Supplementary Information

Promoting the perovskite crystal growth to achieve highly efficient and stable solar cells by introducing acetamide additive

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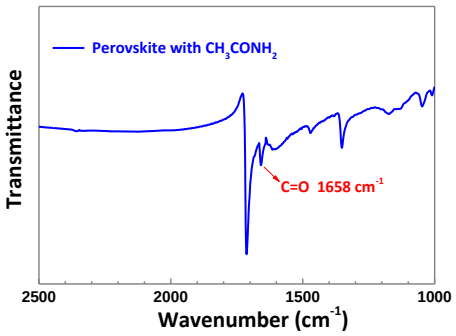

Fig. S1. Partial enlargement of fourier transform infrared (FTIR) spectra of perovskite powder with CH_3CONH_2.

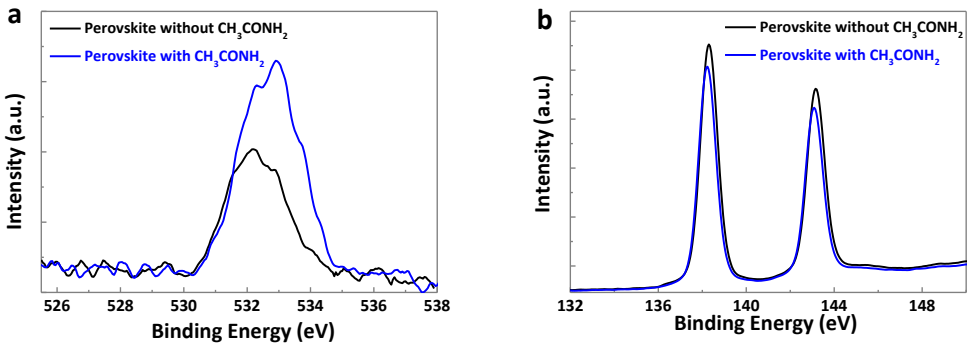

Fig. S2. X-ray photoelectron spectroscopy (XPS) of O 1s (a) and Pb 4f (b) of perovskite films with (5 mg/mL) and without CH_3CONH_2.

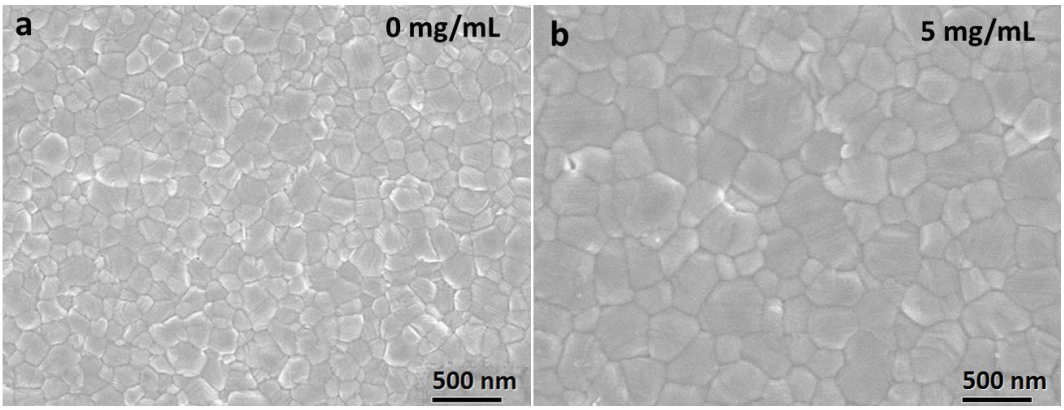

Fig. S3. Top view SEM images of perovskite films (b) with and (a) without CH_3CONH_2.

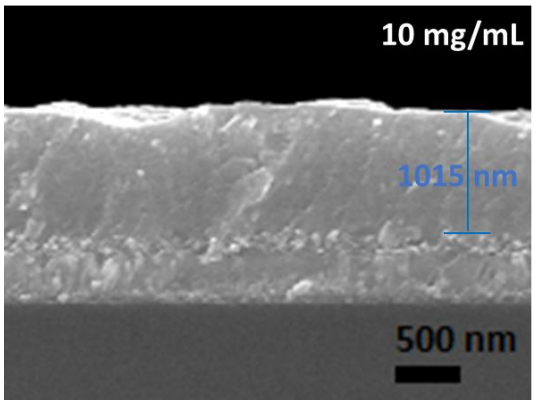

Fig. S4. cross-sectional SEM images of perovskite films with 10 mg/mL CH_3CONH_2.

