

What are the milestones in the development of COFs for solar fuel production?

We review milestones in the development of COFs for solar fuel production and related photocatalytic transformations, including hydrogen evolution, oxygen evolution, overall water splitting, CO₂ reduction, N₂ fixation, oxygen reduction, and alcohol oxidation.

Can COFs be used in photocatalytic photosynthesis?

Despite the significant potential of COFs in photocatalytic CO₂ reduction, water splitting, H₂O₂ photosynthesis, and other applications, their practical utilization remains challenging due to limited solar energy absorption and suboptimal photocatalytic activity.

Can COF-based materials be used in photocatalysis?

The application of COF-based materials in photocatalysis in the past three years has been summarized. A brief outlook on the application predicament of COF-based materials in photocatalysis was presented. Abstract The clean conversion of solar energy presents a potential approach to addressing the current energy and environmental predicament.

Can COF-based membranes overcome the defects of powdered materials?

Recent studies have shown that COF-based membrane materials can overcome the defects of powdered materials and broaden their application range. Herein, we present our Viewpoint on strategies for the preparation of COF-based membranes and their applications in energy storage and pollutants removal.

What is a covalent organic framework photocatalyst?

In 2014, the first example of a covalent organic framework (COF) photocatalyst for the hydrogen evolution reaction was reported by our group, which has not only marked the beginning of COF photocatalysis for solar fuel production but also helped to accelerate research into "soft photocatalysis" based on porous polymers in general.

Does COF@CNT improve solar-thermal conversion efficiency?

The synergistic effect of enhanced charge transfer and suppressed radiative relaxation in the COF@CNT material significantly improved its solar-thermal conversion efficiency, achieving a temperature increase of approximately 70 °C under 1 sun illumination.

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The review's outcomes identify that advanced energy storage materials substantially influence the enhancement of solar still productivity as compared to conventional solar stills. The ...

This system is realized through the unique combination of innovative and advanced container technology. Our pioneering and environmentally friendly solar systems: ...

The thermal energy storage (TES) system using phase change materials (PCMs) has been studied since past three decades. PCMs are widely used in heat storage applications due to their high ...

This critical review imparts a comprehensive summary of the fast-developing COF field in terms of molecular design and subsequent synthetic strategies to prepare ...

This paper presents a comprehensive systematic review of phase-change material (PCM) applications in solar refrigeration systems. It ...

This research not only sheds light on the intricate interplay between coating composition, substrate material, and optical properties but also underscores the practical feasibility of ...

Furthermore, promising prospects for the development in the field of pollutant adsorption were also outlined. The objective was to deepen the comprehension of COFs and COF ...

Covalent organic frameworks (COFs) are highly crystalline polymers that possess exceptional porosity and surface area, making them a subject of significant research interest. COF ...

These materials offer a diverse range of tunable physicochemical properties and functionalities. This comprehensive review aims to provide an in ...

The strength of the booth material also meets the requirements, and there are two skylights on the top to improve the daylighting rate of the whole space. With the development of new materials and new ...

Covalent-organic frameworks (COFs) with unique properties are potential capacitive materials. The review summarizes the recent progress in the ...

We review milestones in the development of COFs for solar fuel production and related photocatalytic transformations, including hydrogen ...

In this article, we describe the recent progress in the topology design and synthesis method of COF-based nanomaterials by elucidating the ...

Following this, the applications of COF-based photocatalysts are detailed including photocatalytic hydrogen evolution, CO₂ conversion and degradation of ...

These properties make them perfectly suitable for photovoltaic application: throughout this review, we summarize recent advances in the employment of both MOFs and COFs in emerging photovoltaics, ...

The use of a variety of carbon materials in diverse TES applications has been assembled and a detailed analysis is provided. Carbon materials are compared to each other and ...

This paper reviews various kinds of heat storage materials, their composites and applications investigated over the last two decades. It was found tha...

The thermal energy storage (TES) system using phase change materials (PCMs) has been studied since past three decades. PCMs are widely used in heat storage applications due to ...

Given these extraordinary characteristics, the COF-based materials have found wide applications in myriads of applications such as gas ...

The effects of MOF/COF and their derivatives on the cathode performance of ZIBs were investigated from the energy storage mechanism.

Additionally, different types of 2D MOF and COF materials and performance adjusting strategies have been systematically summarized. Furthermore, the remaining challenges and current ...

Phase change materials (PCMs) are extensively used now a days in energy storage devices and applications worldwide. PCMs play a substantial role in energy storage for solar thermal ...

In many parts of the world, direct solar radiation is considered to be one of the most prospective sources of energy. Among the different energy end u...

COF-based materials are also designed for battery application, and efforts are made to improve the performance of the existing batteries. The COFs based materials are being explored as ...

This study evaluates the effectiveness of phase change materials (PCMs) inside a storage tank of warm water for solar water heating (SWH) system through the theoretical simulation ...

This work expands the catalyst choice for imine-based COFs and provides a design paradigm for the synthesis of perovskite@COF composites for future applications.

The application of COF-based materials in photocatalysis in the past three years has been summarized. A brief outlook on the application predicament of COF-based materials in ...

To operate solar street lights, off-grid solar power plants, and solar pumps during night or cloudy condition,

the solar PV systems with battery-based energy storage are employed. Solar thermal ...

Some of the PCM candidates were characterized for: chemical stability with some container materials; phase change transformation temperatures; and latent heats.

Phase change material is considered one of the most innovative way used in the engineering world to reduce the use of energy. PCM uses the renewable resource (solar energy) to ...

This review highlights recent advancements in COFs for applications beyond lithium-ion batteries, emphasizing performance optimization methodologies for next-generation cathode ...

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