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Electronic Supplementary Information

Constructing water-resistant CH₃NH₃PbI₃ perovskite films via coordination

interaction

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Figure S1 Photographs of PbI_2/DMF solutions added with 0 M, 0.1 M, 0.2 M, 0.3 M and 0.4 M 2-AET as additive at room temperature.



Figure S2 FTIR spectra of MAI and MAI/2-AET DMF solution in the range of 3500-500 cm⁻¹;



Figure S3 Photographs (a) of perovskite precursor solution extracted with ethyl acetate; Tyndall effect (b) of perovskite precursor solution without 2-AET (left) and with 2-AET (right) extracted with ethyl acetate; XRD patterns of complex extracted from the precursor solution before (c) and after annealed at 100°C for 30 min. The insert photographs are solid complexes.

Table S1 1 Peak intesity and FWHM of annealed perovskite films

Samples	2-Theta	Height	FWHM
0 MIN	14.137	3408	0.221
3 MIN	14.073	21546	0.147
6 MIN	14.072	24814	0.153
9 MIN	14.073	26562	0.161
12 MIN	14.139	33284	0.111
15 MIN	14.150	32039	0.114
20 MIN	14.151	37928	0.112
30 MIN	14.151	39841	0.113
0 M 2-AET	14.154	3939	0.142

obtained from XRD spectra.



Figure S4 SEM images of MAPbI₃·(075)2-AET perovskite films with different thermal annealing time at 100°C prepared on FTO substrates, (a): 0 min; (b): 6 min; (c): 8 min; (d): 30 min; (e): Counts for the size of perovskite grains before annealing and after annealing 10 min at 100°C;



Figure S5 UV-vis absorption spectra of MAPbI₃·(0.75)2-AET perovskite films with different thermal annealing time at 100 °C prepared on FTO substrates, (black): 0 min; (red): 1 min; (orange): 3 min; (yellow): 5 min; (green):12 min; (cyan): 15 min; (blue): 30 min; (violet): 60 min.



Figure S6 XRD patterns of $MAPbI_3 \cdot (1)2\text{-}AET$ perovskite films after annealing at

100°C for 10 min.



Figure S7 SEM images of MAPbI₃·(075)2-AET perovskite films immersed in water

at (a): 0 s, (b): 10 s, (c): 60 s, (d): 180 s and (e): 300 s.



Figure S8 SEM images of MAPbI₃·(075)2-AET perovskite films immersed in water at (a): 0 s, (b): 10 s, (c): 30 s, (d): 60 s, (e): 180 s and (f): 300 s.

Table S2 1 Peak intensity of and FWHM of perovskite films obtained from XRD

Sample	2-Theta	Intensity	FWHM
0 M	12.785	1359	0.186
0.15 M	12.51	784	0.461
0.25 M	12.483	438	0.627
0.3 M	12.222	157	0.872

spectra after immersed in water 15 s.



Figure S9 DSC/ TGA curves of 2-AET.