Recent advances in perovskite solar cells at LPI

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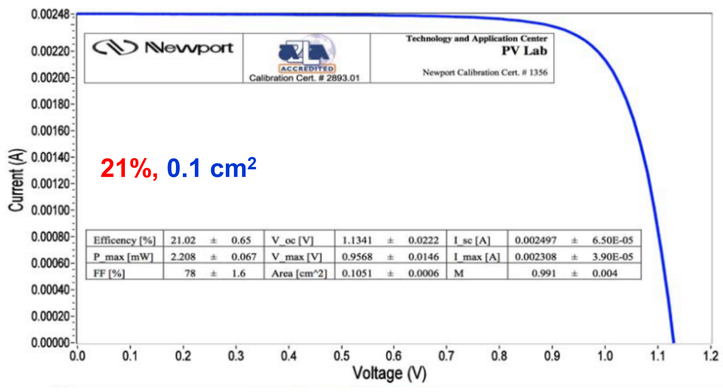
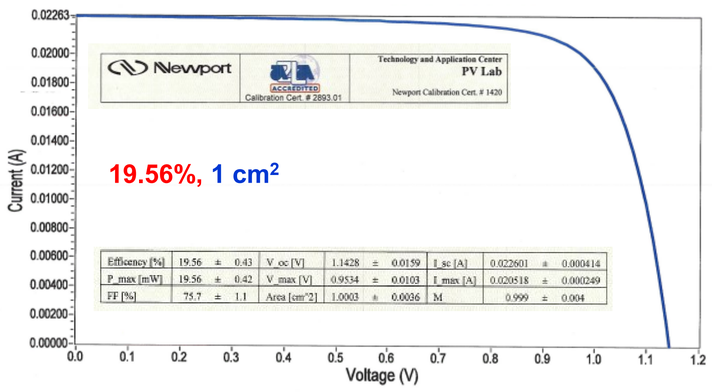
Introduction

Perovskite solar cells have caught enormous attention in photovoltaic field due to their facile preparation method and high conversion efficiency. However, to reach the final commercialization, their efficiency and stability still need significant improvement. Furthermore, the process has to be compatible with large scale production. This poster summarizes the recent advances in perovskite solar cells at the Laboratory of Photonics and Interfaces.

