

Good transparency and color contrast are difficult to obtain at the same time, which is a pressing problem for photochromic ceramics. Lanthanum oxide doping improved the transmittance and color-changing characteristics of the sample. In this study, the photochromism and reversible luminescence modulation of $0.94(\text{K}_{0.5}\text{Na}_{0.5})\text{NbO}_3\text{-}0.06\text{Sr}(\text{Bi}_{0.5}\text{Nb}_{0.5})\text{O}_3\text{:}2.0 \dots$

As a novel multi-functional dielectric energy storage material, KNN-based transparent ceramic has attracted wide attention for its high transparency, high energy storage efficiency as well as long cycle life, which are expected to be fabricated into advanced transparent ferroelectric capacitors for application in electronic components of a ...

The PFM phase and amplitude (Fig. 3b-e) images show that the NBCSB ceramics exhibit clear contrast following local poling under ~ 10 V. After the external voltage is removed, the majority of switched domains in the NBCSB ceramic's phase pictures go back to their original states, demonstrating the significant reversibility and excellent ...

Dielectric ceramics have attracted wide interest in the field of energy storage. However, high energy density depends on large electric field, seriously threatening the safety of workers and distribution equipment. This work reports excellent energy storage performance of $\text{Bi}_{0.5}\text{Na}_{0.5}\text{TiO}_3$ -based transparent ceramics at low electric field. A ...

The development of ceramics with superior energy storage performance and transparency holds the potential to broaden their applications in various fields, including optoelectronics, energy storage ...

Lead-free transparent ferroelectric ceramics are an ideal material to meet the needs of pulsed power technology and optical transparency because of their excellent optical transparency and energy storage performances. However, it is difficult for lead-free ceramics to have both high energy storage performance
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Lead-free bulk ceramics for advanced pulse power capacitors possess low recoverable energy storage density (W_{rec}) under low electric field. Sodium bismuth titanate ($\text{Bi}_{0.5}\text{Na}_{0.5}\text{TiO}_3$, BNT)-based ferroelectrics have attracted great attention due to their large maximum polarization (P_{m}) and high power density. The BNT-ST: xAlN ceramics are ...

We prepared highly transparent relaxor ferroelectric ceramics based on $(\text{K}_{0.5}\text{Na}_{0.5})\text{NbO}_3$ using a pressure-less solid-state sintering method without using hot isostatic pressing and spark plasma sintering. A high energy storage density of 2.48 J cm^{-3} and high transparency in the visible region (ca. 60% at 0.7 mm) were achieved for the ...

With rare-earth doping, the NBBN-AS glass ceramics' theoretical energy storage density can reach 22.48 J/cm³. This excellent energy storage property is credited with increasing breakdown strength ...

Achieving high overall energy storage performance of KNN-based transparent ceramics by ingenious multiscale designing ... In addition, relatively high energy storage frequency stability, thermal stability, and polarization fatigue endurance were also obtained, and the charge-discharge behavior indicated their potential in practical ...

BaTiO₃ ceramics are difficult to withstand high electric fields, so the energy storage density is relatively low, inhabiting their applications for miniaturized and lightweight power electronic devices. To address this issue, we added Sr_{0.7}Bi_{0.2}TiO₃ (SBT) into BaTiO₃ (BT) to destroy the long-range ferroelectric domains. Ca²⁺ was introduced into BT-SBT in the ...

Exploring high-performance energy storage dielectric ceramics for pulse power applications is paramount concern for a multitude of researchers. In this work, a (1 - x)K_{0.5}Na_{0.5}NbO₃-xBi_{0.5}La_{0.5}(Zn_{0.5}Sn_{0.5})O₃ ((1-x)KNN-xBLZS) lead-free relaxor ceramic was successfully synthesized by a conventional solid-reaction method. X-ray diffraction and Raman ...

Transparent ceramic capacitors have broad application prospects in electronic devices due to their excellent optical transparency and energy storage properties. However, the low polarizability and high remnant polarization of the existing transparent dielectric ceramics limit the promotion of energy storage performance.

Lead-free potassium sodium niobate (KNN)-based transparent ceramics are highly desirable owing to their excellent piezoelectricity, and recoverable energy storage density (W_{rec}) especially for optoelectronic devices. However, it is challenging to achieve all parameters such as efficient light transmittance and excellent piezoelectricity or energy storage ...

Eco-friendly transparent dielectric ceramics with superior energy storage properties are highly desirable in various transparent energy-storage electronic devices, ranging from advanced transparent pulse capacitors to electro-optical multifunctional devices. However, the collaborative improvement of energy storage properties and optical transparency in KNN ...

In fact, KNN-0.025BBT ceramic has a higher energy storage density than the majority of KNN-based transparent ferroelectric ceramics [14, 15, 21, 26, 28, 30, 33, 46], indicating its potential applications in the field of lead-free transparent energy storage electronics like transmission pulse capacitors and memories.

