Solar interfacial catalytic hydrogen storage and production

What is solar to hydrogen-electricity and thermal storage system (sthet)?
Solar to hydrogen-electricity and thermal storage system (STHET) is proposed. Hydrogen production in STHET is improved by recycling scattered light. Low-grade waste heat is converted into electrical energy by flexible TEGs. STHET can achieve continuous power generation by self-thermal storage capability.

Can a novel integrated system achieve photothermal catalytic hydrogen production?
3. Conclusion In summary,a novel integrated system (STHET) is firstly proposed to achieve photothermal catalytic hydrogen productioncoupled with low-grade waste heat utilization by flexible TEGs and thermal storage capacity of liquid phase system for continuous power generation in the dark.

Does photothermal catalysis increase conversion efficiency of solar-to-hydrogen?
Compared to only photocatalytic hydrogen production (Fig. 3 a),photothermal catalysis maintained a higher conversion efficiencyof solar-to-hydrogen with the increase of light intensity,which can be considered that the photothermal effect accelerated the photothermal catalytic reaction.

Can photocatalytic platforms be used for efficient solar hydrogen production?
Despite recent progress in the design of highly active photocatalysts 19,20 such as semiconductor biohybrids 21,22,organic semiconductors 23,24 and plasmonic nanoparticles (NPs) 25,26,the development of photocatalytic platforms and their large-scale applications for efficient solar hydrogen (H 2) production have not been well explored.

Can photothermal catalytic water splitting produce renewable hydrogen?
Photothermal catalytic water splitting is a potential way to produce renewable hydrogen. However,low-grade heat converted from solar energy in the photochemical process is inevitably dissipated to the environment and often wasted. Besides,the intermittency of solar energy causes the devices unable to work continuously.

How does photocatalysis affect thermocatalytic hydrogen production?
Wang et al. reported that the combined effect of photocatalysis and thermocatalysis results in an impressive thermo-photo catalytic hydrogen production rate of 13,046.7 umol·g -1 ·h -1 for the core - shell ?-SiC-50@PPCN heterojunction.

Photo-thermo catalytic hydrogen production represents one of the most promising routes for channeling solar energy but typically suffers from high reaction ...

The solar-driven H2 production from water by particulate photocatalysts is an effective approach to produce H2 fuel. Here, the authors propose an integrated ...

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Photocatalytic water splitting for hydrogen generation is an appealing means of sustainable solar energy storage. In the past few years, mesoporous semiconductors have been at the forefront ...

Green hydrogen (H 2) production is relevant to sustainable energy systems due to its potential to decarbonize various sectors and mitigate climate change.Our inspiration ...

The rate of hydrogen production was increased in the first hour and then gradually stabilized in the next two hours under every light intensity (Figs. 2 i & S5). After ...

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The Bi2Te3/Cu-based device is able to heat CuOx/ZnO/Al2O3 nanosheets to 305 °C under 1 sun irradiation, and this system shows a 1 sun-driven hydrogen production rate of ...

The optimal and reliable operation of solar-driven devices for hydrogen production and storage also depends on electrode arrangements. Until now, over a dozen ...

At present, photocatalysis and solar thermochemical catalysis are popular research methods of solar-driven methanol steam reforming hydrogen production. Solar ...

Dihydrogen (H2), commonly named "hydrogen", is increasingly recognised as a clean and reliable energy vector for decarbonisation and defossilisation by various sectors. The global hydrogen ...

It is highly desirable to seek green and sustainable technologies, such as employing photothermal effects to drive energy catalysis processes to address the high energy ...

The optimal H 2 production rate of 1.6 mol g -1 h -1 with the corresponding solar-to-hydrogen conversion efficiency of 7% and the CO selectivity of 5% is achieved under ...

Zhang and co-authors design a porous MXene monolith that enables interfacial heat localization and propose a defect-engineering strategy for MXenes to realize the ...

As a promising substitute for fossil fuels, hydrogen has emerged as a clean and renewable energy. A key challenge is the efficient production of hydrogen to meet the commercial-scale demand of hydrogen. Water splitting ...

In this work, we have designed and synthesized the self-floating solar photothermal composite (Cu/TiO 2 /C-Wood) that possesses efficiently full-spectrum solar energy capture and ...

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Inorganic semiconductors, though dominant in solar hydrogen production, are hampered by a variety of issues, including poor light absorption, serious photo-corrosion, suboptimal stability, ...

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