Supporting Information

Low-temperature Processed Inorganic Perovskites for Flexible Detectors with Broadband Photoresponse

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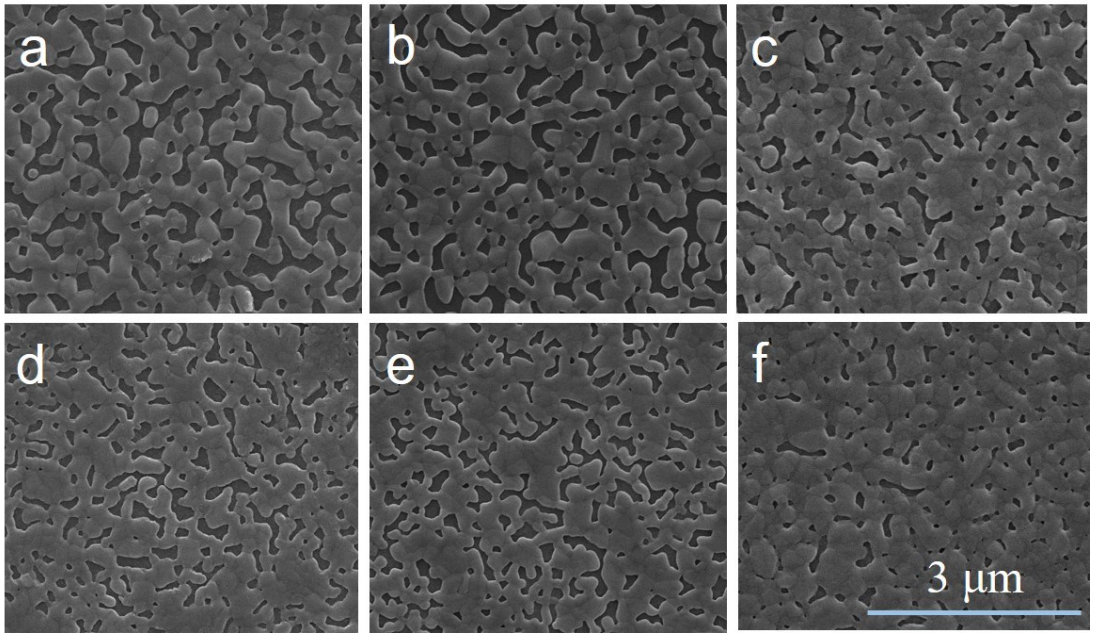

Figure S1 $CsPbBr_3$ perovskite films obtained with various duration for the first step annealing (a, 5 min; b, 8 min; c, 12 min) and immersion in IPA (d, 2 min; e, 4 min; f, 6 min).

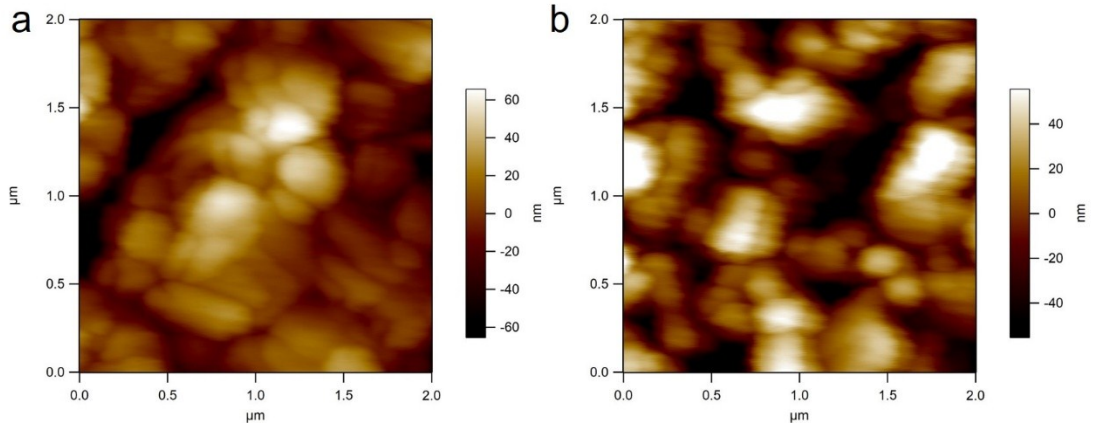

Figure S2 AFM maps of as-prepared $CsPbBr_3$ films with (a) or without (b) SE treatment.

