High performance organic photovoltaics

Intrinsically stretchable organic photovoltaics (is -OPVs) hold significant promise for integration into self-powered wearable electronics. However, their potential is hindered by ...

This system also exhibits high-performance devices with over 18% efficiencies for five batches with various molecular weights (23.6-80.8 KDa), six different blend thicknesses ...

A Universal Nonhalogenated Polymer Donor for High-Performance Organic Photovoltaic Cells. Adv. Mater. 2022;34:2105803. doi: 10.1002/adma.202105803. [Google Scholar] Wang Z. Tang A. Wang H. Guo Q. Guo Q. Sun X. Xiao Z. Ding L. Zhou E. Organic photovoltaic cells offer ultrahigh VOC of ~ 1.2 V under AM 1.5G light and a high efficiency of 21.2% ...

Semantic Scholar extracted view of "High-performance and multifunctional organic photovoltaic devices" by Yiming Wang et al. ... The ternary blend is demonstrated as an effective strategy to promote the device performance of organic photovoltaics (OPVs) due to the dilution effect. While the compromise between the charge ... Expand. 138.

Organic photovoltaics (OPVs) have shown remarkably enhanced performance in small cells; however, it is highly important to realize high-efficiency devices using large-area ...

Organic photovoltaic cells (OPVs) have been a hot topic for research during the last decade due to their promising application in relieving energy pressure and environmental problems caused by the increasing combustion of fossil fuels. Much effort has been made toward understanding the photovoltaic mechanism, including evolving chemical structural motifs and ...

The origin of Urbach energy (EU) in organic semiconductors and its effect on photovoltaic properties remain a topic of intense interest. In this letter, we demonstrate quantitative information on the EU value in emerging Y-series molecules by an in-depth analysis of the line shape of the temperature-dependent quantum efficiency spectra.

Most efforts to grow superior films of organic-inorganic perovskites for solar cells have focused on methylammonium lead iodide (MAPbI 3).However, formamidinium lead iodide (FAPbI 3) has a broader solar absorption spectrum ...

The field of organic photovoltaics has recently seen great progress, with power-conversion efficiencies surpassing 18% and 12% in lab-scale devices and modules, respectively. ... Narrowing the band gap: the key to high-performance organic photovoltaics. Acc. Chem. Res., 53 (2020), pp. 1218-1228. Crossref View in Scopus Google Scholar. 55. R.R ...

Organic photovoltaic devices (OPVs) are emerging as a promising renewable energy source for the future.

Their unique advantages, such as semitransparency, light weight, superior flexibility, and low cost, enable a wide range of applications. However, compared to silicon-based photovoltaics, OPVs still face challenges for further improving their efficiency. ...

Interfacial layers (ILs) are prerequisites to form the selective charge transport for high-performance organic photovoltaics (OPVs) but mostly result in considerable parasitic absorption loss. Trimming the ILs down to a ...

The development of high-performance organic photovoltaics (OPVs) with thick film active layers is key to moving this technology from laboratory preparation to industrial production. Design and synthesis of active layer materials to achieve a bi-continuous interpenetrating morphology with appropriate nanoscale phase separation has been ...

It is a time-consuming and costly process to develop affordable and high-performance organic photovoltaic materials. Computational methods are essential for accelerating the material discovery ...

Recently, to achieve high-performance OSCs, an emerging molecular design strategy of applying flexible alkyl units as linkers to construct non-fully conjugated acceptors has been developed and addressed great attention. This review highlights the non-fully conjugated photovoltaic materials with Y-series backbone that enable high-performance OSCs.

The detailed photovoltaic performance is shown in Figures 4 A and S17, and the corresponding photovoltaic parameters of devices are presented in Table S5. For the b- and t-OSCs processed from toluene, ... High-performance semitransparent organic solar cells with excellent infrared reflection and see-through functions. Adv. Mater., 32 (2020), p ...

The origin of Urbach energy (EU) in organic semiconductors and its effect on photovoltaic properties remain a topic of intense interest. In this letter, we demonstrate quantitative information on the EU value in emerging Y-series molecules by an in-depth analysis of the line shape of the temperature-dependent quantum efficiency spectra. We found that the static disorder (EU(0)), ...

A high-performance large-scale-integrated organic phototransistor needs a semiconductor layer that maintains its photoelectric conversion ability well during high-resolution pixelization. However ...

Recently developed organic photovoltaic (OPV) materials have simultaneously closed the gaps in efficiency, stability, and cost for single-junction devices. Nonetheless, the developed OPV materials still pose big challenges in meeting the requirements for practical applications, especially regarding the prevalent issues of solution processability.

1 Introduction. Over the past decade, research on organic solar cells (OSCs) has advanced, leading to an increased photovoltaic performance. Thanks to their superior features including affordability, resilience, and

ease of large area manufacturing, OSCs can be employed in diverse array of applications as an efficient alternative to inorganic solar cells.

Duan, Y. et al. Pronounced effects of a triazine core on photovoltaic performance-efficient organic solar cells enabled by a pdi trimer-based small molecular acceptor. Adv. Mater. 29, 1605115 ...

Semi-transparent organic photovoltaics (ST-OPVs) are promising solar windows for building integration. Improving the light-absorbing selectivity, that is, transmitting the visible photons while absorbing the invisible ones, is a key step toward high-performance ST-OPV.

Although the layer-by-layer (LBL) processing can usually achieve an optimal bulk-heterojunction morphology for high-performance Organic photovoltaics (OPVs), the unambiguous working principles governing the morphology evolution are still lacking. To address this issue, here the phase-separation kinetics of LBL processing are comprehensively ...

In this essay, the construction of high-performance OPVs is discussed, with a focus on combining the advantages of new non-fullerene acceptors and the tandem-junction structure. In order to achieve higher PCEs, methods to enable high short-circuit current density, open-circuit voltage, and fill factor are discussed.

Intrinsically stretchable organic photovoltaics (is-OPVs) hold significant promise for integration into self-powered wearable electronics.However, their potential is hindered by the lack of sufficient consistency between optoelectronic and mechanical properties.

Interfacial layers (ILs) are prerequisites to form the selective charge transport for high-performance organic photovoltaics (OPVs) but mostly result in considerable parasitic absorption loss. Trimming the ILs down to a mono-molecular level via the self-assembled monolayer is an effective strategy to mitigate parasitic absorption loss. However ...

The origin of Urbach energy (EU) in organic semiconductors and its effect on photovoltaic properties remain a topic of intense interest. In this letter, we demonstrate quantitative ...

Most efforts to grow superior films of organic-inorganic perovskites for solar cells have focused on methylammonium lead iodide (MAPbI 3).However, formamidinium lead iodide (FAPbI 3) has a broader solar absorption spectrum that could ultimately lead to better performance.Yang et al. grew high-quality FAPbI 3 films by starting with a film of lead iodide ...

ConspectusOrganic photovoltaics (OPVs) have attracted considerable attention in the last two decades to overcome the terawatt energy challenge and serious environmental problems. During their early development, only wide-band-gap organic semiconductors were synthesized and employed as the active layer, mainly utilizing photons in the UV-visible region ...

High-Performance Organic Photovoltaics Incorporating Bulk Heterojunction and p-i-n Active Layer Structures. ... Notably, this SD method is particularly effective in semitransparent organic photovoltaics (ST-OPVs), despite the material requirements it entails. ... aimed at high-efficiency OPVs and ST-OPVs with BHJ- and p-i-n structured ...

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