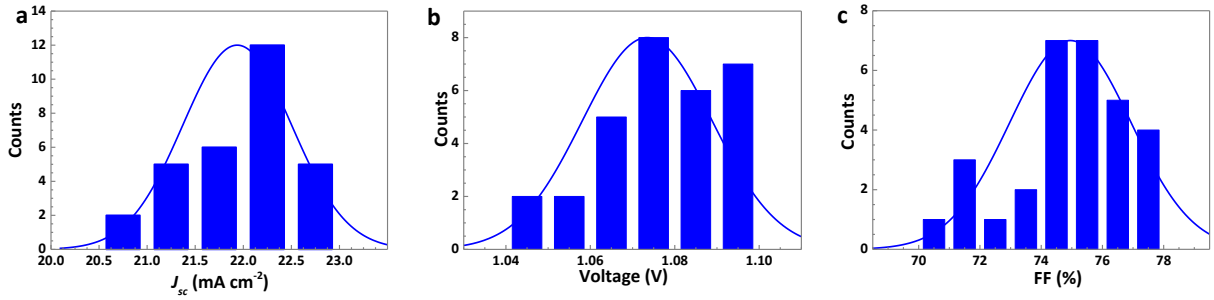

Fig. S5. (a) Short-circuit current density (J_{sc}), (b) open circuit voltages (V_{oc}) and (c) fill factor (FF) histogram fitted with a Gaussian distribution of the devices with 5 mg/mL CH_3CONH_2 over 30 measured devices.

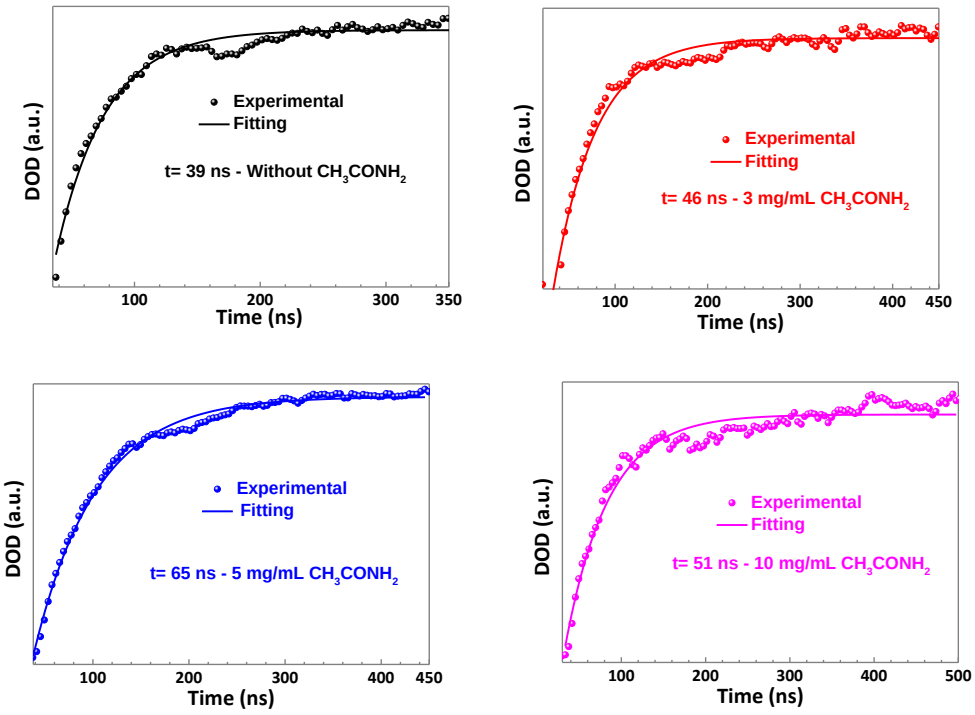

Fig. S6. Normalized TA responses of perovskite films with varied ratios of CH_3CONH_2 (0, 3, 5, 10 mg/mL).