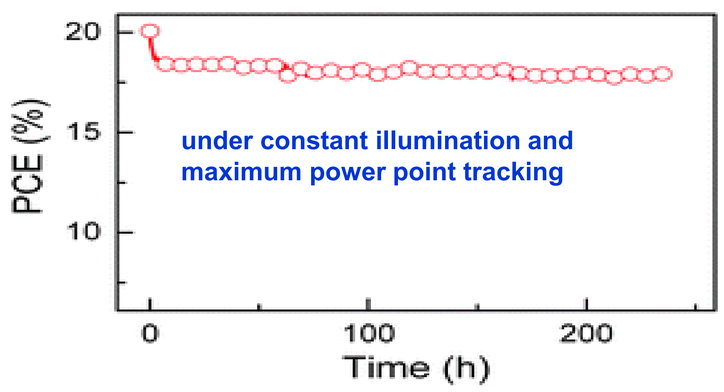
Higher efficiency



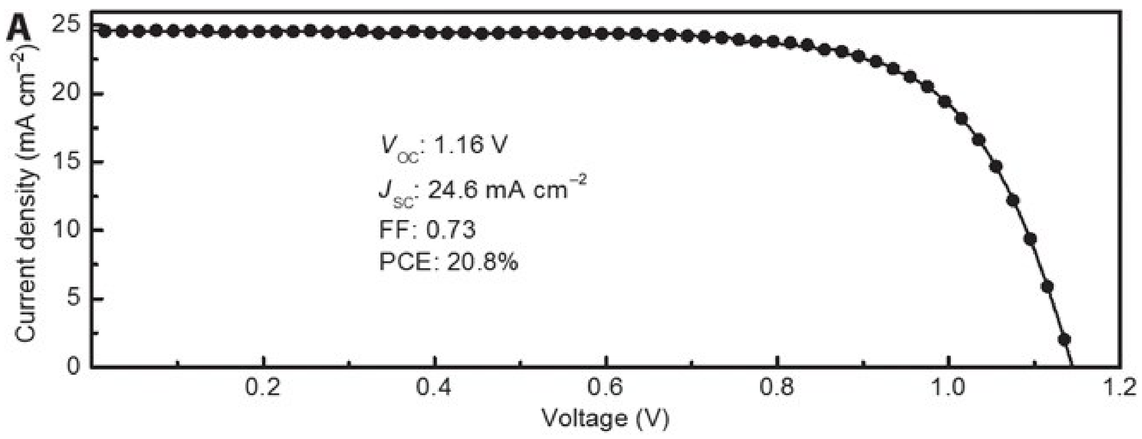
Larger area



Better stability

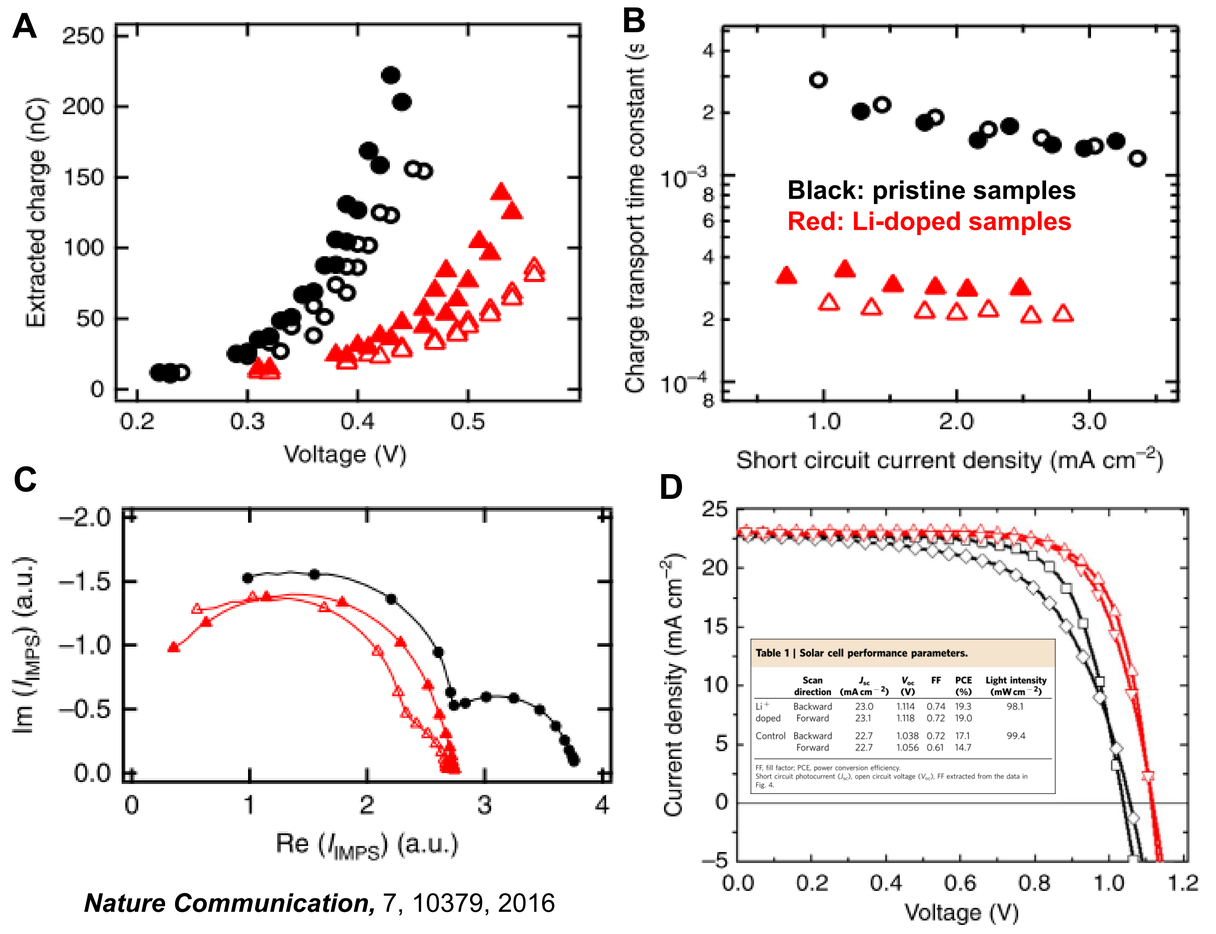


PbI_2–enriched mixed-cation mixed-halide perovskite solar cells



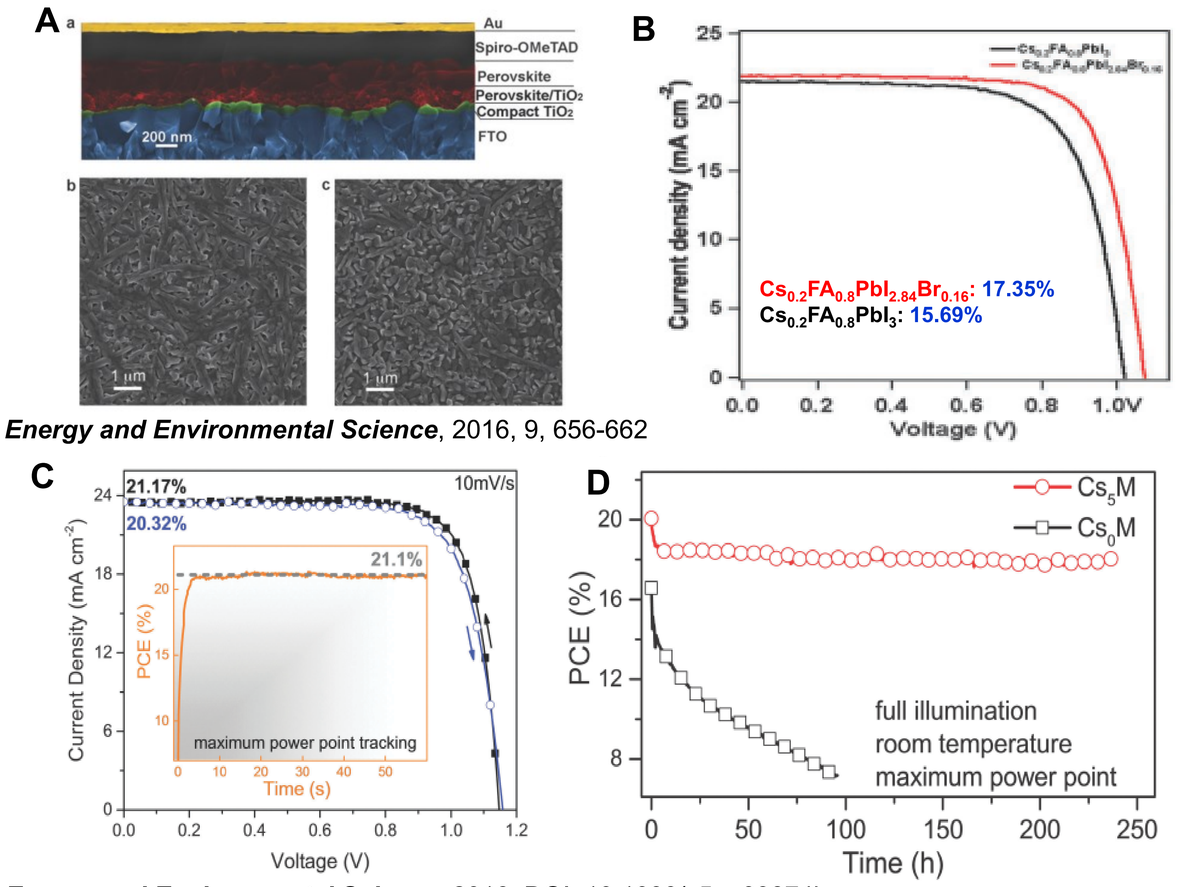
Science Advances, 2016, 2, e1501170

Enhanced electronic properties in mesoporous TiO_2 via lithium doping



Nature Communication, 7, 10379, 2016

