Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Modification of dry/wet hybrid fabrication method for preparing perovskite absorption layer on PCBM electron transport layer

Junta Kagae, Takaaki Yamanaka, Shun Takahashi, and Kenichi Yamashita*

Faculty of Electrical Engineering and Electronics, Kyoto Institute of Technology, Matsugasaki, Sakyo-ku, Kyoto 606-8585, Japan

*Corresponding author: yamasita@kit.ac.jp

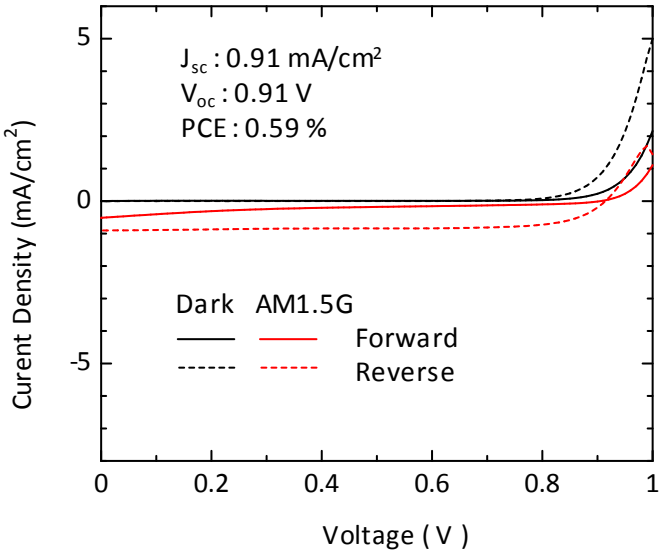

Figure S1 Current density – voltage curves of a photovoltaic device with a $MAPbI_3$ absorption layer fabricated by spin coating of PbI_2 on PCBM. The detailed fabrication conditions are the same with that described in the Experimental section in the main manuscript.

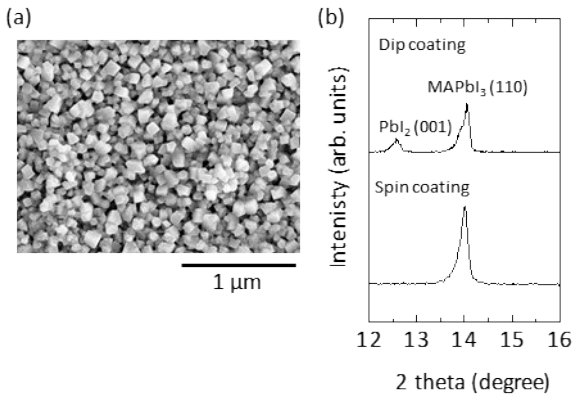

Figure S2 (a) SEM images of $MAPbI_3$ perovskite films synthesized with dip coating into MAI precursor solution. The PbI_2 film was prepared by vapor deposition method. (b) XRD patterns of $MAPbI_3$ film synthesized by dip coating and spin coating of MAI precursor solutions. The PbI_2 precursor layers were prepared by thermal evaporation.

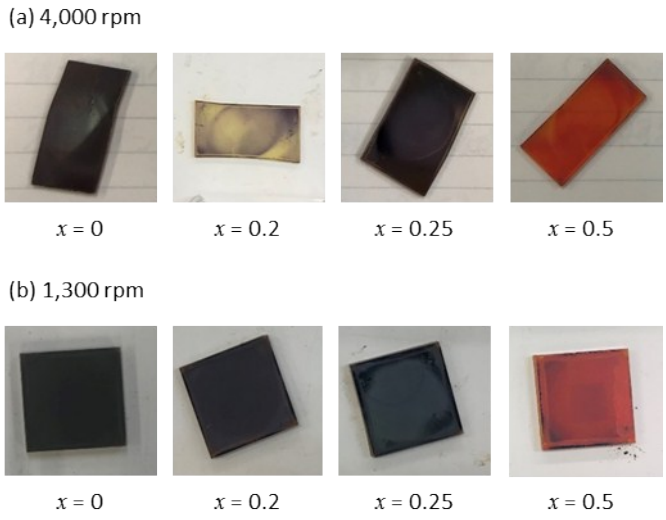

Figure S3 Photographs of $FA_xMA_{1-x}PbI_3$ mixed perovskite films with x = 0, 0.2, 0.25, and 0.5 prepared by spin coating at (a) 4,000 rpm and (b) 1,300 rpm on thermally evaporated PbI_2 precursor films.

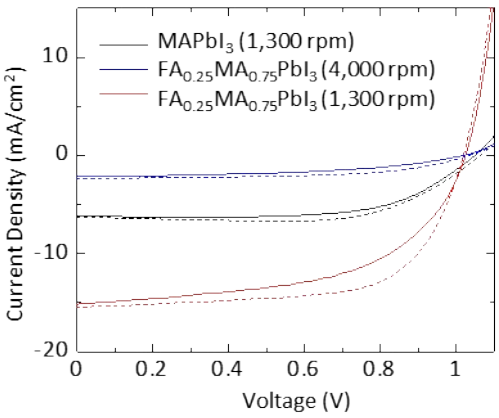

Figure S4 Example of J –V curves for photovoltaic devices with $MAPbI_3$ (black curves) and $FA_{0.25}MA_{0.75}PbI_3$ (blue and red lines) absorption layers under AM1.5G illumination. Solid and dashed curves exhibit characteristics at forward and reverse scans, respectively.

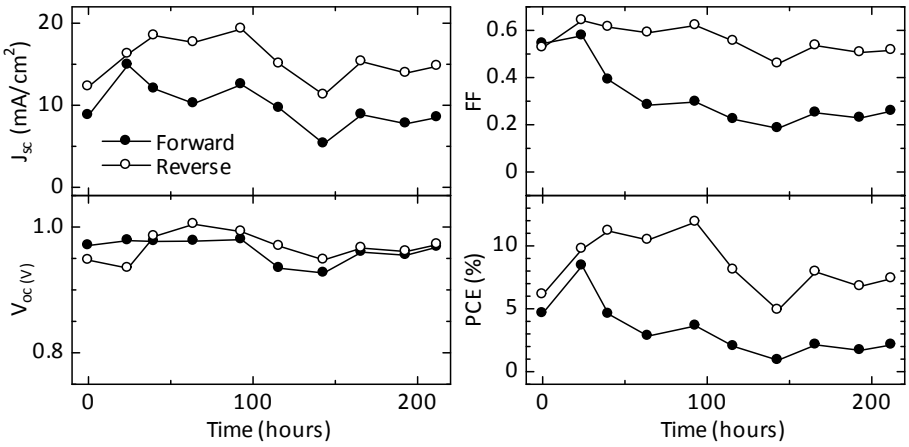

Figure S5 Stability test of photovoltaic device with $FA_{0.25}MA_{0.75}PbI_3$ absorption layer prepared by spin coating at 1,300 rpm. Temporal variations of the short-circuit current density J_{sc}, open-circuit voltage V_{oc}, filling factor FF, and power conversion efficiency PCE are shown. The sample was kept in a dark place with 25% humidity.