

# Breakthrough in Photovoltaic Silicon Technology



## Overview

In a blog post entitled “ Changing the rules: UNSW breakthrough opens door to silicon cells beyond 30% efficiency with singlet fission,” the Australian Center for Advanced Photovoltaics said, “A team from UNSW Sydney has published a major advance that could unlock a new generation. In a blog post entitled “ Changing the rules: UNSW breakthrough opens door to silicon cells beyond 30% efficiency with singlet fission,” the Australian Center for Advanced Photovoltaics said, “A team from UNSW Sydney has published a major advance that could unlock a new generation. Support CleanTechnica's work through a Substack subscription or on Stripe. Beyond Silicon, Caelux, First Solar, Hanwha Q Cells, Oxford PV, Swift Solar, Tandem PV 3 to 5 years In November 2023, a buzzy solar technology broke yet another world. Researchers from the University of New South Wales (UNSW) Sydney have developed a solar cell technology that could lead to higher-efficiency silicon photovoltaics. The team has devised a new method with the potential to increase solar panel efficiency to over 30%, a notable improvement on the. University of New South Wales researchers have filed patent protection and are working to scale production of a new class of photostable organic molecules proven to boost silicon solar cell efficiency, reduce heat and extend panel lifetimes using singlet fission. The use of singlet fission. On November 10, 2025, Nature online published significant progress in silicon-based tandem solar cell research by a team jointly formed by LONGi, Soochow University, Xi'an Jiaotong University, and other institutions. Recent solar efficiency advancements have achieved conversion rates exceeding 47% in multi-junction cells, marking a.

## Article Content

### Balancing Cost and ROI in Semi-Transparent Photovoltaic Glazing

The technology landscape began shifting in the 2010s with advances in crystalline silicon cell processing, organic photovoltaics, and perovskite materials. These developments enabled

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### Silicon solar cells with hybrid back contacts

Silicon solar cells are essential for sustainable energy but remain limited by efficiency losses, particularly in the fill factor 1, 2, 3. Here we develop a hybrid interdigitated back-contact...

### Taiwan's perovskite solar industry seeks breakthrough in global market

Lai-chu Chen, Chairman of Taiwan Perovskite Research and Industry Alliance (TPRIA), highlighted the growing global interest in perovskite solar technology.

### UNSW Researchers Claim Solar Cell Breakthrough

In a blog post entitled “ Changing the rules: UNSW breakthrough opens door to silicon cells beyond 30% efficiency with singlet fission,” the Australian Center for Advanced Photovoltaics

### Breakthrough Solar PV Technologies That Are

These developments, coupled with emerging perovskite-silicon tandem technologies and advanced manufacturing processes, are rapidly

### Perovskite-Silicon Tandem Solar Cells Achieve Record

Perovskite silicon tandem solar cells combine a perovskite top cell with a silicon bottom cell. This pairing represents the next major step forward in

### Super-efficient solar cells: 10 Breakthrough

Super-efficient solar cells: 10 Breakthrough Technologies 2024 Solar cells that combine traditional silicon with cutting-edge perovskites could push

### Perovskite: The "wonder material" that could transform

The technology combines silicon, the material currently used in solar photovoltaics (PV) in panels across the world, with perovskite materials to

### Flying butterflies could power the future — Australia's

By copying the microscopic nanostructure on the Blue Morpho Didius butterfly's wings, it became clear to the scientists that this arrangement could be

Breakthrough solar tech could power next-gen panels

Researchers from the University of New South Wales (UNSW) Sydney have developed a solar cell technology that could lead to higher

Flexible Silicon Photovoltaics: A Breakthrough in Space

In-space manufacturing is expected to become a core part of future space economy by using assets in orbits or beyond Earth orbit for use in space.

State-of-play of contending silicon photovoltaic technologies

This paper gives an overview of past research and discusses the strengths and weaknesses of these competing technologies, along with what the future might look like for silicon

Atomic Layer Deposition For Photovoltaics: Light Absorption

Atomic Layer Deposition (ALD) has emerged as a transformative technology in the photovoltaic industry, representing a paradigm shift from traditional thin-film deposition methods. This

Photovoltaic Technologies at ICEMD 2026: Next-Gen Solar Energy ...

Photovoltaic Technologies at ICEMD 2026: Advancing solar energy is central to achieving a sustainable and low-carbon future. At the International Conference on Energy Materials & Devices (ICEMD ...

Researchers improve efficiency of next-generation solar

MIT researchers have devised a design for perovskite solar cells that pushes the material to match or exceed the efficiency of today's typical

Coherent to Unveil Breakthrough AI-Scale Optical Innovations and ...

Coherent will unveil AI-scale optical innovations at OFC 2026, showcasing technologies that advance bandwidth, scalability, and energy efficiency.

The stability turn in perovskite photovoltaics

Perovskite solar cells have emerged as one of the most exciting photovoltaic technologies, offering a unique combination of high efficiency and low-cost solution processability.

Advancements in photovoltaic technology: A comprehensive review of ...

This review provides a comprehensive analysis of recent advancements in PV technology and presents forward-looking insights into future trends. Beginning with a historical overview and the

## UNSW Researchers Claim Solar Cell Breakthrough

In contrast, singlet fission on silicon solar cells can be built upon silicon technologies with minimal changes to the silicon architecture. The commercial implications are far reaching.

## MIT Researchers Make Discovery in Solar Cell Technology for

MIT researchers have reported a solar cell technology discovery that could help push photovoltaic systems beyond current limits in performance, resilience, and affordability. As demand

31.25% efficiency breakthrough in photovoltaic

Scientists from EPFL's Photovoltaics and Thin Film Electronics Laboratory (PV-Lab) and CSEM have made remarkable progress in the

## Most Efficient Solar Panels 2025: Complete Guide

Conclusion The most efficient solar panels in 2025 represent a remarkable achievement in photovoltaic technology, with leading models

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Tongwei Co Ltd stock (CNE1000019K1): Solar presence amid LONGi ...

Tongwei Co Ltd: core business model Tongwei Co Ltd specializes in the solar photovoltaic supply chain, focusing on high-purity polysilicon production, silicon wafers, and solar cells and modules.

Pathways toward commercial perovskite/silicon tandem

To overcome these limitations and harness the full potential of photovoltaics, perovskite/silicon dual-junction tandem solar cells have emerged as a promising

Singlet fission research breakthrough unlocks high

University of New South Wales researchers have filed patent protection and are working to scale production of a new class of photostable

Nature Consecutively Publishes LONGi's Breakthroughs in HIBC and ...

On November 10, 2025, Nature online published significant progress in silicon-based tandem solar cell research by a team jointly formed by

Emerging innovations in solar photovoltaic (PV) technologies: The ...

Solar photovoltaic (PV) technology has made significant strides since its inception, primarily by developing conventional silicon-based solar cells. However, ongoing research and

## Super-efficient solar cells: 10 Breakthrough

Solar cells that combine traditional silicon with cutting-edge perovskites could push the efficiency of solar panels to new heights.

Solar energy breakthrough could reduce need for solar

Scientists at Oxford University Physics Department have developed a revolutionary approach which could generate increasing amounts of solar

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