**Efficient Perovskite-Perovskite Tandem Solar Cells**

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**Abstract**

Power conversion efficiency (PCE) of single-junction perovskite solar cells has been boosted largely to certified 25.2% in the past few years. Tandem configuration has been proven to be a promising approach to break the single-junction Shockley-Queisser radiative efficiency. Perovskite-perovskite (all-perovskite) tandem cells are particularly attractive due to the low-temperature process of all components and potentially low fabrication cost. Here, we have developed reproducible processes to fabricate efficient mixed tin-lead iodide low-bandgap (~1.25 eV) perovskite and lead mixed iodide and bromide wide-bandgap perovskite solar cells, enabling us to fabricate efficient all-perovskite tandem solar cells. When mechanically stacking a semitransparent perovskite top cell and a ~1.25 eV bandgap perovskite bottom cell, our best 4-terminal all-perovskite tandem solar cells show PCEs of 25.0%. By carefully optimizing the novel interconnecting layers, we have already obtained efficient 2-terminal all-perovskite monolithic tandem solar cells with over 23%-efficiency. Our results offer the great potential of low-cost all-perovskite tandem solar cells for achieving ultra-high efficiencies.

Reference

Reference:

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**Biography**

Dewei Zhao received his Ph.D. degree from Nanyang Technological University, Singapore. From 2012–2018, he worked as a Postdoc Associate at University of Michigan and University of Florida and a Research Assistant Professor at The University of Toledo. Currently, he has been a professor in Institute of Solar Energy Materials and Devices, College of Materials Science and Engineering at Sichuan University, China. He has been awarded “Chinese Government Award for Outstanding Self-Finance Students Abroad” (2011, China), and “Green Talents Competition 2010” (BMBF, Germany). He has contributed over 100 publications in journals of Nat. Energy (2), Science (3), Adv. Mater. (2), Adv. Energy Mater. (3), etc. He has also been serving as referee in journals of Nat. Energy, Energy & Environ. Sci., Adv. Mater., J. Am. Chem. Soc., etc. His recent research interest focuses on organic/inorganic hybrid optoelectronic devices and characterizations, such as thin-film solar cells, light-emitting diodes, and photodetectors.