Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Detection Range Extended 2D Ruddlesden-Popper Perovskite Photodetectors

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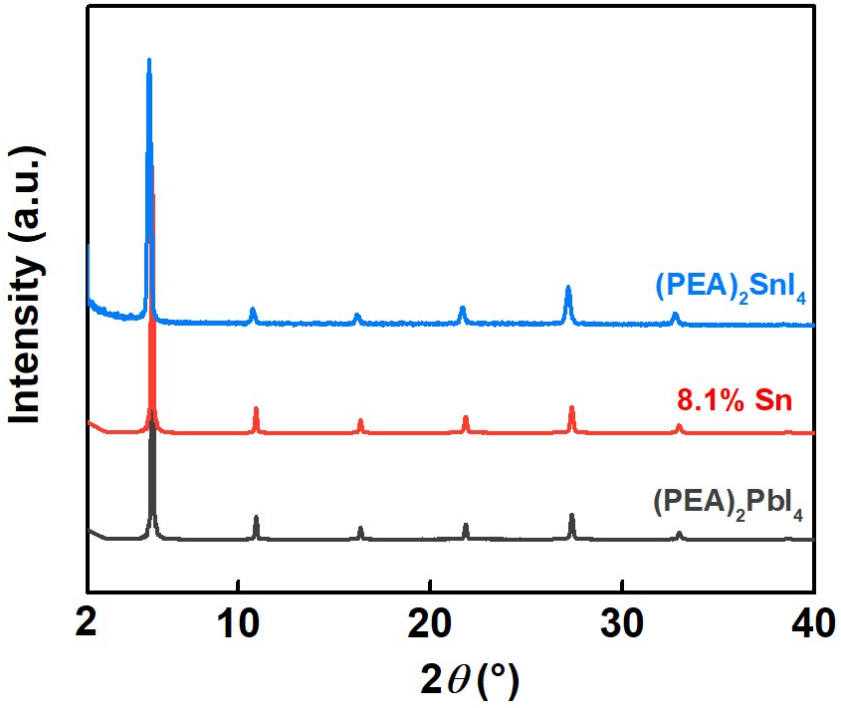

Figure S1. XRD patterns of $(PEA)_2PbI_4$, $(PEA)_2SnI_4$ and 8.1% Sn-doped $(PEA)_2PbI_4$ perovskite films.

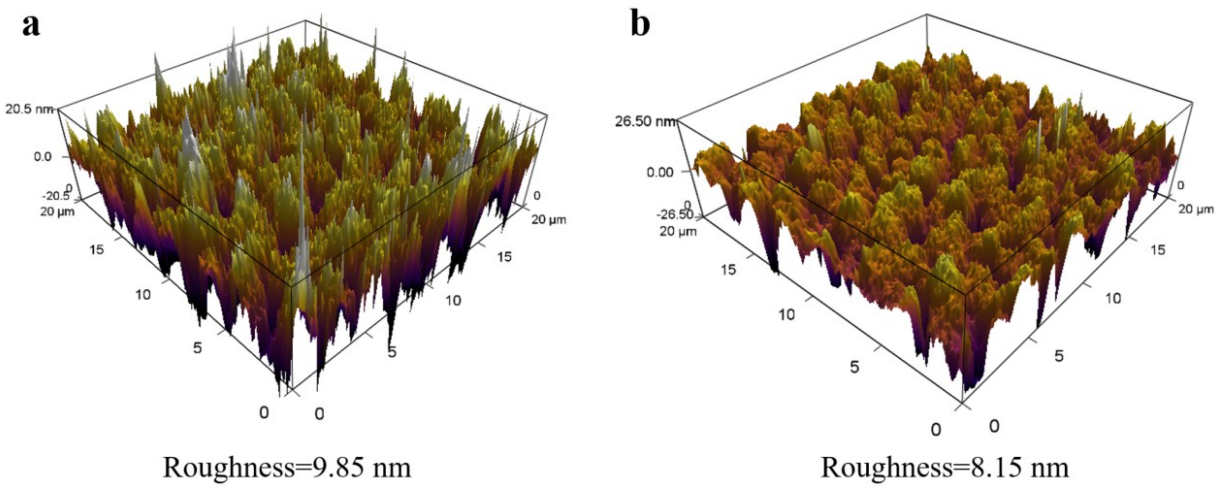

Figure S2. 3D AFM images of a) $(PEA)_2PbI_4$ and b) 4.2% Sn-doped $(PEA)_2PbI_4$ perovskite films show r.m.s roughness of 9.85 and 8.15 nm, respectively.

