Pyongyang Organic Solar Cells

In organic solar cells, the charge-transfer (CT) electronic states that form at the interface between the electron-donor (D) and electron-acceptor (A) materials have a crucial role in exciton ...

A mini review of recent advancements in organic solar cells, also known as organic photovoltaics, which use organic materials to convert sunlight into electricity. The ...

The high-power conversion efficiencies of first- and second-generation solar cells have drawn a lot of attention, but in order to meet the current demand, it will be difficult to overcome the high production costs and material availability issues associated with materials like indium [] anic solar cells have benefits including cheap cost, flexibility, simple ...

This study introduces a novel self-assembling deposition (SAD) method utilizing synthesized molecules BPC-M, BPC-Ph, and BPC-F, simplifying the fabrication while achieving high-performance of organic solar cells ...

Current high-efficiency organic solar cells (OSCs) are generally fabricated in an inert atmosphere that limits their real-world scalable manufacturing, while the efficiencies of air ...

The relatively low efficiency obviously makes the tandem concept attractive for organic solar cells. On the other hand, organic semiconductors are dominated by van de Waals interaction, rather than covalent bonding in inorganic crystalline semiconductors. This removes the strict lattice matching requirement in inorganic tandem solar cell ...

Yuan, J. et al. Single-junction organic solar cell with over 15% efficiency using fused-ring acceptor with electron-deficient core. Joule 3, 1140-1151 (2019).

The exact charge transport mechanisms in organic semiconductors are still under debate. The most commonly used model is the Holstein"s small-polaron model [] covalent p-conjugated organic systems, the distribution of electronic cloud in molecules is highly delocalized.Self-trapping occurs via the creation of localized states in the gap between ...

Hadipour A, de Boer B, Blom PWM, (2008) Device Operation of Organic Tandem Solar Cells Org Electron 9: 617-624. Article Google Scholar Hiramoto M, Suezaki M, Yokoyama M, (1990) Effect of Thin Gold Interstitial-Layer on The Photovoltaic Properties of Tandem Organic Solar Cell Chem Lett 19(3): 327-330.

Flexibility is the most prominent advantage of organic solar cells (OSCs) compared with traditional photovoltaic devices, showing an irreplaceable commercial potential. Currently, the maximum power conversion efficiencies (PCEs) of single-junction OSCs have been over 19% and 16% upon rigid and flexible substrates, respectively, which meet the criteria for ...

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An organic solar cell (OSC [1]) or plastic solar cell is a type of photovoltaic that uses organic electronics, a branch of electronics that deals with conductive organic polymers or small organic molecules, [2] for light absorption and ...

Small-molecular organic solar cells usually exhibited unsatisfactory device stability, which might originate from their molecular diffusion behaviors. Herein, based on the all-small-molecule system HD-1:BTP-eC9, we reported a dimerized acceptor DC9, and its ...

This article reports a highly efficient and stable organic solar cell based on a PM6:BTP-eC9 blend with a third component, L8-BO-X, and a volatile additive, TCB. The ...

In ternary organic solar cells (TOSCs), three different components are mixed to form the photoactive layer, opening up opportunities to boost the power conversion efficiency -- for example, by ...

Organic solar cells (OSC) based on organic semiconductor materials that convert solar energy into electric energy have been constantly developing at present, and also an effective way to solve the energy crisis and reduce carbon emissions. In the past several decades, efforts have been made to improve the power conversion efficiency (PCE) of OSCs.

The performances of organic solar cells (attained a PCE of 18.2%) and various quantum dot cells (achieved an efficiency of 18.1%) with a low cost/watt balance are highly notable. In view of their advantages like potential wide-scale production and quick energy payback times, organic solar cells have received a lot of attention over the past two ...

The high efficiency all-small-molecule organic solar cells (OSCs) normally require optimized morphology in their bulk heterojunction active layers. Herein, a small-molecule donor is designed and ...

3 · Developing organic solar cells (OSCs) processable with halogen-free, non-aromatic solvents is crucial for practical applications, yet challenging due to the limited solubility of most ...

