

## Supplementary Information

### **Photoelectric performance enhancement of Sn-based perovskites by benzylamine boron trifluoride passivation**

Wenhao Zheng<sup>1</sup>, Xiao Peng<sup>1</sup>, Wenjing Zhai<sup>1</sup>, Lin Huang<sup>1</sup>, Peizhuo Chen<sup>1</sup>, Penghui Shi<sup>2</sup>, Xiaohui Zhou<sup>1</sup>, Jianguo Wan<sup>1</sup>, Zhibo Yan<sup>1, a)</sup>, and J.-M. Liu<sup>1,3</sup>

<sup>1</sup>*National Laboratory of Solid-State Microstructures, School of Physics, and Collaborative Innovation Center of Advanced Microstructures, Nanjing University, Nanjing 210093, China.*

<sup>2</sup>*Department of Applied Physics, College of Science, Nanjing Forestry University, Nanjing 210037, China*

<sup>3</sup>*Institute for Advanced Materials, Hubei Normal University, Huangshi 435002, Hubei, China.*

a) [zbyan@nju.edu.cn](mailto:zbyan@nju.edu.cn)

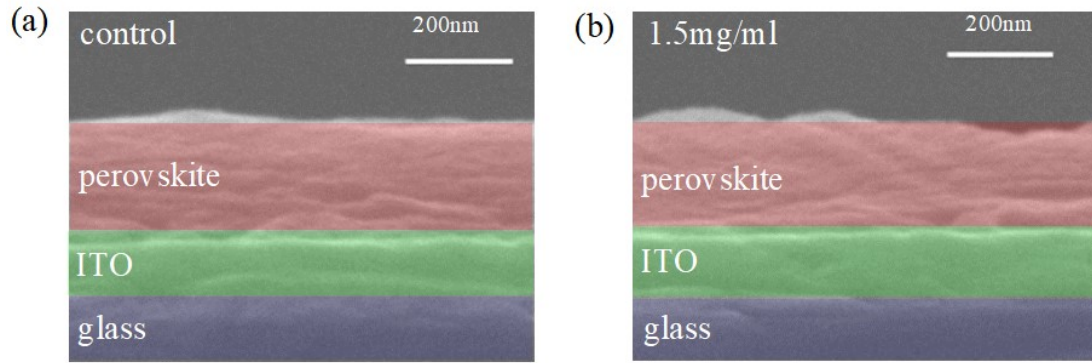


Fig.S1 Cross-sectional SEM images of perovskite (a) without BBF and (b) with BBF.

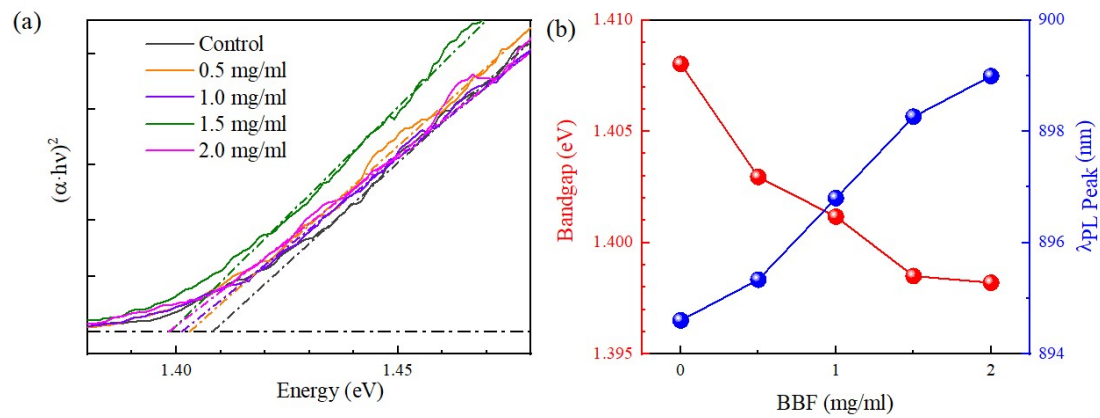


Fig.S2 (a) Tauc plot of the absorbance spectra of the FASnI<sub>3</sub> films with different BBF concentrations. (b) Optical bandgap and PL position with respect to the BBF concentration.

