

Dielectric capacitors have drawn growing attention for their wide application in future high power and/or pulsed power electronic systems. However, the recoverable energy storage density (W_{rec}) for dielectric ceramics is relatively low up to now, which largely restricts their actual application. Herein, the domain engineering is employed to construct relaxor ...

With the fast development of the power electronics, dielectric materials with high energy-storage density, low loss, and good temperature stability are eagerly desired for the potential application in advanced pulsed capacitors. Based on the physical principals, the materials with higher saturated polarization, smaller remnant polarization, and higher electrical breakdown field are the most ...

DOI: 10.1016/J.CERAMINT.2016.05.042 Corpus ID: 138906013; Dielectric relaxation behavior and energy storage properties of Sn modified SrTiO₃ based ceramics @article{Xie2016DielectricRB, title={Dielectric relaxation behavior and energy storage properties of Sn modified SrTiO₃ based ceramics}, author={Juan Xie and Hua Hao and Hanxing Liu and ...

Among many energy storage technologies, compressed air energy storage (CAES) is developing rapidly due to the high round trip efficiency (RTE) of 70 %-82 % [4], long service life of 30 years and high security [5], while it is also limited by geological formations and usually relies on huge storage reservoirs due to the low density of air [6 ...

As a result, a high total energy storage density of 3.6 J cm⁻³, energy storage efficiency of 80%, and good thermal stability are achieved simultaneously in the compounds ...

The chemically converted graphene sheets that were produced have the largest area reported to date (up to 20 x 40 microm), making them far easier to process, and field-effect devices have been fabricated by conventional photolithography, displaying currents that are three orders of magnitude higher than previously reported for chemically produced graphene.

(DOI: 10.1142/S2010135X13300016) With the fast development of the power electronics, dielectric materials with high energy-storage density, low loss, and good temperature stability are eagerly desired for the potential application in advanced pulsed capacitors. Based on the physical principals, the materials with higher saturated polarization, smaller remnant polarization, and ...

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.", author = "Zhonghua Yao and Zhe Song and Hua Hao and Zhiyong Yu and Minghe Cao and Shujun Zhang and Lanagan, {Michael T.} and Hanxing Liu";,

The results indicate that PCZ thin films annealed at 550 °C crystallized into a nanocrystalline structure

of the pyrochlore phase, while also displaying the highest recoverable energy density and efficiency and attribute the ultrahigh energy storage properties mainly to dramatic improvements in the electric breakdown strength caused by the dense nanocrystalline structure.

Recently, new multifunctional supercapacitors, which combine energy storage capability with load-carrying and other functions, offer a new "two-birds-one-stone" strategy for next-generation ...

This review investigates the energy storage performances of linear dielectric, relaxor ferroelectric, and antiferroelectric from the viewpoint of chemical modification, ...

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 parameters of important ...

Electrostatic energy storage technology based on dielectrics is fundamental to advanced electronics and high-power electrical systems. Recently, relaxor ferroelectrics characterized by nanodomains have shown great promise as dielectrics with high energy density and high efficiency. We demonstrate substantial enhancements of energy storage properties in relaxor ...

@article{Hao2017SignificantlyEE, title={Significantly enhanced energy storage performance promoted by ultimate sized ferroelectric BaTiO₃ fillers in nanocomposite films}, author={Yan Hao and Xiao-hui Wang and Ke Bi and Jiameng Zhang and Yunhui Huang and Longwen Wu and Peiyao Zhao and Kun Xu and Ming Lei and Long-tu Li}, journal={Nano Energy ...

DOI: 10.1111/J.1551-2916.2009.03015.X Corpus ID: 98171980; Improved Energy Storage Performance and Fatigue Endurance of Sr-Doped PbZrO₃ Antiferroelectric Thin Films @article{Hao2009ImprovedES, title={Improved Energy Storage Performance and Fatigue Endurance of Sr-Doped PbZrO₃ Antiferroelectric Thin Films}, author={Xihong Hao and Jiwei ...

In recent years, high performance energy storage technologies and devices have attracted tremendous research in academia and industry, influenced by the growing demand for electrical energy and excessive consumption of conventional energy sources in current society [1], [2], [3]. Up to date, based on the redox reactions (like lithium batteries, fuel cells and super ...

DIELECTRICS Ultrahigh energy storage in superparaelectric relaxor ferroelectrics Hao Pan¹⁺, Shun Lan¹⁺, Shiqi Xu², Qinghua Zhang³, Hongbao Yao, Yiqian Liu¹, Fanqi Meng, Er-Jia Guo³, Lin Gu, Di Yi¹, Xiao Renshaw Wang⁴, Houbing Huang², Judith L. MacManus-Driscoll⁵, Long-Qing Chen⁶, Kui-Juan Jin^{3*}, Ce-Wen Nan^{1*}, Yuan-Hua Lin^{1*} Electrostatic energy storage ...

Mitigating climate change requires a range of measures, including increased use of renewable and low-carbon energy and reducing the CO₂ intensity of fossil energy use. We present an approach designed to address the major deployment barriers to CO₂ capture, utilization, and storage (CCUS) and utility-scale energy storage

needed to maximize use of ...

Sr-doped PbZrO₃ antiferroelectric (AFE) thin films have been fabricated on the platinum-buffered silicon substrates via the sol-gel technique. The temperature-dependent dielectric properties results indicated that the AFE phase was stabilized for the Sr-modified PbZrO₃ thin films with a Curie temperature of 251±176°C. The recoverable energy density and energy ...

[39][40][41] However, the main challenge of dielectric energy storage lies in their relatively low energy density. 42,43 Although many effective routes have been developed to enhance energy ...

The market-dominating material BaTiO₃ is highly crucial in advanced electronics and electric power systems owing to its fast charging/discharging speed and superior cycle life. However, ...

Abstract(Na_{0.5}Bi_{0.5})TiO₃ lead-free thick films were successfully fabricated on alumina substrates via a screen printing method with 0-10 wt% BaO-B₂O₃-SiO₂ glass addition. Microstructure, dielectric properties and energy-storage performance of the thick films were systematically investigated. The results show that the denser thick films were obtained by ...

Ni(OH)₂ nanosheet, acting as a potential active material for supercapacitors, commonly suffers from sluggish reaction kinetics and low intrinsic conductivity, which results in suboptimal energy density and long cycle life. Herein, a convenient electrochemical halogen functionalization strategy is applied for the preparation of mono/bihalogen engineered Ni(OH)₂ ...

A new asymmetric capacitor concept is proposed providing high energy storage capacity for only one charging direction. Size-selective microporous carbons (w<0.9 nm) with narrow pore size distribution are demonstrated to exclusively electrosorb small anions (BF₄⁻) but size-exclude larger cations (TBA⁺ or TPA⁺), while the counter electrode, an ordered ...

DOI: 10.1016/j.egy.2023.11.024 Corpus ID: 265359747; Application of energy storage allocation model in the context of mitigating new energy source power fluctuation @article{Hao2023ApplicationOE, title={Application of energy storage allocation model in the context of mitigating new energy source power fluctuation}, author={Yu Hao and XiaoYan ...

From an environmental perspective, mechanical energy storage is promising as it does not cause chemical pollution and therefore could be an alternative option [4]. There are two main types of mechanical energy storage [5]: Pumped Hydroelectric Energy Storage (PHES) and Compressed Air Energy Storage (CAES). The PHES is a mature technology of converting the ...

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