Fill factor of perovskite solar cells

How efficient are perovskite solar cells?
By incorporating this charge transport material into perovskite solar cells,we demonstrate 1-cm 2 cells with fill factors of >86%,and an average fill factor of 85.3%. We also report a certified steady-state efficiency of 22.6%for a 1-cm 2 cell (23.33% ± 0.58% from a reverse current-voltage scan).

Do perovskite solar cells have a low fill factor?
Tremendous efforts have been dedicated toward minimizing the open-circuit voltage deficits on perovskite solar cells (PSCs),and the fill factors are still relatively low. This hinders their furthe...

What are lead halide perovskite solar cells?
Lead halide perovskite solar cells (PSCs) have made unprecedented progress,exhibiting great potential for commercialization. Among them,inverted p-i-n PSCs provide outstanding compatibility with flexible substrates,more importantly,with silicon (Si) bottom devices for higher efficiency perovskite-Si tandem solar cells.

Who are the authors of in situ graded passivation in perovskite solar cells?
Kuo Su, Wentao Chen, Yuqiong Huang, Guang Yang, Keith Gregory Brooks, Bao Zhang, Yaqing Feng, Mohammad Khaja Nazeeruddin, Yi Zhang. In Situ Graded Passivation via Porphyrin Derivative with Enhanced Photovoltage and Fill Factor in Perovskite Solar Cells.

Can nitrogen-doped titanium oxide electron transport layers be used in perovskite solar cells?
Here we introduce a reverse-doping process to fabricate nitrogen-doped titanium oxide electron transport layers with outstanding charge transport performance. By incorporating this charge transport material into perovskite solar cells, we demonstrate 1-cm 2 cells with fill factors of >86%, and an average fill factor of 85.3%.

Can 3D nickel oxide scaffolds be used in perovskite solar cells?
3D nickel oxide scaffolds have been formed using chemical bath deposition. These scaffolds have been used as hole transport layers in perovskite solar cells. Fill factors of up to 85% and efficiencies of up to 16.7% have been achieved. Efficiencies with 15% improvement compared to conventional spray deposited NiO demonstrated.

Although rapid progress has been witnessed recently in regular perovskite solar cells (PSCs), one of the bottlenecks to delay their industrialization is the complicated and poor reproducible doping process of the widely used hole-transporting material (HTM) spiro-OMeTAD. To address this issue, herein, an unreported polymer, P25NH, has been synthesized and adopted as a dopant ...

The performance of a tandem solar cell depends on the performance of its constituting subcells. Although this

dependency is theoretically straightforward for open-circuit voltage (Voc) and short-circuit current, it is indirect for fill factor ...

As a result, a record-high fill factor of 83.96% and an ultra-high open-circuit voltage of 1.191 V for ?-phase CsPbI 3 perovskite solar cells are achieved simultaneously. This work provides a proficient methodology to manipulate the crystal lattice of inorganic perovskites toward high-performance photovoltaics.

Owing to rapid development in their efficiency 1 and stability 2, perovskite solar cells are at the forefront of emerging photovoltaic technologies.State-of-the-art cells exhibit voltage losses 3-8 approaching the theoretical minimum and near-unity internal quantum efficiency 9-13, but conversion efficiencies are limited by the fill factor (<83%, below the Shockley-Queisser limit of ...

Fill factor is a critical parameter for characterizing the performance of perovskite solar cells and is speculated to be closely related to the trap states, while the underlying correlation remains unclear. In this work, the effect of the energetic distribution of trap states in perovskite on the fill factor of the device is systemically investigated. . Perovskite ...

Efficient perovskite solar cells enabled by ion-modulated grain boundary passivation with a fill factor exceeding 84% ... leading to a boosted efficiency of 21.01% with a high fill factor of 84%. This performance is among the best ...

Multifunctional chemical anchors achieve a boosted fill factor and mitigate ion migration of high-stability perovskite solar cells ... with an improved fill factor (FF) from 70.54% to 80.40%, and improved ambient stability of the unencapsulated device. This study may probe research insight into the design of passivators with synergistic effects ...

Lead halide perovskite solar cells (PSCs) have made unprecedented progress, exhibiting great potential for commercialization. Among them, inverted p-i-n PSCs provide outstanding compatibility with flexible ...

High bandgap perovskite solar cells are integral to perovskite-based multi-junction tandem solar cells with efficiency potentials over 40%. However, at present, high bandgap perovskite devices ... Expand

Tremendous efforts have been dedicated toward minimizing the open-circuit voltage deficits on perovskite solar cells (PSCs), and the fill factors are still relatively low. ...

This strategy results in reduced nonradiative recombination and residual stress, culminating in perovskite solar cells (PSCs) achieving a champion power conversion efficiency (PCE) of 23.73 % and a remarkable fill factor of 83.64 %.

In this work, we studied charge extraction and recombination in efficient triple cation perovskite solar cells with undoped organic electron/hole transport layers (ETL/HTL). Using integral time of flight we identify the

transit ...

The efficiency and stability of perovskite solar cells (PSCs) can be greatly affected by various factors such as passivating the perovskite film, oxidizing the hole-transport material of 2,2?,7,7?-tetras(N,N-p-methoxyaniline)-9,9?-spirodifluorene (Spiro-OMeTAD), and inhibiting the iodide migration.Here we introduce a multifunctional starch-iodine complex in the ...

We analyze practical fill factor limits across various bandgaps for single-junction perovskite solar cells, focusing on the impact of bulk charge carrier lifetime, surface recombination, and charge transport layer-induced contact resistance.

The utilization of the sol-gel method for fabricating planar SnO2 as the electron transport layer (ETL) induces numerous defects on the SnO2 layer surface and perovskite film bottom, causing considerable ...

Here we introduce a multifunctional starch-iodine complex in the perovskite film to enhance the fill factor and stability of PSCs. Results demonstrate that the starch-iodine ...

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