

## Supporting Information for

# **Crystallization control of wide-bandgap perovskite for efficient solar cells via adding an anti-solvent into the perovskite precursor**

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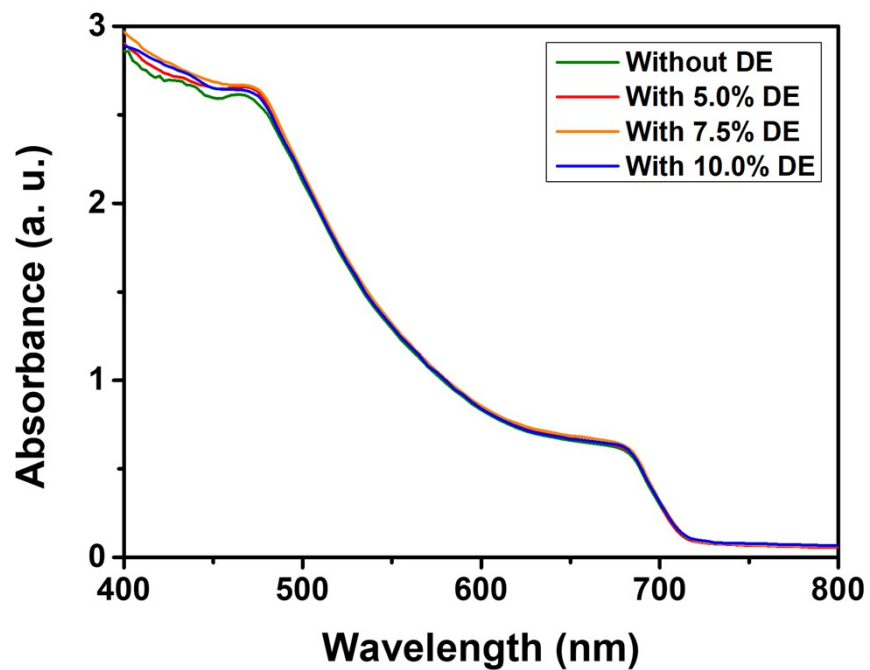


Figure S1. UV-vis absorption spectrum of the  $\text{Cs}_{0.12}\text{MA}_{0.05}\text{FA}_{0.83}\text{Pb}(\text{I}_{0.6}\text{Br}_{0.4})_3$  perovskite films prepared without and with different amounts of DE.

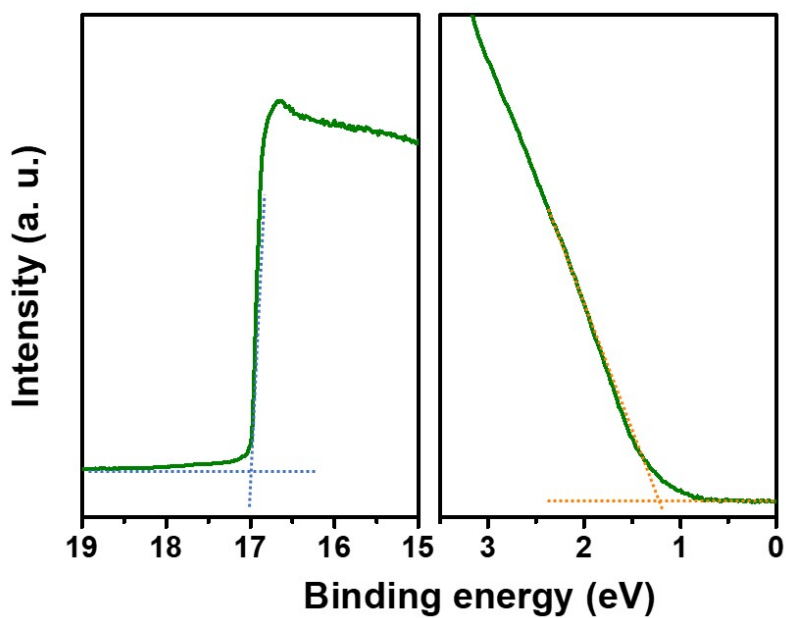


Figure S2. UPS spectra of the  $\text{Cs}_{0.12}\text{MA}_{0.05}\text{FA}_{0.83}\text{Pb}(\text{I}_{0.6}\text{Br}_{0.4})_3$  perovskite films.

