Electronic Supplementary Information

Interface Engineering Improves the Performance of Green Perovskite Light-emitting Diodes

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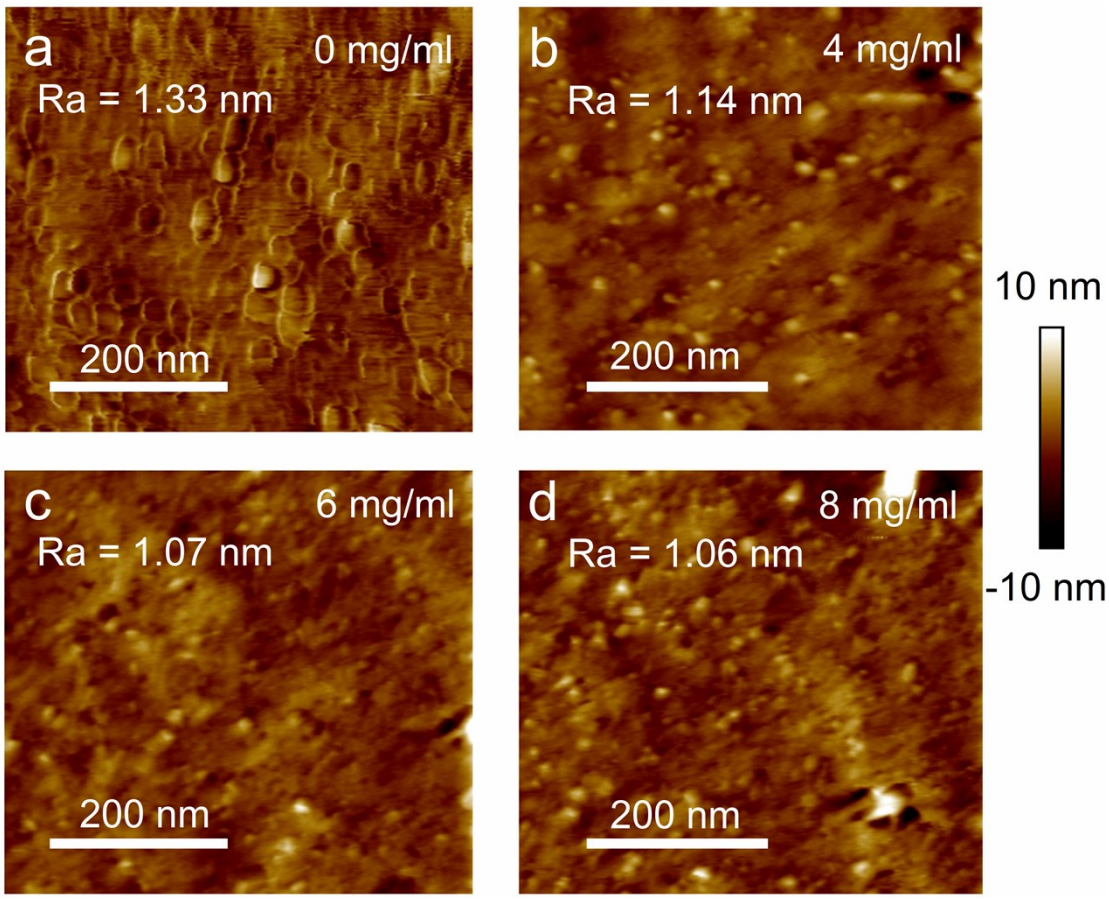

Figure S1. AFM images of the perovskite films grown on the PEDOT:PSS substrate mixed with various AT ratios.

