Supporting Information

Hydrophobic Perovskite based on an Alkylamine Compound for High Efficiency Solar Cells with Improved Environmental Stability

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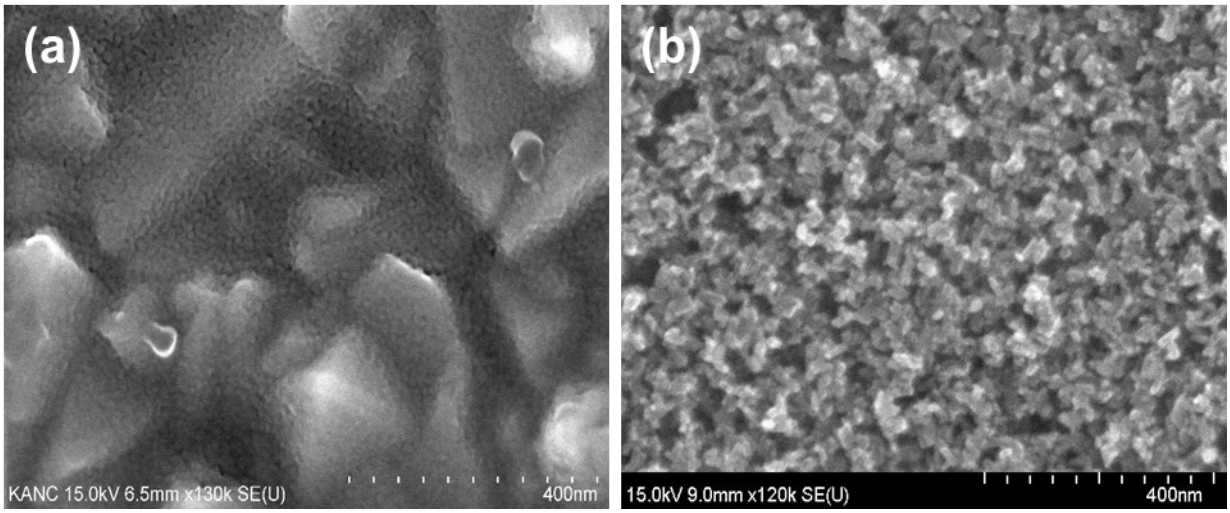

Figure S1. (a) TiO_2 blocking layer on FTO glass and (b) TiO_2 mesoporous layer on the TiO_2 blocking layer.

