Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Highly oriented quasi-2D layered tin halide perovskites with 2-thiopheneethylammonium iodide for efficient and stable tin perovskite solar cells

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Supporting information

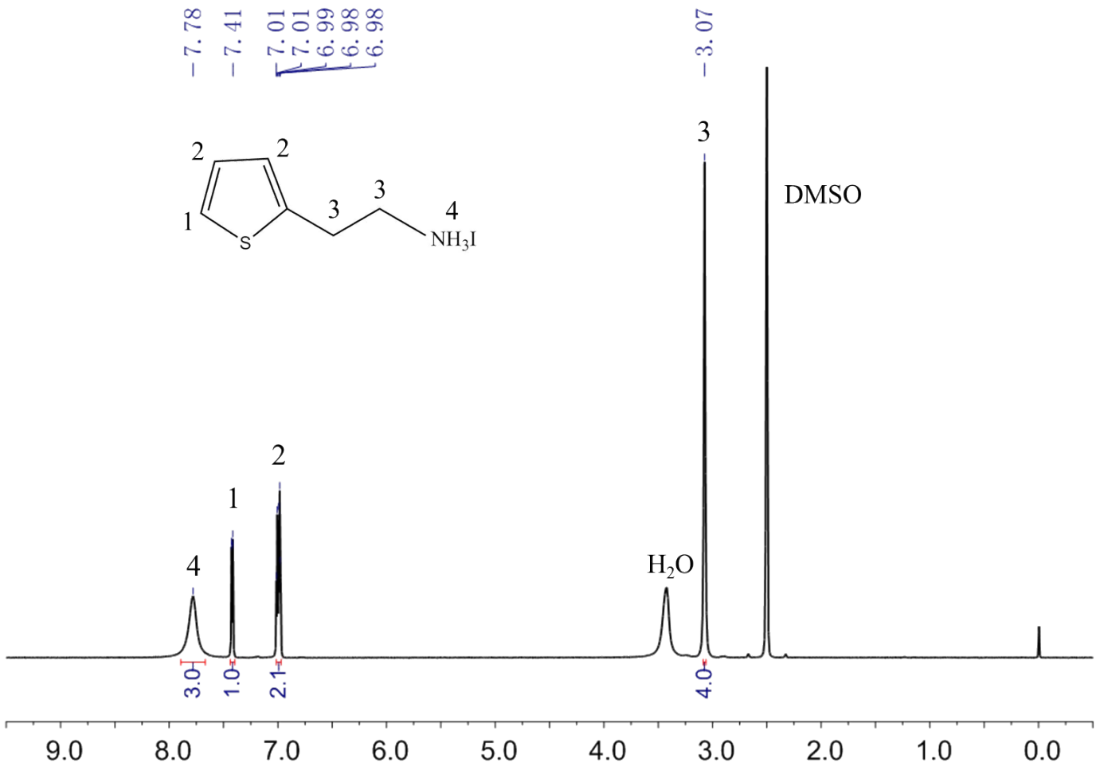

Fig. S1. The ^{1}H NMR spectrum of TEAI.

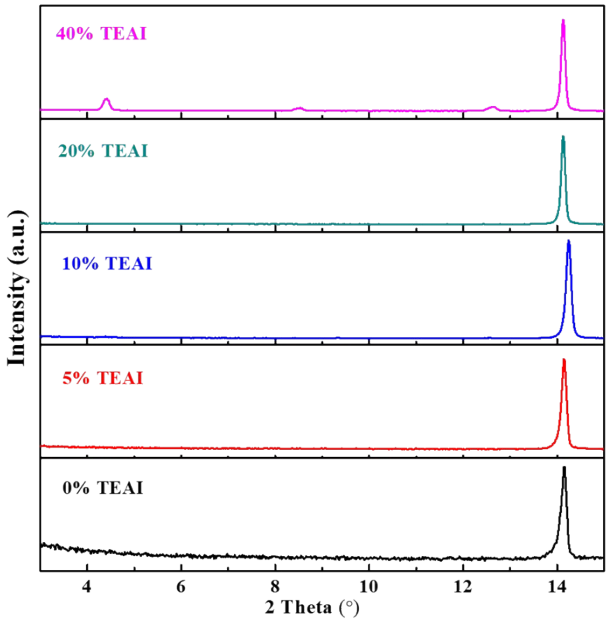

Fig. S2. The enlarged XRD pattern of the pristine $MASnI_3$ film and the $MASnI_3$ films with different amounts of TEAI, from range 3°-15°.

