

What are all-polymer solar cells?

All-polymer solar cells are a kind of OPV cells with a bulk heterojunction (BHJ) active layer of a polymeric electron donor and a polymeric electron acceptor.

What are the most efficient Polymer solar cells?

The most efficient polymer solar cell (PSC) devices are based on the bulk heterojunction (BHJ) architecture, which features an interpenetrating network of contiguous hole- and electron-conducting domains achieved by blending electron-rich (donor) and electron-poor (acceptor) organic semiconductors, respectively.

Which polymer acceptor enables all-polymer solar cells?

An efficient polymer acceptor via a random polymerization strategy enables all-polymer solar cells with efficiency exceeding 17%. Energy Environ. Sci. 15, 3854-3861 (2022). Wang, J. et al. A new polymer donor enables binary all-polymer organic photovoltaic cells with 18% efficiency and excellent mechanical robustness. Adv. Mater. 34, 2205009 (2022).

What are the advantages of all-polymer solar cells?

All-polymer solar cells with blending active layer of polymer donors and polymer acceptors have attracted tremendous interest due to their outstanding advantages such as superior morphological and mechanical stability, which show great potential in large-area and flexible devices.

Are all-polymer solar cells stretchable?

All-polymer solar cells (all-PSCs) have attracted significant research interest in the recent decade due to their great potential in stretchable electronic applications in terms of long-term stability and mechanical stretchability.

Which n-type polymer enables efficient all-polymer solar cells?

Nat. Commun. 12, 5264 (2021). Sun, H. et al. A narrow-bandgap n-type polymer with an acceptor-acceptor backbone enabling efficient all-polymer solar cells. Adv. Mater. 32, 2004183 (2020). Jia, T. et al. 14.4% efficiency all-polymer solar cell with broad absorption and low energy loss enabled by a novel polymer acceptor. Nano Energy 72, 104718 (2020).

Meanwhile, the introduction of PFBO-C12 reduces voltage loss and enables all-polymer solar cells with excellent light stability and mechanical durability in flexible devices.

1 State Key Laboratory of Luminescent Materials and Devices, South China University of Technology, Guangzhou 510640, China 2 Center for ... and prospects of all-polymer solar cells Chem Rev 119 8028. Crossref Google Scholar [8] Sun R, Wang W, Yu H et al 2021 Achieving over 17% efficiency of ternary all-polymer solar cells with two well ...

Recent research progress of all-polymer solar cells based on PSMA-type polymer acceptors. Chem, 2023, 9: 1702-1767. Article CAS Google Scholar Wang J, Li Y, Han C, et al. All-polymer solar cells with 19% efficiency via introducing pincer-shaped non-covalent bond interactions. Energy Environ Sci, 2024, 17: 4216-4227

Nevertheless, the fill factor (FF) of all-polymer solar cell devices is relatively low compared to their fullerene or small molecule acceptor counterparts, mainly due to ...

We report all-polymer solar cells (All-PSCs) with record-high power conversion efficiency (PCE) through tuning the molecular weights of the polymer donor (PBDB-T) to form optimal active layer morphology. By combining the polymer donors with a newly reported polymer acceptor (PJ1), an unprecedented high PCE of 15.4% and fill factor over 75% were achieved ...

The power conversion efficiency, more commonly known as the efficiency of a solar cell, is the ratio of the maximum power generated by the solar cell to the incident radiant energy (also called Solar Constant); the solar constant actually varies by about 0.3% over the 11-years solar cycle but averages about 1368 W/m².

All polymer solar cells (APSCs) composed of polymeric donors and acceptors have attracted tremendous attention due to their unique merits of mechanical flexibility and good film formation property, which exhibit promising ...

In contrast, all-polymer solar cells (APSCs) including acceptor and donor polymers exhibit morphological and mechanical stability, which are advantageous under thermal and mechanical stressors and are regarded as essential characteristics for future commercialization [2]. However, because of a dearth of high-performance acceptors, all-PSC ...

All-polymer solar cells (all-PSCs) have attracted significant research interest in the recent decade due to their great potential in stretchable electronic applications in terms ...

Summary Polymer-polymer solar cells (all-PSCs) have demonstrated significantly improved ambient operational stability, ... Jiangsu Key Laboratory for Carbon-Based Functional Materials & Devices, 199 Renai Road, Suzhou, Jiangsu, 215123 P.R. China. Search for more papers by this author.

Limited by the relatively low short-circuit current density (J_{sc}) and fill factor (FF), the efficiency of all-polymer solar cells (all-PSCs) is still inferior to the small molecular acceptor ...

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