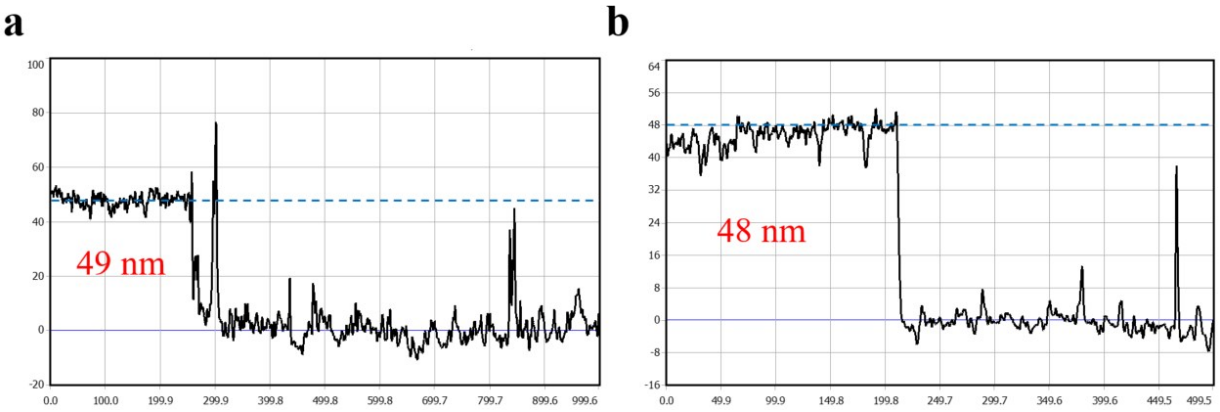

Figure S3. a) the thickness of 2D $(PEA)_2PbI_4$ perovskite film. b) the thickness of 4.2% Sn-doped $(PEA)_2PbI_4$ perovskite film.

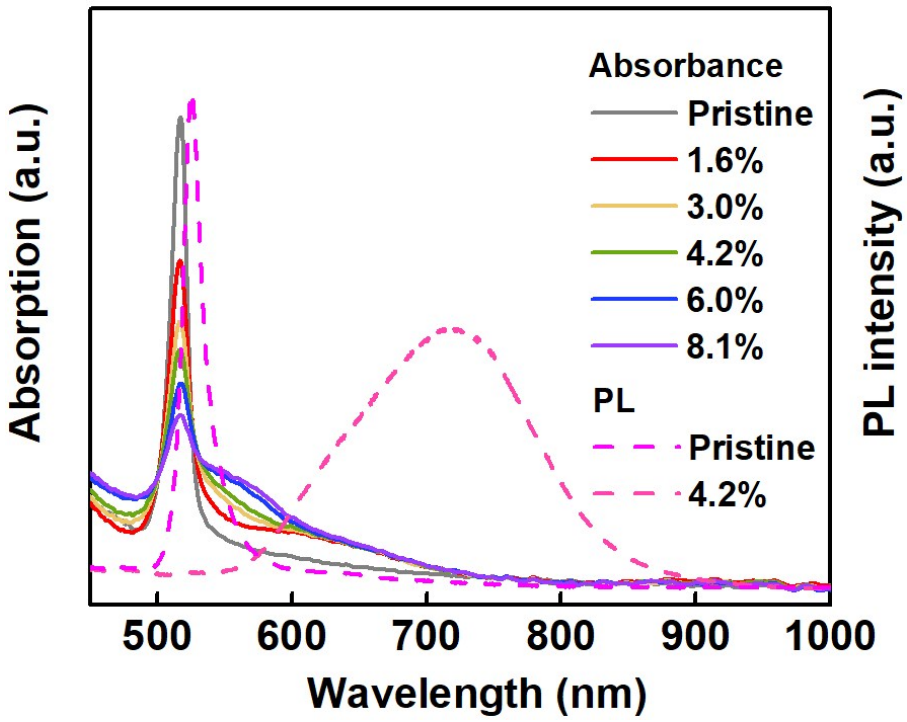

Figure S4. Absorbance spectra (solid line) and PL spectra (dash line) of $(PEA)_2PbI_4$ and Sn-doped $(PEA)_2PbI_4$ perovskite films with different doping concentration.

