Chemical design scheme for solar container materials

Which polymers are used for organic solar cells?
Compounds with similar structural characteristics may perform similarly. Designing of materials for organic solar cells (OSCs) is a difficult and time-consuming process. An existing polymer database is mined to find polymers for OSCs,three polymers (PM6,PBT7-Th,and D18)are used as standard.

Are PCM container designs practical for solar thermal storage?
PCM container geometry and orientations are practicalpassive heat transfer enhancement techniques in the long-term compared to adding nanoparticles and attaching fins. This review focuses on significant aspects of PCM container designs for practical solar thermal storage.

Which container geometries encapsulate PCMS?
PCMs are encapsulated primarily in shell-and-tube,cylindrical,triplex-tube,spherical,rectangular,and trapezoidalcontainers. This review focuses on PCM's melting and solidification in different container geometries and their orientations for heat storage in solar thermal systems.

Which materials are suitable for selective solar thermal applications?
A proper combination of container geometry,orientation,fins,nanoparticles,metal foams,and heat pipescould be considered for further research. The hybridization of sensible and latent heat storage materials could be investigated to suit the selective solar thermal applications.

Are polymer and small molecular donors good for solar cells?
The development of various kinds of polymer and small molecular donors,as well as fullerene and non-fullerene acceptors (NFAs),has led to a notable increase in the power conversion efficiency(PCE) of organic solar cells.

Which type of photovoltaic cell uses small organic molecules as light absorbing materials?
One kind of photovoltaic cells that use small organic molecules or polymers as light absorbing materials is organic solar cell,also known as a plastic solar cell ,. Using photovoltaic effect,these molecules produce electricity by absorption of light and charge generation .

Specifically, the classification of TiO 2 -based S-scheme heterojunction photocatalysts has been detailly described, mainly including metal oxides, metal chalcogenides, organic semiconductors, and other ...

Solar energy, while abundant, is intermittent [8, 9], leading to the widespread utilization of phase change materials (PCM) in latent heat storage technology for solar energy storage [10, 11]. ...

Hitherto, numerous attempts are made to imitate the natural photosynthesis of plants by converting solar

energy into chemical fuels which resembles the "Z-scheme" process. A recreation of this system is ...

Organic solar cells have the potential to be the most cost-effective kind of energy. The small molecule acceptors (SMAs) and their chemical structure influence the efficiency of OSCs. This ...

Combining inorganic semiconductors with covalent organic frameworks (COFs) to construct excellent hybrid materials is a promising strategy for solar-driven CO2 reduction, but how to modulate the ...

Microbe-semiconductor biohybrids have emerged as promising systems for converting solar energy into chemicals by integrating intracellular ...

Photosynthetic biohybrids incorporate excellent light-absorbing and conversion property of photocatalytic materials and biosynthesis capability of microorganisms, enabling solar-driven, green, sustainable, ...

In this Review, we highlight recent milestones in these areas and some key scientific challenges remaining between the current state of the art and a technology that can effectively ...

By successfully incorporating machine learning predictions, this suggested framework serves as an important tool in the material design process, allowing the discovery of the best SMAs.

Design of functional materials with targeted properties is a challenge because of the diversity of their potential structures. The functional ...

Solar-driven semiconductor photocatalysis technology is deemed to be a potential strategy to alleviate environmental crisis and energy shortage. Thus, the exploration of high-efficiency photocatalysts is ...

Container material is defined as the substance used to construct a container that isolates the working fluid from the external environment, ensuring it is leak-proof, compatible with the fluid, and able to ...

Potential of the thermal energy storage materials especially phase change materials (PCM) is great support to the thermal systems for their performance enhancement especially for ...

Design and synthesis of an S-scheme TiO 2 homojunction with an adjusted, well-defined phase for directional carrier transfer in solar water splitting +. The ...

This review presents a comprehensive overview of advancements in 3D-printed photocatalysts for solar to chemical energy, providing their transformative potential to enhance ...

Printable photocatalyst plates have the potential to use in water splitting system for practicality of solar hydrogen production. In this system, transparent conductive nanoparticles can be ...

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Abstract This review summarizes our recent achievements in the development of new chalcogen-containing materials employed as hole-transporting materials (HTMs) in efficient ...

Designing of materials for organic solar cells (OSCs) is a difficult and time-consuming process. An existing polymer database is mined to find polymers for OSCs, three polymers (PM6, ...

An effective approach to address this issue is the construction of Z-scheme heterostructures. In this study, WSSe-XS 2 (X = Hf, Zr) ...

Photocatalytic CO2 conversion into valuable hydrocarbon fuels via solar light is a promising strategy to simultaneously address energy shortage and en...

In order for the proposed scheme to be realized, research needs to be undertaken to minimize technological risks and produce designs that meet cost targets. In the contexts of the HTF, ...

Efficiencies of organic solar cells have practically doubled since the development of non-fullerene acceptors (NFAs). However, generic chemical design rules for ...

Since the concept was introduced in 2019, step-scheme (S-scheme) heterojunctions have emerged as an important subclass of heterojunction technology and attracted much attention for ...

Solar thermal conversion technology with a green, low-cost, and low carbon footprint attracts attention in the application of water treatment. Photothermal materials, which convert sunlight ...

Therefore, the UV transmission properties of container materials play an important role in SODIS, as the process is mainly driven by UV photons transmitted through container walls [10]. In ...