

Sodium niobate doping modification energy storage

Are sodium niobate-based lead-free ceramics suitable for energy storage applications?

NEXT Cite this: ACS Appl. Mater. Interfaces 2020,12,29,32834-32841 Sodium niobate (NaNbO_3)-based lead-free ceramics have been actively studied for energy storage applications because of their antiferroelectric and/or relaxor features achieved in modified systems.

What is sodium niobate (NaNbO_3) based lead-free antiferroelectric?

Sodium niobate (NaNbO_3)-based lead-free antiferroelectric (AFE) ceramics are currently the focus of most attention on account of their outstanding energy storage density. Nevertheless, the high...

Is sodium niobate a potential energy storage capacitor?

Sodium niobate, NaNbO_3 , which exhibits a perovskite structure, has recently stimulated interest in the field of energy storage capacitors, with derived solid solutions shown to have promising energy storage densities. Here A-site Bi/vacancy doping in NaNbO_3 in the system $\text{Na}_{1-3x}\text{Bi}_x\text{V}_{2x}\text{NbO}_3$ (where V = vacancy a

How many phases of sodium niobate are there?

Lefkowitz, I., & Megaw, H. D. The high-temperature phases of sodium niobate and the nature of transitions in pseudosymmetric structures. Acta Crystallogr. 20, 670-683 (1966). Megaw, H. D. The seven phases of sodium niobate. Ferroelectrics 7, 87-89 (1974).

Can $\text{Na}_{0.7}\text{Bi}_{0.1}\text{NbO}_3$ lead-free ceramics be used for energy storage?

This study not only paves the way for environment-friendly $\text{Na}_{0.7}\text{Bi}_{0.1}\text{NbO}_3$ lead-free ceramics to be developed for energy storage applications, but also interprets the internal mechanism of microstructure modulation which enhances energy storage properties.

Can NaNbO_3 be used for lead-free AFE energy storage applications?

This sets the design platform for future precise engineering of NaNbO_3 at the atomic-scale for lead-free AFE energy storage applications.

Recently, ceramic capacitors with fast charge-discharge performance and excellent energy storage characteristics have received considerable attention. Novel NaNbO_3 -based lead-free ceramics ($0.80\text{NaNbO}_3\text{-}0.20\text{SrTiO}_3$, abbreviated as 0.80NN-0.20ST), featuring ultrahigh energy storage density, ultrahigh power density, and ultrafast discharge ...

DOI: 10.1016/J.JEURCERAMSOC.2019.03.030 Corpus ID: 139627950; A new family of sodium niobate-based dielectrics for electrical energy storage applications @article{Yang2019ANF, title={A new family of sodium niobate-based dielectrics for electrical energy storage applications}, author={Zetian Yang and Hongliang Du and Li Jin and Qingyuan ...

Sodium niobate doping modification energy storage

Silver-doped sodium niobate antiferroelectric (AFE) ceramics, represented by $\text{Na}(1-x)\text{Ag}_x\text{NbO}_3$ ($x = 0.00, 0.01, 0.05$), have emerged as significant electronic materials having a wide range of uses, including cooling systems, micro-switches, safety sensors, high-energy capacitors, and pulsing power plants. This study investigates the structural modifications ...

Semantic Scholar extracted view of "Enhanced energy storage density and discharge efficiency in potassium sodium niobate-based ceramics prepared using a new scheme" by Yingda Li et al. ... Abstract Sodium niobate (NaNbO_3)-based antiferroelectric ... Effect of $\text{Ca}^{2+}/\text{Hf}^{4+}$ modification at A/B sites on energy-storage density of $\text{Bi}_{0.47}\text{Na}_{0.47}\text{BaO}$...

A Brief Review of Sodium Bismuth Titanate-Based Lead-Free Materials for Energy Storage: Solid Solution Modification, Metal/Metallic Oxide Doping, Defect Engineering and Process Optimizing ...

By introducing aliovalent cations and A-site vacancies, the relaxor characteristics are greatly enhanced in $(\text{Na}_{1-2x}\text{Bi}_x)(\text{Nb}_{1-x}\text{Zr}_x)\text{O}_3$ ceramics, leading to a high energy storage efficiency above 90% and a promising candidate for high power dielectric energy storage applications. Sodium niobate (NaNbO_3)-based lead free ceramics have been actively ...

To meet the increasing demand for environment-friendly, high-performance energy devices, sodium niobate (NaNbO_3) is considered one of the most promising lead-free antiferroelectric ...

To meet the great demands for energy storage devices, dielectric materials are urgently expected in recent years, owing to their promising properties such as high working voltage, large power density, fast charge-discharge rate, and long lifespan [1,2,3]. Among the dielectric materials, lead-free ceramics with good energy storage properties have attracted ...

Lead-free dielectric ceramics can be used to make quick charge-discharge capacitor devices due to their high power density. Their use in advanced electronic systems, however, has been hampered by their poor energy storage performance (ESP), which includes low energy storage efficiency and recoverable energy storage density (W_{rec}). In this work, we ...

The mechanism for the enhanced piezoelectricity in $(\text{K},\text{Na})\text{NbO}_3$ based ceramics has not been fully understood. Here, the authors find that the dopants induced tetragonal phase and the ...

Sodium niobate (NaNbO_3 , NN)-based lead-free antiferroelectric (AFE) ceramics are currently the focus of most attention on account of their outstanding energy storage density. Nevertheless, the high loss energy density (W_{loss}) by unique field-induced AFE-ferroelectric (FE) phase transition in pure NN ceramic and low breakdown electric field (E_b) largely restrict their ...

Sodium niobate doping modification energy storage

Sodium niobate (NaNbO_3)-based lead-free ceramics have been actively studied for energy storage applications because of their antiferroelectric and/or relaxor features achieved in modified systems. The P-E loops of NaNbO_3 -based ceramics are usually hysteretic because of the existence of a metastable ferroelectric phase at room temperature. In this study, by introducing ...

Ultrahigh Energy Storage Characteristics of Sodium Niobate-Based Ceramics by Introducing a Local Random Field ... In this work, the doping modification of the NaNbO_3 (NN) ceramics is used to produce a local random field to improve the electrical breakdown strength, obtaining a lead-free dielectric capacitor with high energy storage ...

Sodium niobate (NaNbO_3 , NN)-based lead-free antiferroelectric (AFE) ceramics are currently the focus of most attention on account of their outstanding energy storage density. Nevertheless, the high loss energy density (W_{loss}) by unique field-induced AFE-ferroelectric (FE) phase transition in pure NN ceramic and low breakdown electric field (E_b) largely restrict their ...

The excellent energy storage performance of total energy storage density (W_{tot}) of 6.06 J/cm^3 ;, recoverable energy storage density (W_{rec}) of 4.85 J/cm^3 ; and a high energy storage efficiency (η) ...

NaNbO_3 -based antiferroelectric ceramics are promising candidates for high-performance energy storage capacitors due to their environmental friendliness and low cost despite their current energy storage properties being inferior to those of their lead-based and AgNbO_3 -based counterparts. Typically, the antiferroelectric phase in NaNbO_3 ceramics is not ...

Web: <https://www.arcingenieroslaspalmas.es>