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Electronic Supplementary Information

Solvent engineering approach via introducing poly (3, 4-ethylene dioxy-thiophene)–poly (styrene sulfonate) (PEDOT:PSS) into photosensitive absorber layer for ambient temperature processed efficient inverted planar perovskite solar cells

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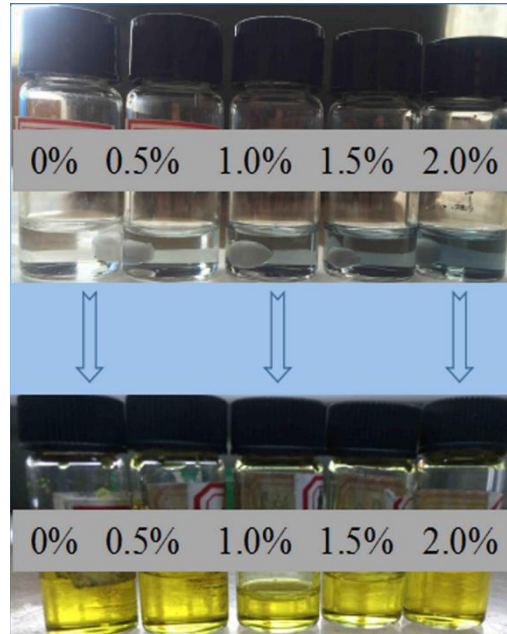


Fig. S1 The photograph of (up) mixed DMF solvents with different volume ratio of PEDOT:PSS aqueous solution and (down) Perovskite precursor solution fabricated with the mixed solvents of DMF and PEDOT:PSS aqueous solution (different volume ratios of 0 v%, 0.5 v%, 1.0 v%, 1.5 v%, 2.0 v%).

