Molecular chain energy storage

What is molecular solar thermal energy storage?
Molecular solar thermal energy storage systems (MOST) offer emission-free energy storagewhere solar power is stored via valence isomerization in molecular photoswitches. These photoswitchable molecules can later release the stored energy as heat on-demand.

Are molecular Photoelectrochemical Energy Storage materials effective?
In contrast,molecular photoelectrochemical energy storage materials are promisingfor their mechanism of exciton-involved redox reaction that allows for extra energy utilization from hot excitons generated by superbandgap excitation and localized heat after absorption of sub-bandgap photons.

Can molecular photoswitches be used in solar thermal energy storage?
The calculated energy densities of the dimer and trimer systems of up to 927 kJ kg -1 (257 Wh kg -1) and measured densities up to 559 kJ kg -1 (155 Wh kg -1) greatly exceed the original targets of 300 kJ kg -1 15 highlighting the potentialof applying molecular photoswitches in future solar thermal energy storage technologies.

Do molecular semiconductors influence energy storage performance of Pei composites?
A comprehensive conduction-breakdown-energy storage model was established to explain the influence mechanism of molecular semiconductors on the improved energy storage performanceof PEI composites at high temperatures.

Can charge trapping be combined with molecular displacement?
It has been shown that only qualitative analyses can be performed from the perspective of charge trapping, and it is difficult to obtain quantitative results. Therefore, this work proposes to study the macroscopic properties of polymer dielectrics by combining charge trapping with molecular displacement.

Do morphological nanofillers bind to molecular chains?
The results show that different morphological nanofillers have various degrees of binding to molecular chains. Nanoplates can bind molecular chains more effectively so that the mobility of molecular chains is reduced.

In this study, we developed composite PCMs using BN as the supporting material and two alkanes of different molecular chain lengths-dodecane (C 12 H 26) and ...

A molecular elongation design strategy is explored to develop a novel family of fatty phase change materials for intermediate-temperature solar-thermal energy storage and ...

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However, the energy storage capacity and phase-change temperature of phase-change composites largely depend on the PCM type and molecular weight, in addition to the ...

Here we bypass the obstacle to high-efficiency capacitive energy storage up to 250 °C by designing a dielectric polymer with mechanical bonds to inhibit the phonon-assisted ...

It is emphasized that by adjusting molecular chain arrangements or introducing specific functional groups, the properties and functionality of materials can be effectively ...

The simulation results were consistent with the experimental results of high-temperature breakdown and energy storage. It was unveiled that the aggregate structure ...

The migration of molecular chains can provide energy for charge hopping. Therefore, a comprehensive conduction-breakdown-energy storage simulation model combining charge ...

The new insight concerning the contribution of molecular chains in the amorphous region to the enhancement of mechanical performance for RCFs is expected to provide ...

Molecular extension engineering constructing long-chain organic elastomeric interphase towards stable po-tassium storage Jun Peng1,§, Xianhui Yi1,§, Ling Fan1, Jiang Zhou2* and Bingan ...

In order to clarify the influence mechanism of high temperature on the breakdown and energy storage performance of dielectrics, this paper established a charge ...

Polyetherimide (PEI) has gained extensive research for its good high-temperature properties. In order to further improve its energy storage performance at high ...

Dielectric polymers with capacitive energy storage capabilities are essential for advanced electronics and electrical systems. However, a persistent challenge lies in enhancing ...

Request PDF | On Mar 1, 2023, Dimberu G. Atinafu and others published Unveiling the effect of molecular chain length on the thermal energy storage capacity and transition temperature of ...

Here, we present a general approach to impeding charge transport in all-organic polymer composites by introducing organic molecular semiconductors with high electron affinity ...

Jun Peng, Xianhui Yi, Ling Fan, Jiang Zhou, Bingan Lu. Molecular extension engineering constructing long-chain organic elastomeric interphase towards ...

In the molecular chains of PI containing the alicyclic structure, the anhydride part of the alicyclic structure and

the diamine part of the aromatic ring are stacked together, thus ...

Graphical abstract New polyimides featuring alicyclic structures are designed to improve dielectric energy storage performance. By introducing elongated non-coplanar ...

The introduction of highly polarized flexible segments into polymer molecular chains is an effective means to improve the dielectric constant and mechanical flexibility of ...

Flexible laminated polymer nanocomposites with the polymer layer confined are found to exhibit enhanced thermal stability and improved high-temperature energy storage ...

Polyetherimide (PEI) for high-temperature energy storage still face the critical problem of low discharged energy density. The dramatic increase in leakage current is the ...

Applications span energy storage (shale gas adsorption, CO2 sequestration, hydrogen leakage mitigation), demonstrating the versatility of these methods. Key innovations ...

Introduction About 70 % energy is ultimately used by humans in the form of heat, so the efficient storage and utilization of heat and the conversion of other energy sources ...

The migration of molecular chains can provide energy for charge hopping. Therefore, a comprehensive conduction-breakdown-energy storage simulation model ...

This study not only reveals the importance of molecular structure in enhancing energy storage, but also points out the key role of molecular chain displacement and charge transport in ...

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