

## Supporting Information

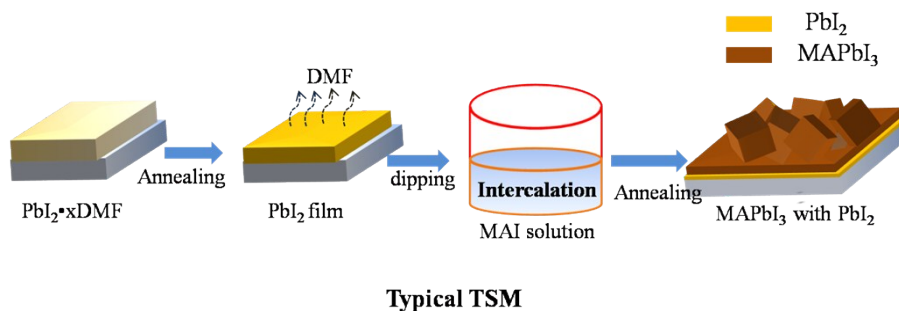
### High quality perovskite films fabricated from Lewis acid–base adduct through molecular exchange

*Xiaobing Cao<sup>1</sup>, Yahui Li<sup>1</sup>, Fei Fang<sup>1,2</sup>, Xian Cui<sup>1</sup>, Youwei Yao<sup>2</sup>, Jinquan Wei<sup>1\*</sup>*

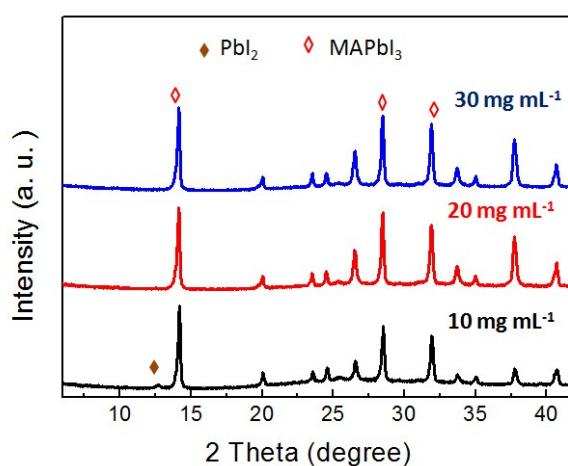
- 1. Key Lab for Advanced Materials Processing Technology of Education Ministry;  
State Key Lab of New Ceramic and Fine Processing; School of Materials Science  
and Engineering, Tsinghua University, Beijing 100084, P.R. China*
- 2. Division of Energy & Environment, Graduate School at Shenzhen, Tsinghua  
University, Shenzhen 518055, P.R. China*

\*E-mail: [jqwei@tsinghua.edu.cn](mailto:jqwei@tsinghua.edu.cn)

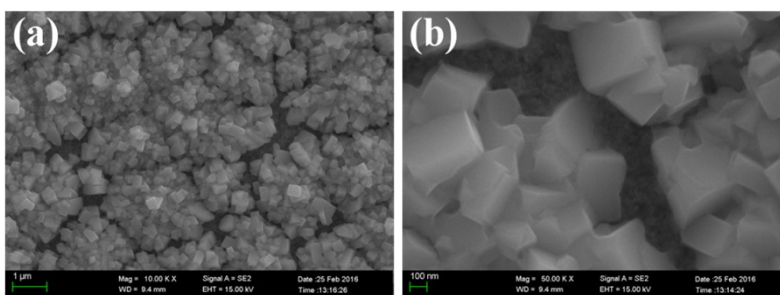
**This file includes Figures from S1 to S7**



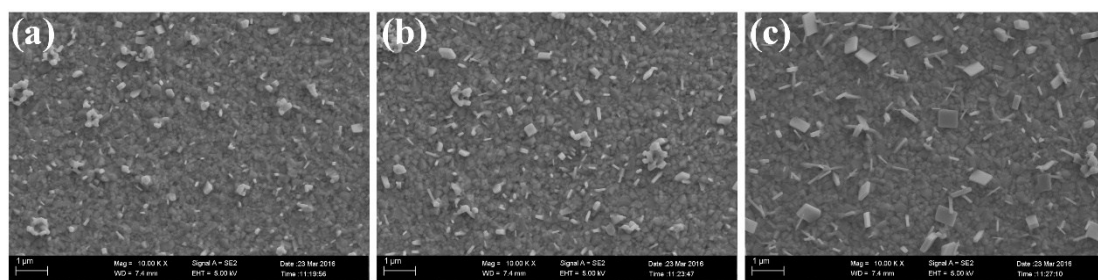
**Fig. S1** Schematic illustration of the fabrication of perovskite films from typical two-step method.



