

## Highly Efficient Hysteresis-less Perovskite Solar Cells

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Since Kojima et al. reported perovskite-sensitized solar cells intensive studies have been done to develop efficient solid-state perovskite hybrid solar cells because of their unique properties such as high absorptivity due to direct bandgap, high open circuit voltage by small exciton binding energy, high efficiency due to long charge carriers' diffusion length, and convenient bandgap tailoring by compositional engineering. However, the perovskite hybrid solar cells often exhibited great current density-voltage (J-V) hysteresis with respect to the scan direction and scan rate. The correct efficiency of perovskite hybrid solar cells should be carefully determined when measuring it with solar simulator. The origin of J-V hysteresis of perovskite hybrid solar cells is not clearly elucidated and the ferroelectricity, ionic motion, and traps are considered as a potential reason. Here, we systematically conducted experiment to understand the origin of J-V hysteresis in terms of traps and would like to discuss it with you.