Efficient molecular photovoltaics

Suppressing surface Cs+ accumulation in methylammonium-free a-FA1-xCsxPbI3 perovskite with an intermediate phase-assisted strategy enables high-efficiency and thermally ...

More than 80% of the photons in the solar energy spectrum cannot be used. Accordingly, the photocurrent of photovoltaic devices such as pure BiFeO 3 is only mA cm -2 or nA cm -2 levels [14-17]. In order to improve the photoelectric conversion efficiency of ferroelectric photovoltaics, reducing the band gap has become a possible strategy.

Sun, C. et al. High efficiency polymer solar cells with efficient hole transfer at zero highest occupied molecular orbital offset between methylated polymer donor and brominated acceptor. J. Am.

Cells with a power conversion efficiency as high as 18.06% (17.8% certified) are achieved, along with moisture tolerance for up to 1,512 h (under 70% humidity conditions), thermal stability for ...

Context The development of high-efficiency photovoltaic devices is the need of time with increasing demand for energy. Herein, we designed seven small molecule donors (SMDs) with A-p-D-p-A backbones containing various acceptor groups for high-efficiency organic solar cells (OSCs). Molecular engineering was performed by substituting the acceptor group in ...

Unraveling the Role of Electron-Withdrawing Molecules for Highly Efficient and Stable Perovskite Photovoltaic Angew Chem Int Ed Engl . 2024 Sep ... College of Chemistry and Molecular ... PCSs modified with F4TCNQ achieved an impressive power conversion efficiency (PCE) of 25.21%, while demonstrating excellent long-term stability. ...

Cui, Y. et al. 1 cm 2 organic photovoltaic cells for indoor application with over 20% efficiency. Adv. Mater.31, 1904512 (2019). Chen, H. et al. A guest-assisted molecular-organization approach for >17% efficiency organic solar cells using environmentally friendly solvents. Nat. Energy6, 1045-1053 (2021).

a) Molecular structures of PM6, L8-BO, and BTP-S10; b) energy level diagrams of all materials in this work; c) J-V characteristics in PM6:L8-BO:BTP-S10 bulk-heterojunction organic photovoltaics (OPVs) employing ZnO films with different CO 2-DMI concentrations (the inset presents the configuration of inverted OPVs).

Semantic Scholar extracted view of "Alkyl-Functionalized Organic Dyes for Efficient Molecular Photovoltaics [J. Am. Chem. Soc. 2006, 128, 14256-14257]." by N. Koumura et al.

Efficient dye sensitizers N,N?-dialkylcarbazolocarbazole derivatives BG-501 and BG-502 were synthesized and characterized. UV-vis, 1H NMR and CV were used for the structural characterization. The aim of the synthesis of these molecules is to improve some optical and electronic properties such as molar absorption coefficient, spectral coverage and electron ...

Efficient molecular photovoltaics

Novel organic dyes (MK dyes), which have a carbazole derivative as an electron donor and a cyanoacrylic acid moiety (?C(--C?N)COOH) as an electron acceptor and an anchoring group, connected with n-hexyl-substituted oligothiophenes as a p-conjugated system, were designed and synthesized for application in dye-sensitized solar cells (DSSCs), which are one of the ...

For organic solar cells to be competitive, the light-absorbing molecules should simultaneously satisfy multiple key requirements, including weak-absorption charge transfer ...

Organic photovoltaics (OPVs) are an emerging solar cell technology that is cost-effective 1,2,3, lightweight 4,5 and flexible 4,6,7,8.Moreover, owing to their energy-efficient production and non ...

Baran, D. et al. Reducing the efficiency-stability-cost gap of organic photovoltaics with highly efficient and stable small molecule acceptor ternary solar cells. Nat. Mater. 16, 363-369 (2017).

The use of photovoltaic technologies has been regarded as a promising approach for converting solar energy to electricity and mitigating the energy crisis, and among these, organic photovoltaics (OPVs) have attracted broad interest because of their solution processability, flexibility, light weight, and potential for large-area processing.

Baran, D. et al. Reducing the efficiency-stability-cost gap of organic photovoltaics with highly efficient and stable small molecule acceptor ternary solar cells. Nat. Mater. 16, 363-369 (2017).

Surface trap-mediated nonradiative charge recombination is a major limit to achieving high-efficiency metal-halide perovskite photovoltaics. The ionic character of perovskite lattice has enabled molecular defect passivation approaches through interaction between functional groups and defects.

It was reported that the achieved high efficiency results were due to using a monolayer of a hydroxamic acid derivative as a pre-adsorber on the surface of TiO 2, which improved the dye molecular ...

Precisely controlling bulk heterojunction (BHJ) morphology through molecular design is one of the main longstanding challenges in developing high-performance organic solar cells (OSCs). Herein, three small molecule acceptors (SMAs) with different side chains (methyl, 2-ethylhexyl, and 2-decyl tetradecyl on benzotriazole unit), namely R-M, R-EH, R-DTD, were ...

DOI: 10.1016/J.JOULE.2018.03.017 Corpus ID: 139696701; Direct Contact of Selective Charge Extraction Layers Enables High-Efficiency Molecular Photovoltaics @article{Cao2018DirectCO, title={Direct Contact of Selective Charge Extraction Layers Enables High-Efficiency Molecular Photovoltaics}, author={Yiming Cao and Yuhang Liu and Shaik Mohammed Zakeeruddin and ...

We designed and synthesized new alkyl-functionalized organic dyes, MK-1 and MK-2, for dye-sensitized

solar cells (DSSCs). Based on the MK-2 dye, a high performance of efficiency (eta, 7.7%; short ...

Photovoltaic performances of the BG-501, BG-502 and Z907 were shown in Fig. 3 and results were summarized in Table 2. Under standard global AM 1.5 solar irradiation, the BG-501 sensitized cell gave a short-circuit current density (J sc) of 7.46 mA cm -2, open circuit voltage (V oc) of 0.56 V, and a fill factor of 0.60, corresponding to an overall conversion ...

To understand the effect of solid-state molecular packing on the photovoltaic properties of ... for efficient charge transfer and extraction as well as high photovoltaic efficiency. This statement ...

Adjusting the energy levels and fibrillar morphology is paramount to enhancing the power conversion efficiency (PCE) of organic solar cells (OSCs). In the present study, an increase in the open-circuit voltage (VOC) is facilitated through the elongation of the alkyl chain within ...

Over the past three decades, dye-sensitized solar cells (i. e. Grätzel cells) have evolved from a pioneering concept of molecular photovoltaics to large-scale industrial deployment this review article, we provide a ...