Supporting Information

Effective n-Type De-doping of Perovskite Surface by Defect Passivation and Improved Film Crystallization for High-Efficiency Inorganic Solar Cells

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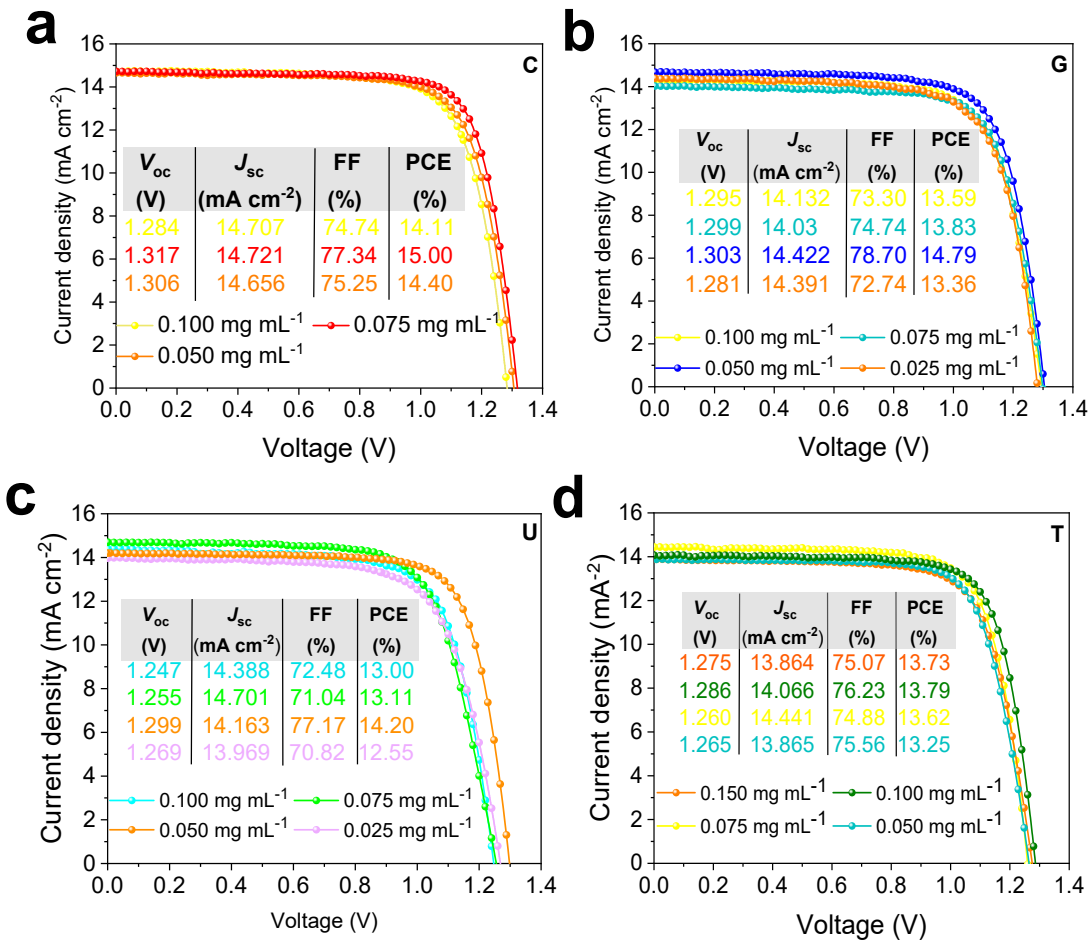

Fig. S1 *J-V* curves of the prepared $CsPbI_2Br$ devices treated by (a) cytosine (b) guanine (c) uracil (d) thymine.