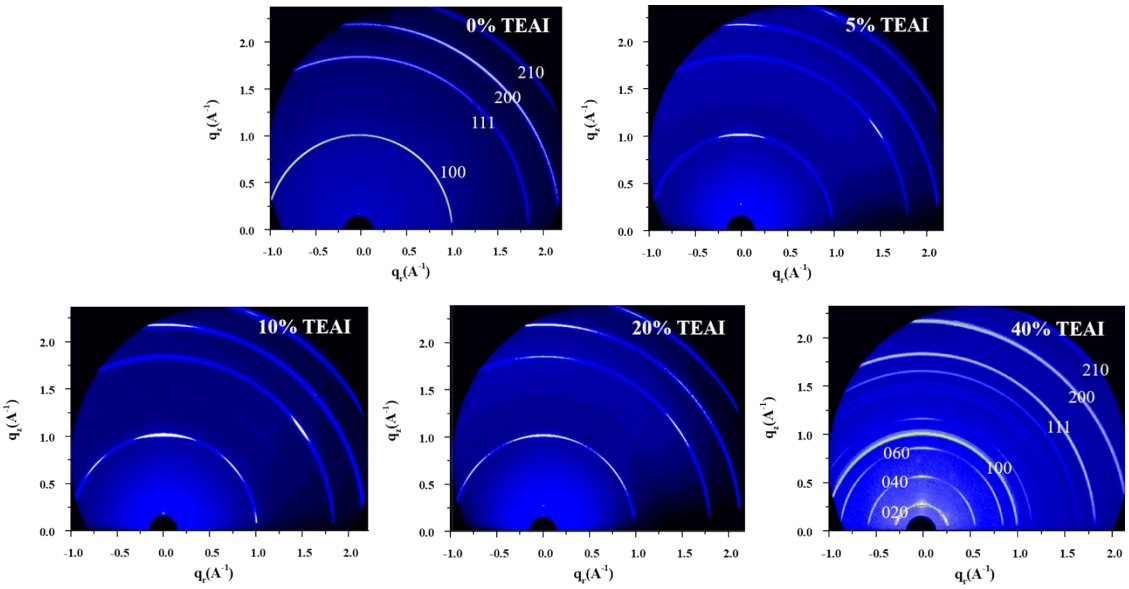

Fig. S3. GIWAXS images of the perovskite films with 0%, 5%, 10%, 20%, and 40% TEAI, respectively.

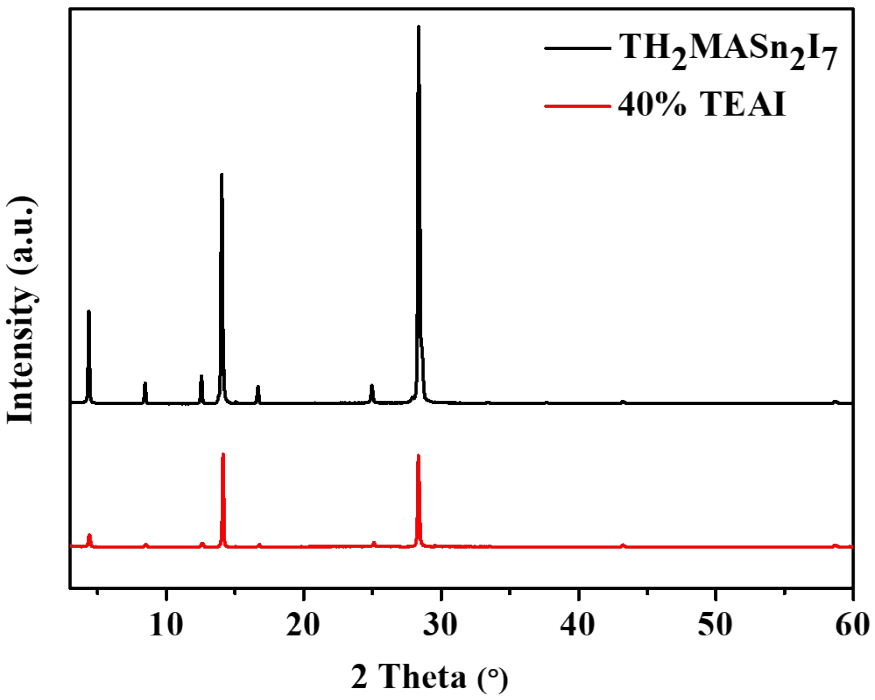

Fig. S4. XRD patterns of the $TH_2MASn_2I_7$ film and the 40% TEAI film.