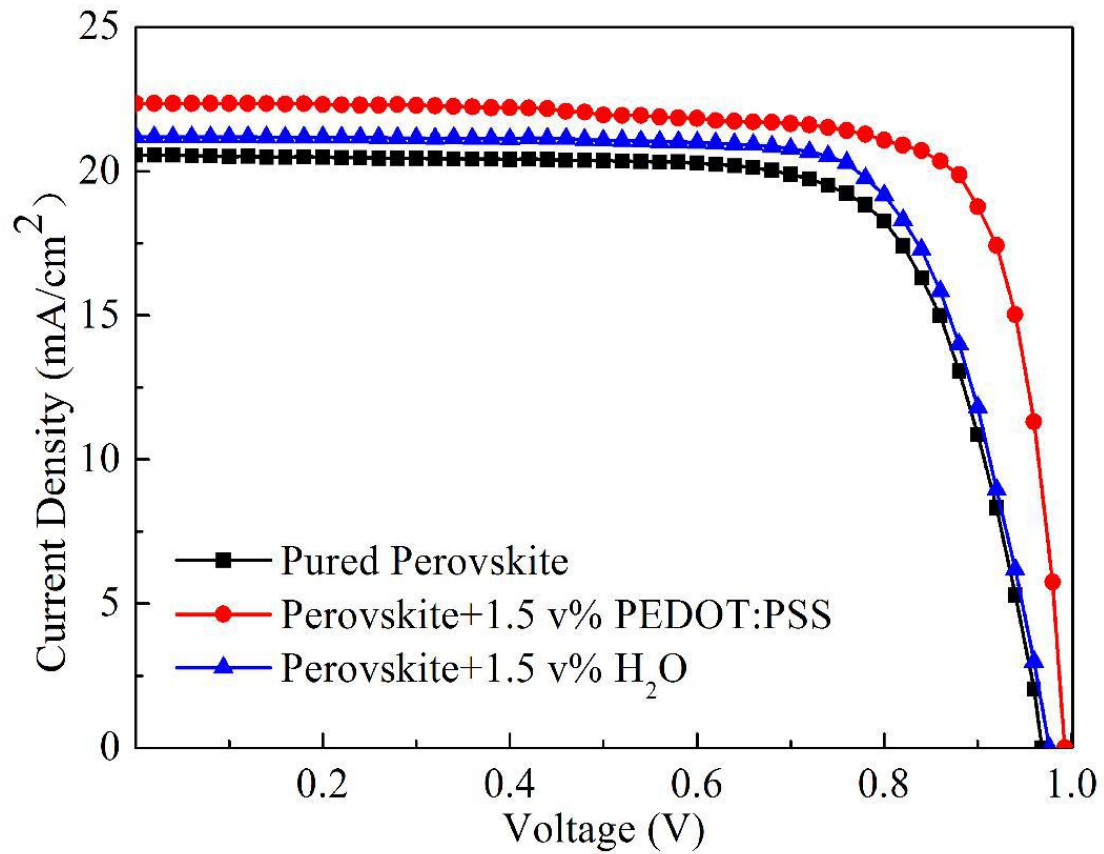


Fig. S2 The J-V curves of the devices based on different perovskite films: (Black line) pure perovskite; (Red line) perovskite doped with 1.5 v% PEDOT:PSS; (Blue line) perovskite doped with 1.5 v% H₂O, respectively.

