# Kaust photovoltaics

A team of researchers at the King Abdullah University of Science and Technology (KAUST) has revealed the details of the 33.7%-efficient perovskite-silicon tandem solar cell ...

The origins of parasitic heating for photovoltaic (PV) technologies based on silicon, perovskites, and their combination in monolithic tandems are investigated. To quantify heating losses, the cooling score (CS) as a new simple metric, representing the percentage of incident solar irradiance not contributing to module heating is introduced.

note = "KAUST Repository Item: Exported on 2020-10-01 Acknowledged KAUST grant number(s): KUS-C1-015-21 Acknowledgements: We would like to acknowledge the Nanoflex Power Corporation and the Center for Advanced Molecular Photovoltaics (CAMP) (KUS-C1-015-21) of the King Abdullah University of Science and Technology (KAUST) for financial support of this ...

The triple-junction solar cell is based on a 15.0%-efficient top perovskite solar cell modified with potassium thiocyanate (KSCN) and methylammonium iodide (MAI). According to its creators, the ...

Finally, in the area of integrated photovoltaics -- where photovoltaics are incorporated into the building envelope -- Sargent believes KAUST scientists will also contribute. "To be accepted, integrated photovoltaic needs to take account of design principles, being able to make conformable technologies and being able to control the color of ...

In the last week of February KAUST hosted some of the most cutting-edge researchers in the area of photovoltaics at the annual KAUST Solar Energy research conference. The conference theme, Synergistic Approaches in ...

Monolithic Perovskite/Silicon Tandem Photovoltaics with Minimized Cell-to-Module Losses by Refractive-Index Engineering. by Lujia Xu, Jiang Liu, Francesco Toniolo, Michele De Bastiani, Maxime ... "KAUST shall be a beacon for peace, hope and reconciliation, and shall serve the people of the Kingdom and the world." King Abdullah bin Abdulaziz Al ...

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 ...

In December 2021, KAUST researchers achieved a power conversion efficiency of 28.2% for a tandem solar cell with an area of around 1 cm2, based on an n-i-p perovskite ...

KAUST S olar Center"s mission is to create new science and technology in the field of solar energy conversion, providing an environment for interdisciplinary research, training and innovation. The current

expertise in the Center is centered on photovoltaic applications based on organic, hybrid and perovskite materials.

Perovskite/silicon tandem solar cells offer a promising route to increase the power conversion efficiency of crystalline silicon (c-Si) solar cells beyond the theoretical single-junction limitations at an affordable cost. In the past decade, progress has been made toward the fabrication of highly efficient laboratory-scale tandems through a range of vacuum- and solution-based perovskite ...

TY - JOUR. T1 - Organic photovoltaics. AU - Kippelen, Bernard. AU - Brédas, Jean Luc. PY - 2009. Y1 - 2009. N2 - Organic photovoltaics, the technology to convert sun light into electricity by employing thin films of organic semiconductors, has been the subject of active research over the past 20 years and has received increased interest in recent years by the industrial sector.

KAUST researchers have found that light causes small, rapid distortions in perovskite crystals that affect how its charge carriers behave. Skip to main content. ... A shade closer to more efficient organic photovoltaics. Material Science and Engineering. 26 Mar 2024. A tandem approach for better solar cells. Material Science and Engineering.

KAUST Repository Item: Exported on 2023-07-13 Acknowledged KAUST grant number(s): CRG2019-4093, IED OSR-2019-4208, IED OSR-2019-4580, OSR-2021-4833, OSR-CARF/CCF-3079, OSR-CRG2020-4350 ... The origins of parasitic heating for photovoltaic (PV) technologies based on silicon, perovskites, and their combination in monolithic tandems are ...

Organic photovoltaics (OPVs) are one of the greenest solar cell technologies, contributing as little as three grams of CO 2 equivalent carbon emissions per KW of energy. "However, their fabrication still relies on halogenated solvents that, on top of being linked to reproductive hazards and cancer, are derived from petrochemical processes ...

Professor Stefaan De Wolf and the KAUST Photovoltaics Laboratory have written in Science a roadmap for bringing perovskite/silicon tandem solar cells to market, paving the ...

support@kaust .sa +966 (12) 808-3463. ... We model the energy efficiency of green roofs and walls, investigate rooftop and building-integrated photovoltaic systems, and explore advanced thermal management for photovoltaics. Additionally, we examine solar-driven desalination as a cross-project with the Hydrological Cycle pillar.

Photovoltaics is projected to play a key role in averting the anticipated catastrophic effects of climate change thanks to its cost competitiveness, continued technological advancements, and the abundance of solar energy. ... KAUST Solar Center (KSC), Physical Sciences and Engineering Division (PSE), King Abdullah University of Science and ...

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KAUST"s Stefaan De Wolf believes there is a great opportunity for cheap and abundant photovoltaics and other renewable sources of energy, such as wind, to electrify the country"s energy sector. "There are huge opportunities ...

The KAUST Photovoltaics (KPV) Lab, led by Prof. Stefaan De Wolf, which is part of the KAUST Solar Center (KSC), is dedicated to the development of high-efficiency silicon-based solar cells, using SHJ solar cells as a core technology, and to tailoring such solar cells specifically for use in hot and sunny climates.

The origins of parasitic heating for photovoltaic (PV) technologies based on silicon, perovskites, and their combination in monolithic tandems are investigated. To quantify heating losses, the cooling score (CS) as a new simple metric, ...

The energetics of organic semiconductors play a significant role on determining several factors for device operation. For instance, open circuit voltage of an organic photovoltaic is determined by the energetic difference between ionization potential and electron affinity of donor and acceptor molecules. However, the way that we determine such energy levels vary depending on the ...

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 ...

Professor Stefaan De Wolf and the KAUST Photovoltaics Laboratory have written in Science 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.

KAUST Workshop: Photovoltaic Innovation in Saudi Arabia: Achieving the Goals of the Kingdom"s Vision 2030. April 22-24, 2024, KAUST Auditorium Between Buildings 4& 5 ... in Tsukuba, Japan. In 2008, he assumed the role of a team leader at the Photovoltaics and Thin-Film Electronics Laboratory at Ecole Polytechnique Federale de Lausanne (EPFL) in ...

Researchers in the KAUST Photovoltaics Laboratory of the KAUST Solar Center have produced a perovskite/silicon tandem solar cell with a power conversion efficiency (PCE) of 33.2% -- the highest tandem device efficiency in the world to date, surpassing that of Helmholtz Zentrum Berlin"s (HZB) record at 32.5% PCE.

abstract = "Perovskite solar cells have demonstrated the efficiencies needed for technoeconomic competitiveness. With respect to the demanding stability requirements of photovoltaics, many techniques have been used to increase the stability of perovskite solar cells, and tremendous improvements have been made

over the course of a decade of research.

Researchers from Saudi Arabia"s King Abdullah University of Science and Technology (KAUST) investigated the commercial prospects of perovskite-silicon tandem PV technologies and found that, in ...

Efficient coupling adds an extra level to photovoltaics. ... The KAUST-led team"s solution to this was to use an ultrathin film of amorphous indium zinc oxide as their interconnecting layer. They were able to show that this provided a higher density and homogeneity of anchor points for the self-assembled monolayer. Yildirim explains that ...

This Review discusses these aspects in view of contemporary solar cell manufacturing, offers insights into the possible pathways toward commercial perovskite/silicon tandem photovoltaics, and highlights research opportunities to realize this goal.