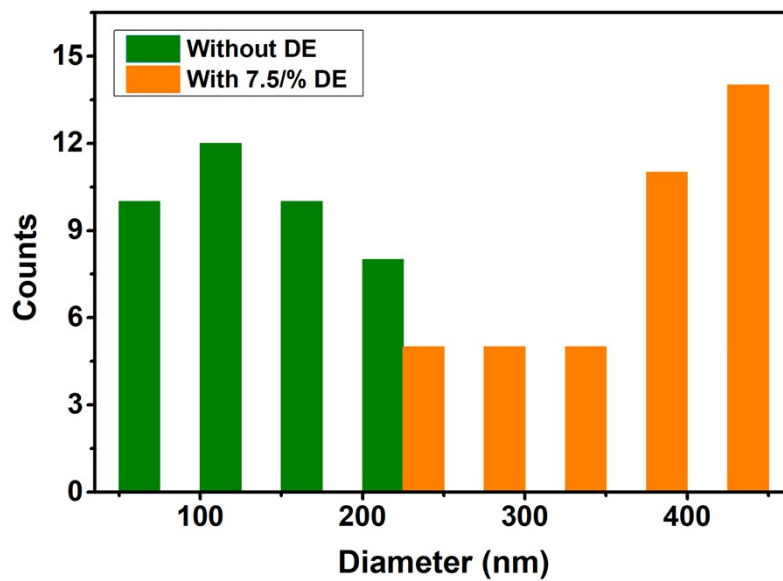


Figure S3. Statistical diameter histograms for the perovskite grains processed without and with 7.5% DE.

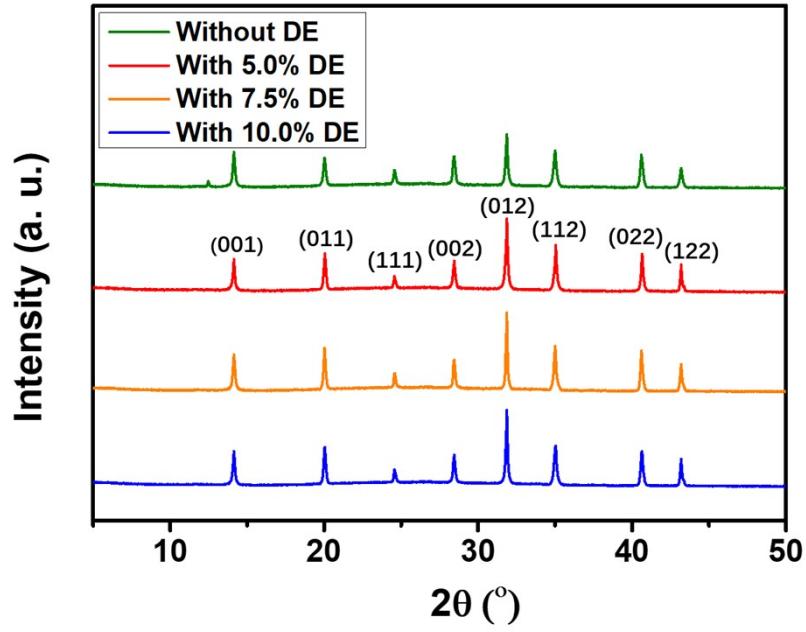


Figure S4. XRD patterns of the perovskite films prepared from precursors without and with different amount of DE.

