HIGH ENERGY STORAGE FLEXIBLE DIELECTRIC

Do dielectric materials maintain high-temperature capacitive energy storage? Nature Materials (2025) Cite this article High-temperature capacitive energy storage demands that dielectric materials maintain low electrical conduction loss and high discharged energy density under thermal extremes.

Do polymer dielectrics have high energy storage performance at high temperatures? The temperature stability of polymer dielectrics plays a critical role in supporting their performance operation at elevated temperatures. For the last decade, the investigations for new polymer dielectrics with high energy storage performance at higher temperatures (>200 ?C) have attracted much attention and numerous strategies have been employed.

Can high-temperature polymer dielectrics be fabricated by ultraviolet irradiation? Herein,a facile and scalable approachis reported to fabricating flexible high-temperature polymer dielectrics for high-efficiency energy storage by ultraviolet irradiation.

What is the best dielectric polymer for high-temperature applications? The best commercially available dielectric polymer represented by biaxially oriented polypropylene(BOPP) can operate only at temperatures below 105 ?C (ref. 14). Therefore,thermal management is always required to enable the use of dielectric polymers in high-temperature applications.

Can ultraviolet irradiation improve the capacitive performance of high-temperature polymer dielectrics? This work clarifies the contribution of space charge to energy loss and demonstrates the effectivenessof ultraviolet irradiation in improving the capacitive performance of high-temperature polymer dielectrics. These findings provide a novel paradigm for the rational design of high-temperature polymer dielectrics for high-efficiency energy storage.

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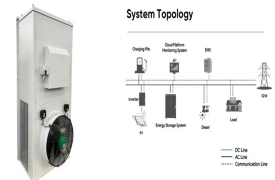
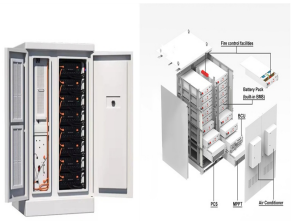
Are flexible dielectric film capacitors suitable for energy storage? Cite this: ACS Appl. Mater. Interfaces 2019, 11, 5, 5247???5255 As passive components in flexible electronics, the dielectric capacitors for energy storage are facing the challenges of flexibility and capability for integration and miniaturization. In this work, the all-inorganic flexible dielectric film capacitors have been obtained.

The key to improving the energy density is to achieve a high breakdown strength E b (the maximum electric field that the material can withstand without undergoing electrical breakdown) and a large electric ???



In recent years, researchers used to enhance the energy storage performance of dielectrics mainly by increasing the dielectric constant. [22, 43] As the research progressed, the bottleneck of this method was revealed. []Due to the different ???

The introduction of highly polar groups into the polymer chain and the incorporation of high-k inorganic fillers are usually utilized to develop dielectric film with high energy storage ???



The influence of dielectric polarization, charge distribution, charge injection, interfacial barrier and electrical dendrite growth on the energy storage performance and the synergistic enhancement mechanisms in such sandwich ???

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As illustrated in Fig. S1, the energy storage density of the dielectric could be determined using equation U e = ??<< P r P max E d D, which simplifies in linear dielectrics as U e ???


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The gradual depletion of conventional fossil energy sources and the development of energy storage devices that are lighter, more flexible, and smaller in size have resulted in the ???


Organic ferroelectrics with high dielectric constant have received substantial attention for sustainable and flexible energy storage. Here, we report a high-?? dielectric, optically transparent, mechanically strong and flexible ???


The temperature stability of polymer dielectrics plays a critical role in supporting their performance operation at elevated temperatures. For the last decade, the investigations for new polymer dielectrics with high energy ???

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Flexible dielectric films based on fluoropolymers demonstrate a high breakdown strength and dielectric constant and are considered better potential candidates for high-energy-density capacitors than is commercial ???

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

A key parameter of polymer dielectrics for high-temperature energy storage is the glass transition temperature (T g) and thermal stability [12].When the temperature is close to ???