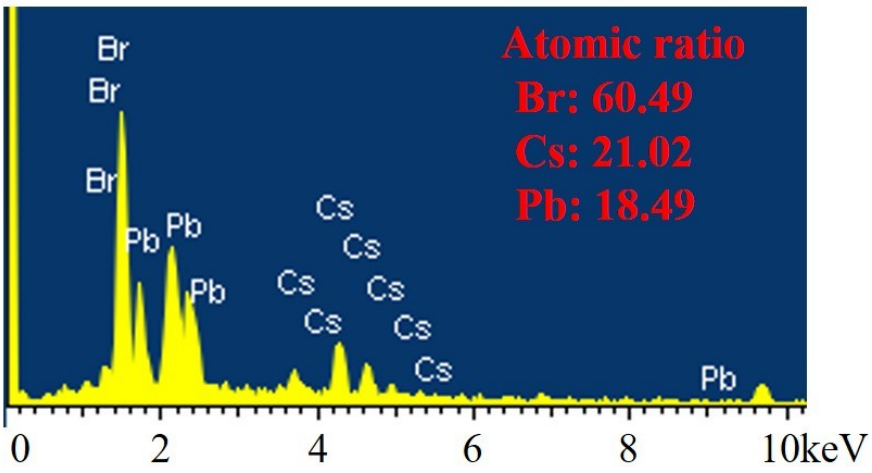

Figure S3. EDS spectra of a SE treated $CsPbBr_3$ film. It suggests that the stoichiometric ratio of inorganic perovskite is ~ 1:1:3 for Cs:Pb:Br.

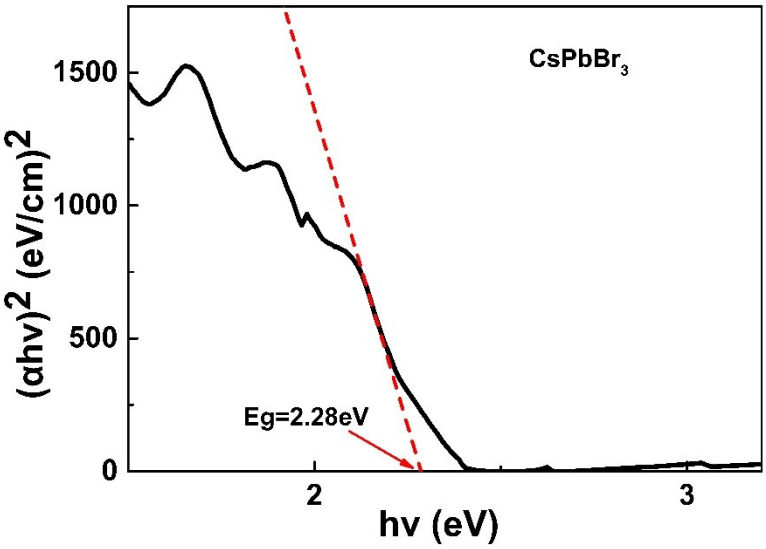

Figure S4. Tack plot curve of the inorganic perovskite film. The optical bandgap of $CsPbBr_3$ was measured to be ~2.28eV.

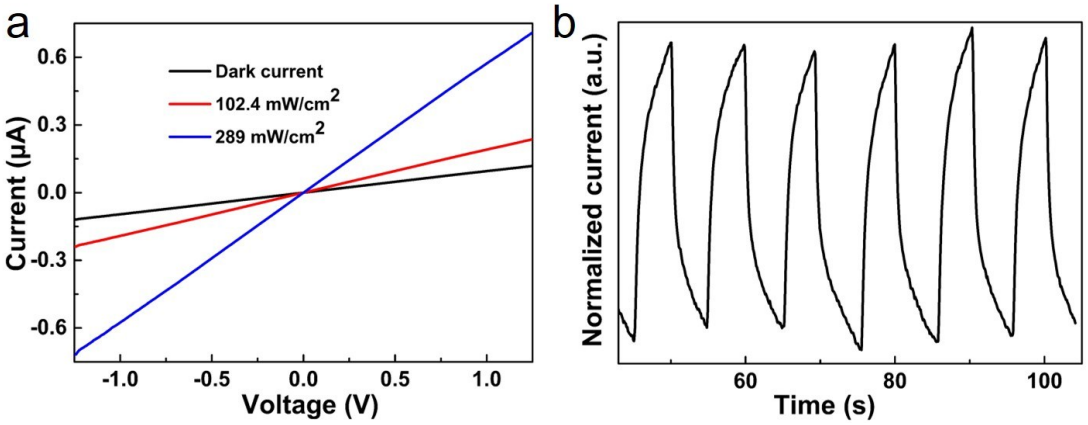

Figure S5. (a) I-V (b) and I-t characteristics of the flexible $CsPbBr_3$ photodetector without SE treatment.