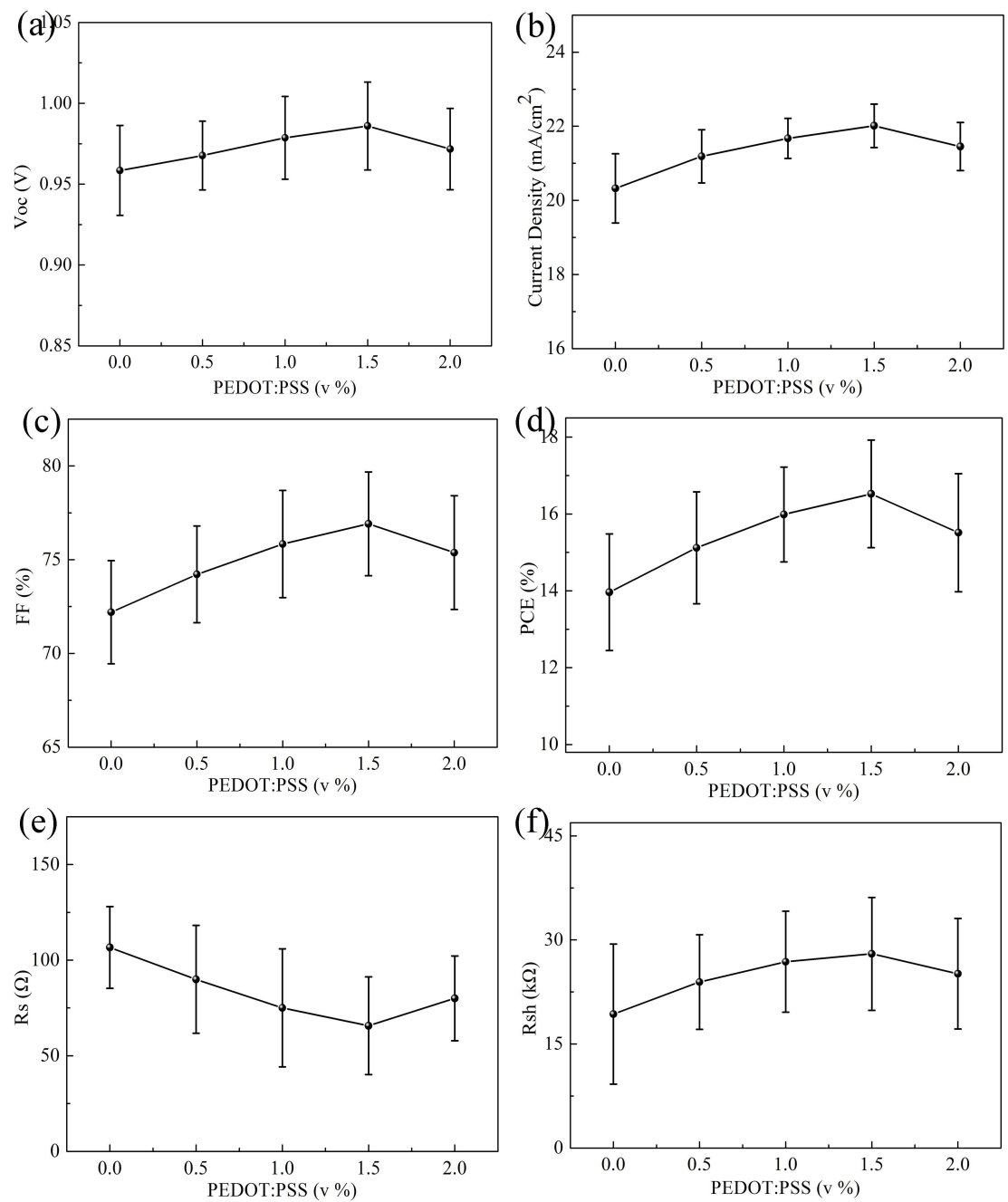


Fig. S3 The mean and standard deviations of the (a) PCE, (b) Voc, (c) Jsc, (d) FF, (e) Rs and (f) Rsh of the PSCs based on CH₃NH₃PbI_{3-x}Cl_x-PEDOT:PSS film with different volumes of PEDOT:PSS additives (0 v%, 0.5 v%, 1.0v%, 1.5 v%, and 2.0 v%).

