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 MAPbI₃ absorption layer fabricated by spin coating of PbI₂ 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$_x$MA$_{1-x}$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.