

What are photo-thermal conversion materials & PCMs?

They consist of photo-thermal conversion material and PCMs, which can store or release a large amount of thermal energy during the solid-liquid phase-change process. These materials have great potential for applications in desalination, heating, construction, and solar energy storage systems.

What is photo-thermal conversion phase-change composite energy storage?

Based on PCMs, photo-thermal conversion phase-change composite energy storage technology has advanced quickly in recent years and has been applied to solar collector systems, personal thermal management, battery thermal management, energy-efficient buildings and more. The future research should address:

Are composite inorganic materials suitable for photo-thermal conversion and energy storage?

Composite inorganic materials for photo-thermal conversion and energy storage have potential applications in solar thermal conversion and storage, thermal management of electronic devices, and temperature regulation. However, they also face challenges such as low thermal conductivity, easy leakage, phase separation, and large subcooling.

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.

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.

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.

Therefore, the utilization of solar thermal energy to construct photothermal-assisted solar hydrogen production systems is of paramount importance for enhancing solar ...

Abstract Aiming at improving the utilization efficiency of solar photothermal energy, this study focuses on a novel phase-change microcapsule system based on an n ...

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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2. Core challenges and 3D printing for low-temperature energy storage Extreme low-temperature environments impose stringent demands on the performance and stability of ...

Photothermal catalysis is an innovative approach that integrates photochemical and thermocatalytic processes to enable an efficient use of full-spectrum sunlight in catalyzing ...

In summary, we reported a novel composite microsphere with a core-shell structure for encapsulated paraffin, synergistically enhancing efficient photothermal conversion and thermal ...

The obtained PCM microcapsules have good thermal stability and durability, with a PCM core content of up to 88.9% and a phase change enthalpy of 214.3 J g⁻¹, which is ...

While carbon-based materials with photothermal or electrothermal effects have advanced, they face challenges like environmental dependence, poor resistance, high energy ...

Energy storage equipment manufacturing involves the design, production, and assembly of devices that store energy for later use, including batteries, supercapacitors, and ...

China's Energy Technology Innovation and Industrial ... In terms of core technologies, new breakthroughs are required for core equipment of fuel cell hydrogenation stations, green ...

5 ????#0183; 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 ...

Abstract To meet the requirement of multipurpose applications in infrared thermal camouflage and solar photothermal energy storage, we have developed a series of ...

The photothermal utilization of solar energy is a significant method in solar energy utilization, encompassing absorption [9], transformation [10], storage [11], and other related aspects.

Photothermal superhydrophobic materials are characterized by efficient photothermal energy conversion upon irradiation, thus showing promise for applications in the ...

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