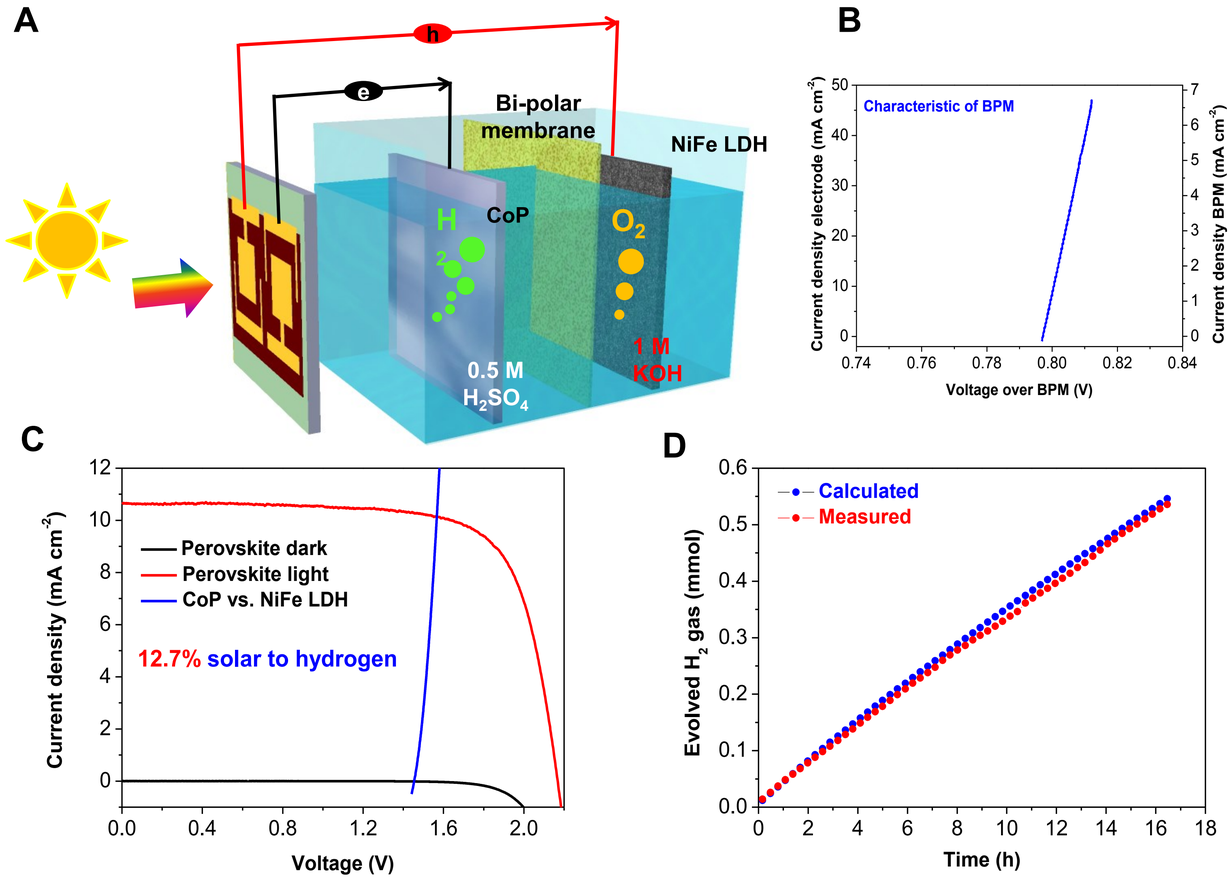
Cesium-containing mixed-cation mixed-halide perovskite solar cells



Energy and Environmental Science, 2016, 9, 656-662

Energy and Environmental Science, 2016, DOI: 10.1039/c5ee03874j

Bipolar membrane-assisted solar water splitting in optimal pH



Advanced Energy Materials, 2016, DOI:10.1002/aenm.201600100 in press

Outlook

The above achievements are obtained on conventional structure perovskite solar cells. The future focus is to transform the knowledge and skills to tandem devices with Si or CIGS as the bottom absorbers.

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Synergy
Realizing photovoltaic energy harvesting systems based on tandem solar cells with efficiency beyond that achievable with state-of-the-art industrial single-junction cells

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