



# Photothermal equipment of Jingba Solar Electronics Factory

The parallel development of photothermal regulation strategies through both material and system designs has further improved the overall solar utilization efficiency for heating/cooling. In this review, we will review the latest progress in photothermal regulation, including solar heating and passive cooling, and their manipulating strategies.

A key global issue for the sustainable development of human society is the growing shortage of water and electricity resources [1]. In remote and underdeveloped areas, power resources are even more limited; moreover, inadequate equipment for water production has led to an increase in the number of people suffering from water shortages and the spread ...

The evaporation mass of raw water measured by electronic analytical balance was equal to the difference between the mass of the evaporation device at the start time and end time in a test process. ... pore size: 0.45, 1.00, and 5.00 mm, purchased from China Haining Yibo Filtration Equipment Factory) was selected as the basal membrane of GC ...

The results show that black Fe<sub>3</sub>O<sub>4</sub> NPs act as a powerful photothermal filler with enhanced photothermal conversion [65], and GO together showed a strong ability to convert light energy into thermal energy for the evaporator, where the solar-water vapor conversion efficiency  $\eta$  was 90.7 %, heat loss calculated to be 2.95 % (Note S2-3). The 0 ...

Abstract Photothermal conversion material that generates thermal energy from sunlight is expected to be a promising technology for harvesting and conversion of clean solar energy. However, its photothermal conversion will be affected due to the surface contamination by dirt in outdoor applications, which greatly reduces the solar energy absorption. Herein, a ...

Solar power driven photothermal materials can absorb and convert incident energy into heat (Fig. 3 e). The heat generated by the functional layer raises the surface temperature, and prolonged the ice nucleation time. Meanwhile, it also shortens the ice melting time on the surface [78], [79]. The superhydrophobicity of the material assist water ...

In-situ deposition to synthesize photothermal materials for enhanced solar-driven interfacial evaporation and gradient materials for electricity generation. ... which can be connected in series to power small electronic devices like a digital watch. This research not only advances the design and practical application of high-performance solar ...

DOI: 10.2139/ssrn.4292580 Corpus ID: 254270633; All-Weather Photothermal-Electrothermal Integrated System for Efficient Solar Steam Generation @article{Zhao2023AllWeatherPI, title={All-Weather Photothermal-Electrothermal Integrated System for Efficient Solar Steam Generation}, author={Shujing Zhao



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and Xin Zhang and Gang Wei and Zhiqiang Su}, ...

The principle of solar photothermal power generation is that the sun rays are concentrated through the reflector to the solar collection device, and the heat transfer medium (liquid or gas) in the collection device is heated by the solar energy, and then the water is heated to form steam to drive or directly drive the generator to generate ...

B) Five cycles of photothermal measurement of GTPA-BTO-Py + solid under  $1 \text{ kW m}^{-2}$  solar irradiation. C) Photothermal properties of the GTPA-BTO-Py + loaded non-woven fabrics and the blank non-woven fabrics under  $1.0 \text{ kW m}^{-2}$  solar irradiation. Insets show the infrared thermal photos of two kinds of non-woven fabrics.

Thus, converting  $\text{CO}_2$  into valuable chemicals is highly desired, especially with renewable solar energy, which shows great potential with the manner of photothermal catalysis. In this review, ...

Most of the traditional photocatalytic hydrogen productions were conducted under room temperature. In this work, we selected nonplasmonic Pt metal anchored on  $\text{TiO}_2$  nanoparticles with photothermal activity to explore more efficient hydrogen production technology over the whole solar spectrum. Photothermal experiments were carried out in a ...

Using  $\text{Bi}_2\text{Te}_3/\text{Cu}$  to achieve a high solar-heating temperature.  $\text{Bi}_2\text{Te}_3$  is a typical photothermal material with a narrow band gap ( $\approx 0.2 \text{ eV}$ ) [45,46] that can nearly fully absorb the solar spectrum ...