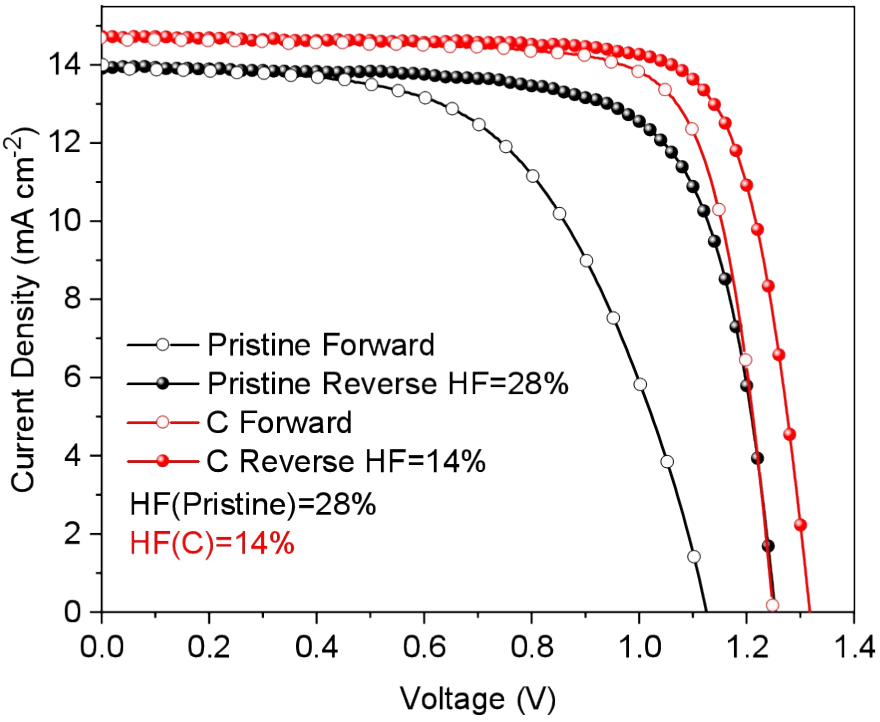

Fig. S2 The characteristic *J-V* curves of pristine and C-treated PSCs under forward and reverse scanning directions. The calculation formula of hysteresis factor is HF = (PCE_{rev} - PCE_{for})/PCE_{rev}.

