Supporting information

Passivation of defective states in single crystal MAPbBr3 and their optoelectronic properties study

Hui Li,a Zhenhua Chen\*b, Jin Wang,a Nan Xu,c Yaobo Huangb and Zhi Guob

aCollege of Science, Donghua University, Songjiang District, Shanghai 201620, China

bShanghai Synchrotron Radiation Facility (SSRF), Shanghai Advanced Research Institute, Chinese Academy of Sciences, Shanghai 201800, China

cInstitute of Advanced Studies, Wuhan University, Wuhan 430072, China

\* Correspondence: chenzhenhua@sari.ac.cn

Table S1. XPS stoichiometry analysis for MAPbBr3 seeds and large single crystal.

[Stoichiometry](http://www.dictall.com/indu60/48/6048959FA2D.htm) analysis for MAPbBr3 seeds.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Start BE | Peak BE | End BE | FWHM eV | Area (P) CPS.eV | Area (N) TPP-2M | Atomic % |
| N1s | 409.98 | 401.64 | 392.18 | 1.25 | 7576.36 | 68.55 | 15.28 |
| Pb4f | 152.98 | 138.31 | 133.18 | 1.16 | 141869.85 | 54.29 | 12.1 |
| Br3d | 75.98 | 68.47 | 62.18 | 1.96 | 39425.2 | 178.19 | 39.73 |
| C1s | 297.98 | 285.5 | 279.18 | 2.25 | 10273.7 | 144.13 | 32.14 |

The stoichiometry ratio between Pb and Br is 1:3 (Area (N) TPP-2M value).

Stoichiometry analysis for MAPbBr3 seeds.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Start BE | Peak BE | End BE | FWHM eV | Area (P) CPS.eV | Area (N) TPP-2M | Atomic % |
| N1s | 409.98 | 401.26 | 392.18 | 1.29 | 21342.41 | 193.05 | 14.53 |
| Pb4f | 152.98 | 137.75 | 133.18 | 1.09 | 412726.92 | 157.88 | 11.88 |
| Br3d | 75.98 | 67.78 | 62.18 | 1.91 | 107732.63 | 486.74 | 36.63 |
| C1s | 297.98 | 285.02 | 279.18 | 2.44 | 34567.24 | 484.78 | 36.48 |

The stoichiometry ratio between Pb and Br is 1:3 (Area (N) TPP-2M value).

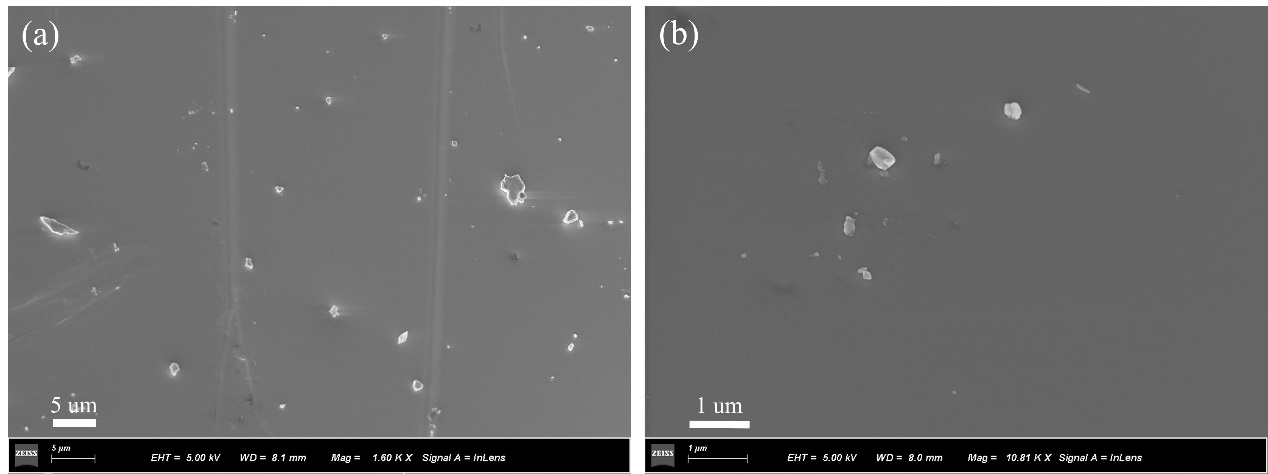


Figure S1. SEM image of as-prepared MAPbBr3 single crystal with different magnification.

