Bismuth ferrite solar container ceramics

Can rare earth elements be used in bismuth ferrite ceramics?
Introducing rare earth elements such as Nd 3+,La 3+,to bismuth ferrite ceramics effectively suppresses the formation of impurity phase and oxygen vacancies,thereby reducing the leakage current and improving the ferroelectric properties [11,12,13].

What is the impurity phase for bismuth ferrite ceramics?
Impurity phase such as Bi 2 Fe 4 O 9for bismuth ferrite ceramics is easy to form during the high-temperature sintering process.

What causes higher leakage current in bismuth ferrite ceramics?
The higher leakage current in bismuth ferrite ceramics is mainly due to the volatilization of Bi 3+and the partial valence change of Fe 3+to Fe 2+during high-temperature sintering,which leads to the formation of more oxygen vacancies to maintain the electroneutrality.

Does PR 3+ enhance the densification of bismuth ferrite ceramics?
Moreover,the relative densities of Bi 1-x Pr x FeO 3 ceramics (x = 0,0.025,0.05,and 0.075) are 94.2%,94.8%,95.4%,and 95.8%,respectively,indicating that the introduction of Pr 3+can enhance the densification of bismuth ferrite ceramics to a certain extent.

Does delayed polarization saturation induced superior energy storage capability of bifeo 3 based ceramics?
Energy Mater. 10, 1903338 (2019). Zhao, J. et al. Delayed polarization saturation induced superior energy storage capability of BiFeO 3 -based ceramics via introduction of non-isovalent ions. Small 19, 2206840 (2023). Duan, J. et al. High-entropy superparaelectrics with locally diverse ferroic distortion for high-capacitive energy storage. Nat.

What causes vacancy defects in bismuth ferrite?
Generally,the vacancy defects such as oxygen vacancy in bismuth ferrite tends to form during high-temperature sintering. The existence of oxygen defects leads to the creation of crystal vacancies and the formation of vacancy channels,which facilitate ion transport,accelerate ion migration rates,and promote grain growth .

Bismuth ferrite (BiFeO 3, BFO) is a classical multiferroic compound associated with high leakage current density, low resistivity, and instability to obtain the pure phase of this material, ...

In summary, the introduction of appropriate rare earth elements can effectively improve the microstructure and electrical properties of BFO ceramics. Impurity phase such as Bi 2 Fe 4 O 9 ...

Here, an attempt was taken to synthesize the modified bismuth ferrite by the conventional solid-state reaction method. The microstructural, dielectric, electrical, and optical ...

Nanoscale domain structure, electric-field-induced polarization switching and electromagnetic strain in lead-free perovskite bismuth ferrite are substantial parameters for ...

Enhancement in photovoltaic properties of bismuth ferrite/zinc oxide heterostructure solar cell device with graphene/indium tin oxide hybrid electrodes A.M. Afzal a, Yasir Javed b, Sajad ...

Review Article Critical review: Bismuth ferrite as an emerging visible light active nanostructured photocatalyst Syed Irfan a b, Zheng Zhuanghao a b, Fu Li a, Yue-Xing Chen a, ...

BiFeO 3 Bismuth Ferrite having multiferroic properties at room temperature is the most well-known single-phase multiferroic material which has been under extensive studies [[10], [11], [12]]. ...

The mineral bismuth ferrite, sometimes characterized as bismuth iron oxide as well as bismuth ferrite garnet (BiFeO 3 -BFO), seems to be a perovskite well with the empirical formulation of ...

Bismuth Ferrite (BiFeO 3) and its doped materials have gained a lot of attention nowadays due to its very narrow band gap (?2.1 eV), recycling nature, coexistence of magnetic and ...

Among many known perovskites, bismuth ferrite (BiFeO 3) is one of the single-phase perovskites, which exhibits room temperature multiferroic properties along with narrow band gap (~2 ...

Multiferroics are an interesting domain of ceramic materials and has simultaneously attracted the interests of the researchers due to coexistence of two or more properties such as ferro ...

Abstract For the purpose of meeting the requirements of protecting environment and sustainable development, bismuth ferrite (BiFeO 3, BF)-based lead-free ceramics have gained ...

Enhancement in energy storage performance of La-modified bismuth-ferrite-based relaxor ferroelectric ceramics by defect compensation and process optimization Yan Yan a

All oxide lead-free bismuth ferrite perovskite absorber based FTO/ZnO/BiFeO3/Au solar cell with efficiency ~ 12%: First principle material and macroscopic device simulation studies

Bismuth ferrite (BiFeO 3) nanomaterial has various applications because of its multiferroic nature and it exhibits magnetoelectric coupling due to the presence of active lone pair of ...

A detailed literature survey shows there is a lot of work remaining on Bismuth ferrite. So, the author wants to introduce a new modified bismuth ceramics which has both ferroelectric and ...

Lead-free perovskite-type bismuth ferrite BiFeO3 (BFO) materials are possibly the most studied multiferroic materials and have been considered as candidates for magnetoelectric ...

Abstract Integrating of ferroelectric thin films with two-dimensional materials may provide a novel and unique characteristics in the field of optoelectronics due to the coupling of their distinctive intrinsic ...

Unraveling Multiferroic Properties and Phase Stability of Bismuth Ferrite (BiFeO 3)-Calcium Titanate (CaTiO 3) Solid Solution Ceramics Synthesized via the Flux-Assisted ...