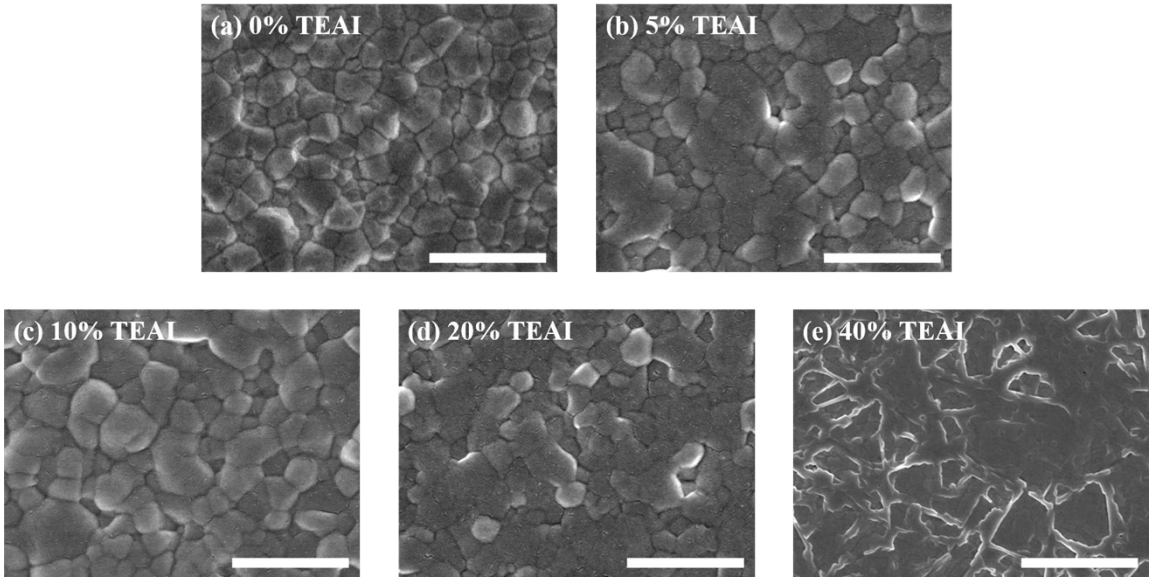

Fig. S5. Surface SEM images of the perovskite films with 0%, 5%, 10%, 20%, and 40% TEAI, respectively.

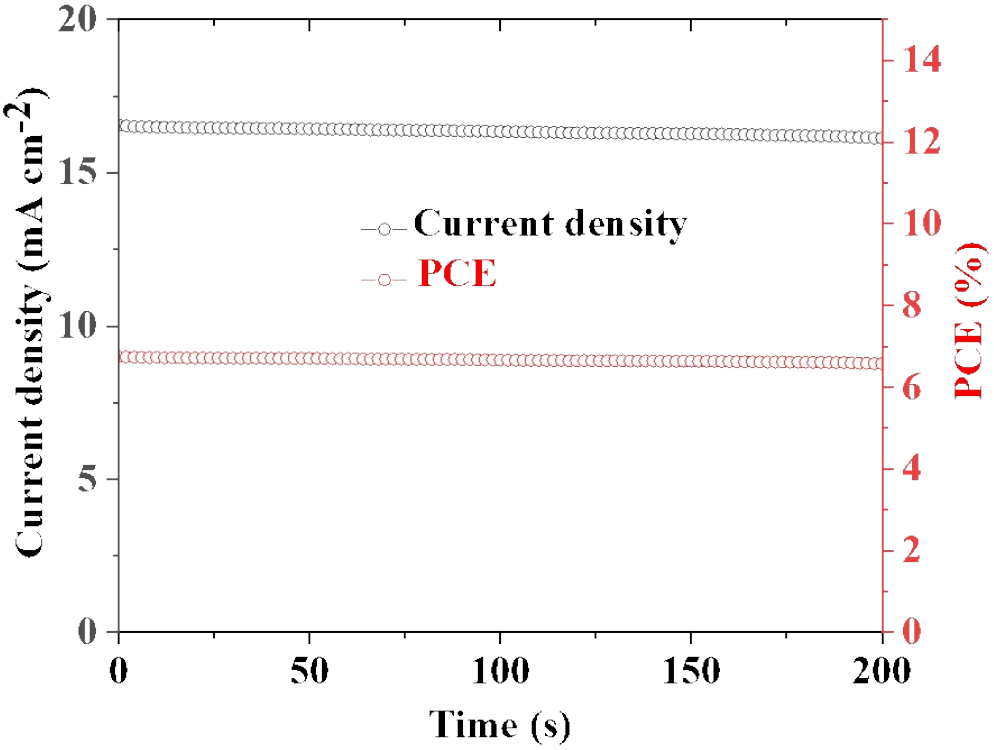

Fig. S6. Stabilized current and power output of the device with 10% TEAI, monitored under a constant bias of 0.41 V.