Considering the advantage of the feasibility of efficient multifunctional coupling, which meets the integration trend of electronic devices and relies on the excellent ...

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transparent ceramics by optimizing the polarization and breakdown strength; by C. Li et al. Skip to search form Skip to main content Skip to account menu. Semantic Scholar's Logo. Search 222,048,912 papers from all fields of science ...

Transparent ceramics with energy storage properties could be used as modulation switches and optoelectronic devices for storing and displaying optical information in optical fiber communication, integrated optics, information processing and other technical fields. Among them, transparent pulse capacitor with applicative prospect in electron ...

The development of ceramics with superior energy storage performance and transparency holds the potential to broaden their applications in various fields, including optoelectronics, energy storage devices, and transparent displays. However, designing a material that can achieve high energy density under low electric fields remains a challenge.

These results revealed the potential applications of $(K_{0.5}Na_{0.5})NbO_3$ -based ceramics for energy storage and provide a feasible approach of domain engineering to develop new lead-free energy storage ... Transparent ceramics with submicron grain size can be achieved by introducing secondary compound in KNN based ceramics by solid-state reaction.

KNLNB-0.1%RE ceramics exhibit excellent optical transmittance, with KNLNB-0.1%Ho achieving 71.8% transmittance in the visible wavelength range (780nm) and largest effective energy storage density ...

The energy storage efficiency η showed a gradual upward trend with the increase in the value of the second component x . When $x = 0.02$, the energy storage efficiency of ceramics was 58%, and when $x = 0.06$ and 0.07 , the energy storage efficiency of ceramic samples increased to 68% and 74%, respectively.

Abstract Transparent dielectric ceramics are splendid candidates for transparent pulse capacitors (TPCs) due to splendid cycle stability and large power density. ... and Zr, Ta, Hf in A- and B-sites of the $NaNbO_3$ matrix, including recoverable energy storage density (5.39 J cm^{-3}), extremely high energy storage efficiency (91.97%), ultra-fast ...

Rare earth tri-doped precursor glasses (PGs) were prepared by traditional high-temperature melting method, and $NaSr_2Nb_5O_{15}$ transparent glass-ceramic (GC) was obtained by subsequent heat treatment. Results exhibit that the up-conversion emission intensity of GC is greatly enhanced compared to PG.

The recoverable energy-storage density (W_{rec}) of a material can be theoretically expressed as follows [4, 5]: $W_{rec} = \frac{1}{2} P_r P_m E_d$ where P is the dielectric polarization, E is the applied electric field, P_m is the maximum polarization at the breakdown electric field, and P_r is the remnant polarization. We can deduce that a high P_m , low P_r , and ...

Ho doping $0.825K_{0.5}Na_{0.5}NbO_3-0.175Sr(Yb_{0.5}Nb_{0.5})O_3$ (KNN-SYbN-x%Ho) transparent ceramics were

prepared by solid-state sintering method. The structure, ferroelectric, energy storage, and optical properties of KNN-SYbN-x%Ho were explored. With the addition of Ho, under the excitation of a 980 nm laser, the ceramics exhibit up-conversion luminescence ...

Here, P_{max} , P_r and E are the maximum polarization, remnant polarization and applied electric field, respectively. It is clear that dielectric breakdown electric field (E_b) of the materials determines the upper limit of E [10]. According to the theory of electrostatic energy storage, coexistence of large polarization difference ($\Delta P = P_{max} - P_r$) and high E_b is ...

Lead-free transparent ferroelectric ceramics with superior energy storage properties are highly desirable for pulsed power technologies and the increased optical transparency demand.

As a novel multi-functional dielectric energy storage material, KNN-based transparent ceramic has attracted wide attention for its high transparency, high energy storage ...

@article{Sun2024AchievingHO, title={Achieving high overall energy storage performance of KNN-based transparent ceramics by ingenious multiscale designing}, author={Zixiong Sun and Shibo Zhao and Ting Wang and Hongmei Jing and Qing Guo and Ruyue Gao and Liming Diwu and Kang Du and Yongming Hu and Yongping Pu}, journal={Journal of Materials ...

In our experiments, rare-earth-doped KNLNB ceramics exhibit photoluminescence effects. This work facilitates the development of transparent energy storage ceramics with fluorescent effects.

Eco-friendly transparent dielectric ceramics with superior energy storage properties are highly desirable in various transparent energy-storage electronic devices, ranging from advanced ...

Although transparent ceramics are highly desirable for practical applications, it is challenging to achieve outstanding energy storage properties and high transparency simultaneously in $(K, Na)NbO_3$ ceramics. Herein, through a combination of modifying crystal symmetry and refining domain size and grain size, a high recoverable energy storage density ...

In this study, good energy storage properties are obtained via enhancing dielectric breakdown strength (DBS) in transparent $ErBiO_3$ (EB)-doped $(K_{0.5}Na_{0.5})NbO_3$ (KNN-xEB) ceramics. ...

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