

27 **Supplementary Table 1.** Fitting parameters of TRPL spectra for perovskite films with
28 or without PI layer.

	τ_{avg} (ns)	A_1	τ_1 (ns)	A_2	τ_2 (ns)
w/o PI	220.9	0.516	123.8	0.737	254.0
w/ PI	32.1	4.647	21.2	1.168	50.4

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