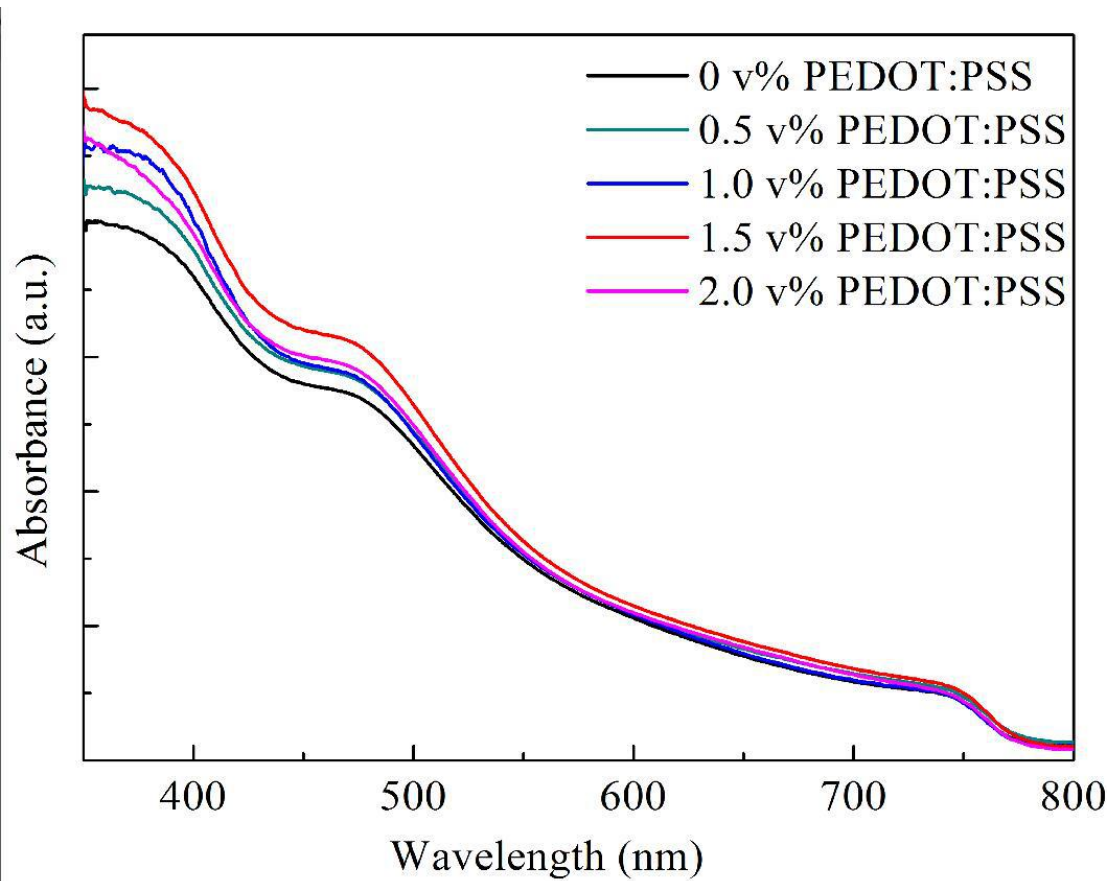


Fig. S4 UV/Vis absorption spectra of the PSCs based on CH₃NH₃PbI_{3-x}Cl_x-PEDOT:PSS film with different volumes of PEDOT:PSS additives (0 v%, 0.5 v%, 1.0 v%, 1.5 v%, and 2.0 v%).

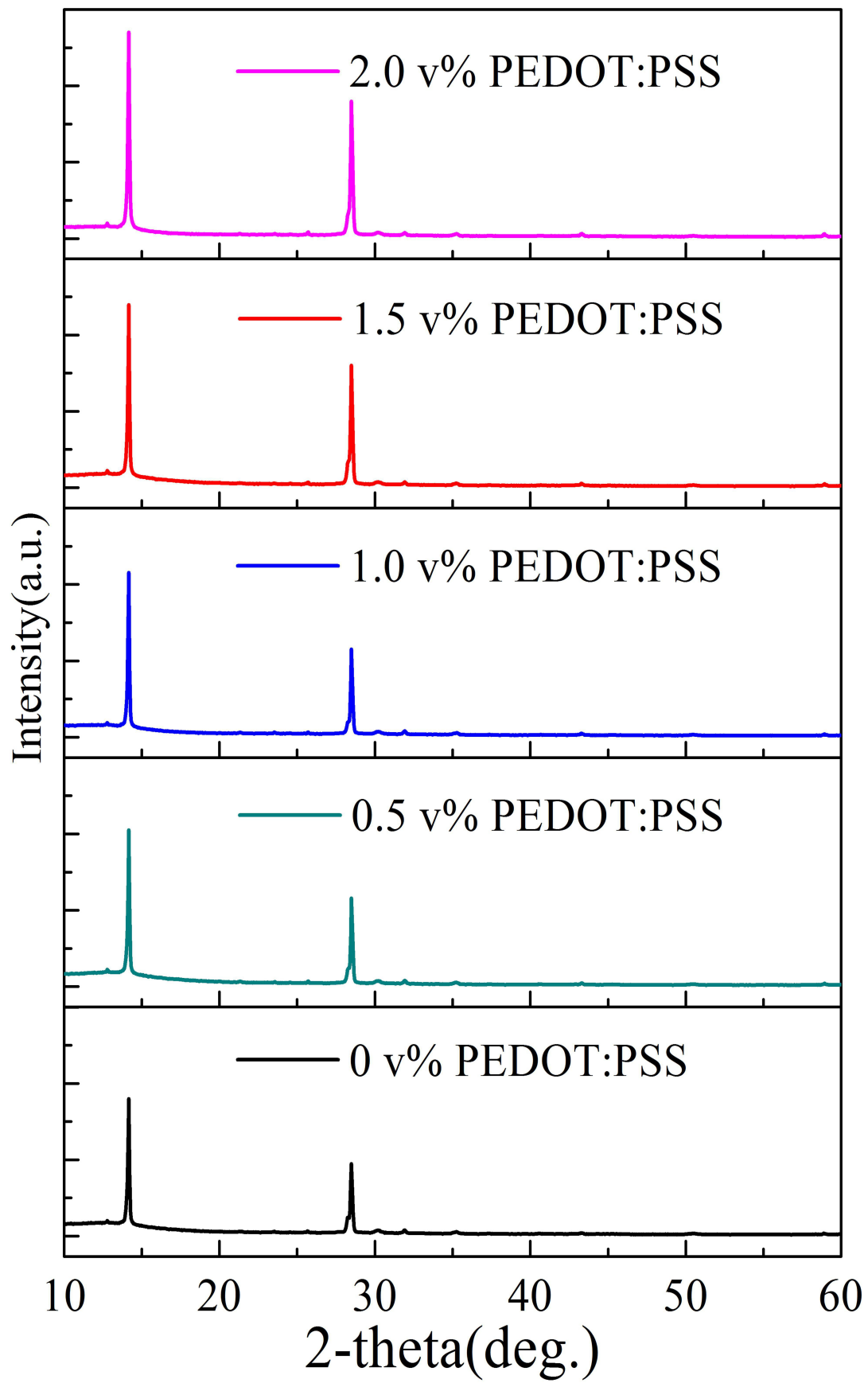


Fig. S5 X-ray diffraction patterns of perovskite film with different volume ratio of