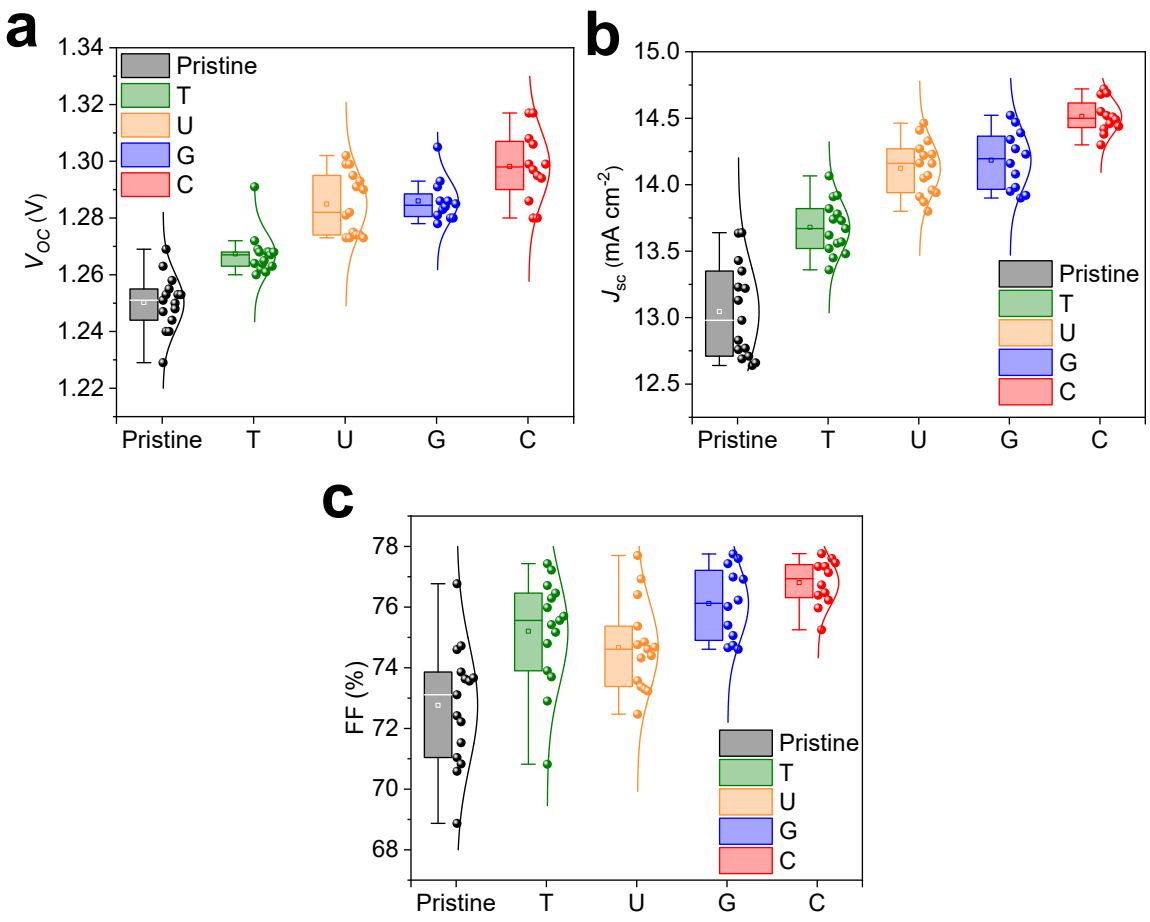

Fig. S3 The statistical photovoltaic parameters distribution including (a) V_{OC}, (b) J_{SC} and (c) FF.

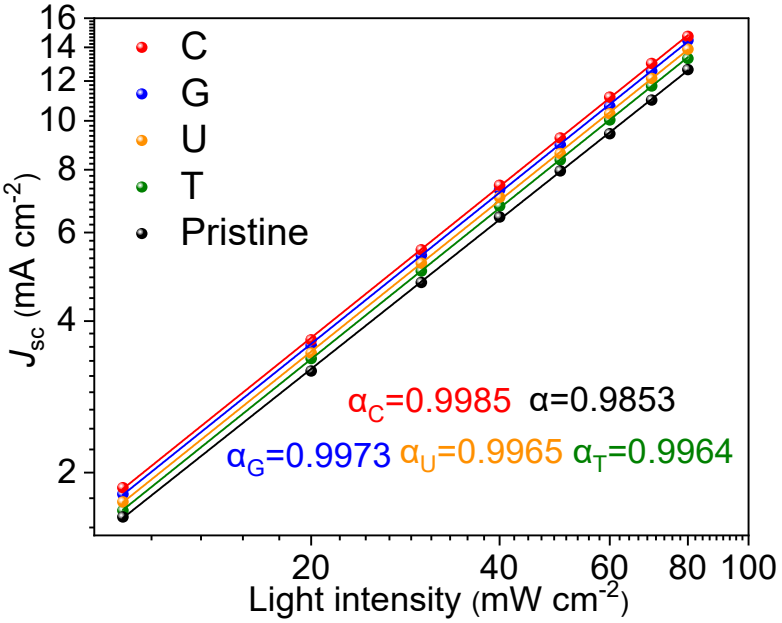

Fig. S4 J_{SC} dependence of $CsPbI_2Br$ devices on light intensity.

