Thin film energy storage characteristics

How can flexible ferroelectric thin films improve energy storage properties?
Moreover,the energy storage properties of flexible ferroelectric thin films can be further fine-tuned by adjusting bending angles and defect dipole concentrations,offering a versatile platform for control and performance optimization.

What is the recoverable energy storage density of PZT ferroelectric films?
Through the integration of mechanical bending design and defect dipole engineering,the recoverable energy storage density of freestanding PbZr 0.52 Ti 0.48 O 3 (PZT) ferroelectric films has been significantly enhanced to 349.6 J cm -3compared to 99.7 J cm -3 in the strain (defect) -free state,achieving an increase of ?251%.

Can ultra-thin multilayer structure improve energy storage performance of multilayer films?
In this study, an innovative approach is proposed, utilizing an ultra-thin multilayer structure in the simple sol-gel made ferroelectric/paraelectric BiFeO 3 /SrTiO 3 (BF/ST) system to enhance the energy storage performance of multilayer films.

Can antiferroelectric thin films be used in miniaturized power electronics?
Antiferroelectric (AFE) HfO 2 /ZrO 2 -based thin films have recently emerged as apotential candidatefor high-performance energy storage capacitors in miniaturized power electronics.

Do ultra-thin layers improve energy storage performance?
However,the energy density of these dielectric films remains a critical limitation due to the inherent negative correlation between their maximum polarization (Pmax) and breakdown strength (Eb). This study demonstrates enhanced energy storage performancein multilayer films featuring an ultra-thin layer structure.

Does mechanical bending improve the energy storage density of ferroelectric thin films?
Therefore,the structural design involving the mechanical bending of bilayer films,as depicted in Figure 1a,proves highly effectivein significantly augmenting both the energy storage density and efficiency of the thin film system for the majority of ferroelectric thin films.

In the application of high pulse power, the energy storage characteristics of thin film capacitors are reflected in the fast charge-discharge behavior. Figure 6a shows the discharge characteristics of the film capacitor in a range of the applied electric field from 10 to 35 V. Discharge energy density (W dis) can be expressed by the formula:

Moreover, the charging and discharging characteristics demonstrate the faster microsecond discharge and large dielectric strength of the thin film capacitor. The excellent energy storage and dielectric performances of the relaxor ferroelectric 0.89NBT-0.06BT-0.05BFO thin-film capacitors may render them to be promising

materials for applications ...

The research on thin-film energy storage has increased significantly in recent years for the miniaturization and integration of the devices. ... There are relatively few studies on the temperature stability and fatigue characteristics of the energy storage properties. We need comprehensive consideration of all energy storage parameters (such as ...

CV and GCD tests were performed on PANI and PANI/MXene thin films to investigate their energy storage performance. Both thin films have obvious redox peaks during the scan process within the potential range of -0.1 to 1 V; the CV curves at different scan rates are of similar shape but the redox peaks shift a little, exhibiting a quasi ...

1. Introduction. The use of highly functionalized thin films in various electronic devices has made life comfortable [] and this is due to the enhanced functional properties of materials at the nano-scale level.At present, the miniaturization of various electronic devices is inevitable as the electronics industry looks at manufacturing thinner and lighter devices [], in ...

In our previous work (W. Zhang et al., Space-charge dominated epitaxial BaTiO 3 heterostructures, Acta Mater. 85 (2015) 207-215), it was demonstrated that a space charge dominated BaTiO 3 thin film can have much improved energy storage characteristics when compared with a regular insulating film of ferroelectric BaTiO 3.However, the improved ...

Antiferroelectric thin films have attracted blooming interest due to their potential application in energy storage areas. Pb (1-3x/2) La x HfO 3 (PLHO-x, x = 0-0.05) thin films were fabricated on Pt(111)/TiO 2 /SiO 2 /Si substrates via the chemical solution deposition method. The x-ray diffraction and high-resolution transmission electron microscopy results show that the ...