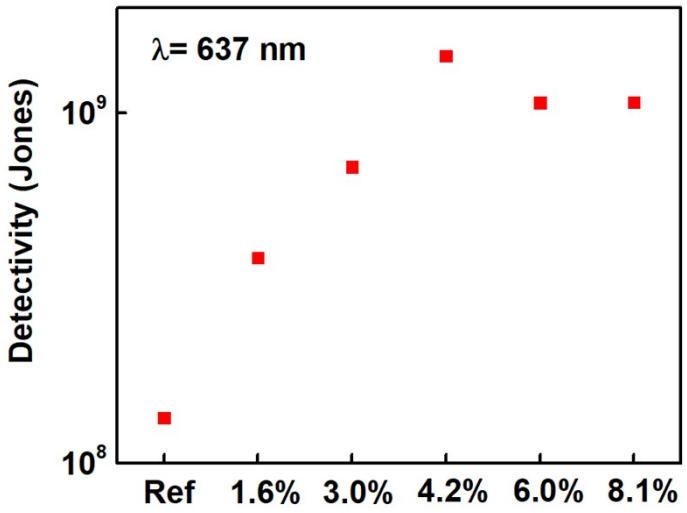

Figure S5. Detectivity of pristine and Sn-doped $(PEA)_2PbI_4$ devices under 637 nm light illumination with irradiance power of 48.9 μW at V_d =10 V.

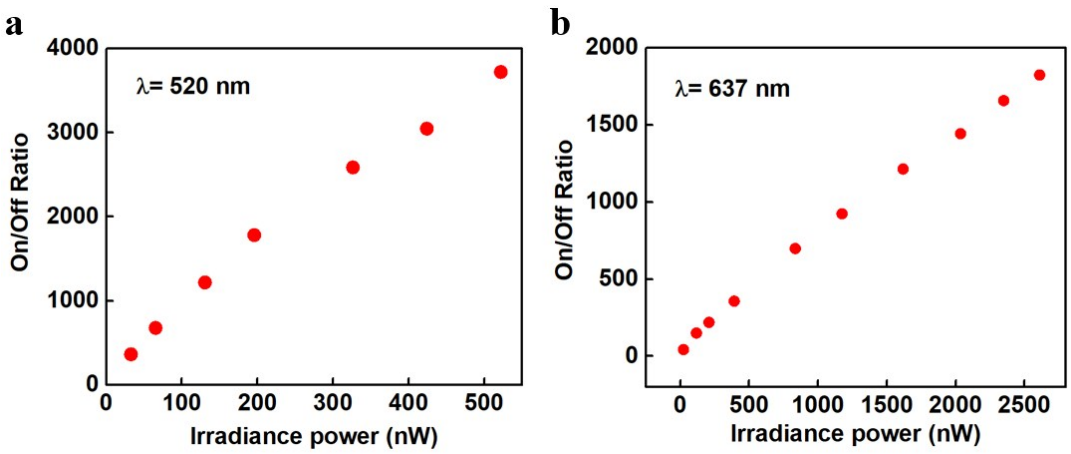

Figure S6. On/off ratio of the Sn-doped $(PEA)_2PbI_4$ device as a function of the light power intensity. a) under 520 nm light illumination. b) under 637 nm light illumination.

