

What is photothermal phase change energy storage?

To meet the demands of the global energy transition, photothermal phase change energy storage materials have emerged as an innovative solution. These materials, utilizing various photothermal conversion carriers, can passively store energy and respond to changes in light exposure, thereby enhancing the efficiency of energy systems.

Can photothermal materials be used beyond solar energy harvesting?

These efforts have expanded the use of photothermal materials beyond solar energy harvesting to applications such as photothermal therapy (PTT), bactericidal treatments, drug delivery systems, and photoacoustic imaging.

What are photothermal materials?

Photothermal materials are powerful converters for the light-heat transition towards an energy-efficient society. By integrating it with PCMs, it further exhibits thermal regulation properties with an increased heat capacity.

How does solar radiation affect photothermal materials?

When exposed to solar radiation, photothermal agents absorb and convert it into heat, which is then passed to the PCMs. The large latent heat of PCMs enhances the heat capacity of photothermal materials, improving flexibility and stability in energy use.

Are photothermal materials a key platform for water evaporation?

Dewei Chu, and Haolan Xu. Photothermal materials: A key platform enabling highly efficient water evaporation driven by solar energy. *Mater. Today Energy*, 12 (2019), pp. 277 - 296
W Van Roosbroeck and William Shockley. Photon-radiative recombination of electrons and holes in germanium. *Phys. Rev.*, 94 (6):1558, 1954.
A & A, 599 (2017), p. A10 Pu.

Do photothermal PCMs have light-to-heat conversion and thermal energy storage capabilities?

6.2. Future perspectives Although photothermal PCMs exhibit both light-to-heat conversion and thermal energy storage capabilities, it is important to note that the photothermal effect is typically confined to a thin surface layer due to the opacity of most photothermal PCMs documented in existing literature.

In this study, a photothermal phase change energy storage material integrating light capture, photothermal conversion and thermal energy storage is constructed, which ...

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The developed DW-CI/EP/PEG exhibits excellent energy storage performance and photothermal conversion ability, showing great potential for applications in solar energy ...

How Photothermal Energy Storage Tower Trough Tech Works Imagine a giant disco ball, but instead of sparkles, it shoots sunlight onto a tower filled with molten salt. That's a photothermal ...

Abstract Photochemical phase transition is an effective strategy to realize photothermal conversion and multi-source energy storage. Azobenzene molecule with photo ...

Self-operation and low-carbon scheduling optimization of solar thermal power plants with thermal storage systems Photo thermal power generation, as a renewable energy technology, has ...

Moreover, we have introduced an advanced high-photothermal conversion layer that synergizes with our directionally conductive phase change composite. This strategic ...

Photothermal conversion phase change materials can combine the mechanisms of photothermal conversion and phase transformation to realize storage or release solar ...

Nevertheless, its performance was greatly reduced in intermittent sunlight and uncontrollable weather. Herein, we proposed a composite photothermal structure with energy ...

In recent years, the growth rate of energy demand and carbon emissions has reached an unprecedented level.^{1,2} As a renewable energy source, solar power holds ...

Phase change materials (PCMs), such as paraffin (PW), are capable of harvesting and converting solar energy into thermal energy, thus playing a crucial role in solar ...

Nowadays, solar energy is widely applied in thermal energy storage, seawater desalination, space heating, energy-efficient buildings, and photovoltaic systems [3]. Since ...

6 ???· The integration of nanofluids into solar collectors has gained increasing attention due to their potential to enhance heat transfer and support the transition toward low-carbon energy ...

POWERCHINA signed an EPC contract with Baowu Clean Energy Co to build the Zabuye integrated energy supply project which will involve a power supply, grid, load, and energy ...

Abstract The development of efficient, reliable, and sustainable energy storage technologies is essential for addressing the growing global demand for clean energy solutions. This study ...

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