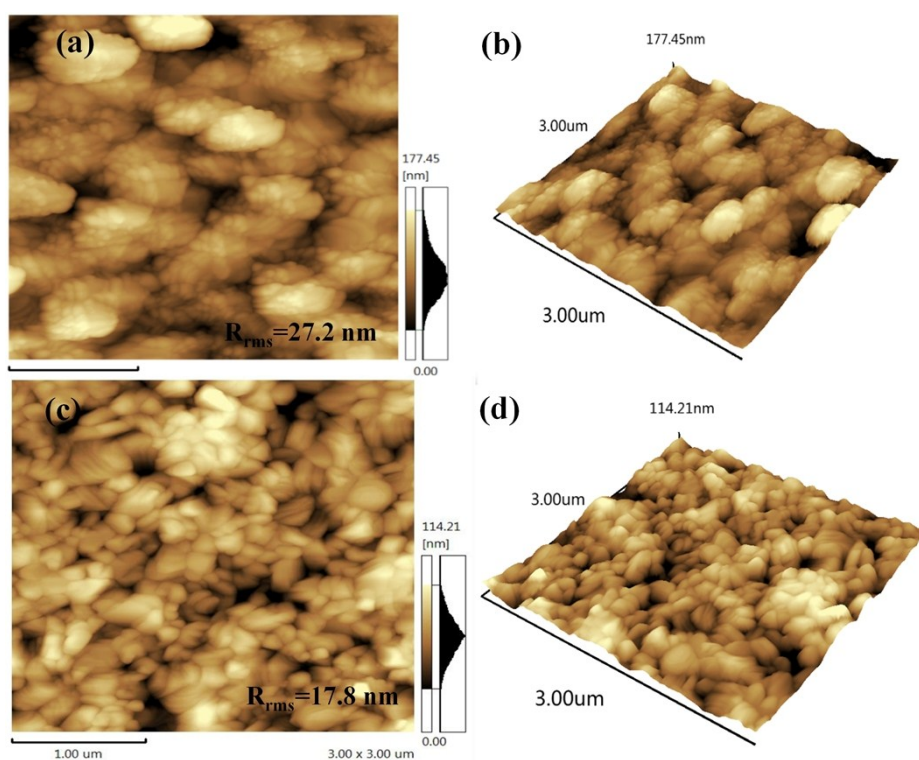
**Fig. S2** XRD patterns of the perovskite films fabricated from Lewis adduct by immersing in MAI/2-propanol solutions with different MAI concentrations at a fixed reaction time of 30 s



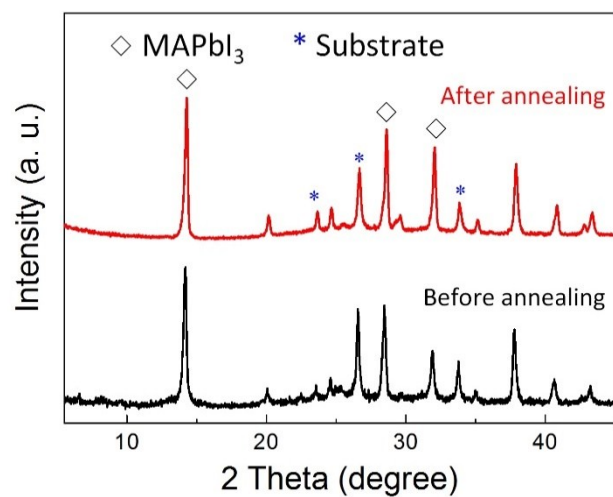
**Fig. S3** SEM images of a perovskite film prepared from a solution of MAI/2-propanol with MAI concentration of  $7.5 \text{ mg mL}^{-1}$  via Lewis adduct reaction. There are evident gaps among the clusters of perovskite grains.



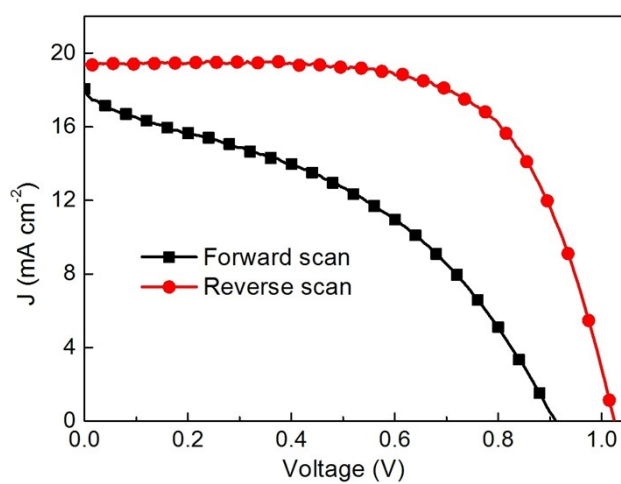
**Fig. S4** SEM images of the perovskite films prepared from the concentration of MAI  $20 \text{ mg mL}^{-1}$  by the typical TSM for different reaction time. (a) 1 min, (b) 2 min, (c) 5 min.



**Fig. S5** Planar (Left) and 3D topographic (Right) atomic force microscope images of the perovskite films fabricated from different routes in MAI/2-propanol solution with a concentration of  $20 \text{ mg mL}^{-1}$ . (a) and (b) typical TSM. (c) and (d) Lewis adduct reaction.



**Fig. S6** XRD spectra of the MAPbI<sub>3</sub> films fabricated from the Lewis adduct reaction before and after annealing.



**Fig. S7** J-V curves obtained from the forward and reverse scans of a perovskite solar cell fabricated from the Lewis adduct reaction.