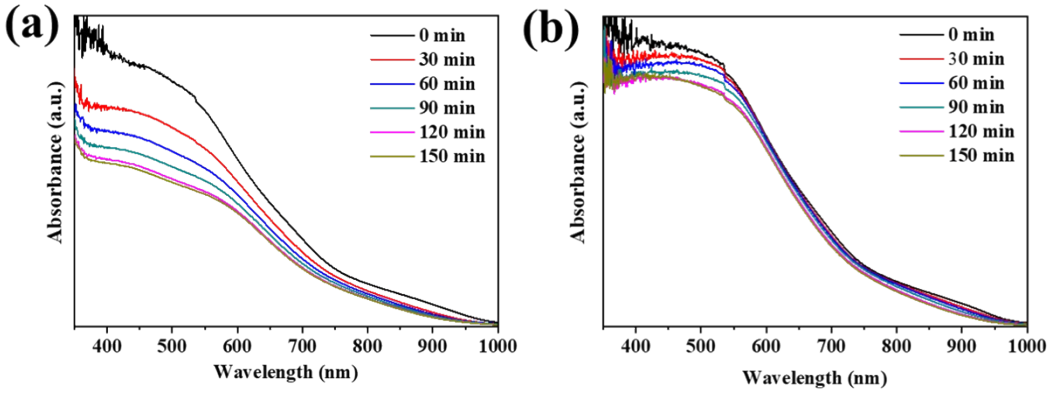

Fig. S7. UV-vis absorption spectra of perovskite films without (a) and with 10% TEAI (b), stored in air at 25 ~ 35 °C and 30 ~ 45% RH.

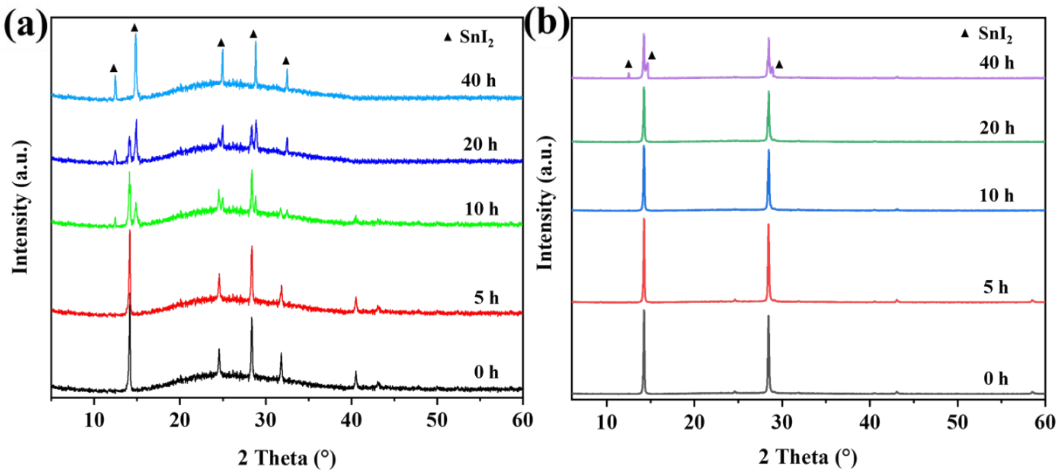

Fig. S8. XRD patterns of perovskite films without (a) and with 10% TEAI (b), stored in air at 25 ~ 35 °C and 30 ~ 45% RH.

Table S1 TRPL characteristics values of the control and 10% TEAI perovskite (the effect of IRF has been eliminated by deconvolution during the fitting process)

Samples	τ_1 (ns)	τ_2 (ns)	A_1(%)	A_2(%)	τ_{ave} (ns)
Control	0.147394	1.126329	212.88935	370.22434	0.7689
With 10% TEAI	11.66845	0.65143	336.59982	488.13155	5.1478

$\tau_{ave} = (\tau_1 * A_1 + \tau_2 * A_2)/(A_1 + A_2)$