

Supplementary Materials

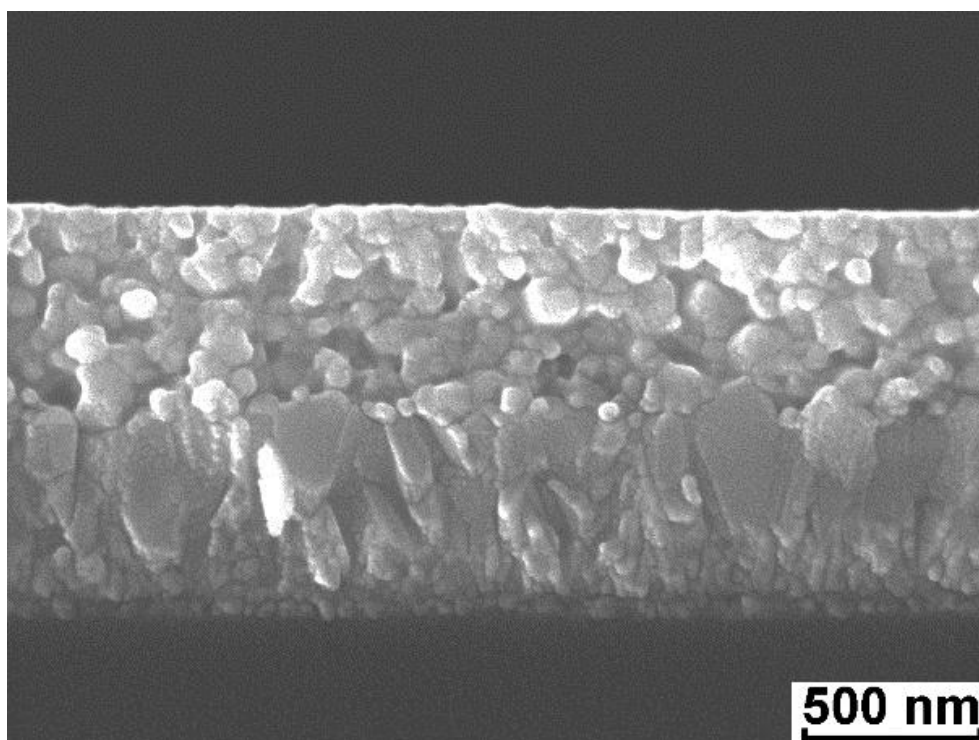


Figure S1. Cross-sectional view of the perovskite film under the drying pressure of 10 Pa.

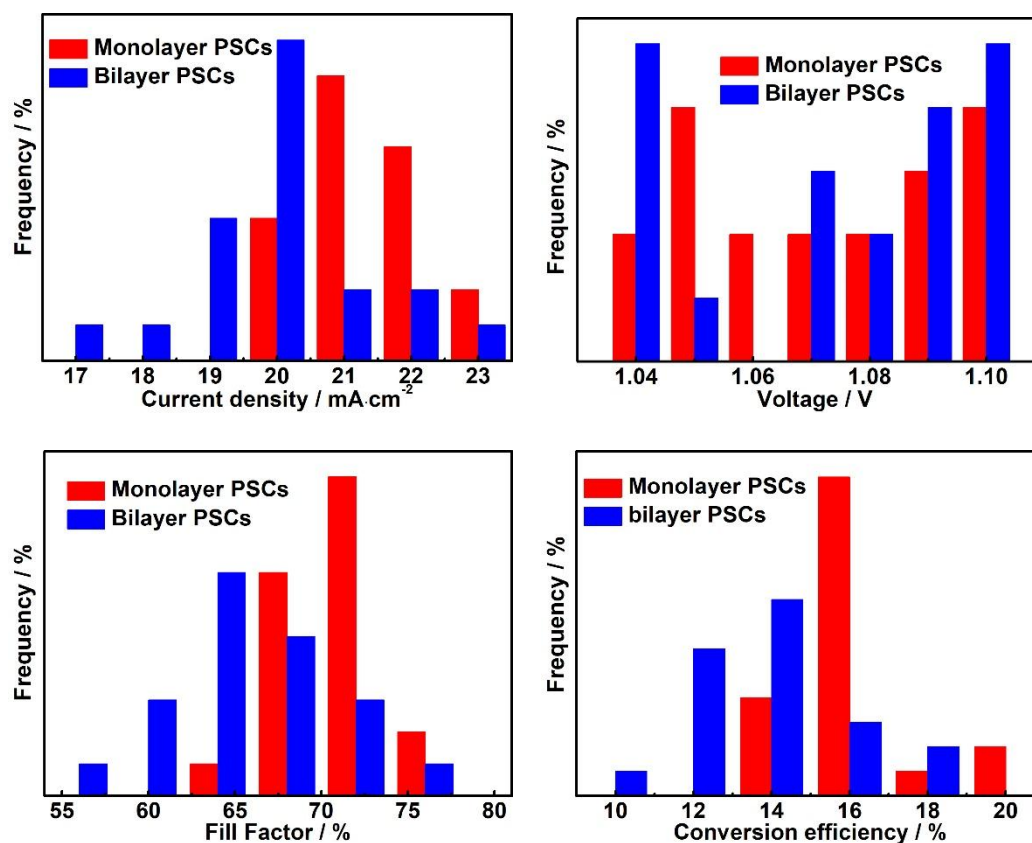


Figure S2. Histogram format of the photovoltaic performance for both PSCs

Table S1. Photovoltaic performance of the monolayer PSCs.

No.	$J_{sc}/\text{mA}\cdot\text{cm}^{-2}$	V_{oc}/V	FF/%	$\eta/\%$
1	21.67	1.09	69.29	16.36
2	23.27	1.04	68.5	16.58
3	20.15	1.09	70.99	15.59
4	22.95	1.04	74.95	17.89
5	20.5	1.1	70.67	15.93
6	22.84	1.07	71.89	17.57
7	23.23	1.1	74.9	19.14
8	22.27	1.05	65.33	15.27
9	21.57	1.1	78.32	18.58
10	22.96	1.1	75.56	19.08
11	20.78	1.1	74.51	17.03
12	21.48	1.05	68.82	15.52
13	20.27	1.05	77.01	16.39
14	21.84	1.07	72.36	16.91
15	21.72	1.06	72.12	16.60
16	21.96	1.08	72.6	17.22
17	21.65	1.09	71.54	16.88
18	22.03	1.05	73.18	16.93
19	21.37	1.08	71.12	16.41
20	22.31	1.06	73.6	17.40

Table S2. Photovoltaic performance of the bilayer PSCs.

No.	$J_{sc}/\text{mA}\cdot\text{cm}^{-2}$	V_{oc}/V	FF/%	$\eta/\%$
1	20.9	1.1	72	16.55
2	18.24	1.1	63.54	12.75
3	22.11	1.09	72.51	17.47
4	21.43	1.09	70.58	16.48
5	19.16	1.04	60.31	12.02
6	19.57	1.04	69.99	14.24
7	23.1	1.04	76.8	18.45
8	19.96	1.07	56.26	12.01
9	20.28	1.1	67.36	15.03
10	20.52	1.1	70.04	15.81
11	17.77	1.04	60.04	11.09
12	20.1	1.09	64.99	14.24
13	22.57	1.1	73.97	18.36
14	20.44	1.08	67.57	14.91
15	20.65	1.09	68.12	15.33
16	20.23	1.07	67.02	14.51
17	20.87	1.05	69.11	15.14
18	20.01	1.04	66.03	13.74
19	19.82	1.07	68.93	14.62
20	21.06	1.08	66.21	15.06