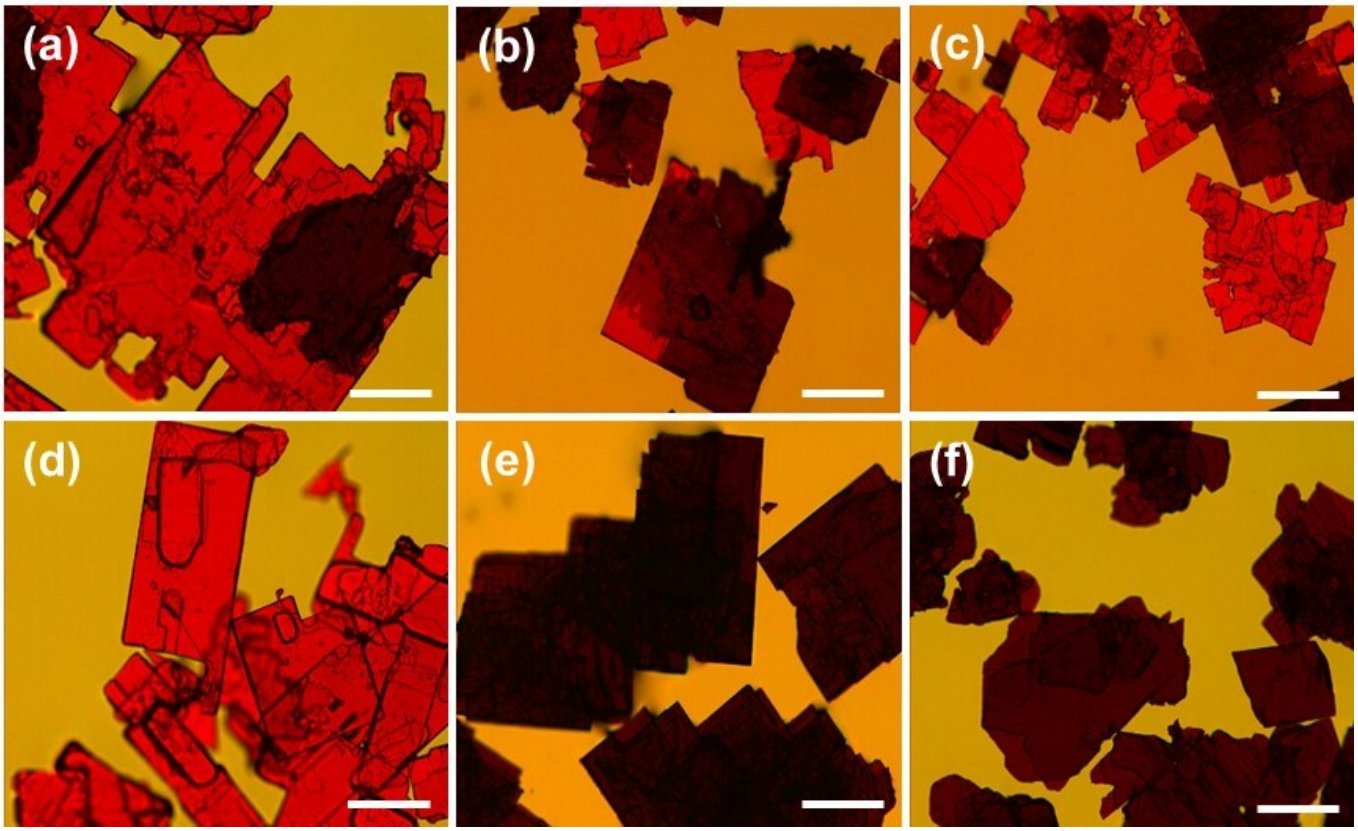

Figure S2. (a) $(HA)_2MAPb_2I_7$ (n = 2) perovskite contaminated with $(HA)_2(MA)_2Pb_3I_{10}$ (n = 3) perovskite, (b-c) $(HA)_2(MA)_2Pb_3I_{10}$ (n = 3) compound contaminated with $((HA)_2MAPb_2I_7$ (n = 2) perovskite, (d) pure $(HA)_2MAPb_2I_7$ (n = 2) and (e-f) $(HA)_2(MA)_2Pb_3I_{10}$ (n = 3) perovskites. The scale bar is 100 μm.

Table S1. Average and standard deviation of photovoltaic parameters for 25 perovskite solar cells based on $(HA)_2(MA)_2Pb_3I_{10}$ perovskite.

Device Number	Jsc [mA/cm^2]	Voc [V]	FF [%]	η [%]
1	12.339	0.688	62.5	5.30
2	12.679	0.689	61.4	5.37
3	11.772	0.683	60.3	4.85
4	12.219	0.717	64.4	5.65
5	13.610	0.721	60.1	5.90
6	12.053	0.747	66.7	6.01
7	11.775	0.737	67.0	5.82
8	12.539	0.734	66.3	6.10
9	12.073	0.723	59.1	5.16
10	12.827	0.745	63.7	6.09
11	13.064	0.739	58.2	5.61
12	12.355	0.741	60.4	5.53
13	12.444	0.742	59.6	5.50
14	12.801	0.731	61.0	5.71
15	12.738	0.747	60.4	5.75
16	12.447	0.731	63.7	5.80
17	12.527	0.728	62.8	5.73
18	12.179	0.741	64.1	5.78
19	12.263	0.712	65.2	5.70
20	11.851	0.734	62.7	5.46
21	11.962	0.730	64.2	5.60
22	13.907	0.691	59.9	5.75
23	14.013	0.690	59.4	5.75
24	13.455	0.724	62.2	6.06
25	11.592	0.752	62.7	5.46
Average	**12.54**	**0.72**	**62.32**	**5.66**
Standard deviation	**0.65**	**0.02**	**2.49**	**0.29**