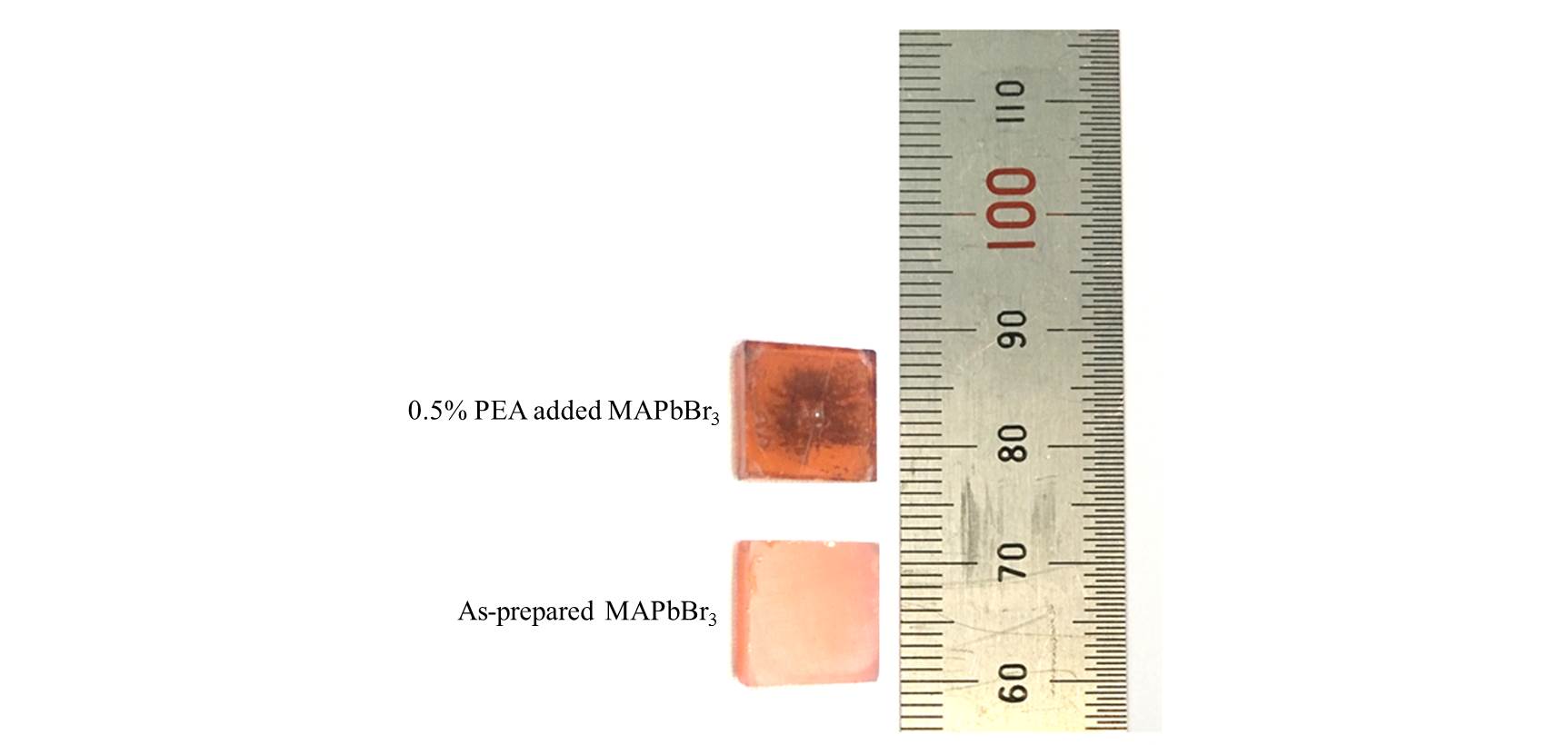


Figure S2. Optical image of as-prepared MAPbBr3 single crystal and MAPbBr3 crystal fabrication with 0.5wt% PEA additives.

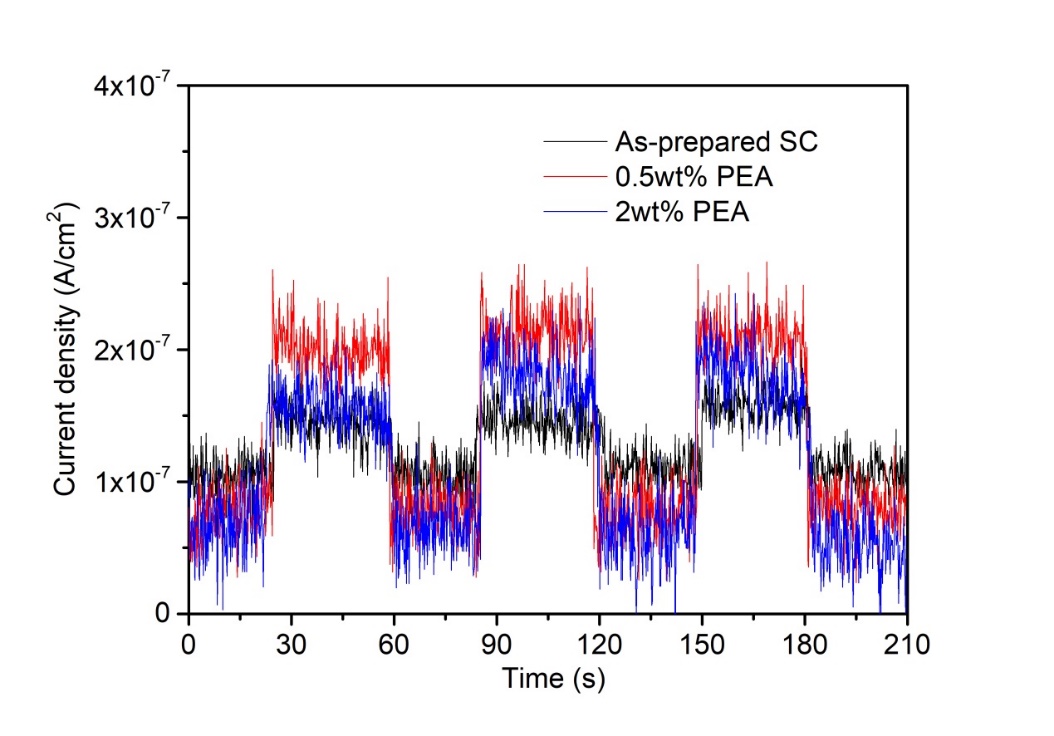


Figure S3. Temporal response of the MAPbBr3 single crystals without and with 0.5wt% and 2wt% PEA additives based detectors under low dose (~3.4 mSv) X-ray illumination.