

The energy storage densities are, as expected, lower than those of the parent norbornadiene (1 a).<sup>12</sup> This observation can be explained by the inverse correlation between the molecular weight and the energy storage density.<sup>15, 16</sup> In agreement with this relationship, the comparison of 2-aryl-norbornadienes with 2,3-disubstituted norbornadienes ...

Here, norbornadiene (NBD)-quadricyclane (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 ...

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.

A major challenge in the field of molecular solar thermal energy storage is designing visible light-absorbing photoswitches with long energy storage half-lives. Five novel visible light-absorbing norbornadiene dimers ...

Data on the valence isomerisation of norbornadiene and its derivatives into the corresponding quadricyclanes published between 1990 and 2001 are considered and described systematically. The applicability of this reaction for the storage of solar energy is discussed. The bibliography includes 112 references.

phenyl linker in norbornadiene dimers can greatly enhance the solar thermal energy storage properties of the photoswitch. This design feature can then be used in high-performing MOST devices in the future, making strides in the field of renewable energy storage.

## 2. Results and Discussion

### 2.1. Synthesis

Developing norbornadiene-quadricyclane (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 ...

@misc{etde\_21257145, title = {Norbornadiene-quadricyclane as an abiotic system for the storage of solar energy} author = {Dubonosov, Alexander D, Bren, Vladimir A, and Chernov, V A} abstractNote = {Data on the valence isomerisation of norbornadiene and its derivatives into the corresponding quadricyclanes published between 1990 and 2001 are ...}

This work demonstrates that, by modifying the rotational energy landscape of the molecules, it is possible to obtain new solar energy storage systems that exhibit exceptionally long half-lives ...

Photochromic molecules are systems that undergo a photoisomerization to high-energy isomers and are attractive for the storage of solar energy in a closed-energy cycle, for example, in molecular ...

ancing energy storage time with solar spectrum match.[11g,h] Here, we present the synthesis of a new series of NBD-based molecules with a good solar spectrum match (estimated up to 3.8% solar energy storage efficiency), using the strong acceptor moiety trifluoroacetyl unit in conjunction with carefully selected

For the transition to renewable energy sources, novel energy storage materials are more important than ever. This review addresses so-called molecular solar thermal (MOST) systems, which appear ...

An alternative is molecular solar thermal energy storage (MOST). This technique relies on molecular photoswitches which have a low-energy state and, upon (solar) irradiation, convert to a higher -energy, metastable isomer. (Figure 1) The amount of energy one can store is related to the energy difference between the two isomers.

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 p ...

It is urgent yet challenging to develop new environmentally friendly and cost-effective sources of energy. Molecular solar thermal (MOST) systems for energy capture and storage are a promising option. With this in mind, we have prepared a new water-soluble (pH > 6) norbornadiene derivative (HNBD1) whose MOST properties are reported here. HNBD1 shows ...

Due to high global energy demands, there is a great need for development of technologies for exploiting and storing solar energy. 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 ...

Web: <https://nowoczesna-promocja.edu.pl>

