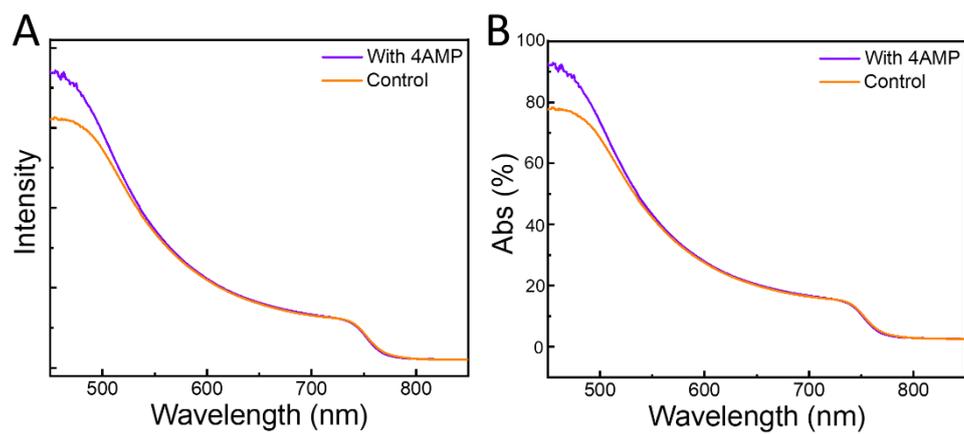
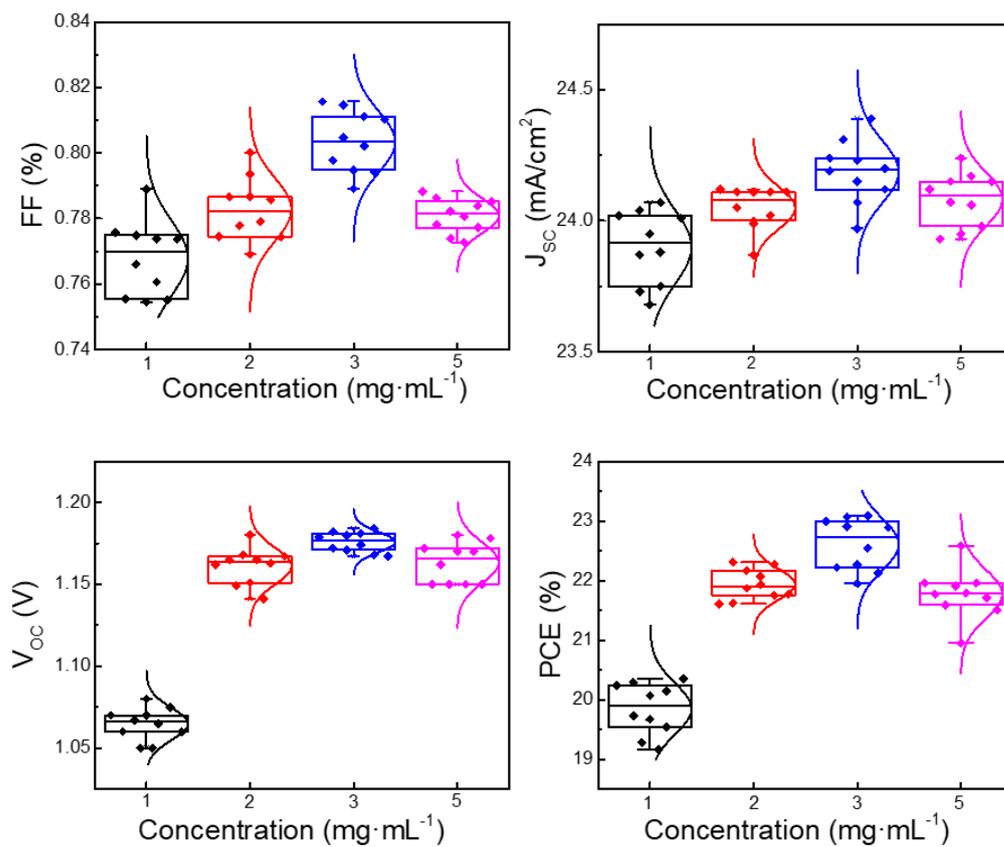


**Figure S1.** Top SEM images of the perovskite film treated with and without 4AMP.



**Figure S2.** UV absorbance spectra of the perovskite film treated with and without 4AMP.



**Figure S3.** Statistical analysis for 10 individual cells of the effect of different concentration on the *FF*, *J<sub>sc</sub>*, *V<sub>oc</sub>*, and *PCE*.

## Supporting Information

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**Table S1.** The summary of TRPL curve analysis : short and long lifetime contributions and electron lifetimes.

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	A <sub>1</sub> (%)	$\tau_1$ (ns)	A <sub>2</sub> (%)	$\tau_2$ (ns)	T <sub>ave</sub> (ns)
Modified film	52.79	5.12	47.21	152.48	147.15
Control film	43.85	8.37	56.15	161.12	153.83

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