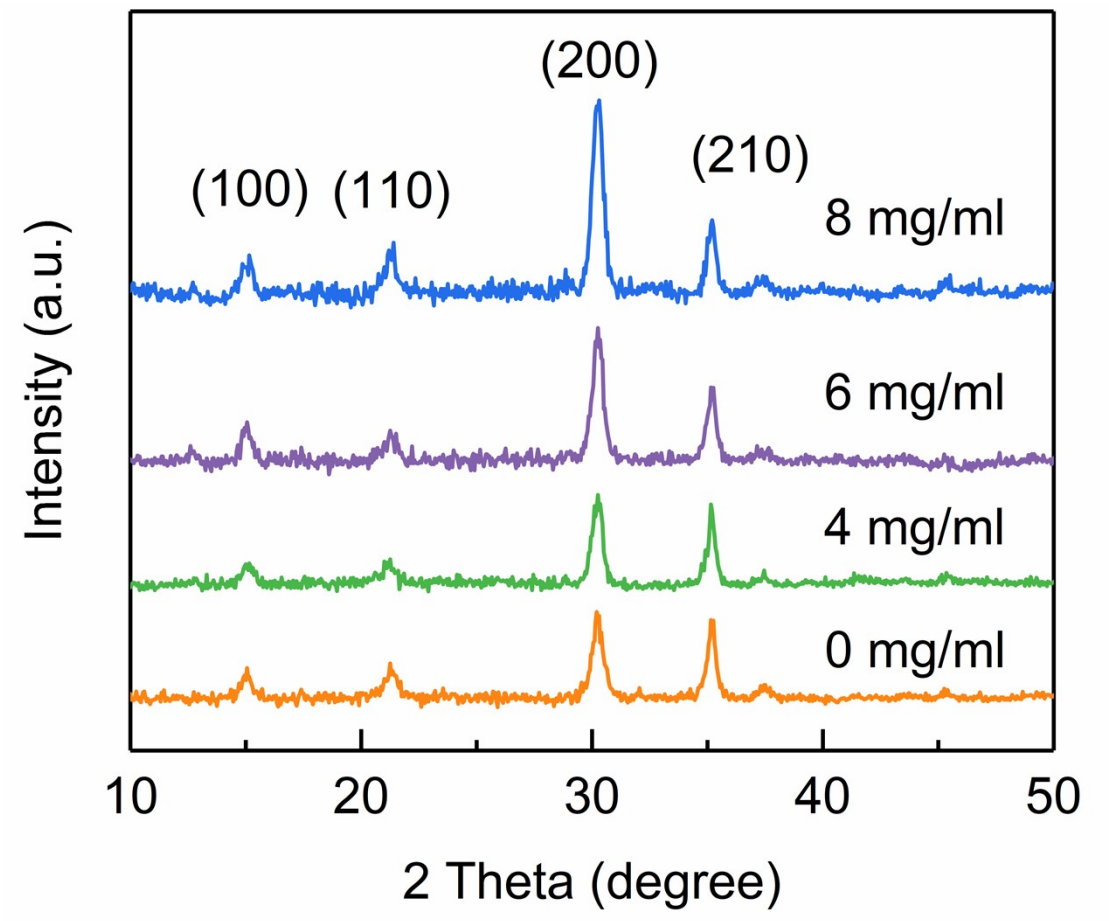

Figure S2. XRD patterns of perovskite films formed on the PEDOT:PSS substrate mixed with various ratios of AT. All the results were normalized by (210) peak.