3 · Perovskite/organic TSCs, comprising a wide-bandgap (WBG) perovskite solar cell (pero-SC) as the front cell and a narrow-bandgap organic solar cell (OSC) as the rear cell, ...

The development of stretchable electrodes for intrinsically stretchable organic solar cells (IS-OSCs) with both high power conversion efficiency (PCE) and mechanical stability is crucial for wearable electronics. However, research on top electrodes that maintain high conductivity and excellent stretchability

Small-molecular organic solar cells usually exhibited unsatisfactory device stability, which might originate from their molecular diffusion behaviors. Herein, based on the all-small-molecule ...

During past several years, the photovoltaic performances of organic solar cells (OSCs) have achieved rapid progress with power conversion efficiencies (PCEs) over 18%, demonstrating a great practical application prospect. The development of material science including conjugated polymer donors, oligomer-like organic molecule donors, fused and ...

Organic solar cells (OSCs), as a renewable energy technology that converts solar energy into electricity, have exhibited great application potential. With the rapid development of novel materials and device structures, the power conversion efficiency (PCE) of non-fullerene OSCs has been increasingly enhanced, and over 19% has currently been achieved in single-junction ...

Strong electron-phonon coupling can hinder exciton transport and induce undesirable non-radiative recombination, resulting in a shortened exciton diffusion distance and constrained exciton dissociation in organic solar cells (OSCs). Therefore, suppressing electron-phonon coupling is crucially important for achieve high-performance OSCs.

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Single-junction organic solar cells (OSCs) have achieved prominent power conversion efficiencies (PCEs) over 19% in recent years 1,2,3,4.The recent development of polymerized non-fullerene ...

As mentioned in previous section, unlike inorganic solar cells, which light radiation results in free charge carrier production, in organic solar cells, an exciton would be constructed. Excitons have intense binding energy of larger than the 0.25 eV, whereas thermal energy is approximately 0.026 eV, and insufficient to break the photo-generated ...

Thin, light, and flexible, organic solar cells pattern the roof of a school in France. HELIATEK. Zhan"s first NFA device was only about 7% efficient. But chemists around the globe quickly began to tweak ITIC"s structure, producing improved versions. By 2016, new NFAs pushed OPV efficiency to 11.5%. By 2018, they hit 16%.

This study introduces a novel self-assembling deposition (SAD) method utilizing synthesized molecules BPC-M, BPC-Ph, and BPC-F, simplifying the fabrication while achieving high-performance of organic solar cells (OSCs). BPC-M notably enhances power conversion efficiency to 19.3%, highlighting the balance of thermodynamic forces and intermolecular ...

Organic semiconductors offer the advantage of high optical absorption and tunable energy levels, enabling thin-film solar cells with high light-to-electron conversion ...

Organic solar cells incorporating three components in the active layer blend -commonly referred to as ternary organic solar cells (TOSCs)- typically consist of a dominating donor:acceptor (D:A) system along with a third

component. TOSCs can be categorised into two main types based on the role of the third component: systems with two donors ...

Organic solar cells (OSCs) can be solution-processed on flexible substrates at low temperatures, enabling fast and inexpensive manufacturing. Thus they have attracted great attention in past decades. Huge progress in power conversion efficiency (PCE) has been achieved since advances in material and device engineering (Zheng et al., 2019).

To meet the increasing global energy demand, a continuous improvement of clean and renewable energy sources is imperative. One technology that shows great promise in achieving this goal is organic solar cells (OSCs), which have the ability to convert sunlight directly into electricity [1].Advanced development of non-fullerene acceptors (NFAs) over the past ...

Based on the PM6:Y6 binary system, a novel non-fullerene acceptor material, D18-Cl, was doped into the PM6:Y6 blend to fabricate the active layer. The effects of different doping ratios of D18-Cl on organic solar cells were investigated. The best-performing organic solar cell was achieved when the doping ratio of D18-Cl reached 20 wt%. It exhibited a short ...