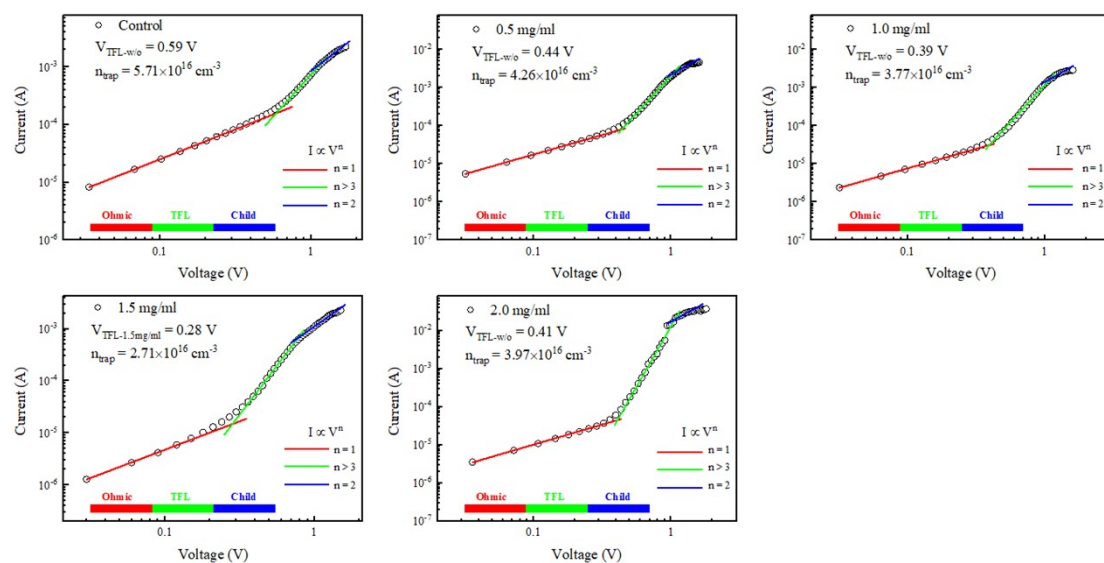


Fig.S3 Space-charge-limited current versus voltage for the perovskite films with different amount of BBF.

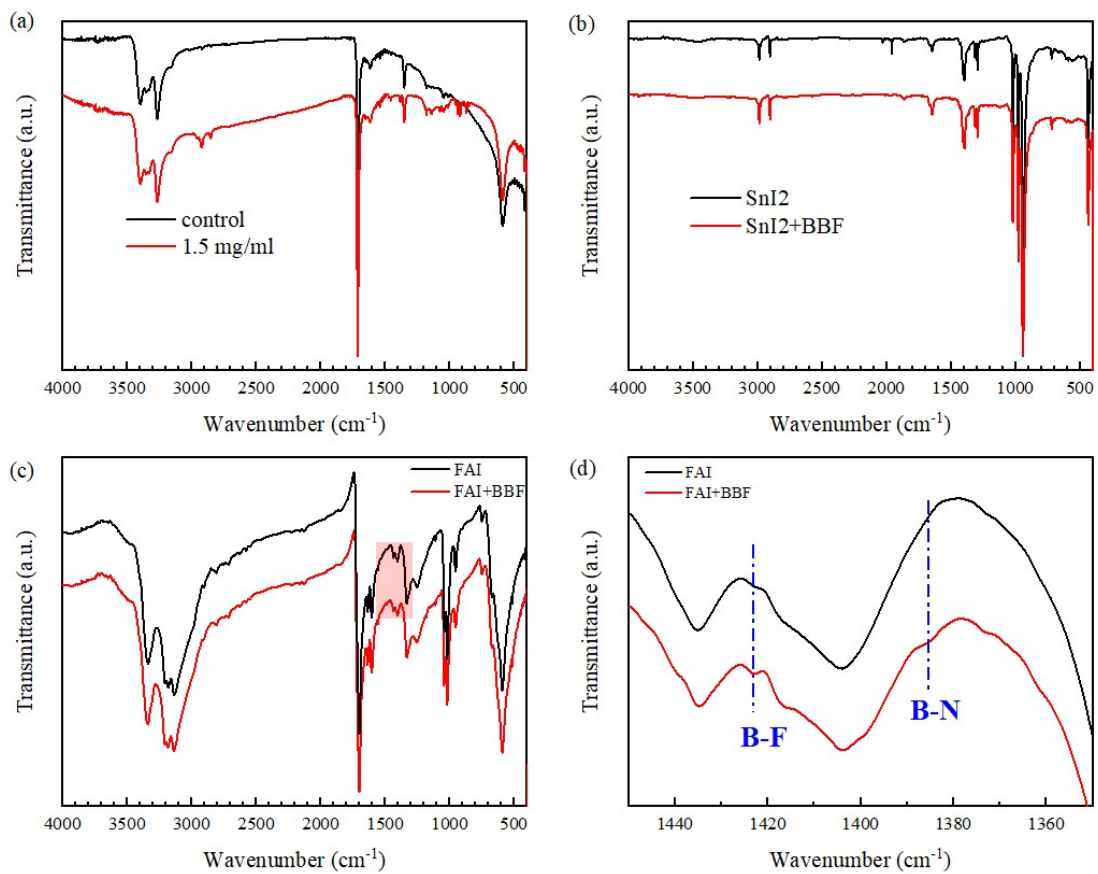


Fig.S4 FTIR spectra of (a) FASnI<sub>3</sub> films (b) SnI<sub>2</sub> precursor films (c) FAI precursor films without/with BBF additive, respectively. (d) Enlarged view of the FTIR peaks correspond to B-F and B-N in FAI FTIR spectra.