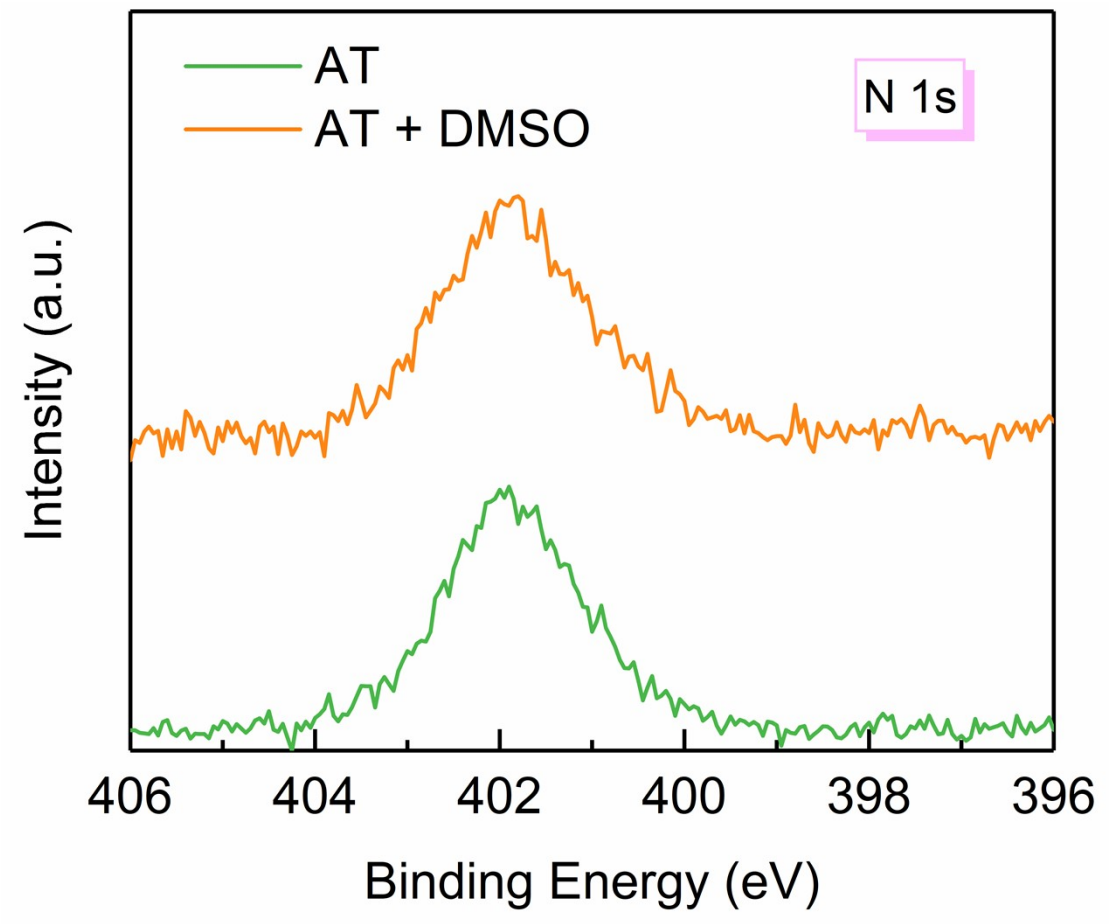

Figure S3. XPS results of the N 1s signal in AT-modified PEDOT:PSS and in AT-modified PEDOT:PSS after washing with DMSO solution.

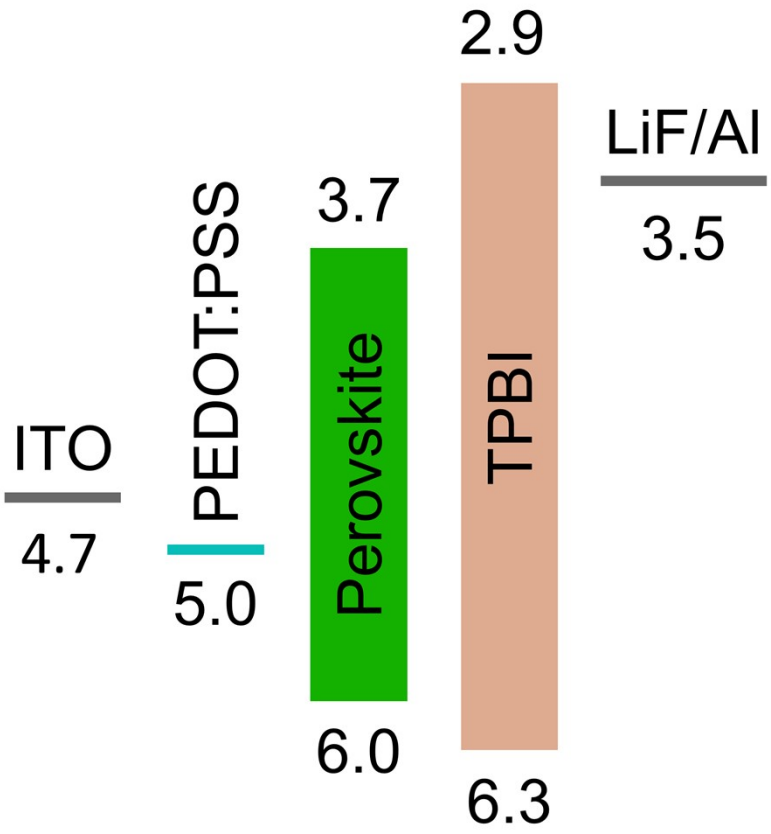

Figure S4. Energy level diagram of PeLEDs (unit: eV)