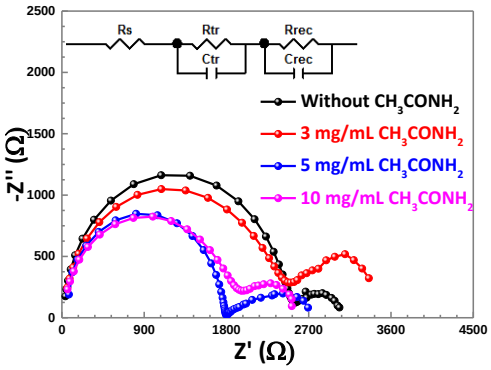

Fig. S7. Nyquist plots of perovskite devices with varied ratios of CH_3CONH_2 (0, 3, 5, 10 mg/mL) at V=0.9 V.

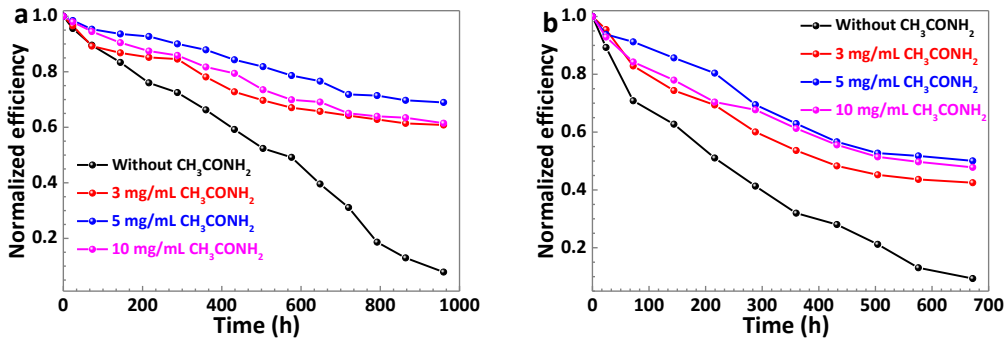

Fig. S8. Normalized efficiency variation curves of unsealed perovskite devices with varied ratios of CH_3CONH_2 (0, 3, 5, 10 mg/mL) under (a) 50% and (b) 80% RH.

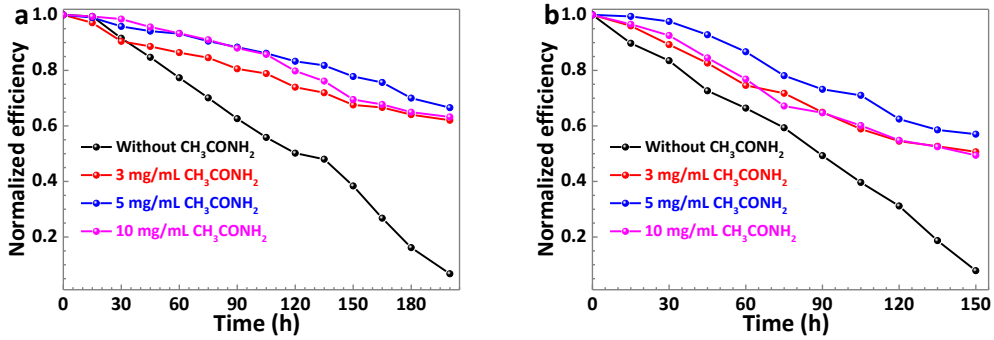

Fig. S9. Normalized efficiency variation curves of unsealed perovskite devices with varied ratios of

CH_3CONH_2 (0, 3, 5, 10 mg/mL) at (a) 60 °C and (b) 85 °C.

Table S1. Photovoltaic parameters of perovskite devices with varied ratios of CH_3CONH_2 (0, 3, 5, 10, 15 and 20 mg/mL).

Device	J_{sc} (mA cm^{-2})	V_{oc} (V)	FF (%)	PCE (%)
0 mg/mL	21.91	1.02	73.56	16.44
3 mg/mL	22.64	1.09	75.46	18.62
5 mg/mL	22.89	1.09	76.19	19.01
10 mg/mL	22.41	1.09	73.05	17.84
15 mg/mL	20.43	1.02	67.44	14.05
20 mg/mL	18.52	0.98	66.39	12.08

Table S2. Photovoltaic parameters of perovskite devices with (5 mg/mL) and without CH_3CONH_2 under reverse and forward scan directions.

Device	J_{sc} (mA cm^{-2})	V_{oc} (V)	FF (%)	PCE (%)
Without-Reverse	21.91	1.02	73.56	16.44
Without-Forward	19.19	1.02	75.77	14.83
With-Reverse	22.89	1.09	76.19	19.01
With-Forward	22.84	1.09	74.38	18.52