

Supporting Information

Regulating Charge Carrier Extraction and Transport with Dual- interface Modification for Efficient Perovskite Solar Cells

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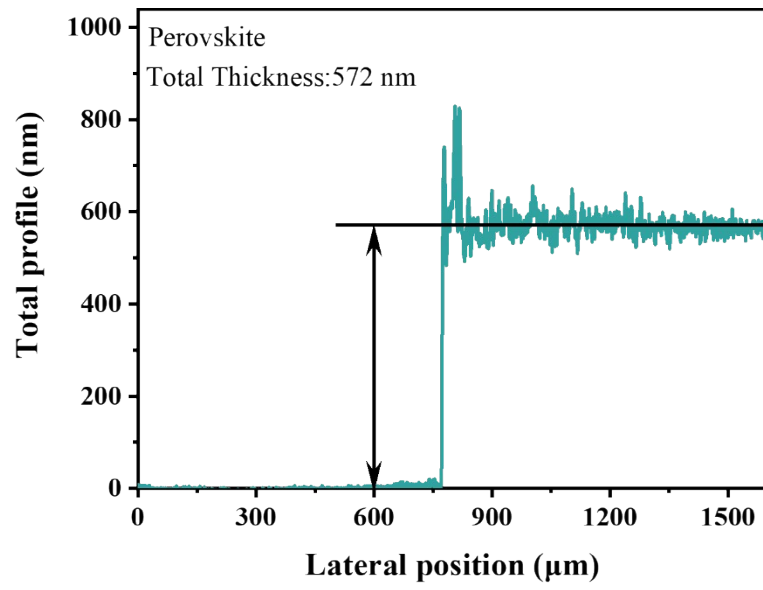


Figure S1. The thickness of the perovskite films.

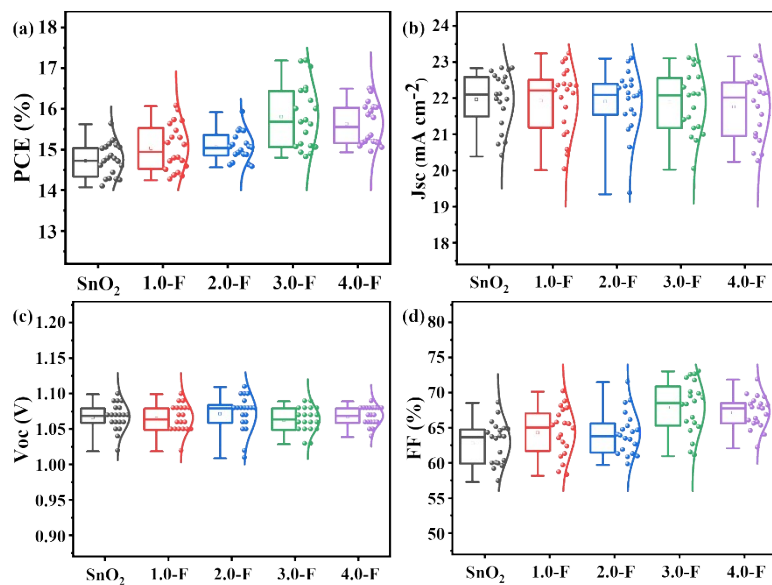


Figure S2. The photovoltaic parameters distribution: (a) PCE, (b) Jsc, (c) Voc and (d) FF of the perovskite solar cells without or with ETL/perovskite interface modification with different NH₄F concentration varying from 1.0 to 4.0 mg mL⁻¹.

