Small solar photovoltaic self-absorption

How do solar-selective absorbers affect photothermal efficiency?
The performance of solar-selective absorbers with maximum absorption in the solar spectrum and suppression of heat loss in the infrared region directly determines the optimal photothermal efficiency, which implies that achieving high solar absorptance (?) and low thermal emittance (?) favors the final conversion efficiency.

Can solar absorbers improve photothermal conversion efficiency?
The growing attention in solar energy has motivated the development of a highly efficient solar absorber. Under a certain light concentration,increasing the solar spectral absorption of solar absorbers can improve the photothermal conversion efficiency.

Why do we need a solar absorber?
The growing attention in solar energy has motivated the development of a highly efficient solar absorber. Under a certain light concentration, increasing the solar spectral absorption of solar abso...

What is the difference between a solar absorber and a IR absorber?
In the IR range of 2.5-30 um, both show high reflectance, corresponding to a low absorption. In other words, both designed absorbers achieve selective absorption of the solar spectrum.

Can small molecule donors improve the performance of organic solar cells?
In the last few years,there have been notable developments in organic solar cells using both small molecule donor and acceptor. It has been noted that adding halogens to the end groups of small molecules could enhance the film structure and,consequently,the performance of the devices. In this study,three novel small molecule donors are created.

Are Dybo-based organic solar cells stable?
The origins of the excellent photovoltaic performance and stability of DYBO-based OSCs are elucidated. The power conversion efficiencies (PCEs) of small-molecule acceptor (SMA)-based organic solar cells (OSCs) have increased remarkably,but their long-term stability is insufficient for commercialization.

Scientific Reports - Amplifying the photovoltaic properties of tetrathiafulvalenes based materials by incorporation of small acceptors: a density functional theory approach Skip to main content ...

Self-assembled monolayers are essential for achieving high performance solar cells by minimizing interfacial energy losses. Here, authors the develop a co-adsorb strategy ...

A two-dimensional conjugated small molecule (SMPV1) was designed and synthesized for high performance solution-processed organic solar cells. This study explores the photovoltaic properties...

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Photovoltaic (PV) power generation is highly regarded for its capability to transform solar energy into electrical power. However, in real-world applications, PV modules are prone to issues such as increased self-heating and surface dust accumulation, which contribute to a reduction in photoelectric conversion efficiency. Furthermore, elevated temperatures can ...

All-small-molecule organic solar cells (all-SMOSCs) have attracted tremendous attention on account of their special merits of easy purification, well-defined molecular ...

Dynamic control of solar transmission by photovoltaic-powered electrochromic smart windows is an up-and-coming approach towards the reduction of energy consumption in buildings. Selectively-absorbing transparent organic solar cells are capable of exhibiting excellent visible-light transparency as well as respectable power conversion ...

The cermet absorber shows a solar radiation absorption of 96.5% in the ultraviolet, visible, and near-infrared bands of sunlight (300-2500 nm). To further improve the solar radiation absorption of the device, a quasi ...

The cermet absorber shows a solar radiation absorption of 96.5% in the ultraviolet, visible, and near-infrared bands of sunlight (300-2500 nm). To further improve the solar radiation absorption of the device, a quasi-optical microcavity structure (QOM) based on cermet-metal-cermet (CMC) was proposed. Due to the synergistic effect of the ...

Synergistic optimization of donor-acceptor blend morphologyis a hurdle in the path of realizing efficient non-fullerene small-molecule organic solar cells (NFSM-OSCs) due to the anisotropic conjugated backbones of both donor and acceptor. Therefore, developing a facile molecular design strategy to effectively regulate the crystalline properties of photoactive ...

UV-vis absorption spectroscopy showed that these SAMs exhibit similar ?-?* absorption characteristics in dilute tetrahydrofuran (THF) solutions (10 -5 M), with absorption peaks at 304, 349, and 363 nm for 2BrCzPA, 319 nm for 2BrPTZPA, and 334 nm for 2BrPXZPA, indicating minimal light absorption in the visible spectrum. Notably, 2BrPTZPA and 2BrPXZPA ...

The power conversion efficiencies (PCEs) of small-molecule acceptor (SMA)-based organic solar cells (OSCs) have increased remarkably, but their long-term stability should be improved. In this study, we develop a dimerized SMA (DYBO) for efficient (PCE > 18%) and stable OSCs (i.e., t80% lifetime > 6,000 h under 1-sun illumination ...

All-small-molecule organic solar cells (all-SMOSCs) have attracted tremendous attention on account of their special merits of easy purification, well-defined molecular structures, and better molecular repeatability compared with polymer solar cells (PSCs).

We propose the enhancement of the photovoltaic absorption in thin-film solar cells using densely packed

arrays (not obviously regular) of non-absorbing submicron or micron-sized dielectric spheres located on top of the cell. The spheres can decrease reflection forming an effective blooming layer.

To broaden the absorption spectra, modify the bulk-heterojunction microstructure, and suppress morphological evolution of the host blend, we introduce an asymmetric small-molecule acceptor, L8-S9, with a ...

Self-assembled monolayers are essential for achieving high performance solar cells by minimizing interfacial energy losses. Here, authors the develop a co-adsorb strategy with a small...

We review a few classes of small molecule solar cell materials and discuss their properties in devices. We discuss device concepts for small molecule organic solar cells, in particular pin devices based on doped transport layers and cascade designs. We point out the points where devices can be improved and describe paths to higher efficiencies, including ...

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