

Accepted Manuscript

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PII: S2095-9273(18)30194-4
DOI: <https://doi.org/10.1016/j.scib.2018.05.003>
Reference: SCIB 394

To appear in: *Science Bulletin*



Please cite this article as: P. Wang, Q. Jiang, Y. Zhao, Y. Chen, Z. Chu, X. Zhang, Y. Zhou, J. You, Synergistic improvement of perovskite film quality for efficient solar cells via multiple chloride salt additives, *Science Bulletin* (2018), doi: <https://doi.org/10.1016/j.scib.2018.05.003>

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Synergistic improvement of perovskite film quality for efficient solar cells via multiple chloride salt additives

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Abstract: Perovskite crystal film quality is critical for obtaining efficient perovskite solar cells. Anti-solvent processing was used for fast crystallization of perovskite precursor film, which can form dense perovskite film. While the crystals from this method are usually small due to the fast crystal growth process, which could lead to grain boundary recombination. Here, element chloride was introduced to enhance the perovskite layer crystallinity via slowing down the perovskite crystallization process by simultaneous introduction of methylammonium chloride (MACl) and cesium chloride (CsCl) into precursor solution. As a result, we achieved high quality of pin-hole free perovskite film with large crystal size. A power conversion efficiency of 21.55% with free of hysteresis of the device is obtained, which is among the highest efficiency of planar structure perovskite solar cells.

Keywords Metal halide perovskite, Solar cells, Crystallization, Power conversion efficiency.

Received: 20-Mar-2018; **Revised:** 19-Apr-2018; **Accepted:** 26-Apr-2018

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