

Can photothermal materials be used in solar-steam generation?

Different categories of photothermal materials are introduced. Mechanisms of light to heat energy conversion over photothermal materials are presented. Applications of photothermal materials in solar-steam generation were reviewed. Future perspectives in the fields of solar-thermal energy conversions and applications are discussed.

Can a broadband solar absorber improve photothermal conversion of sunlight?

However, the methods to achieve cost-effective light absorbers are still challenging. Here we present a perfect broadband solar absorber for efficient photothermal conversion of sunlight employing a low-cost ultraviolet laser-induced graphene (UV-LIG) prepared on a polymer material using the conventional direct laser writing method.

Which materials are suitable for light absorption and heat dissipation?

Taking the advantages of the porosity of materials, porous media such as aerogel architecture, wood, and polymeric foams have been introduced as promising candidates for both light absorption and avoiding the heat dissipation.

What are solar-driven photothermal materials?

Solar-driven photothermal materials are promising platforms for addressing global energy challenges and environmental issues. Solar energy mainly focuses on the wavelength range from 300 to 2500 nm (Figure 3a), which occupies over 98% of solar energy.

How does a light absorber affect photothermal conversion efficiency?

Suitable heat conduction of the light absorber is one of the key factors for directly photothermal conversion efficiency. [24,33,56] After the light absorber absorbs the solar light, the solar energy is transferred into heat by a photothermal process.

What makes a good solar-thermal absorber?

Therefore, from the ideal solar-thermal absorber design point of view, selective and almost total absorption across the entire solar spectrum, flexible tunability of the cut-off wavelength, and minimized excessive energy dissipation by thermal radiation in the near-IR (NIR) to mid-IR range are the essential factors.

Encompassing the first- and second-generation devices, various materials that serve as solar light absorbers in high-efficiency (>20%) incumbent technology industrial cells ...

In addition to the thermal conductivity, their light-absorbing ability was investigated after carbonizing at 500 °C for 60 s. The measured light absorption efficiency was 92%, 84%, ...

# Solar power generation light absorbing materials

The evaporation process at the "air-water" interface is a potential driving force for power generation, and SDIE co-generation is driven by solar energy, the light absorbing ...

An organic-small-molecule solar-energy-absorbing material with a strong intramolecular charge transfer character and a conjugate rigid plane skeleton is developed, ...

Organic-inorganic hybrid lead halide perovskite solar cells (PSCs) have demonstrated notable progress in the field of photovoltaics [1-6].The interdisciplinary nature of ...

Organic solar cells that are semitransparent in the visible and strongly absorbing in the near-infrared spectral regions present unique opportunities for applications in buildings ...

For carbonaceous and black-colored polymer materials, the presence of a large number of conjugated  $\pi$  bonds significantly narrows the energy gap between  $\pi$ - $\pi^*$  orbitals, enabling ...

4  $\pi$ - $\pi^*$ ; Semi-transparent photovoltaics (STPVs) is a promising form of building-integrated photovoltaics for urban green energy generation. By modulating visible light absorption, ...

Here we present a perfect broadband solar absorber for efficient photothermal conversion of sunlight employing a low-cost ultraviolet laser-induced graphene (UV-LIG) prepared on a polymer material using the conventional ...

The photothermal effect, also the so-called photo-induced thermal effect, is produced by absorbing solar light and then releasing heat with the materials. These materials can be both organic materials (conjugated ...

The power conversion efficiency, more commonly known as the efficiency of a solar cell, is the ratio of the maximum power generated by the solar cell to the incident radiant ...

Instead, their innovation works by coating a new power-generating material onto the surfaces of everyday objects like rucksacks, cars, and mobile phones. Their new light-absorbing material ...

Donor-Acceptor-Type Organic-Small-Molecule-Based Solar-Energy-Absorbing Material for Highly Efficient Water Evaporation and Thermoelectric Power Generation ...

The solar PV cells based on thin films are less expensive, thinner in size and flexible to particular extent in comparison to first generation solar PV cells. The light absorbing ...

The transition away from silicon-based solar cells to substitute materials, like perovskites and quantum dots, and their potential for better light absorption and charge ...



# Solar power generation light absorbing materials

& He, Y.-L. Receiver with light-trapping nanostructured coating: A possible way to achieve high-efficiency solar thermal conversion for the next-generation concentrating solar ...

A novel all-solid-state, hybrid solar cell based on organic-inorganic metal halide perovskite ( $\text{CH}_3\text{NH}_3\text{PbX}_3$ ) materials has attracted great attention from the researchers all over the world and is considered to be one of the top 10 ...



# Solar power generation light absorbing materials