Solar Cell Knowledge Summary Report

What is the solar cells Reporting Summary?
Originally, the Solar Cells Reporting Summary was intended for editors and peer reviewers to ensure that manuscripts meet the assessment and reporting standards expected by the community. However, a few years later, we started publishing the document alongside the paper.

Are experimental details included in the solar cells Reporting Summary?
To improve the usefulness of the Solar Cells Reporting Summary as a standalone report,we now ask authors of relevant manuscripts to include experimental details in the Summary,and we have updated some of the requested information.

Why do we need a solar cell summary?
We and other editors across the Nature Portfolio believe that this is more useful to both reviewers and readers: it not only ensures transparency in reporting the results, but also allows a quick assessment of the solar cell data presented in a study, avoiding the need to go back and forth between the Summary and the main files.

Do we need to report the area of solar cells?
In particular,we now ask authorsnot only to report the area of the tested solar cells but also to indicate the type of area calculated,for example,total area,aperture area,active area.

Does Assembly control film forming kinetics for large-area solar cells?
The film-forming kinetics for large-area devices remains unclearfor organic solar cells. Here,the authors propose assembly-controlled kinetics with the assembly determined by molecular configuration and tuned via external effects,contributing to the screening of device fabrication conditions.

Can spectroscopy detect trapped carriers in working perovskite solar cells?
Conventional spectroscopic techniques are not sufficiently selectiveto follow the dynamics of trapped carriers in working perovskite solar cells. Here,authors use infrared optical activation spectroscopy to observe real time evolution of trapped carriers and compare the behaviour of trapped holes.

This form is intended for publication with all accepted papers reporting the characterization of photovoltaic devices and provides structure for consistency and transparency in reporting. ...

Lee et al. show that applying a microscale inverted-pyramidal-structured polydimethylsiloxane (MIPS-PDMS) film to selected areas of transparent crystalline silicon solar cells enhances light absorption, mitigates angle-dependent efficiency reduction, and reduces the temperature increase of the device. These improvements are attributed to the wide-angle anti ...

1. Solar Cells Reporting Summary. Nature Research. https:// 2. Reese et. al. Reliably ...

Summary <p>Photovoltaic systems convert the sun"s energy directly into electricity through the application of semiconductor materials that utilize the so& #x2010;called photovoltaic effect or photovoltaic phenomenon. The discovery of silicon (Si) p& #x2013;n junction in the 1950s offered a significant boost to the development of solar cells as these p& #x2013;n junction structures ...

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Understanding Defects in Perovskite Solar Cells through Computation: Current Knowledge and Future Challenge. Zhendong Guo, Zhendong Guo. Department of Applied Physics, Nanjing University of Science ...

Tang et al. report a 23.6% gas-quenched perovskite solar cell by incorporating potassium iodide (KI) in the precursor and applying n-hexylammonium bromide (HABr) to the surface. KI induces a spatial-compositional change, improving grain boundary properties. KI and HABr reduce traps close to the mid-gap, and HABr greatly improves the built-in potential of the ...

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The National Renewable Energy Laboratory (NREL) has created a new high-efficiency Silicon-Perovskite cell by placing perovskites on top of a silicon solar cell to form a multijunction cell that boosts the efficiency to 27% compared to 21% silicon cells. Nonetheless, NREL also sought to extend the durability of Perovskite solar cells by altering their chemical properties to hinder ...

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Gao et al. report that the addition of molecular engineered multi-functional ionic liquid into perovskite layer affords high-quality perovskite solar cells with long-term stability and >21% power-conversion efficiency. The unencapsulated devices retain >95% of their original efficiency after 1,000 hours of aging.

Consolidated tables showing an extensive listing of the highest independently confirmed efficiencies for solar cells and modules are presented. Guidelines for inclusion of ...

Organic solar cells are layered structures consisting of an organic photoactive layer sandwiched between two opposite electrodes. The most efficient perovskite solar cells are the mesoscopic ones as they allow larger portion of the incident light to be absorbed while also exhibiting a high surface area between the perovskite absorber and the bottom electron ...

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1. Solar Cells Reporting Summary. Nature Research. https:// 2. Reese et. al. Reliably Measuring the Performance of Emerging Photovoltaic Solar Cells. Nanostructured Materials for Type III Photovoltaics, 1-32 (2017). 3. Wang et. al. Reliable Measurement of Perovskite Solar ...

In this report we summarize and update the results of a study project on the environmental aspects of photovoltaic solar cell technology. Four major types of solar cell modules, based on respectively multicrystalline silicon, amorphous silicon, cadmium telluride and copper indium

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