

Which molecule is used in solution-processed organic solar cells?

Zhou, J. et al. Small molecules based on benzo [1,2-b:4,5-b']dithiophene unit for high-performance solution-processed organic solar cells. *J. Am. Chem. Soc.* 134,16345-16351 (2012). Kan, B. et al. Solution-processed organic solar cells based on dialkylthiol-substituted benzodithiophene unit with efficiency near 10%. *J. Am. Chem.*

Can a molecular design strategy improve the performance of organic solar cells?

Effective molecular design strategies for each type of OSC are discussed and promising research directions highlighted, particularly those relevant to facilitating the industrial manufacturing of OSCs. Advances in photoactive-layer materials have contributed to the increase in the performance of organic solar cells.

What is a typical organic solar cell device structure & representative photoactive materials?

Fig. 1: Typical organic solar cell device structure and representative photoactive materials used in organic solar cells. a, A typical organic solar cell (OSC) comprises an electron-transport layer (ETL), hole-transport layer (HTL), transparent conducting layer (TCL) and a photoactive layer.

How efficient are all-small-molecule organic solar cells?

Sun, R. et al. High-efficiency all-small-molecule organic solar cells based on an organic molecule donor with an asymmetric thieno [2,3-f] benzofuran unit. *Sci. China Chem.* 63, 1246-1255 (2020). Wang, X. et al. Over 15% efficiency all-small-molecule organic solar cells enabled by a C-shaped small molecule donor with tailorable asymmetric backbone.

Are single-component organic solar cells thermal & photostable?

Chem. Res. 54,2227-2237 (2021). He, Y. et al. Evidencing excellent thermal- and photostability for single-component organic solar cells with inherently built-in microstructure. *Adv. Energy Mater.* 9,1900409 (2019).

Can dimerized small molecule acceptors be used for organic solar cells?

Lee, J.-W. et al. Linker engineering of dimerized small molecule acceptors for highly efficient and stable organic solar cells. *ACS Energy Lett.* 8,1344-1353 (2023). Sun, C. et al. Dimerized small-molecule acceptors enable efficient and stable organic solar cells. *Joule* 7,416-430 (2023).

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This Review summarizes the types of materials used in the photoactive layer of solution-processed organic solar cells, discusses the advantages and disadvantages of ...

This research offers a significant contribution to the field of organic solar cells (OSCs), specifically addressing the complexity of traditional fabrication methods. By utilizing ...

Lewis base molecules that bind undercoordinated lead atoms at interfaces and grain boundaries (GBs) are known to enhance the durability of metal halide perovskite solar ...

A systematic design of light-absorbing molecules is challenging for them to satisfy multiple key requirements for efficient solar cell application.

blend solar cells. Recently, highly efficient, highly stable, ternary blend all-polymer solar cells have been high-lighted by Sun et al.¹⁰ in Joule. A ternary blend with the newly designed near ...

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

This study introduces a novel self-assembling deposition (SAD) method utilizing synthesized molecules BPC-M, BPC-Ph, and BPC-F, simplifying the fabrication while ...

Lewis base molecules that bind undercoordinated lead atoms at interfaces and grain boundaries (GBs) are known to enhance the durability of metal halide perovskite solar cells (PSCs). Using density functional theory ...

4 ???· Perovskite solar cells with inverted architecture have remarkable power conversion efficiency (PCE) and operating stability based on self-assembled molecules (SAMs) hole ...

organic solar cells through the design of self-assembling hole-transport molecules This study introduces a novel self-assembling deposition (SAD) method utilizing synthesized molecules ...

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Given their high power conversion efficiencies (PCEs), metal halide perovskite solar cells (PSCs) offer a route to lowering the cost of solar electricity (1-4). However, durability remains a major hurdle along the path to ...

5 ???· Organic solar cells (OSCs) have attracted great interests due to their advantages of flexibility, light weight, low cost, ... For the central fused rings of the molecules, we designed ...

Context Various innovative molecules have been designed and explored for use in organic photovoltaics. In

this study, we devised novel molecules (KZ1-KZ7) specifically ...

All designed molecules have more V_{oc} in comparison to reference molecule R, hence they are better donor materials than reference molecule R. M3 exhibits the highest V_{oc} (1.15 V) value, ...

The dye-sensitized solar cell (DSSC), a molecular solar cell technique, has the potential to generate solar cells for less than \$0.5/W_{peak} [5]. Researchers and industry ...

4 ???#0183; An inverse design approach has identified high-performance organic hole-transporting semiconductors for perovskite solar cells. Wu et al. synthesized libraries of conjugated ...

The efficiency of all the perovskite tandem solar cells, with WBG PSCs as the top cell and narrow-bandgap PSC as the bottom cell, reached 26.47%. Our working site ...

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