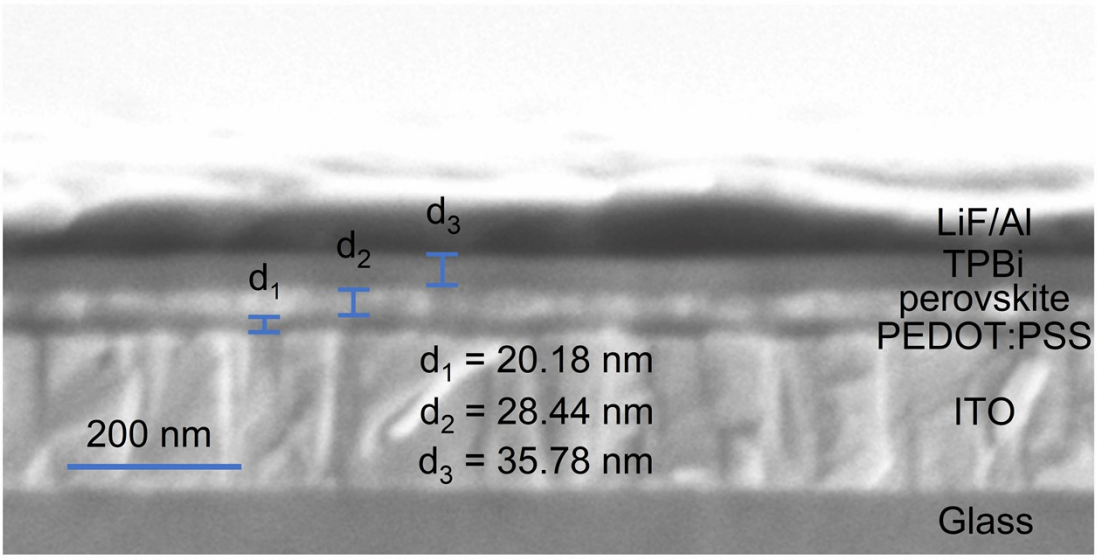

Figure S5. Cross-section SEM images of the PeLED. The thickness of the different functional layers is marked in the figure.

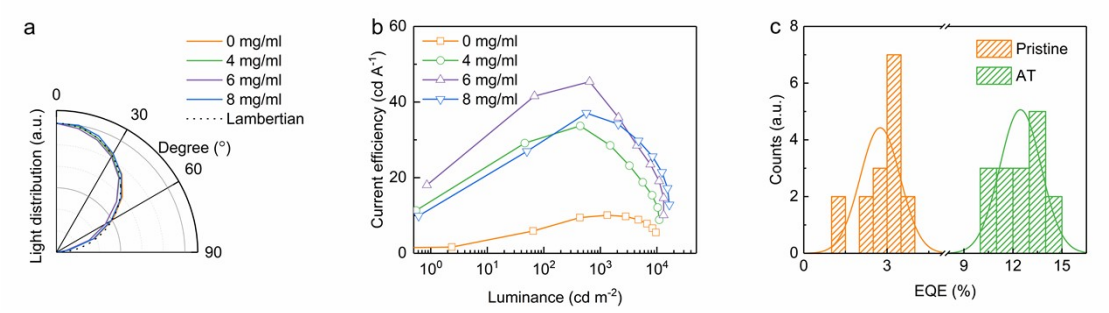

Figure S6. Device performance characteristics of PeLEDs formed on pristine and modified PEDOT:PSS substrates. (a)The angular dependence of the EL intensity. (b) Current efficiency-Luminescence curves. (c) Statistical graph of device performance.

