Dielectric energy storage materials

Here we report a molecular topology design for dielectric polymers with mechanical bonds that overcomes this obstacle, where cyclic polyethers are threaded onto the ...

In this review, the main physical mechanisms of polarization, breakdown, and energy storage in multilayer dielectric are introduced. The preparation methods and design ...

Success of advanced dielectric polymers for energy storage application cannot be claimed without implementing the scalability and demonstrating the feasibility of innovated ...

Commonly, the energy storage performance of a dielectric material is often evaluated by the relationship of the dependences of polarization on the electrical field. Figure 1 ...

Here, using low-energy proton irradiation, a high-entropy superparaelectric phase is generated in a relaxor ferroelectric composition, increasing polarizability and enabling a ...

The demand for high-temperature dielectric materials arises from numerous emerging applications such as electric vehicles, wind generators, solar converters, aerospace power ...

The results indicate that lead-free dielectric materials with large maximum polarization, high breakdown electric field, small remnant polarization, and slim polarization ...

Film capacitors are essential components used for electrical energy storage in advanced high-power electrical and electronic systems. High temperature environments place ...

9%· According to the types of dielectrics, dielectric energy storage materials include ceramics, thin films, organic polymers, and filler-polymer composites. The research status ...

The editors at Nature Communications, Communications Materials, and Scientific Reports invite original research articles about dielectric materials for energy storage ...

Polyimide (PI) has received great attention for high-temperature capacitive energy storage materials due to its remarkable thermal stability, relatively high ...

In recent years, all-organic polymers, polymer nanocomposites, and multilayer films have proposed to address the inverse relationship between dielectric constant and ...

Our study provides a new and widely applicable platform for designing high-performance dielectric energy

storage with the strategy exploring the boundary among different ...

Here, we report a high-entropy stabilized Bi2Ti2O7-based dielectric film that exhibits an energy density as high as 182 J cm-3 with an efficiency of 78% at an electric field ...

Dielectric materials for electrical energy storage at elevated temperature have attracted much attention in recent years. Comparing to inorganic dielectrics, polymer-based ...

Polymer materials have played crucial roles in current electrical device/equipment especially in rapidly developed dielectric energy storage field, due to their ...

In recent years, dielectric capacitors have played a critical role in advanced electronic power systems and energy storage devices, owing to their rapid charge-discharge ...

As potential dielectric materials for capacitors, glass-ceramics exhibit significant promise in the realm of pulse power supply. Extensive research has been undertaken to ...

The development of computational simulation methods in high-temperature energy storage polyimide dielectrics is also presented. Finally, the key problems faced by using ...

Dielectric ceramics with high energy storage performance are crucial for advanced high-power capacitors. Atomic-scale investigations determine that introduction of ...

Dielectric ceramic capacitors, with the advantages of high power density, fast charge-discharge capability, excellent fatigue endurance, and good high temperature stability, ...

Abstract Dielectric film capacitors for high-temperature energy storage applications have shown great potential in modern electronic and electrical systems, such as ...

Dielectric capacitors with ultrahigh power density have emerged as promising candidates for essential energy storage components in electronic and electrical systems.