Can MOFs be used in solar cells?
Functionalized MOFs with intrinsic electric conductive components or formation of MOFs-based composites with conductive materials could also provide solutions to increase the electronic conductivity of MOFs and their derivatives, enabling their applications in solar cells.

What are metal-organic framework (MOF) based materials?
Among the emerging materials,metal-organic framework (MOF)-based materials,including pristine MOFs,MOF composites,and MOF derivatives,have drawn tremendous attention due to their remarkable superiority over conventional materials for energy conversion and storage applications. 3

What types of MOFs are used in solid-state hydrogen storage?
Notably,within this classification,MOFs frequently employed in the realm of solid-state hydrogen storage comprise IRMOF,MIL,UiO,and ZIF. The crystal structure of the prototype materials is visually depicted in Fig. 4.

How to analyze MOFs and MOF derivatives in solar cell applications?
Theoretical studiesincluding simulation work and even the fast developed machine learning as well as AI technology are also very important tools to analyze the relevant parameters and properties of MOFs and MOF derivatives in solar cell applications.

Can MOFs be used as catalysts in chemical storage materials?
The incorporation of MOFs as catalysts has demonstrated enhanced kinetic performancefor hydrogen uptake and release in chemical storage materials. However,regulating the thermodynamic stability remains a persistent challenge.

Can MOFs improve solar-to-electricity conversion performance?
MOFs and derivatives based photovoltaic devices,especially solar cells,have demonstrated exceptional potentialto enhance solar-to-electricity conversion performance with increased stability.

This work comprehensively and systematically reviews the applications of MOF-based materials in energy and catalysis and reviews the research progress of MOF materials for ...

TM-based metal-organic frameworks (MOFs) have emerged as a promising class of materials for catalytic hydrogen production, attributed to their ...

The paper showcases the immense potential of MOF-based interlayers to revolutionize PSC technology, offering a path toward next-generation solar cells with enhanced performance and ...

This review highlights the research that has been focused on utilizing MOFs in the carbon capture processes, particularly targeting materials applicable to low CO2partial pressures but ...

Ambient-dried composite aerogels integrating MOF-303, TEMPO-oxidized cellulose nanofibers (TOCNF), and hygroscopic salts enable high ...

This review article summarizes recent innovations and developments using cutting-edge porous materials such as metal-organic frameworks (MOFs), zeolite ...

Huang et al. focused on COFs based on phthalocyanine (Pc-) and porphyrin (Por-) and their electrocatalytic performance in CO2 RR, ORR, and water splitting. 36 Liu et al. provided a ...

There-fore, MOFs-based materials can be applied in SDIWE technology for solar-driven seawater desalination, making it a promising approach. Figure 1 depicts six typical MOFs in this review.

In recent years, perovskite solar cells (PSCs) have attracted much attention because of their high energy conversion efficiency, low cost, and simple preparation process. Up to now, the photoelectric ...

Unlike previous studies that focus on isolated aspects or applications of MOFs, this paper synthesizes various facets, including structural advantages, chemical properties, and the ...

Liang et al. reported the C, N-doped ZnO materials and they have been synthesized using the Zn based MOF. It showed that the prepared heterojunctions of the MOFs have enhanced ...

Developing low-cost and stable materials for converting solar energy into electricity is vital in meeting the world"s energy demand. Metal ...

Moreover, hybrids formed by MOF-derived materials inherit the distinctive merits from the MOF and offer further diversifi-cation for hybrid photocatalysts. Here, the rational design of MOF-based hybrid photo ...

It provides advantageous bases for the design of semiconductor-MOF-based interfacial evaporation materials with well-defined surface topography and hydration chemistry for solar-driven ...

While this inefficiency might reduce energy storage capacity and performance, refining electrode materials and cell design can help solve this problem. MOF-based batteries lose ...

Moreover, hybrids formed by MOF-derived materials inherit the distinctive merits from the MOF and offer further diversification for hybrid ...

Metal-organic framework (MOF)-based materials are promising candidates for solar water splitting because of their modifiable pores, abundant ...

This paper discusses the potential use of metal-organic framework (MOF) dispersion based fluids for solar-to-thermal energy conversion (STEC). For this, the optical and thermal ...

Metal-Organic Frameworks (MOFs) have emerged as promising materials for addressing modern agricultural challenges due to their exceptional porosity, high surface area, and ...

To solve the energy crisis and environmental issues, it is essential to create effective and sustainable energy conversion and storage technologies. ...

MOF-based atmospheric water harvesting technology is a straightforward and practical strategy for producing safe drinking water. However, separate des...

However, the related photothermal performance of MOFs-based adsorbents has been rarely concerned. Herein, the latest development of MOFs-based adsorbents for efficient solar-driven ...

Metal-organic framework (MOF) materials have achieved significant research interest in the fields of gas storage and separation over the ...

Metal-organic frameworks (MOFs), hailed as the wonder material of the 21st century, exhibit unprecedented tunability, thermal stability, porosity, and surface ...

This review will help to draw more attention and research interests, leading to greater innovation and breakthroughs in the field of MOFs-based materials for solar-powered desalination.

This updated review provides an overview of the advances in MOF-based materials in energy storage and conversion applications, including gas storage, batteries, supercapacitors, and ...

We conduct a detailed analysis of newly developed solar cells that possess unique Metal-Organic Framework (MOF) features, to reveal the relationship between the characteristics of ...

Among these, the construction of MOF composites is considered a research strategy with great potential. This construction strategy highlights the advantages of the materials. It overcame ...

Introduced here is a light-induced MOF synthesis, enabled by plasmonic nanoparticles. The method, proven to be rapid and efficient, can also promote the formation of a nanoparticle-MOF ...

Metal-organic framework (MOF)-based materials with high porosity, tunable compositions, diverse structures, and versatile functionalities provide great scope for next-generation ...

The porous materials such as Zeolite, activated carbon, and metal organic frameworks (MOFs) are having the

eye-catching potentials because these materials have an extreme degree of ...

In this work, porous ambient-dried aerogels of MOF-303 and biobased materials, i.e., TOCNF and NaAlg, cross-linked with CaCl 2, were ...

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