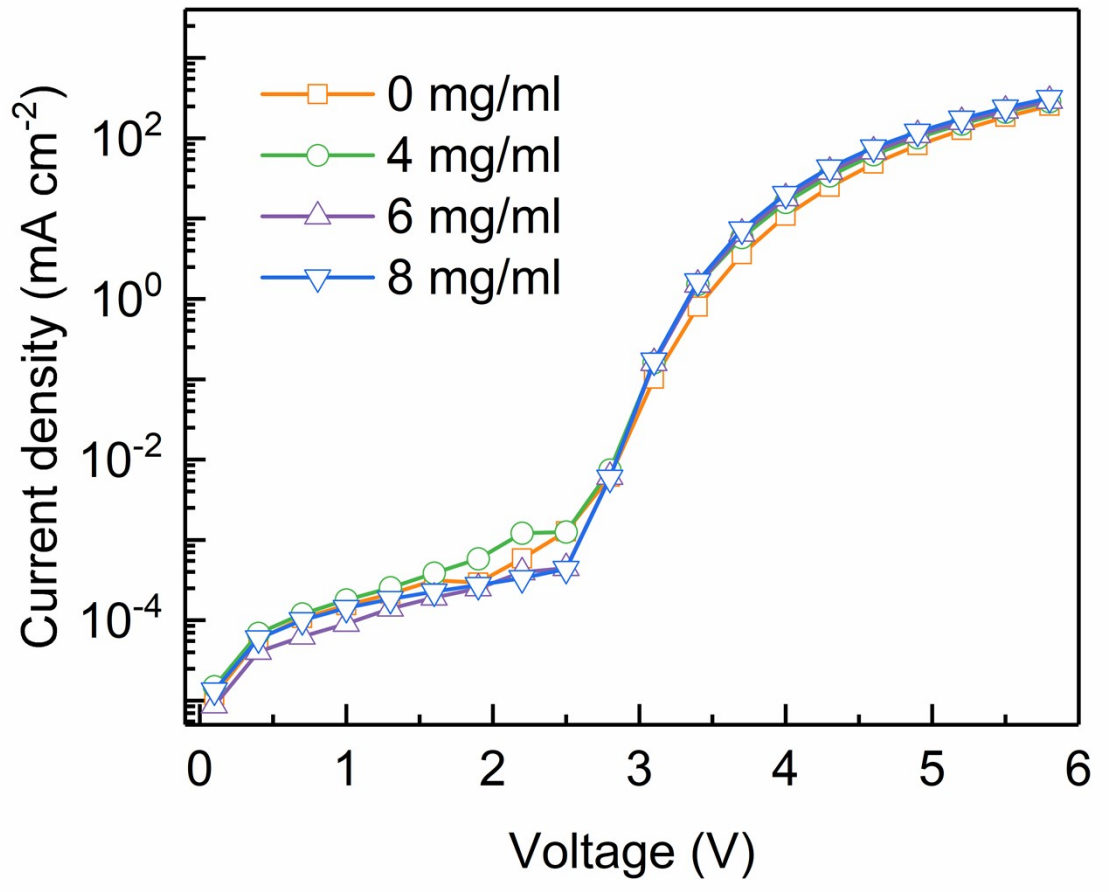

Figure S7. The J-V curves of PeLEDs under the voltage from 0.1 V to 5.8 V.

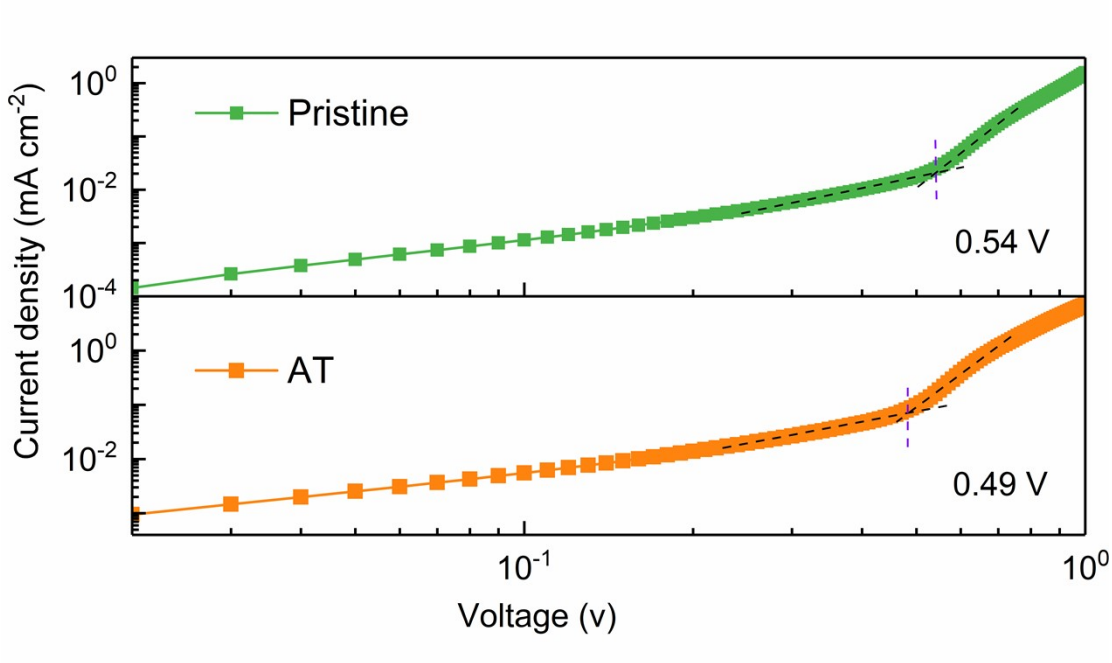

Figure S8. Current density-voltage curves of hole-only devices with a device architecture ITO/pristine or modified PEDOT:PSS/perovskite/MoOx/Ag.

