

In this work, we have fabricated $(1-x)\text{BaTiO}_3\text{-}x\text{Bi}(\text{Zn}^{1/2}\text{Zr}^{1/2})\text{O}_3$ (abbreviated as BT-BZZ, $0 \leq x \leq 0.20$) ferroelectric ceramics using the conventional solid-state reaction ...

Achieving ultrahigh energy storage density and energy efficiency simultaneously in sodium niobate-based lead-free dielectric capacitors via microstructure modulation

The remarkable energy storage properties of $(1-x)$... and energy storage efficiency ... The stable ferroelectric properties across a wide frequency range (1-100 Hz) as illustrated in Figs. 9(d) to ...

Lead-free relaxor ferroelectrics (RFEs) have great potential applications in dielectric ceramic capacitors due to their distinguished energy storage performance, such as ...

Not only in films, high entropy strategy was successfully implemented in lead-free relaxor ferroelectric $(\text{Bi}_{0.5}\text{Na}_{0.5})(\text{Ti}_{1/3}\text{Fe}_{1/3}\text{Nb}_{1/3})\text{O}_3$ ceramics, which exhibited an ...

It remains a huge challenge to enhance the energy-storage density (ESD) and efficiency (ESE) of Pb-free dielectrics for ES applications. However, most of the developed ...

BaTiO_3 (BT) has attracted extensive attention among advanced lead-free ferroelectric materials due to its unique dielectric and ferroelectric properties. However, the ...

$\text{Na}_{0.5}\text{Bi}_{0.5}\text{TiO}_3\text{-BaTiO}_3$ based lead-free ceramic possesses ideal ferroelectric properties, and it is hence expected to be used as a new generation of pulse power ...

$\text{Bi}_{0.5}\text{Na}_{0.5}\text{TiO}_3$ -based lead-free ceramics with superior energy storage properties at high temperatures. Author links open overlay panel Peng Shi a, Xiaopei Zhu a, ...

BaTiO_3 (BT) is a typical perovskite-type structure ferroelectric material and plays a key role in the field of energy density capacitors due to its high dielectric constant, good ...

These materials show excellent energy storage properties with giant energy storage density, ultrahigh efficiency, excellent mechanical properties, good charge-discharge ...

Exceptionally, the 0.819BT-0.091BMT-0.09BMS composition achieved a high energy storage density of 2.83 J/cm³ and an ultra-high energy storage efficiency of 99.5%, ...

Ferroelectric properties and energy storage efficiency

Energy storage properties such as energy density, loss energy density, and energy storage efficiency are estimated from the ferroelectric hysteresis loop of ferroelectric thin films ...

Herein, a high-temperature piezoelectric bismuth layer-structured ferroelectric material has been incorporated with MnO₂ to form Bi₃TiTaO₉:xwt%MnO₂ with $x = 0-0.3$, (BTTO:xMn) to investigate the influence of MnO ...

Ferroelectric polymers are being actively explored as dielectric materials for electrical energy storage applications. However, their high dielectric constants and outstanding ...

In the past years, several efforts have been devoted to improving the energy storage performance of known antiferroelectrics. Polymers and ceramic/polymer composites can present high breakdown fields but store ...

Electrochemical batteries, thermal batteries, and electrochemical capacitors are widely used for powering autonomous electrical systems [1, 2], however, these energy storage ...

Among many ferroelectric materials, BaTiO₃ (BT) has good dielectric and ferroelectric properties [4], [5]. However, the relatively large remnant polarization (P_r) and low ...

Here, P_{max} represents the maximum polarization, P_r is the remaining polarization, and E is the applied electric field (E-field). Usually, energy-storage performance can be ...

Abstract In this study, electric energy storage properties of (Pb_{0.89}La_{0.11})(Zr_{0.70}Ti_{0.30})_{0.9725}O₃ (PLZT 11/70/30) relaxor ceramics were investigated. ...

Electrochemical energy storage systems with high efficiency of storage and conversion are crucial for renewable intermittent energy such as wind and solar. [[1], [2], [3]] ...

To deep understand and optimally design the energy storage properties of dielectrics with the ferroelectric nano-to-macro structural transformation and nano vortex ...

(1-x)Ba_{0.4}Sr_{0.6}TiO_{3-x}Bi(Mg_{0.5}Ti_{0.5})O₃ ((1-x)BST-xBMT) relaxor ferroelectric ceramics were prepared by a conventional solid-state method. In this work, the ...

High-entropy systems can present a range of striking physical properties, but mainly involve metal alloys. Here, using low-energy proton irradiation, a high-entropy superparaelectric phase is ...

An appropriate amount of Zn-ions are incorporated into the high Curie temperature bismuth layer-structure ferroelectric material to fabricate Sr_{0.2}Na_{0.4}Pr_{0.4}Bi₄Ti₄O₁₅:xwt%ZnO; (SNPBT:xZn), with $x = 0, 0.10, 0.15, ...$

The co-substitution effect of La and Fe ions on structural characterization, ferroelectric and magnetic properties, and energy storage efficiency of multiferroics Ba1 ...

The achievement of simultaneous high energy-storage density and efficiency is a long-standing challenge for dielectric ceramics. Herein, a wide band-gap lead-free ceramic of ...

Effect of addition of Sr 0.7 La 0.2 Zr 0.15 Ti 0.85 O 3 on microstructure, dielectric, ferroelectric, and energy storage properties of the ceramics was investigated thoroughly. Compared to the ...

a Comparisons of the energy storage properties between the studied ceramics ($x \geq 0.14$) in this work and other recently reported KNN-based ceramics.b Comparisons of the W ...

The energy storage efficiency of the maximum energy storage density when $x = 0.04$ and $y = 0.01$ is 74.0%, which is slightly less than the maximum energy storage efficiency. ...

Dielectric capacitor is a key component for advanced pulsed power systems owing to its high power density and fast charge-discharge rate [1], [2], [3].Recently, the dielectric ...

Selecting lead-free materials with strong ferroelectric properties and reducing their P_r by component doping is the most widely used strategy to develop energy-storage ceramic ...

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Ferroelectric properties and energy storage efficiency