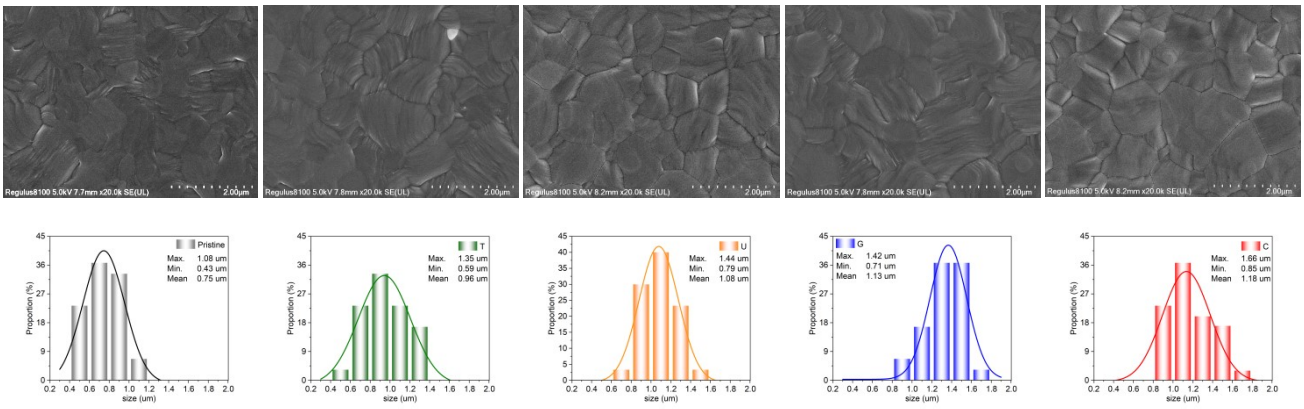

Fig. S5 Top-view SEM images and particle size distribution maps of $CsPbI_2Br$ perovskite films.

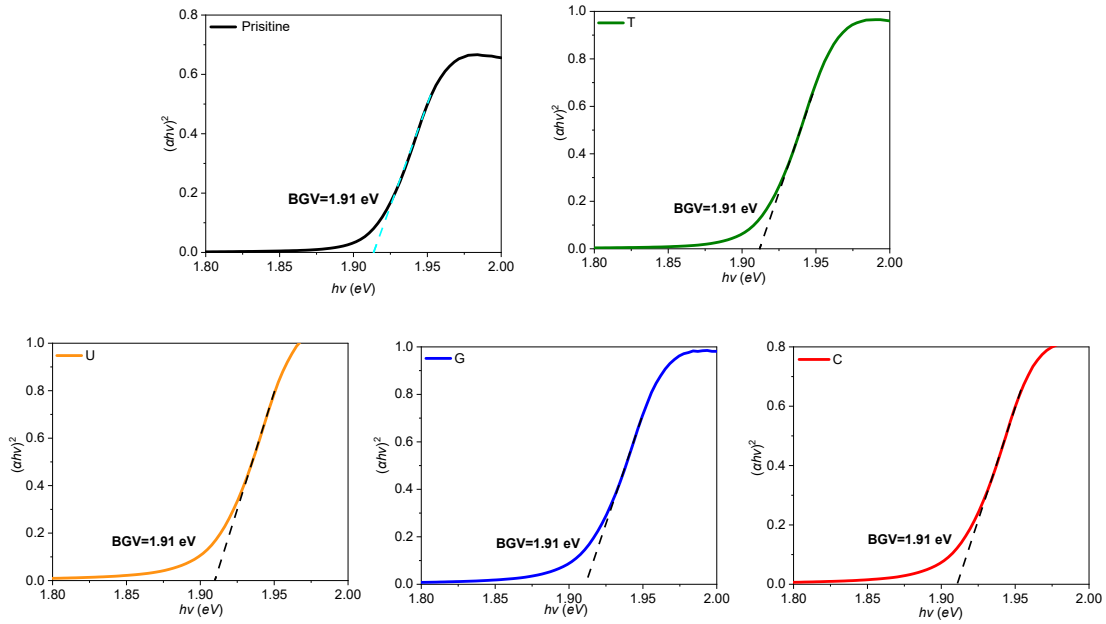

Fig. S6 Bandgaps of $CsPbI_2Br$ perovskite films.