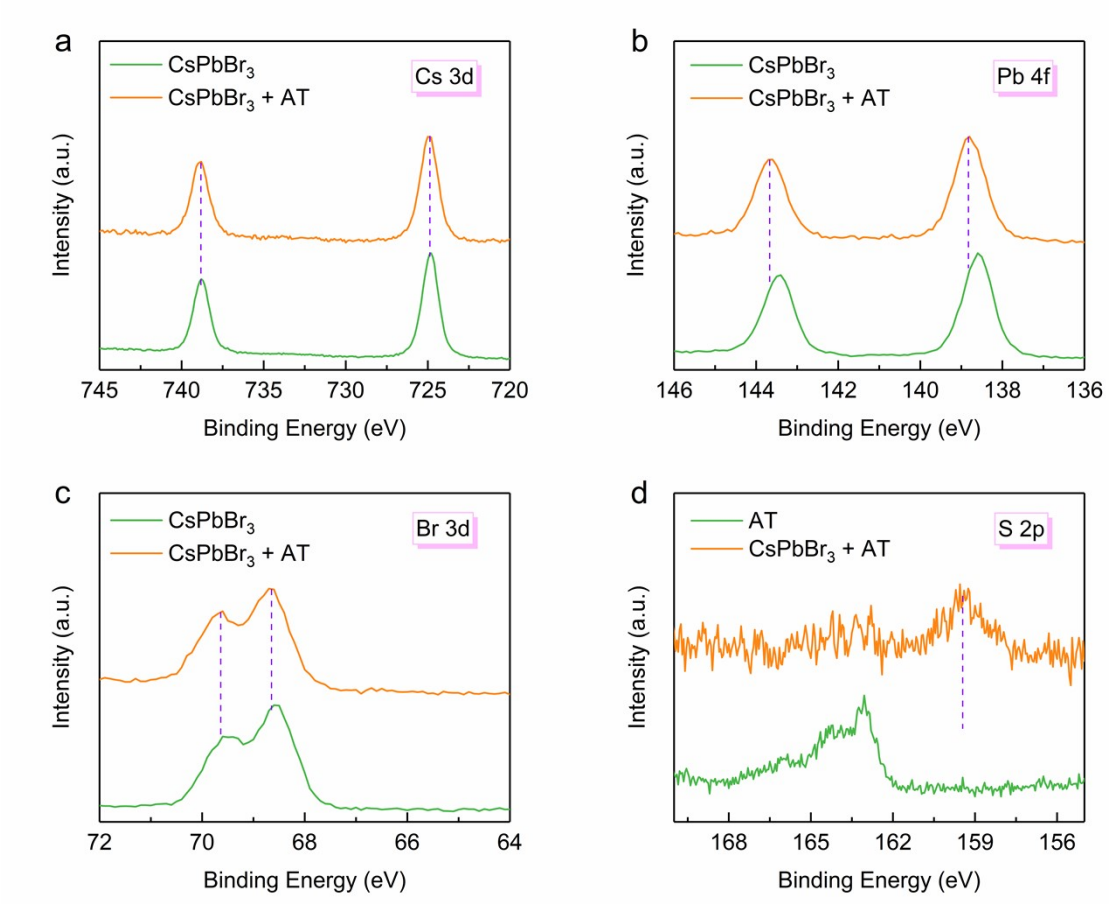

Figure S9. (a-c) XPS survey of Cs 3d, Pb 4f and Br 3d for the pristine and AT-doped $CsPbBr_3$ perovskite. (d) XPS results of S 2p for AT and $CsPbBr_3$ + AT.

Table S1. Time-transient PL spectra fitting of perovskite films on the PEDOT:PSS substrate with various AT ratios.

AT (ratio)	τ_1 [ns]	τ_2 [ns]	A_1 (%)	A_2 (%)	τ_{avg} [ns]
0 mg/ml	3.13	36.36	32.25	67.75	25.64
4 mg/ml	3.60	40.29	28.22	71.78	29.94
6 mg/ml	3.96	44.90	25.74	74.26	34.36
8 mg/ml	3.71	41.96	27.86	72.14	31.30

The TRPL decay curves of perovskite films were fitted with a bi-exponential decay function of $I(t) = A_1 \times \exp[-t/\tau_1] + A_2 \times \exp[-t/\tau_2]$, where A_1 and A_2 correspond to the decay amplitudes of the curve fitting, τ_1 and τ_2 correspond to the decay time constants of the fast and slow processes. The average lifetime τ_{avg} was calculated by $\tau_{avg} = (A_1\tau_1 + A_2\tau_2)/(A_1 + A_2)$.