Enhanced the Open-circuit Voltage for Tin-based Perovskite Solar Cells by Introducing a New Electron Transporting Layer

이명정, 정인†
서울대학교
(inchung@snu.ac.kr†)

Tin-based halide perovskite materials are considered to have great potential as superior light-absorbing materials for high-performance solar cells due to their absorption edges lying in the near-infrared region, low exciton binding energies and high charge mobilities. However, photovoltaics based on these materials show poor open-circuit voltages (V_{OC}) to date, mainly resulting from mismatched energy levels between a tin-based perovskite layer and electron transporting layers (ETLs). In this presentation, we show an enhanced V_{OC} of tin-based perovskite solar cells by adopt a new ETL. We analyzed the energy levels of a tin-based absorber layer and various transporting layers, and found a new ETL with the energy levels most suitable for a tin-based absorber layer. As a result, our tin-based perovskite solar cells achieve a power conversion efficiency of 7.05 % with the significantly large V_{OC} of 0.65 V. Our research emphasizes the importance of structural design of tin-based perovskite solar cells based on the energy levels of device components.