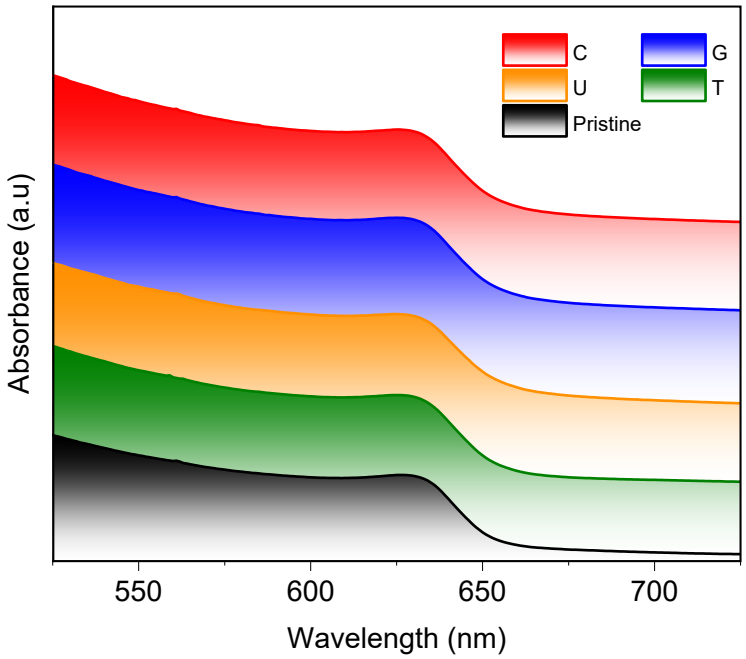

Fig. S7 UV-vis spectra of $CsPbI_2Br$ perovskite films.