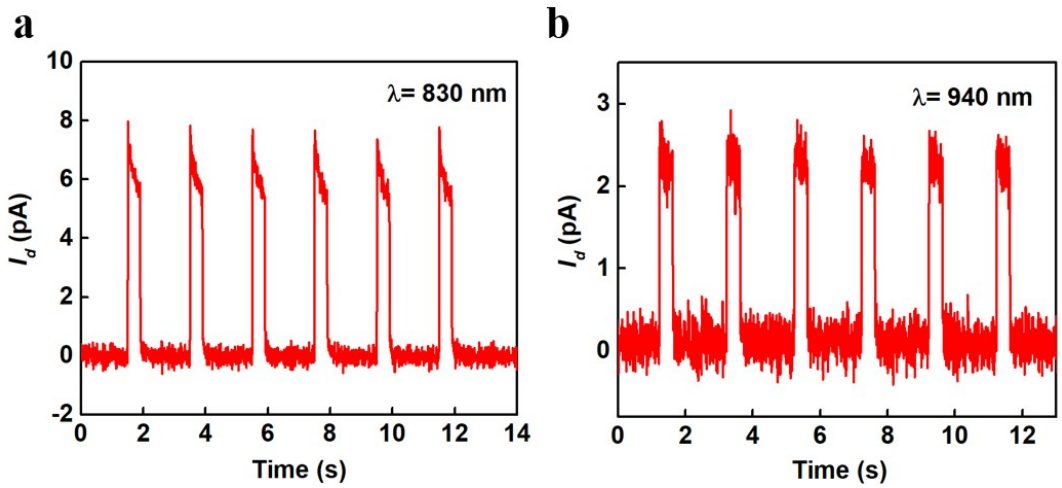

Figure S7. The time-dependent photocurrent measurement of 4.2% Sn-doped $(PEA)_2PbI_4$ perovskite photodetectors under a) 830 nm light illumination and b) 940 nm light illumination.

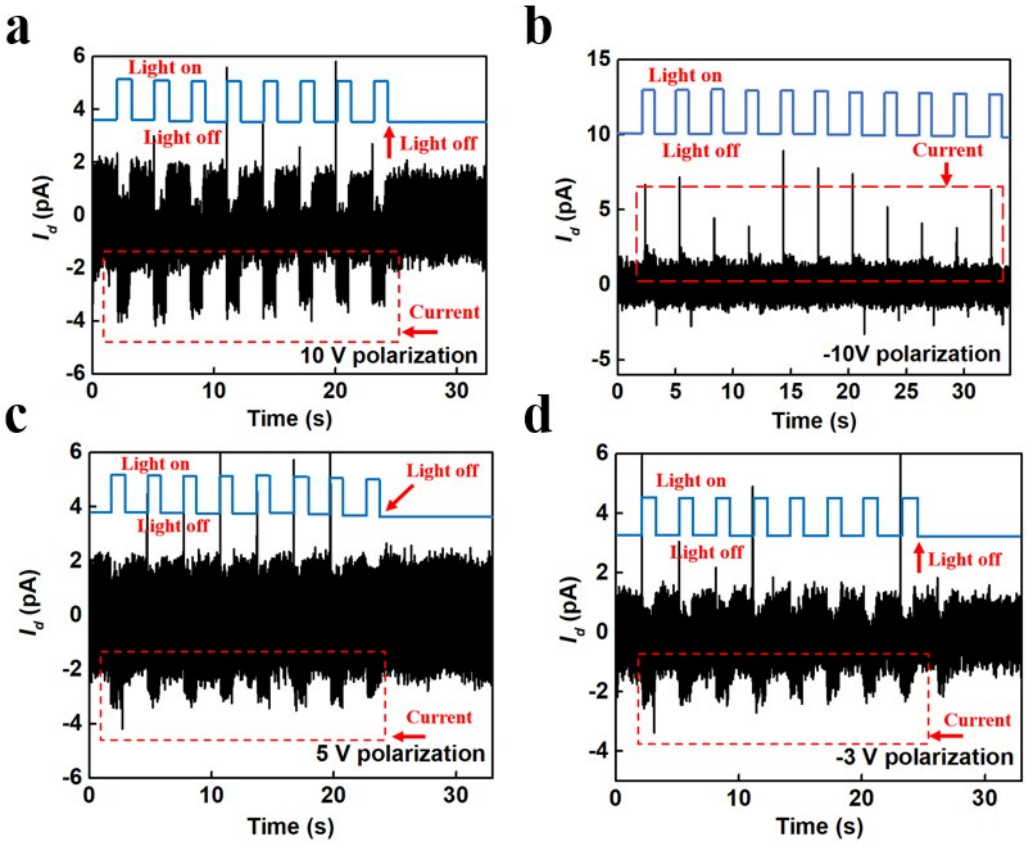

Figure S8. The time dependence of current of 4.2% Sn-doped $(PEA)_2PbI_4$ perovskite photodetectors under 637 nm light illumination after a) 10 V b) -10 V c) 5 V and d) -3 V polarization.