

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 the applications of photothermal materials?

The investigation of photothermal materials with broadband absorption is beneficial for the utilization of renewable solar energy, while the engineering of materials with efficient heat generation abilities can be widely useful in various fields, including water evaporation,^(6,7) photothermal catalysis,^(8,9) and biomedicine.^(10,11)

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.

What is solar-thermal storage with phase-change material (PCM)?

Nature Communications 14, Article number: 3456 (2023) Cite this article Solar-thermal storage with phase-change material (PCM) plays an important role in solar energy utilization. However, most PCMs own low thermal conductivity which restricts the thermal charging rate in bulk samples and leads to low solar-thermal conversion efficiency.

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

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.

1 ?· Beijing University of Chemical Technology, Institute of Advanced Technology and Equipment, CHINA. Search for more papers by this author. Bo Yuan, ... (STFs) for ...

6 ???· However, solar energy has limitations due to its low intensity and variability, influenced by daily and seasonal changes [1]. Implementing solid-liquid phase change materials (PCMs) ...

Thermoelectric energy storage is mainly in the form of TECs [53], ... TEG is a green and sustainable energy technology that converts thermal energy directly into electrical ...

In order to promote the development of a solar photothermal conversion... Energy Storage Science and Technology >> 2020, Vol. 9 >> Issue (S1): 62-69. doi: 10.19799/j.cnki.2095 ...

Purpose This paper aims to provide a flexible polyurethane (PU) film with visible light trapping ability, photothermal conversion and energy storage performance by covalently bonded a ...

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One important implementation of photothermal nanomaterials is the solar evaporation technology that allows steam and clean water to be produced from either seawater or wastewater, while the sustainable solar ...