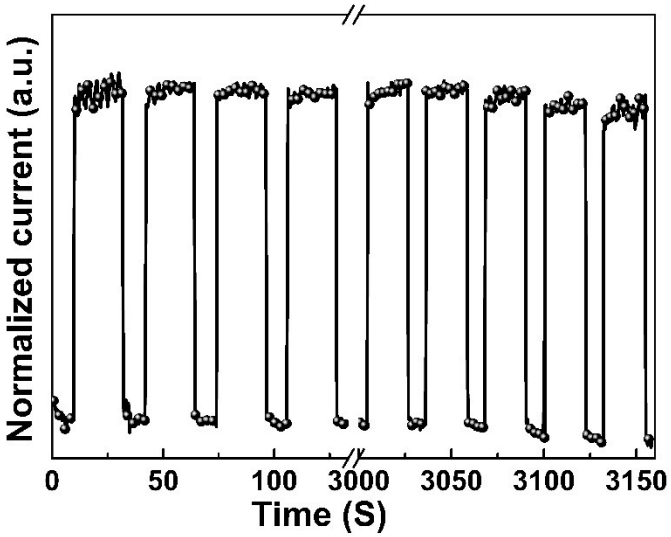

Figure S6. A reproducible I-t curve of the device based on treated $CsPbBr_3$ film measured under periodic light on/off.

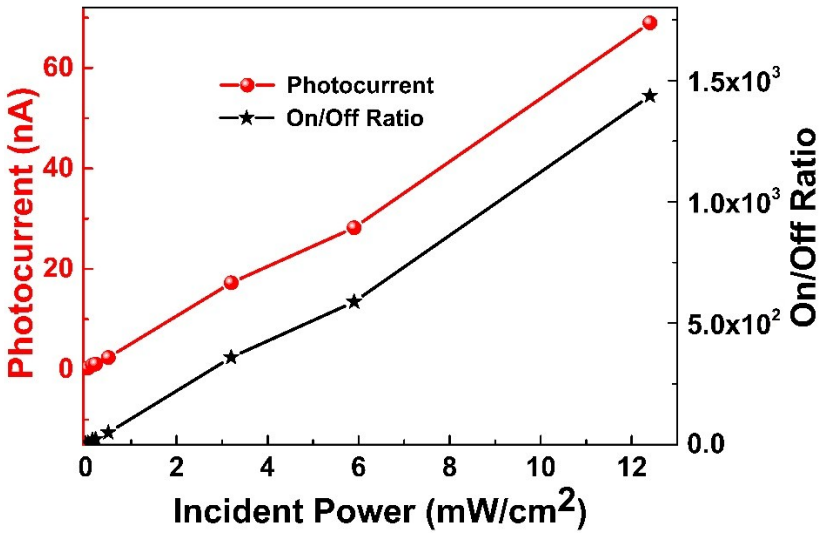

Figure S7. The photocurrent and on/off ratio curves of the treated $CsPbBr_3$ flexible PD.

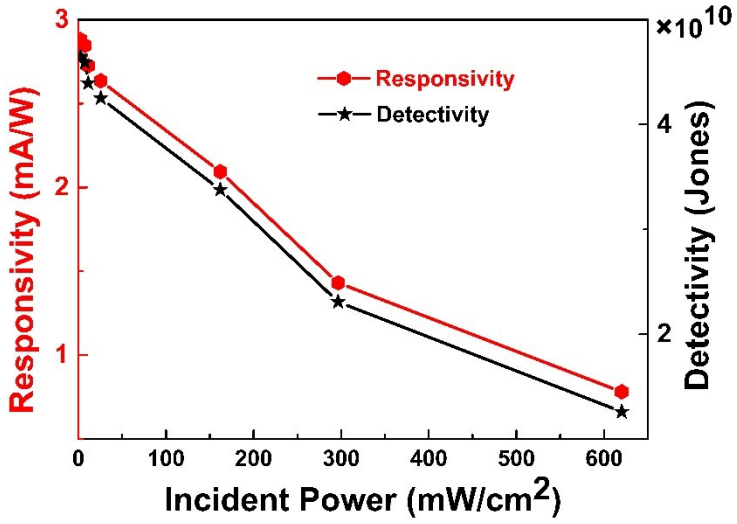

Figure S8. Responsivity and specific detectivity of the treated $CsPbBr_3$ flexible PD.

