

A major challenge in the field of molecular solar thermal energy storage is designing visible light-absorbing photoswitches with long energy ...

Molecular solar-thermal energy storage: A synthetic route to norbornadienes with a cyano acceptor and ethynyl-substituted aromatic donor groups has been developed. The products have been used in low molecular weight norbornadiene-quadracyclane molecular switches with promising molecular solar energy storage properties (see graphic).

Developing norbornadiene-quadracyclane (NBD-QC) systems for molecular solar-thermal (MOST) energy storage is often a process of trial and error. By studying a series of norbornadienes (NBD-R2) doubly substituted at ...

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In this review, we illustrated the evolution from the first discovery of the photoswitchable nature of norbornadiene as route for energy storage to the sophisticated molecular design of numerous derivatives with optimized properties.

The norbornadiene/quadracyclane (NBD/QC) photoswitch pair represents a promising system for application in molecular solar thermal energy storage (MOST). Often, the NBD derivatives have very limited overlap with the solar spectrum, and substitution to redshift the absorption leads to a decrease in t ...

Here, norbornadiene (NBD)-quadracyclane (QC) molecular photoswitches are embedded into polymer matrices, with possible applications in energy storing coatings. The NBD-QC photoswitches that are capable of absorbing sunlight with estimated solar energy storage efficiencies of up to 3.8% combined with attractive energy storage densities of up ...

Closed cycle systems for storage of solar energy have been suggested, based on absorption of photons in photoresponsive molecules, followed by on-demand release of thermal energy. These materials are called solar thermal fuels (STFs) or molecular solar thermal (MOST) energy storage systems.

Developing norbornadiene-quadracyclane (NBD-QC) systems for molecular solar-thermal (MOST) energy storage is often a process of trial and error. By studying a series of norbornadienes (NBD-R2) doubly substituted at the C7-position with R = H, Me, and iPr, we untangle the interrelated factors affecting MOST p

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photoswitches with long energy storage half-lives. Five novel visible light-absorbing norbornadiene dimers were prepared, with half-lives up to 23.0 hours, and high energy densities up to 379.3 kJ/kg.

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Molecular photoswitches of norbornadiene (NBD) derivatives have been effectively applied in molecular solar-thermal energy storage (MOST) by photoisomerization of NBD to a quadricyclane (QC) state. However, a challenge of the NBD-based MOST system is the lack of a reversible two-way photoswitching process, limiting conversion from QC to thermal ...

Molecular solar thermal energy storage (MOST) systems can convert, store and release solar energy in chemical bonds, i.e., as chemical energy. In this work, phenyl- and naphthyl-linked bis- and tris-norbornadienes are presented as promising MOST systems with very high energy densities.

The NBD-QC photoswitches that are capable of absorbing sunlight with estimated solar energy storage efficiencies of up to 3.8% combined with attractive energy storage densities of up to 0.48 MJ kg⁻¹.

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