# Polymer elastic energy storage

Can polymer materials be used for flexible energy storage devices?
Then the design requirements and specific applications of polymer materials as electrodes, electrolytes, separators, and packaging layers of flexible energy storage devices are systematically discussed with an emphasis on the material design and device performance.

Which elastomers can be used as packaging layers for energy storage?
Elastomers,such as PDMS,poly (styrene-isobutylene-styrene),and poly (styrene-b-ethylene-butylene-b-styrene)have been widely investigated as packaging layers for constructing intrinsically stretchable energy storage devices,of which elastic modulus can be flexibly regulated [199,203].

Are elastic electrolytes suitable for stretchable energy storage devices?
Generally, the stretchability of energy storage devices is supported by elastic electrolytes . In this consideration, polymer-based materials with intrinsic elasticity can easily provide superior stretchable properties, thus representing promising candidates as electrolytes for stretchable energy storage devices.

Can polymer electrolytes be used in flexible energy storage devices?
It is necessary to pay more attention to the in situ synthesis of polymer electrolytes for the continuous production of flexible energy storage devices in the future. Owing to their relatively low shape adaptability,polymer-based electrolytes are difficult to be usedin the flexible energy storage devices,particularly in the fiber devices.

Can polymer dielectrics be used as energy storage media?
Polymer dielectrics are considered promising candidateas energy storage media in electrostatic capacitors,which play critical roles in power electrical systems involving elevated temperatures,such as hybrid electric vehicles,oil &gas exploration,aircraft,and geothermal facilities 1,2,3,4,5,6.

Can elastic energy storage be used in biomedical space?
SMPs that combine elastic energy storage and exhibit triggering temperatures near the human body temperaturecould benefit emerging applicationsin the biomedical space. © 2016 Wiley Periodicals,Inc. J. Polym. Sci.,

Electrostatic capacitors are among the most important components in electrical equipment and electronic devices, and they have received increasing attention over the last two decades, especially in the fields of new energy vehicles (NEVs), advanced propulsion weapons, renewable energy storage, high-voltage transmission, and medical defibrillators, as shown in ...

Polymer-based relaxor ferroelectrics with high dielectric constant are pivotal in cutting-edge electronic devices, power systems, and miniaturized pulsed electronics. The surge in flexible electronics technology has

intensified the demand for elastic ferroelectric materials that exhibit excellent electrical propert Celebrating the 20th Anniversary of the Ningbo Institute of ...

Semantic Scholar extracted view of "Highly elastic energy storage device based on intrinsically super-stretchable polymer lithium-ion conductor with high conductivity" by Shi Wang et al. Skip to search form Skip to main content Skip to account menu. Semantic Scholar"s Logo. Search 221,287,918 papers from all fields of science ...

Moreover, the elastic properties of non-compatible blends depend on energy storage mechanisms at the interphaseT he . relaxation of the dispersed phase itself is often much longer than the relaxation of the polymer chains of the individual components. Figure 8 shows the dynamic spectrum of a PMMA/PS blend with different volume fractions of the ...

Shape-memory polymers (SMPs) that respond near body temperature are attracting broad interest, especially in the biomedical fields. In this study, the triggering temperature of poly(caprolactone) SMP networks is ...

Elastic work energy density is an increasingly important metric of shape-memory behavior. Existing shape-memory polymers (SMPs) are capable of storing elastic energy exceeding one MJ/m3 at strains ...

Cyclical storage and release of elastic energy may reduce work demands not only during stance, when muscle does external work to supply energy to the center-of-mass, but also during swing, when muscle does internal work to reposition limbs. Indeed, elastic structures are used as passive antagonists to rapidly reposition the limb between ...

[20, 22] The advances in nanocomposites containing the FE polymer for high efficient energy storage applications are well-summarized in recent reviews. [15, 60] Figure 2. ... energy storage density, and efficiency. Other electrical and mechanical parameters (elastic constants, Young"s modulus, and depolarization temperature) are also ...

Polymer-based dielectric composites show great potential prospects for applications in energy storage because of the specialty of simultaneously possessing the advantages of fillers and polymer matrices. However, polymer-based composites still have some urgent issues that need to be solved, such as lower breakdown field strength (Eb) than ...

With the wide application of energy storage equipment in modern electronic and electrical systems, developing polymer-based dielectric capacitors with high-power density and rapid charge and discharge capabilities has become important. However, there are significant challenges in synergistic optimization of conventional polymer-based composites, specifically ...

A novel thermoplastic polyurethane (TPU) PCFs possessing a high loaded ratio and high elasticity was simply prepared by vacuum absorption following wet spinning, then coated by waterborne polyurethane (WPU).

Octadecane (OCC), hexadecanol (HEO), and stearic acid (SA), which have different tendencies to form hydrogen bonds with TPU, were selected ...

Phase Change Energy Storage Elastic Fiber: A Simple Route to Personal Thermal Management. Weipei Li, 1 Liqing Xu, 1 Xiangqin Wang, 2 Ruitian Zhu, 1, 2, * and Yurong Yan 1, * ... All stress-strain curves showed a classical curve of high elastic polymer, indicating that the main stress-loading medium of the PCFs was the porous TPU fiber ...

The energy storage density of 2.1 MJ kg -1 exceeds that of leading electrical or electrochemical energy storage systems, in particular LIBs, by at least a factor of three. In addition, the ...

DOI: 10.1021/ACS.JPCC.6B12822 Corpus ID: 100310714; Elastic Compressible Energy Storage Devices from Ice Templated Polymer Gels treated with Polyphenols @article{Das2017ElasticCE, title={Elastic Compressible Energy Storage Devices from Ice Templated Polymer Gels treated with Polyphenols}, author={Chayanika Das and Soumyajyoti Chatterjee and Guruswamy ...

Dielectric capacitors have garnered significant attention in recent decades for their wide range of uses in contemporary electronic and electrical power systems. The integration of a high breakdown field polymer matrix with various types of fillers in dielectric polymer nanocomposites has attracted significant attention from both academic and commercial ...

Current collectors of carbon fiber reinforced polymer for stackable energy storage composites. Author links open overlay panel Yusu Han a 1, Byeong Jun So a 1, ... the measured tensile strength and elastic modulus of the CFRP CC were as high as 782 MPa and 54 GPa in the 0° direction, respectively, and they were as low as 68 MPa and 7.5 GPa in ...

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