the PEDOT:PSS additives (0 v%, 0.5 v%, 1.0v%, 1.5 v%, and 2.0 v%).

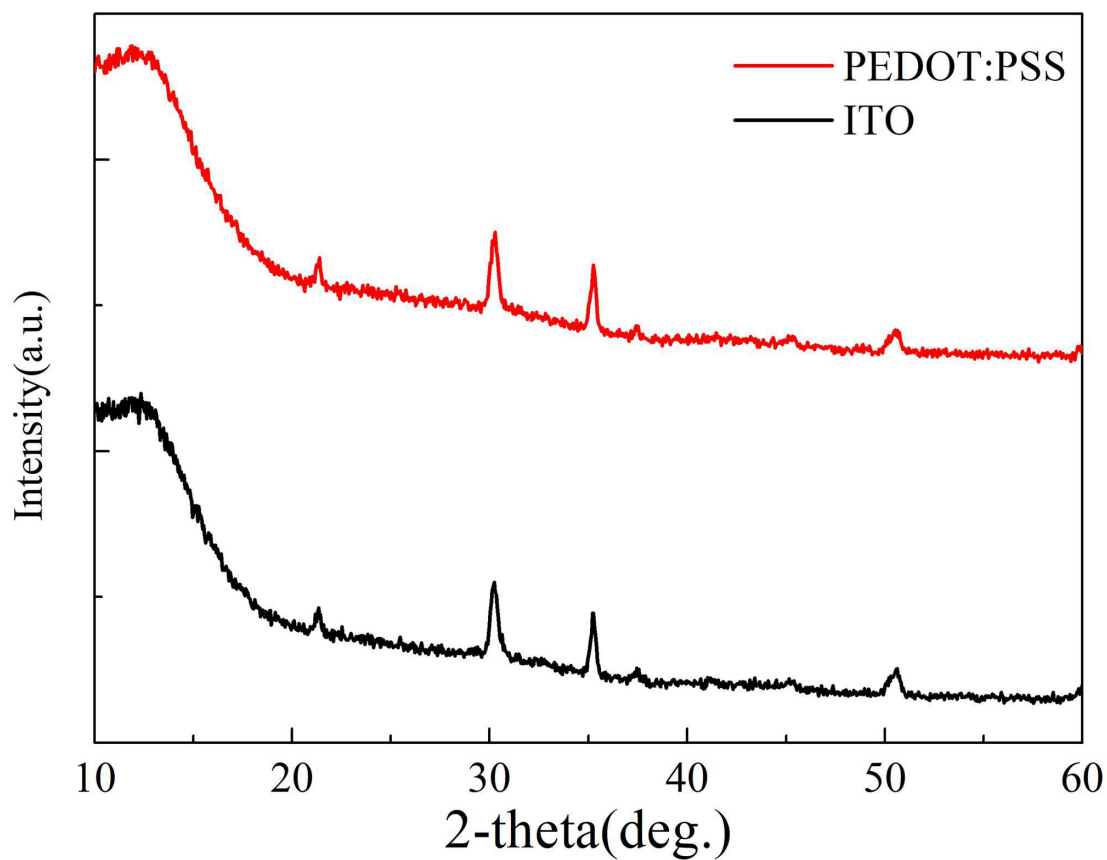


Fig. S6 The X-ray diffraction patterns of the PEDOT:PSS film and the ITO substrate.

