

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

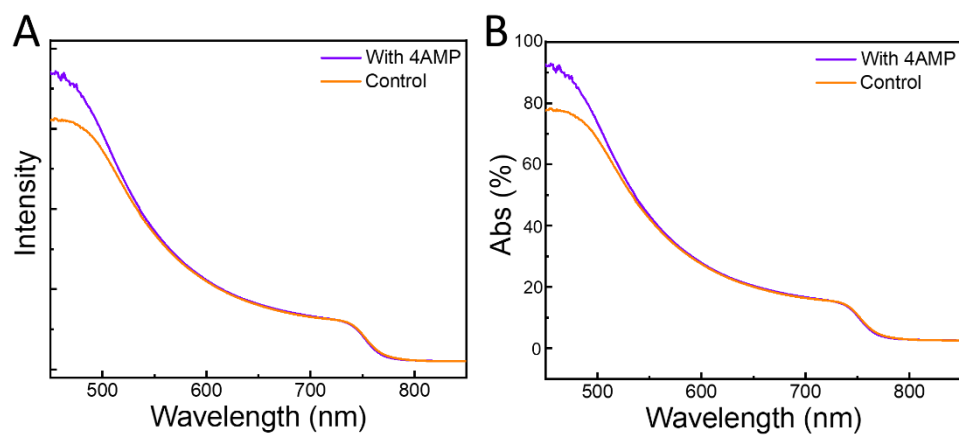


Figure S2. UV absorbance spectra of the perovskite film treated with and without 4AMP.

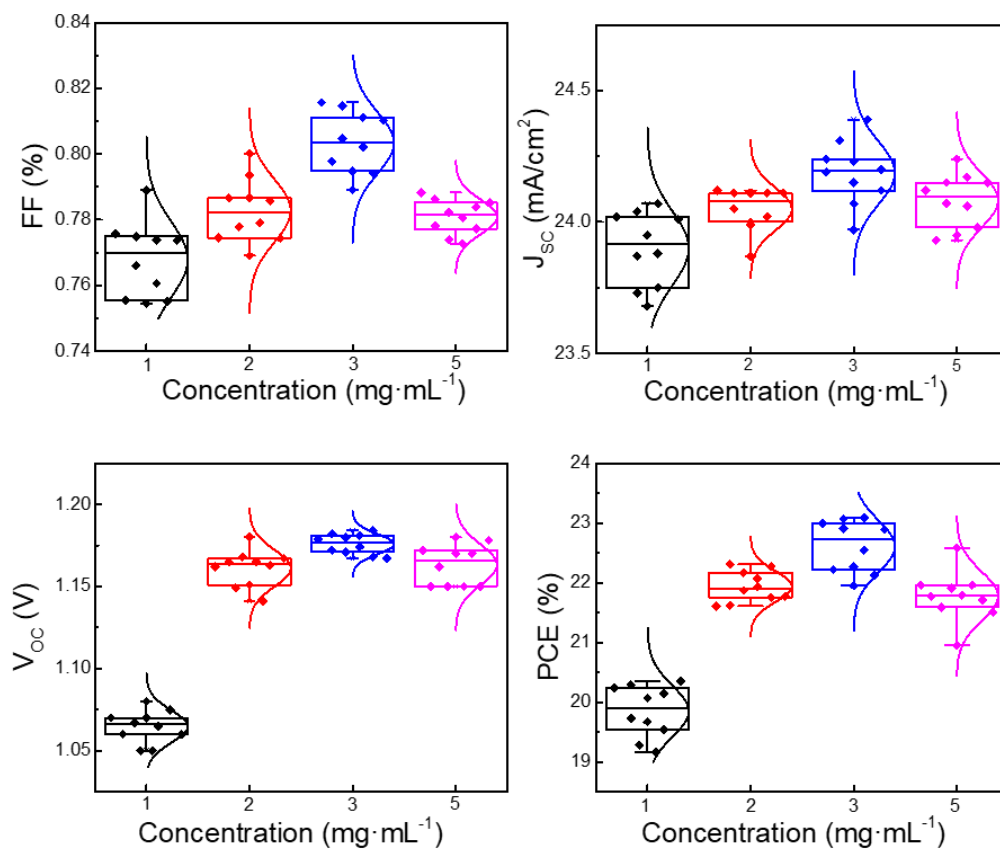


Figure S3. Statistical analysis for 10 individual cells of the effect of different concentration on the FF , J_{sc} , V_{oc} , and PCE .

Supporting Information

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

	A_1 (%)	τ_1 (ns)	A_2 (%)	τ_2 (ns)	T_{ave} (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