Development of a hybrid multifunctional photothermal structure with multifunctional capabilities is deliberated as an effective approach for harvesting abundant solar energy for sustainable environmental applications. Achieving enhanced solar to thermal conversion efficiency utilizing a suitably designed, environmentally compatible thermal ...

Dual-mode harvest solar energy for photothermal  $\text{Cu}_{2-x}\text{Se}$  biomineralization and seawater desalination by biotic-abiotic hybrid

Benefiting from the porous hydrophilic networks that enabled stable water transport, high light absorption (ca. 95% over the entire solar spectrum) and efficient photothermal conversion, PSBMA-LM@PDA hydrogels could also be applied as solar evaporators with high water evaporation rate (up to  $2.42 \text{ kg m}^{-2} \text{ h}^{-1}$ ) and solar-thermal ...

A photothermal conversion experiment was carried out under the irradiation of a xenon lamp. The Solar-thermal conversion curves with or without the simulated solar illumination are shown in Fig. 4 d. With the irradiation time increasing, the temperature platform of P-SCG and P-SCGT appeared between  $35 \text{ }^\circ\text{C}$  and  $37 \text{ }^\circ\text{C}$ , which proved that the ...



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Introduction. Efficiently converting solar energy to hydrogen by photocatalytic water splitting technology is of extremely far-reaching significance to meet future energy demands and concurrently address environmental issues [[1], [2], [3]]. Semiconductor photocatalysis is considered to be one of the most effective means of photolytic hydrogen production, and ...

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Solar lighting technology has significant potential to reduce building energy consumption. However, current solar lighting systems utilize only visible light, neglecting the ...

4 &#0183; This study prepared a novel bionic PPy/BiVO<sub>4</sub>-PI/MXene aerogel composite material with radial center structure through directional freezing as the evaporator, which integrates both photothermal and photocatalytic properties into the evaporation system order to evaluate the efficacy of photocatalytic degradation and salt collection during interfacial evaporation, high ...

In this review, we comprehensively summarized the state-of-the-art photothermal applications for solar energy conversion, including photothermal water ...

The light-to-heat conversion is determined by the photothermal materials that absorb solar energy and is of prime importance. Some common photothermal materials are carbon, semiconductors, and metal-plasmons based materials (Li et al., 2017; Liu et al., 2016; Wang et al., 2014; Wu et al., 2019). Carbon-based materials possess good light ...

1. Introduction. Solar energy utilization has been paid much attention since the solar energy is an abundant, clean and renewable resource [1], [2]. Among the various solar energy utilization technologies, the solar steam generation, also known as solar energy-driven water evaporation, represents one of the most perspective technologies for the utilization of ...

Photothermal conversion is an efficient way to utilize solar energy that allows the transformation of solar illumination into thermal energy, thus enabling MXenes to be applied in various fields ...

the state-of-the-art progress for photothermal conversions of solar energy is introduced in detail, mainly including photothermal water evaporation and desalination, ...

By sorting out the current status of the application of SPCS technology in solar thermal/photovoltaic, aerospace, buildings, textile, and other industries, this analysis clarifies ...



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The commercial single crystalline silicon solar cell panel (1.07 m<sup>2</sup> scale), membrane-free electrolytic water splitting device and factory prepared TiC/Cu based solar heating tube were ...

Given the above considerations, it can be easily inferred that an optimal interfacial photothermal evaporation system must possess the subsequent characteristics: (1) a superior ability to absorb solar energy across the entire spectrum; (2) proficient photothermal conversion while minimizing heat loss; and (3) a wettable substrate with a three ...

Solar desalination, harvesting solar energy to purify seawater, has received considerable attention due to water scarcity problems caused by climate change and human activity. In this study, we investigated a membrane desalination method that collects vaporized water from the surface of a sun-lit porous medium floating on salt water. To maximize the water ...

4 &#0183; In the past few years, various photothermal materials (such as plasmonic materials [7], carbon-based materials [8], and semiconductors [9]) have been used in the field of SDIWE for freshwater production. Semiconductor photothermal materials (such as metal sulfides and metal oxides) are characterized by broadband solar absorption and high photothermal conversion ...

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