

Are perovskite-silicon tandem solar cells efficient?

In a new scientific paper, researchers from the King Abdullah University of Science and Technology (KAUST) in Saudi Arabia presented the 33.7%-efficient perovskite-silicon tandem solar cell announced in May last year.

How efficient is a perovskite-silicon triple-junction solar cell?

In January, KAUST announced it fabricated a perovskite-perovskite-silicon triple-junction solar cell with a power conversion efficiency of 26.4%. In May 2023, it achieved an efficiency of 33.7% for a perovskite-silicon tandem solar cell.

Are metal halide perovskite solar cells a promising candidate for next-generation photovoltaic technology?

Research Details Metal halide perovskite solar cells (PSCs) have attracted significant research attention in the past years and are regarded as a promising candidate for next-generation photovoltaic technology.

Who makes perovskite solar cells?

The pilot factory is owned by Oxford PV--a spinout from the University of Oxford, in England--which since 2012 has worked on commercializing solar cells made from a type of crystal known as a perovskite. The first perovskite solar cells were announced just 10 years ago, by the research team of Tsutomu Miyasaka at Tohoku University, in Yokohama, Japan.

What is the market for perovskite solar cells?

The market for perovskite solar cells is prominent in the North American region, with significant contributions from the United States and Canada. This region focuses strongly on renewable energy sources, making it an ideal market for perovskite solar cells.

Are tandem solar cells a viable alternative to crystalline solar cells?

Tandem solar cells combining silicon and perovskite sub-cells are widely regarded as a promising, high performing and viable alternative to conventional crystalline solar cells, and King Abdullah University of Science and Technology (KAUST) is leading the charge.

In the realm of renewable energy, researchers at King Abdullah University of Science and Technology (KAUST), located in Saudi Arabia, have unveiled a pioneering strategy for enhancing the efficiency and stability of ...

Grain-free single-crystal perovskites offer a potential avenue to the stability of advanced perovskite solar cells (PSCs) beyond that of polycrystalline films. Recent progress in single-crystal PSCs (SC-PSCs) has come primarily from methylammonium (MA)-containing (e.g.,  $\text{FA}_{0.6}\text{MA}_{0.4}\text{PbI}_3$ ) perovskite devices, which have achieved a 23.1% power conversion ...

Perovskite Solar Cells toward Eco-Friendly Printing Research (Wash D C). 2021 Feb 16; 2021: ... KAUST Solar Center (KSC) and Physical Science and Engineering Division (PSE), Thuwal 23955-6900, Saudi Arabia. 3 Cornell High Energy Synchrotron Source, Cornell University, Ithaca, NY 14850, USA.

The addition of carbazole molecules in bulk perovskite layers effectively suppressed the phase segregation. Monolithic perovskite/silicon solar cells were fabricated from a textured silicon heterojunction solar cell. A stabilized PCE of 28.6% (independently certified at 28.2%) was achieved over  $\sim 1$  cm<sup>2</sup> and 27.1% over 3.8 cm<sup>2</sup>. The long-term stability tests ...

Scientists at King Abdullah University of Science and Technology (KAUST) have unveiled a roadmap for bringing perovskite/silicon tandem solar cells to market, paving the way for a future powered by abundant, inexpensive clean energy in Saudi Arabia and the world. The authors of the article, published in esteemed journal Science, include professor Stefaan De ...

(KAUST) and Technology Solar Center. The team is working on improving solar efficiency to meet Saudi Arabia" solar targets. Perovskite/silicon tandem technology combines the strengths of two materials--perovskite"s efficient light absorption and silicon"s long-term stability--to achieve record-breaking efficiency. In 2023, the De Wolf

As reported by Lehr et al., to maximize the energy yield of bifacial perovskite/silicon tandem solar cells with albedo values of practical relevance, narrower band-gap ( $< 1.60$  eV) perovskite compositions are required. 22, 23, ...

Researchers at Saudi Arabia"s King Abdullah University of Science and Technology (KAUST) have developed a perovskite/silicon tandem solar cell with the world"s highest power conversion efficiency (PCE) of 33.2%, according to an announcement on Monday.

Vapor-phase deposition dominates industry-scale thin-film manufacturing but remains less prevalent in halide perovskite photovoltaic research compared with solution-based processes. The challenges in vapor-phase processing of halide perovskites lie in the varying volatility of the precursors, necessitating the use of different sublimation sources to evaporate ...

Since 2009, perovskite solar cell efficiency has risen from 3.8% to 23.3% in 2018 amongst intense interest from many research groups globally. Perovskite photovoltaics show great promise for the future given their use of low-cost, earth-abundant materials and simple processing techniques.

Researchers led by Saudi Arabia"s King Abdullah University of Science and Technology (KAUST) have demonstrated a tandem cell based on an n-i-p perovskite stacked on top of a silicon heterojunction cell that achieved 27% efficiency, breaking the previous record of 22%. Monolithic perovskite/silicon tandem solar cells are currently of interest thanks to their ...

The team's research focus on ways to improve solar efficiency and meet Saudi Arabia's solar targets. Perovskite/silicon tandem technology combines the strengths of two materials - perovskite's efficient light absorption and silicon's long-term stability - to achieve record-breaking efficiency.

A Saudi-Chinese research team has fabricated a perovskite-silicon tandem solar cell without a hole transport layer (HTL) in the perovskite top cell. This innovative strategy, based on the co-deposition of copper(I) thiocyanate and perovskite in the top cell absorber, was intended at solving typical issues of HTLs in tandem devices.

In this work, we explore the underlying reasons for scaling losses of perovskite solar cells, especially for the p-i-n configuration, and have successfully reduced this scaling loss to ~0.9%. With a comprehensive understanding of the ...

The environmental benefits of Saudi Arabia's push for solar energy are significant. ... multiple world records of a new and promising technology called silicon-perovskite tandem solar cells ...

In this work, we explore the underlying reasons for scaling losses of perovskite solar cells, especially for the p-i-n configuration, and have successfully reduced this scaling loss to ~0.9%. With a comprehensive understanding of the underlying mechanisms, high-quality PSCs with a PCE of 20.3% for 2 cm<sup>2</sup> devices and 19.8% for 6.8 cm<sup>2</sup> mini ...

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