

# 18 efficiency organic solar cells





## Overview

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Ternary solar cells based on COi8DFIC gave an outstanding  $J_{sc}$  of 28.20 mA  $cm^{-2}$  and a PCE of 14.08%. This is the first report demonstrating that the PCE for OSCs exceeds 14%.[16] These work indicated the great potential of low-bandgap nonfullerene acceptors. Recently, Zou et al. developed a highly.

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The major challenges associated with bringing organic solar cells (OSCs) to the industrial market are to further improve power conversion efficiency (PCE), device stability, and green-solvent processability within an open-air (OA) environment. High-performance OSCs based on various active layers.

Nowadays, 17% power conversion efficiencies (PCEs) have been achieved in the state-of-the-art OSCs [2,3]. The remarkable progress in OSCs relies on the continuously emerging new materials and device fabrication technologies, and the understanding on film morphology and device physics [4,5]. Donor. Can organic solar cells improve power conversion efficiency?

The major challenges associated with bringing organic solar cells (OSCs) to the industrial market are to further improve power conversion efficiency (PCE), device stability, and green-solvent processability within an open-air (OA) environment. High-performance OSCs based on various active layers are realized.

Are ternary organic solar cells efficient?



Sci Bull 2017;62:1331-6. Xiao Z, Jia X, Li D, et al. 26 mA cm<sup>-2</sup> J<sub>sc</sub> from organic solar cells with a low-bandgap nonfullerene acceptor. Sci Bull 2017;62:1494-6. Xiao Z, Jia X, Ding L. Ternary organic solar cells offer 14% power conversion efficiency. Sci Bull 2017;62:1562-4.

Are organic solar cells stable?

Although organic solar cells (OSCs) have delivered an impressive power conversion efficiency (PCE) of over 19 %, most of them demonstrated rather limited stability. So far, there are hardly any effective and universal strategies to improve stability of state-of-the-art OSCs.

What is the PCE value of organic solar cells?

These cells have a D/A ratio of 1:1.6 (w/w), an active layer thickness of 103 nm, no additive and a chloroform SVA for 5 minutes (Tables S1-S4). To the best of our knowledge, the 18.22% PCE is the highest value achieved from organic solar cells to date.

Which organic solar cell has the highest PCE?

D18:Y6 solar cells demonstrate a PCE of 18.22% (certified 17.6%), which is the highest efficiency for organic solar cells to date. Stille coupling of (DTBT-Br) and tributyl(4-(2-butyloctyl)thiophen-2-yl)stannane gave compound 1 in 93% yield. Bromination of compound 1 with NBS gave the monomer, compound 2, in 90% yield.

Do non-fullerene acceptors affect the efficiency of organic solar cells?

Conventional solar cells with D16 as the donor and Y6 as the acceptor gave high PCEs up to 16.72%. The chemical structure of non-fullerene acceptors (NFAs) affects their light-harvesting capabilities, energy levels and molecular orders, all of which play a crucial role in determining the efficiency of organic solar cells (OSCs).



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### D18 Polymer , 18% Efficiency Organic Solar Cells

A device efficiency of 18.22% and certified efficiency of 17.6% have been achieved using D18 as the electron donor and Y6 as an acceptor in a single junction non-fullerene polymer solar cell (NF-PSC) [1]. D18 can also be ...

### **Over 18% Efficiency Ternary Organic Solar Cells with 300 nm ...**

The development of high-efficiency thickness-insensitive organic solar cells (OSCs) is crucially important for the mass production of solar panels. However, increasing the active layer ...



### **High-efficiency organic solar cells with low voltage ...**

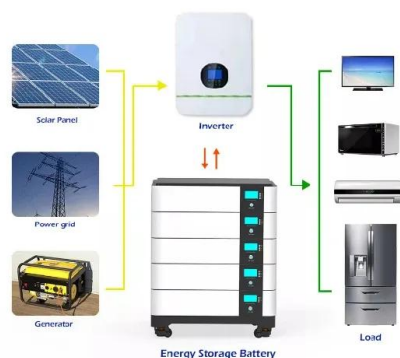
A solvent additive strategy has been employed to reduce voltage loss ( $V_{loss}$ ) in high-efficiency organic solar cells (OSCs). The use of diiodomethane led to a reduced  $V_{loss}$ , and the corresponding device ...

### Organic Solar Cells with 18% Efficiency Enabled by ...

A "two-in-one" strategy is applied to form an acceptor alloy for fine-tuning the donor/acceptor energy alignment and blend morphology.



Enhanced hole transfer and suppressed charge recombination in the alloy ...



### Achieving over 18 % Efficiency Organic Solar Cell Enabled ...

Abstract: Although organic solar cells (OSCs) have delivered an impressive power conversion efficiency (PCE) of over 19 %, most of them demonstrated rather limited stability. So far, there ...

### Oligomer-Assisted Photoactive Layers Enable >18 ...

Graphical Abstract A new concept of oligomer-assisted high-performance organic solar cells (OSCs) was proposed. Developing the oligomer-assisted OSCs is a facile and general strategy with the ...



### Organic Solar Cells with 18% Efficiency Enabled by ...

Herein, a high-performance ternary solar cell with a power conversion efficiency of over 18% using a large-bandgap polymer donor, PM6, and a small-bandgap alloy acceptor containing two structurally ...



### [Achieving over 18 % Efficiency Organic Solar Cell](#)

...

A new hybrid electron-transport layer (ETL) ZnO/NMA was developed, when combined with D18 : N3, the highest power conversion efficiency (18.20 %) among inverted single-junction organic solar cells was achieved with an

...



### [18% efficiency organic solar cells, Science Bulletin](#)

A paper published in Science Bulletin reports the synthesis and characterization of high-performance organic solar cells with 18% power conversion efficiency. The paper provides the affiliations, abstract, and ...

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