

Can organic solar cells help us transition to a fossil-free energy supply?

Efficient and environmentally friendly solar cells are required for a transition to a fossil-free energy supply. Researchers at Linköping University have mapped how energy flows in organic solar cells, something that previously had been unknown. The results, which can contribute to more efficient solar cells, are published in Nature Communications.

Are translucent color organic solar cells based on nonfullerene acceptors?

Nature Communications 16, Article number: 597 (2025) Cite this article The artistic and scientific perspectives of the translucent color organic solar cells (OSCs), made with the emerging narrowband nonfullerene acceptors are explored.

Are organic solar cells sustainable?

Solar cells that are cheap and environmentally friendly to manufacture are needed to be successful. In addition, they need to be efficient at absorbing a large proportion of the sun's rays and converting to electrical energy. Organic solar cells based on organic semiconductors are increasingly emerging as a sustainable option.

What is the difference between organic and non-fullerene solar cells?

Footnote: The organic solar cells in the study are of a type where the electron acceptor is made of a material other than fullerene (a form of carbon), which previously was the most common material used. Non-fullerene-based organic cells become more stable and are capable of absorbing a greater proportion of the sun's rays for conversion to energy.

Are non-fullerene-based organic solar cells thermally stable?

Non-fullerene-based organic solar cells generally suffer from poor thermal stability and especially in case of devices with thick active layers. Here, the authors report hexanary blends based on multi-component acceptor mixtures with a device efficiency of 17.6% and thermal stability for 23 days at 130 °C.

Are organic solar cells better than solution-based solar cells?

In comparison, organic solar cells (OSCs) that use solution-based processing technologies are simpler and less expensive to make. The flexibility, color and semi-transparency features also add a decorative and esthetic dimension to the OSCs that can be blended seamlessly into the overall BIPV design.

Nature Communications - The use of harmful solvents to fabricate stable devices hampers the commercialization of perovskite solar cells. ... McMeekin, D. P. et al. A mixed-cation lead mixed-halide ...

a Current density vs. voltage (J-V) characteristics of WSe<sub>2</sub> solar cells under AM 1.5 G illumination, at

various incident power. Inset represents the circuit diagram of Au-WSe<sub>2</sub> and Gr-WSe<sub>2</sub> ...

Communications Chemistry - Chlorophyll derivatives can be applied in bio-solar cells, but their excited-state dynamics are not fully understood in this context. Here pump-probe time-resolved ...

Inorganic perovskite tandem solar cells using ligand evolution strategy achieve record efficiencies and durability, maintaining 80% of their initial efficiency under light/heat stresses, guiding ...

Nature Communications - Charged surface defects are expected to undermine the charge extraction in organic-inorganic perovskite solar cells. ... Luo, D. et al. Enhanced photovoltage for inverted ...

Controlling crystal growth alignment in low-dimensional perovskites (LDPs) for solar cells has been a persistent challenge, especially for low-n LDPs ( $n < 3$ ,  $n$  is the number of octahedral sheets ...

The power conversion efficiency (PCE) of single-junction solar cells is inherently limited by the principle of detailed balance. To surpass this constraint, a tandem cell architecture can be ...

Nature Communications - The energy disorders in the lateral direction of the junction in large-area photovoltaic modules are largely overlooked. Here, authors employ organic amidinium passivators ...

Prof. Zhao Dewei's team, from the College of Materials Science and Engineering at Sichuan University (SCU), collaborating with Prof. Wang Yang's team, from ...

Efficient and environmentally friendly solar cells are required for a transition to a fossil-free energy supply. Researchers at have now mapped how energy flows in organic solar ...

A multi-institute team led by Oxford has unravelled the factors enabling efficient charge-carrier transport in the light-harvesting materials for solar cells, in a work published in ...

In the quest for the perfect solar cell - efficient, thin, reliable and cheap - new Cornell research offers quantifiable insight into the complex chemistry of getting it just right.

Communications Chemistry - Antimony trisulfide is a promising light harvester for photovoltaics. ... in formamidinium-lead-halide-based perovskite layers for efficient solar cells. Science 356 ...

Nature Communications - The perovskite/electron transport layer interface in inverted solar cells suffers from severe nonradiative recombination losses. Here, authors employ amino acid salts to ...

Organic solar cells (OSC) are considered a promising low-cost and environmentally friendly solar technology, as it can be produced using low-cost printing methods and does not contain any toxic ...

Tunable optical and photovoltaic performance in PTB7-based colored semi-transparent organic solar cells integrated MgF<sub>2</sub>/WO<sub>3</sub> 1D-photonic crystals via advanced light ...

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