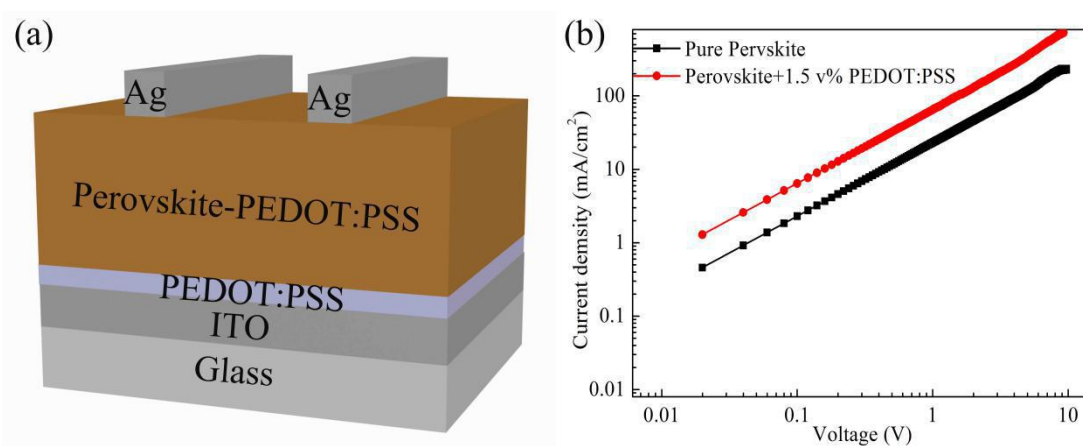


Fig. S7 The hole mobility measurement: the device structure with a hole-only (a) and the corresponding current-voltage curve for device based on perovskite film without and with the PEDOT:PSS (b).