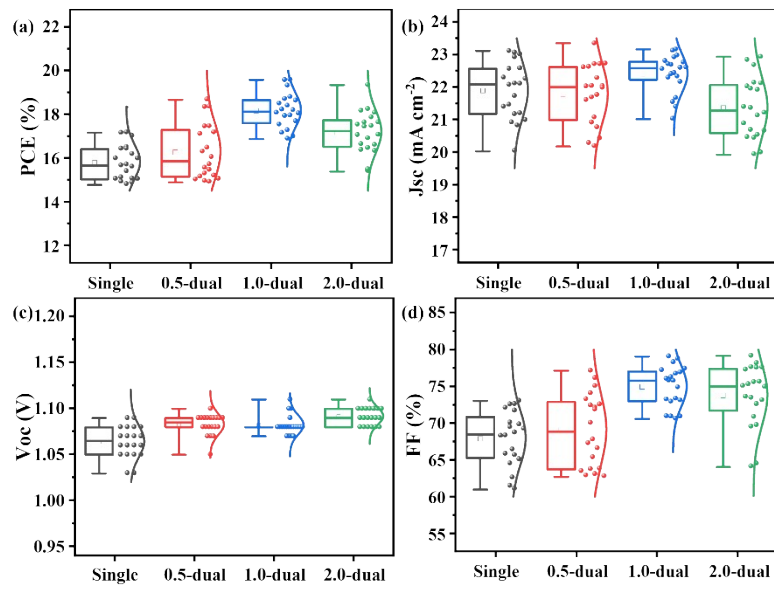


Figure S3. The photovoltaic parameters distribution: (a) PCE, (b) Jsc, (c) Voc and (d) FF of the perovskite solar cells with optimized single interface modification or with dual-interface modification with different GABr concentration varying from 0.5 to 2.0 mg mL⁻¹.

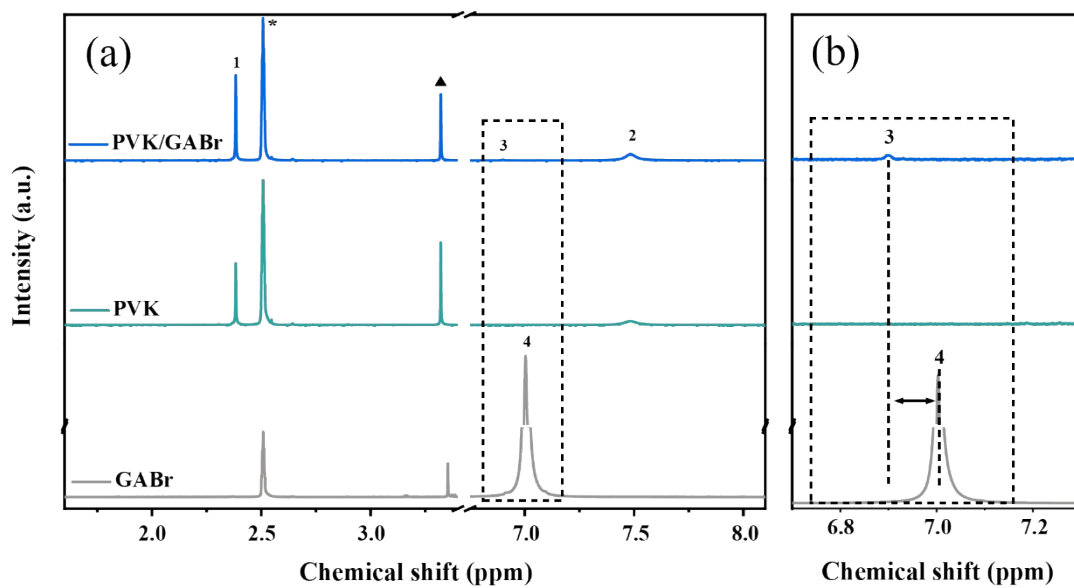


Figure S4. (a) ^1H NMR spectra of pure GABr, PVK and PVK/GABr in $\text{DMSO-}d_6$ solution, (b) Magnified NMR spectra for marked area with dashed square in Figure S4a. The star and triangle symbols denote the peaks from the solvent and water.

Table S1 Extracted parameters from TRPL Spectra in **Figure 4b**.

	τ_1 (ns)	A_1 (%)	τ_2 (ns)	A_2 (%)
Control	8.01	60.82	166.34	39.18
OSIM	5.63	70.15	180.51	29.85
Target	3.76	73.18	187.58	26.82