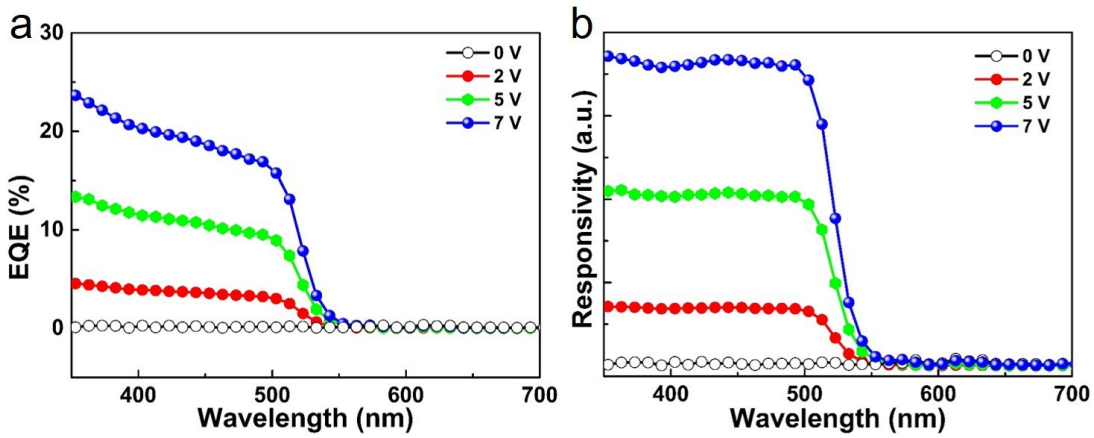

Figure S9 (a) EQE and (b) spectral response of the treated $CsPbBr_3$ flexible PDs under different biases.

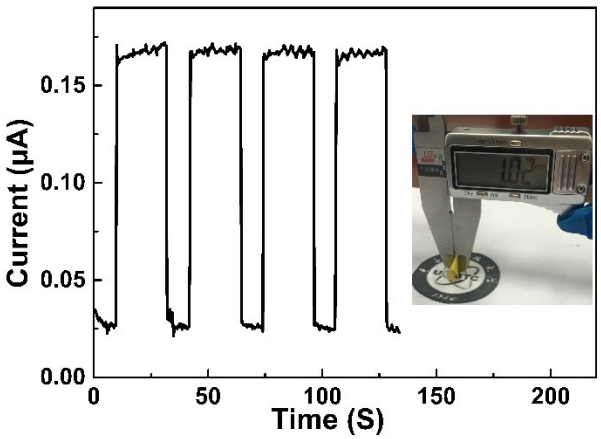

Figure S10. I-t curve of the device bended at 1.02 mm. Even at a deflected condition, the photocurrent response also can be measured with overload bending state.

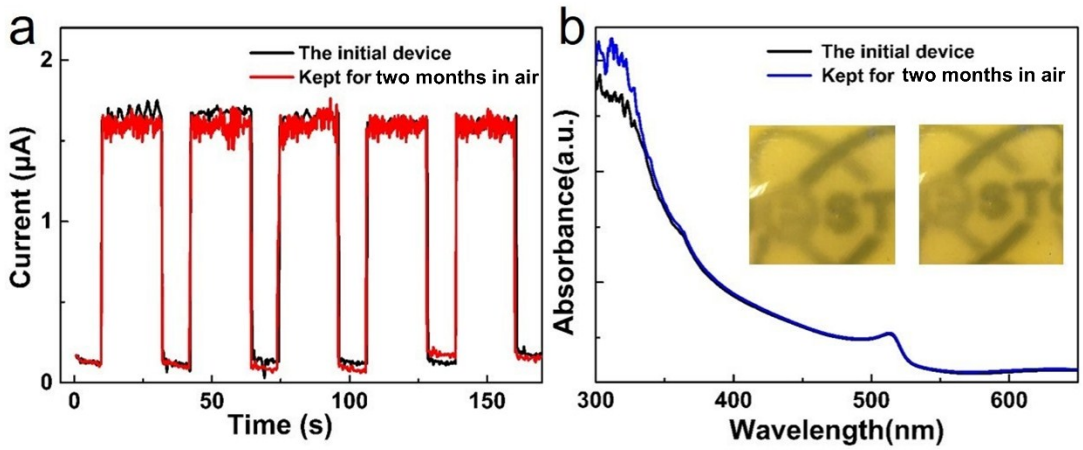

Figure S11. Comparison of environmental stability of the device kept in air for two months with 35~45% relative humidity. (a) The reproducible I-t curves of the devices measured for periodic light on/off. (b) Absorption spectra of the devices in fresh and kept in air for two months. The inset digital photos show that the $CsPbBr_3$ perovskite is stable even after two months.

Table S1 Performance comparison of our device with other reported $CsPbBr_3$ photodetectors

Device structure	Material structure	substrate	Detectivity (Jones)	Rise/ decay time (ms)	Refs.
Au/$CsPbBr_3$/Au	Single crystal	None/rigid	10^{11}	90.7/57	[1]
Pt/$CsPbBr_3$/Au	Single crystal	None/rigid	10^{11}	230/60	[2]
Au/ $CsPbBr_3$/RGO/Au	Thin film	SiO2/rigid	-	417/414	[3]
ITO/ $CsPbBr_3$/ITO	Thin film	Si/rigid	-	600/640	[4]
Au/$CsPbBr_3$/Au	Thin film	PET/flexible	10^{10}	260/280	This work

Reference

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