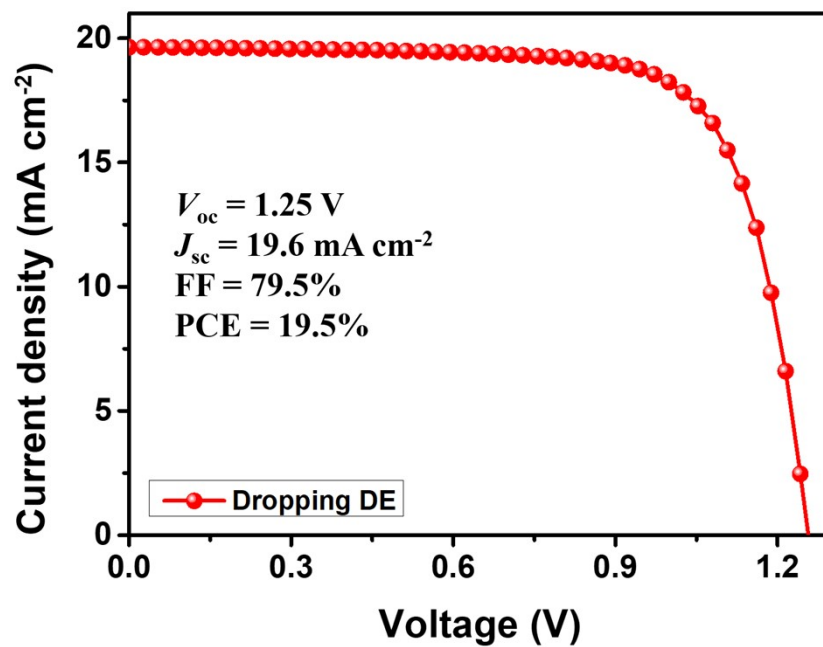


Figure S5.  $J$ - $V$  characteristics for PSCs with dropping DE onto the surface of the samples during spin-coating process.

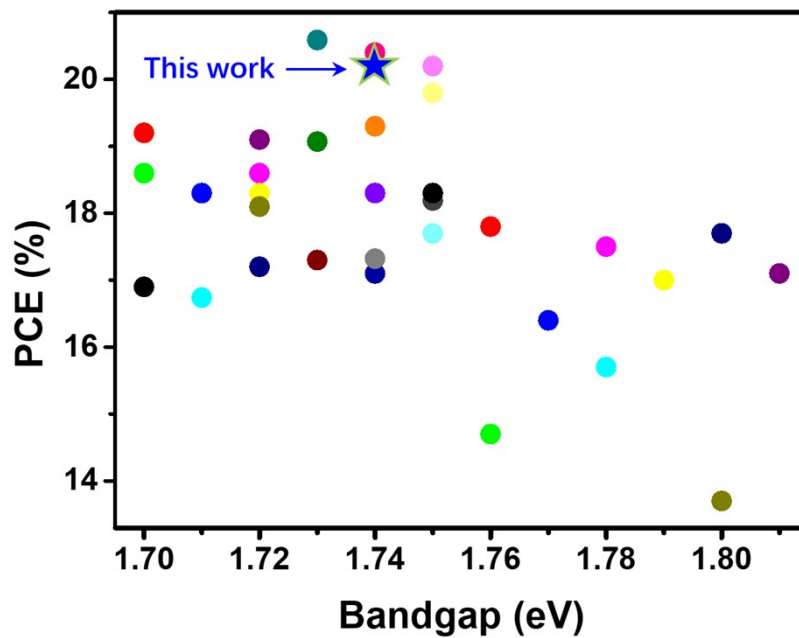


Figure S6. PCE distribution of recently reported wide-bandgap PSCs with bandgaps between 1.70 to 1.81 eV.

Table S1. Recently reported PCEs for wide-bandgap (1.70–1.81 eV) PSCs.

No.	Bandgap (eV)	PCE (%)	Reference
1	1.70	16.9	[1]
2	1.70	19.2	[2]
3	1.70	18.6	[3]
4	1.71	18.3	[4]
5	1.71	16.74	[5]
6	1.72	18.6	[6]
7	1.72	18.3	[7]
8	1.72	18.1	[8]
9	1.72	17.2	[9]
10	1.72	19.1	[10]
11	1.73	17.3	[11]
12	1.73	19.07	[12]
13	1.73	20.59	[13]
14	1.74	17.1	[14]
15	1.74	19.3	[1]
16	1.74	20.1	<i>This work</i>
17	1.74	18.3	[15]
18	1.74	20.37	[16]
19	1.74	20.2	[17]
20	1.74	17.32	[18]
21	1.75	19.8	[19]
22	1.75	17.7	[20]
23	1.75	20.2	[21]
24	1.75	18.19	[22]
25	1.75	18.3	[23]
26	1.76	14.7	[24]
27	1.76	17.8	[25]
28	1.77	16.4	[26]
29	1.78	15.7	[1]
30	1.78	17.5	[27]
31	1.79	17.0	[28]
32	1.80	13.7	[29]
33	1.80	17.7	[30]
34	1.81	17.1	[31]

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