

What is molecular solar thermal energy storage?

Molecular solar thermal energy storage systems (MOST) offer emission-free energy storage where 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 promising for 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 potential of 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 performance of 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.

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

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Molecular chain 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 ...

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 ...

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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