Supporting information

Pressure-assisted annealing method for high quality $CsPbBr_3$ film deposited by sequential thermal evaporation

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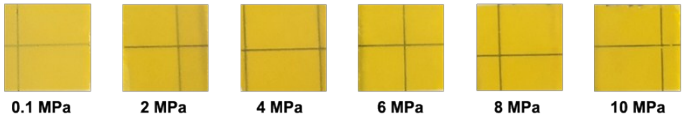

Figure S1. Photograph of $CsPbBr_3$ films with different annealing pressures.

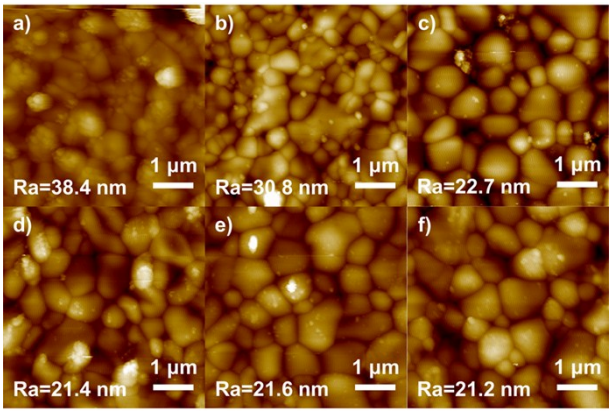

Figure S2. AFM images of CsPbBr3 films with the different annealing pressures of a) 0.1 MPa, b) 2 MPa, c) 4 MPa, d) 6 MPa, e) 8 MPa, f) 10 MPa.

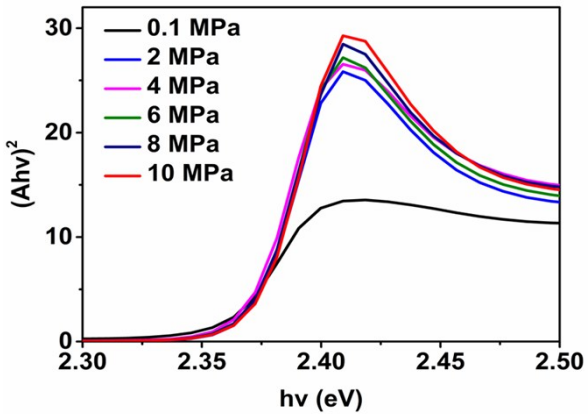

Figure S3. Tauc plots: $(Ahv)^2$ vs hv curves of the $CsPbBr_3$ films prepared with different annealing

pressures.

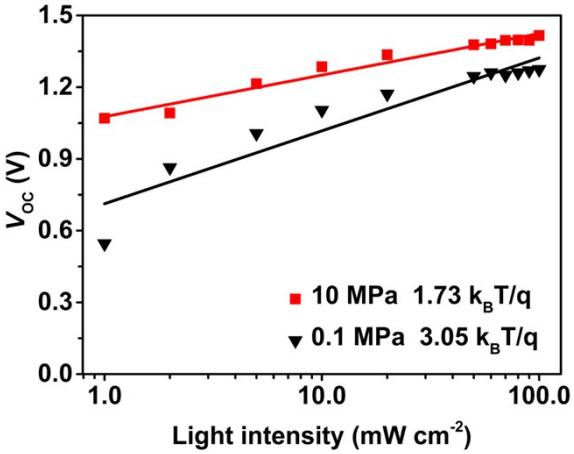

Figure S4. V_{oc} versus various light intensities (from 100 mW cm^{-2} to 1 mW cm^{-2}) plots of AP-0.1 and AP-0.1 devices.

Table S1. The peak intensity parameters extracted from XRD patterns in Figure 3.

Sample	$FTO_{(110)}$	$CsPbBr_{3(200)}$	$CsPbBr_3$/ $FTO_{(200)}$
0.1 MPa	618	649	1.05
2 MPa	757	873	1.15
4 MPa	725	947	1.30
6 MPa	732	1175	1.61
8 MPa	684	1528	2.20
10 MPa	653	1413	2.16

Table S2. The parameters extracted from the time-resolved PL spectra based on the PA-0.1 and PA-10 samples.

Sample	τ_{avg} [ns]	τ_1 [ns]	τ_2 [ns]	A_1 [%]	A_2 [%]
PA-0.1 with ETL	3.35	0.19	3.88	86	25
PA-10 with ETL	8.99	1.11	9.60	38	56
PA-0.1 without ETL	2.64	0.28	3.05	71	38
PA-10 without ETL	1.35	0.12	1.61	88	32

Table S3. The statistical photovoltaic parameters of the 6 batches of devices.

Device	Scan direction	J_{sc} [mA cm^{-2}]	V_{oc} [V]	FF	PCE [%]	Maximum PCE [%]
0.1 MPa	reverse	3.006	1.243	0.546	2.148	2.79
	forward	2.997	1.241	0.462	1.817	2.53
2 MPa	reverse	5.218	1.292	0.637	4.162	4.55
	forward	5.202	1.291	0.502	3.280	3.62
4 MPa	reverse	5.806	1.318	0.706	5.084	5.54
	forward	5.793	1.311	0.621	4.472	5.03
6 MPa	reverse	5.984	1.374	0.737	5.915	6.35
	forward	5.977	1.371	0.654	5.25	5.78
8 MPa	reverse	6.444	1.398	0.748	6.73	7.21
	forward	6.436	1.390	0.661	5.95	6.48
10 MPa	reverse	6.459	1.400	0.746	6.74	7.22
	forward	6.451	1.394	0.675	6.10	6.53