Amorphous ferroelectric thin film energy storage

Optically transparent ferroelectric memories are essential for the advancement of next-generation electronic devices. Hafnium Oxide (HfO 2) - based ferroelectric thin films that ...

6 · Compared to traditional methods, this approach provides a more flexible and valid way to tune the energy storage performance of amorphous dielectric thin films. The high-entropy ...

Thin film capacitors with large energy storage density and high breakdown strength are widely used in modern electronic fields. To solve the problems of interface effect ...

Abstract Amorphous films have excellent breakdown strength and energy storage efficiency, and have broad application prospects in dielectric film capacitors. However, ...

Compared to other dielectric materials like polymers, oxide-based ferroelectric materials typically exhibit higher Pmax and Pr due to their larger spontaneous polarization, ...

Ultra-thin ferroelectric films with uniform, conformal, and controllable thickness are promising for advancement in technology of future ferroelectric-based devices. Most well ...

Our study provides a new and widely applicable platform for designing high-performance dielectric energy storage with the strategy exploring the boundary among different ...

6 · To optimize the relation between polarization and breakdown electric field, entropy (S) engineering was employed by doping multiple ions into the amorphous thin films.

Ultra-high energy storage performance of field-induced ferroelectric Al2O3-inserted Hf0.5Zr0.5O2 thin films for electrostatic supercapacitors

Low power density, poor charge-discharge speed, and deprived breakdown strength of batteries and electrochemical capacitors limit their use in various implantable, ...

First, to increase intrinsic energy storage, atomic-layer-deposited antiferroelectric HfO2-ZrO2 films are engineered near a field-driven ferroelectric phase transition to exhibit ...

A strategy is proposed for enhancing recoverable energy storage density (Wr) while maintaining a high energy storage efficiency (?) in ...

Amorphous ferroelectric thin film energy storage

The energy storage density of ferroelectric thin film capacitors is mainly limited by the breakdown strength. Here we demonstrate that the high ...

Currently, dielectric capacitors still require improvements in energy storage density and efficiency, among which lead zirconate-based thin films exhibit significant advantages. The recoverable ...

The results indicate that the thin films annealed at 600 °C have a high recoverable energy-storage density of 67.6 J/cm 3 and an excellent energy efficiency of 94.5%, ...

The improvement in energy storage performance of ferroelectric (FE) materials requires both high electric breakdown strength and significant polarization ...

In this study, we have investigated the impact of co-doping at the A-site (La) and B-site (Mn) on the energy storage properties of the STO films. BDS of the co-doped thin films ...

Using Zr-doped HfO2 and ultra-thin indium tin oxide, Li et al. develop flexible field-effect transistors with a memory window of 2.78 V and bending reliability to enable high ...

The trade-off relationship of the polarization and the breakdown strength severely limits the enhancement of energy-storage properties of ...

Our research findings suggest that these lead-free relaxor-ferroelectric heterostructures might be the potential candidates to harvest electrical energy from waste low ...

The hysteresis loop area represents the energy dissipation within one complete period of domain reversal, and it has been demonstrated that the scaling relation between A ...

The energy storage density of ferroelectric thin film capacitors is mainly limited by the breakdown strength. Here we demonstrate that the high breakdown strength and high ...

Remarkably, our Bi0.5 Na 0.5 TiO 3-based high-entropy thin film capacitor not only showcases industry-leading energy storage properties at room temperature, with a ...

The continuing drive towards miniaturization of electronic circuits and devices is a motivating factor for the design and development of ...

In this work, flexible xMn-BiMg0.5Ti0.7O3 (xMn-BMT0.7) thin film capacitors with ultrahigh energy storage density and good stability are deposited on mica substrate. The ...

Among all dielectrics, antiferroelectric (AFE) materials have attracted wide attention due to the excellent

energy-storage performance. In this paper, PbHfO3 (PHO) AFE ...

The hysteresis loop area represents the energy dissipation within one complete period of domain reversal, and it has been demonstrated ...

Research paper Ultra-high energy storage density and efficiency at low electric fields/voltages in dielectric thin film capacitors through synergistic effects

Here, a nano-submicron structural film comprising ferroelectric material P (VDF-HFP) and linear dielectric material PMMA has been flexibly designed via the electrospinning ...

Abstract Amorphous thin films with high power density and breakdown strength satisfy the needs of advanced power electronic systems. Nonetheless, improving the energy ...

Dielectric capacitors offer high-power delivery materials for energy-storage, yet suffer from low energy densities. Here, the authors prepared ferroelectric Ba(Zr0.2,Ti0.8)O3 ...

Amorphous thin films have been widely studied due to the excellent breakdown strength in recent years. However, their practical application faces significant challenges ...

Pure perovskite Bi(Mg0.5Tix)O3 (abbreviated as BMTx) thin films are successfully fabricated on Pt/Ti/SiO2/Si substrates by a sol-gel method, where the excess TiO2 with an amorphous ...