for high-density energy storage but dielectric breakdown is poorly understood. Here, a phase-field model is developed to investigate electric, thermal, and ...

A major challenge, however, is how to improve their energy densities to effectuate the next-generation applications that demand miniaturization and integration. Here, we report a high-entropy stabilized Bi 2 Ti 2 O 7-based dielectric film that exhibits an energy density as high as 182 J cm-3 with an efficiency of 78% at an electric field of 6. ...

Optimal electrical energy storage capability was observed when the tensile strain was at 200% ... Jie Chen performed the experiments. Jie Chen, Zhonghui Shen, Qi Kang, and Xiaoshi Qian analyzed the data. Jie Chen, Xiaoshi Qian, and Xingyi Huang co-wrote the paper. All the authors discussed the results and commented on the manuscript. Appendix A.

Here we propose that the con-fi trollable thermal dynamics through nanocon nement in ultrathin fi polymer lms hold great promise for improving the thermal stability fi and high-temperature ...

6 Floors, Building 1 Zhonghui International Mansion, Huicheng District, Huizhou, Guangdong Province, China. inquiry@bsl-battery +86-0752-2819469; ... Stationary Energy Storage; help center. Blogs & News; Contact; Terms; Become A Dealer; Find ...

An ultrahigh energy density of 50 J cm -3 is achieved for the nominal Pb 0.925 La 0.05 ZrO 3 (PLZ5) films at low electric fields of 1 MV cm -1, exceeding the current dielectric energy storage films at similar electric field. This study opens a new avenue to enhance energy density of AFE materials at low field/voltage based on a gradient ...

DOI: 10.1016/J.APPLTHERMALENG.2021.117104 Corpus ID: 236237929; Bionic topology optimization of fins for rapid latent heat thermal energy storage @article{Tian2021BionicTO, title={Bionic topology optimization of fins for rapid latent heat thermal energy storage}, author={Yang Tian and Xianglei Liu and Qiao Xu and Qin Luo and Hangbin ...

In particular, resultant excellent mechanical and electrical properties of the polymer blend films give rise to remarkably improved breakdown strength and energy storage performance, surpassing P(VDF-TrFE) and commercial biaxial-oriented polypropylene films.

This work provides new opportunities to PVDF-based polymer nanocomposites with high energy density and discharge efficiency for capacitive energy storage applications.", author = "Jianyong Jiang and Zhonghui Shen and Xingke Cai and Jianfeng Qian and Zhenkang Dan and Yuanhua Lin and Bilu Liu and Nan, {Ce Wen} and Longqing Chen and Yang Shen",

Zhonghui Chen"s research while affiliated with Henan ... well-defined nanostructures and good flexiblity is an efficient approach for achieving high-performance and flexible energy storage systems

An ultrahigh discharge energy density of 38.8 J cm-3 along with a high discharge efficiency of >80% is achieved at the electric field of 800 kV mm-1 in the gradient polymer films, which is the highest energy density reported thus far in polymer-based dielectrics including their nanocomposites and the highest energy efficiency achieved ...

Zhonghui SHEN | Cited by 4,156 | of Wuhan University of Technology, Wuhan (WHUT) | Read 76

publications | Contact Zhonghui SHEN ... the low energy storage efficiency and breakdown strength hinder ...

The shortage of lithium resources has hindered the future development of lithium ion batteries (LIBs), especially in large-scale energy storage [1], [2], [3].With the naturally abundant sodium resources on earth, sodium ion batteries (SIBs) have attracted worldwide concern for one of the most potential alternatives to LIBs [4], [5].SIBs show similar battery ...

Graphene, versatile building blocks for functional composite materials, shows multiple fascinating properties and draws great interest, especially in the field of electrochemical energy storage. However, several common drawbacks still persist, including (i) it tends to aggregate and restack to loss the surface area, (ii) it is difficult to composite with other materials due to the limited ...

Zhonghui Chen 1, Jiadong Chen 1, Fanxing Bu 1, Phillips O Agboola 2, Imran Shakir 3, Yuxi Xu 1 ... advantageous nanostructures holds great promise for developing high-performance electrode materials for electrochemical energy storage. However, it remains a tremendous challenge to simultaneously gain high gravimetric, areal, and volumetric ...

Ferroelectric polymers with robust electrical polarization have been extensively investigated for capacitive energy storage. However, their inherent ferroelectric hysteresis loss ...

The energy storage density of the metadielectric film capacitors can achieve to 85 joules per cubic centimeter with energy efficiency exceeding 81% in the temperature range from 25 °C to 400 °C ...

Sodium ion batteries (SIBs) are a low-cost and promising alternative to lithium ion batteries, however, due to the large sodium ion size (Na+ vs Li+: 1.02 Å vs 0.76 Å), high ion diffusion barrier and huge volume variation of electrode materials, it remains a challenge to achieve satisfactory Na+ storage performance. To address these issues, herein, we deliberately designed a ...

At present, the clean energy that can replace fossil fuels includes wind energy [4], tidal energy [5], solar energy [6], hydrogen energy [7] and so on. Among them, hydrogen energy stands out for its rich storage capacity (in the atmosphere of the sun, according to the atomic percentage, hydrogen atom accounts for 81.75%) [8], high energy ...

Our work provides a new electrode design strategy based on multidimensional nanoarchitecture for high-performance energy storage devices. Graphical Abstract. Download: Download high-res image (153KB) ... Zhonghui Chen: Formal analysis, Writing - review & editing, Project administration, Funding acquisition. Qilin Song performed theoretical ...

Therefore, energy storage technology is vital for bridging the gap between energy supply and demand. In general, there are three kinds of thermal energy storage techniques: sensible heat storage (SHS), thermochemical heat storage (THS), and latent heat storage (LHS). ... Zhonghui Zhu: Formal analysis.

Qingyang Luo: Writing - review & editing ...

Poly(vinylidene fluoride) (PVDF)-based dielectric polymers are in great demand for the future electronic and electrical industry because of their high dielectric constants and energy density. However, some issues that limit their practical applications remain unsolved. One of the most urgent issues is their high dielectric loss and hence low efficiency.

In addition, the energy storage properties of BT-8%Mn films achieve the best energy storage performance in terms of energy density and efficiency of 72.4 J/cm3 and 88.5% by changing the annealing ...