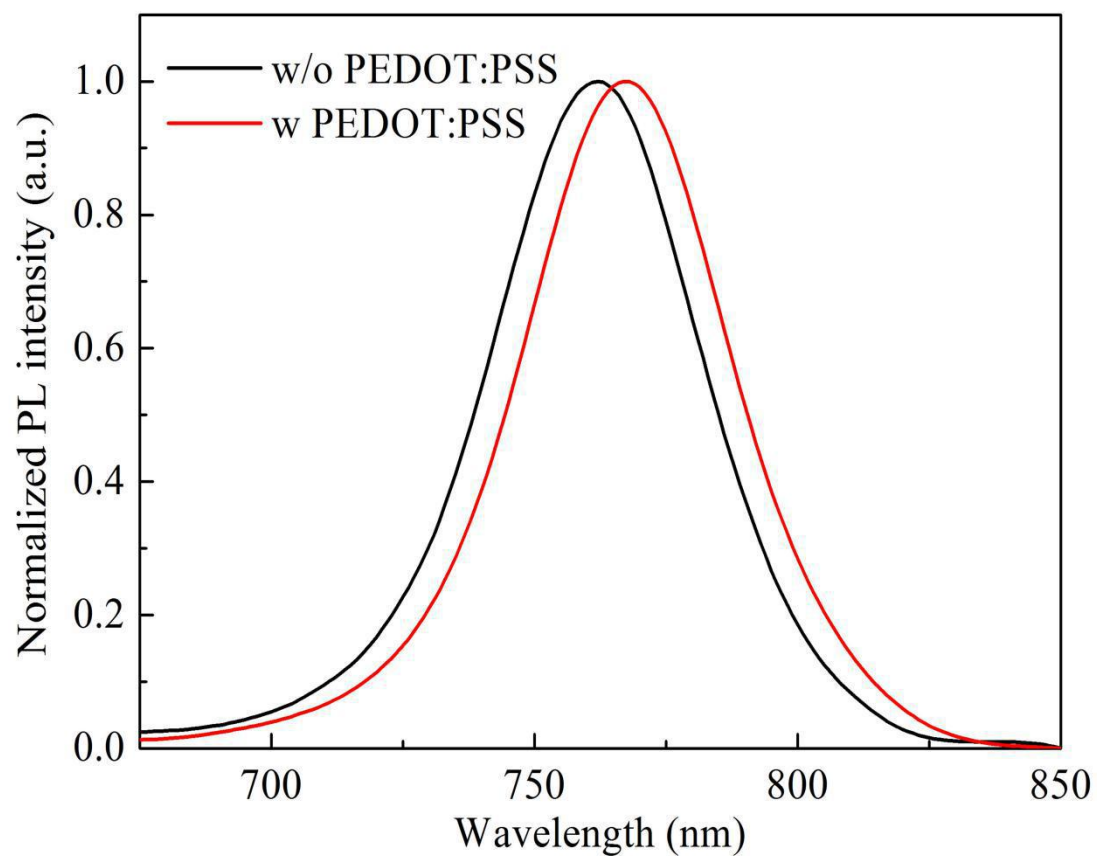


Fig. S8 Normalized steady-state PL spectra of perovskite films without and with the PEDOT:PSS additive on the glass.

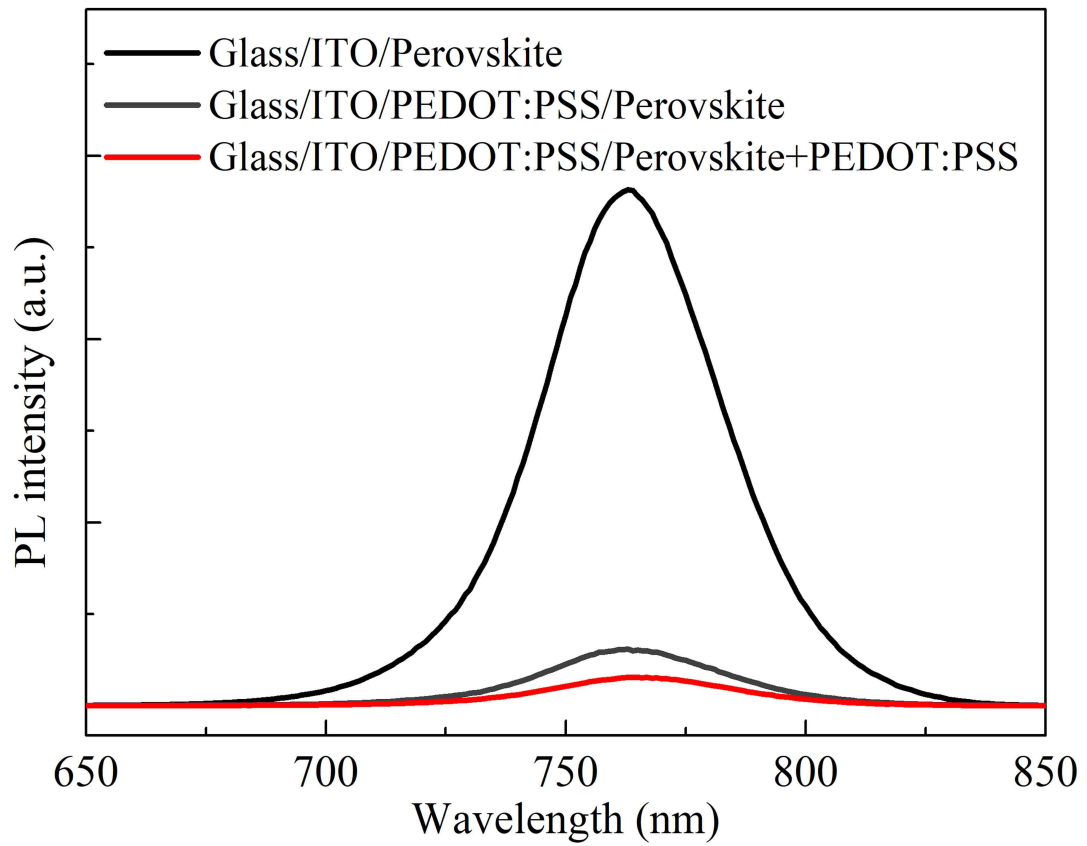


Fig. S9 Photoluminescence spectra of perovskite film without additive deposited on ITO substrate and on PEDOT:PSS film, perovskite film with 1.5 v% PEDOT:PSS additive on PEDOT:PSS film.