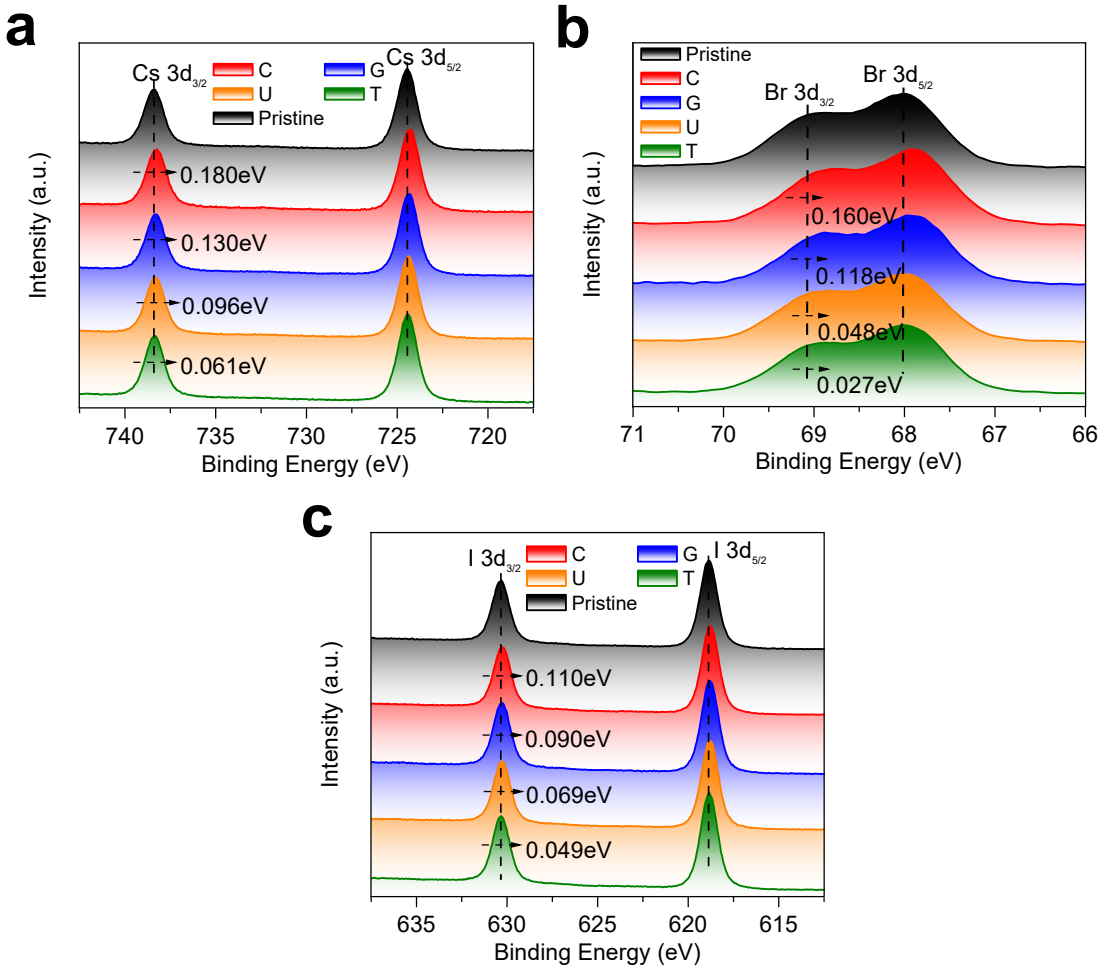

Fig. S8 XPS spectra of (a) Cs 3d, (b) Br 3d and (c) I 3d.

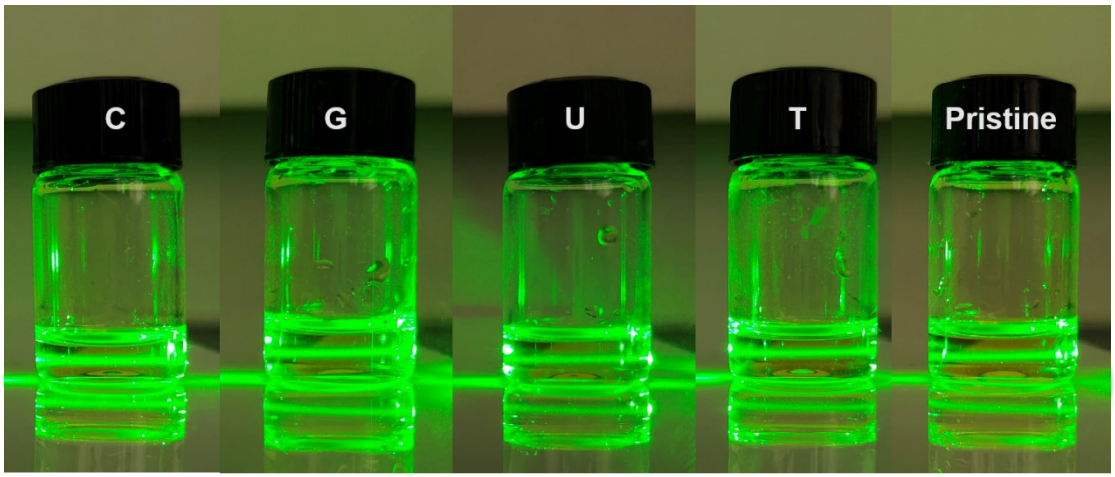

Fig. S9 Tyndall effect of perovskite precursor solutions with different molecules.

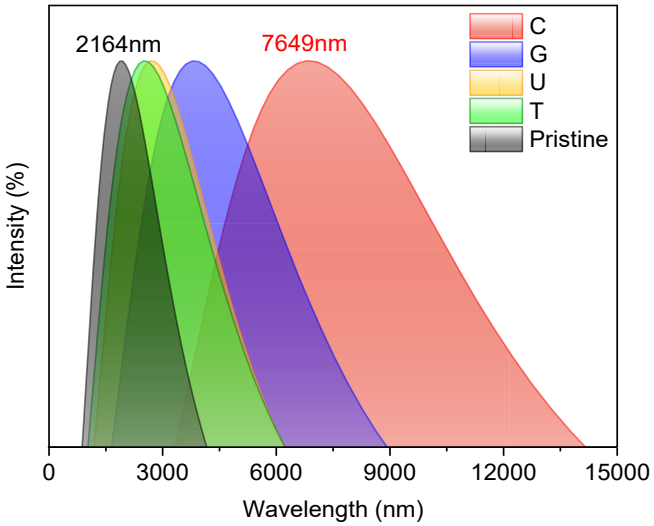

Fig. S10 The statistical size distribution of colloids in perovskite solutions.

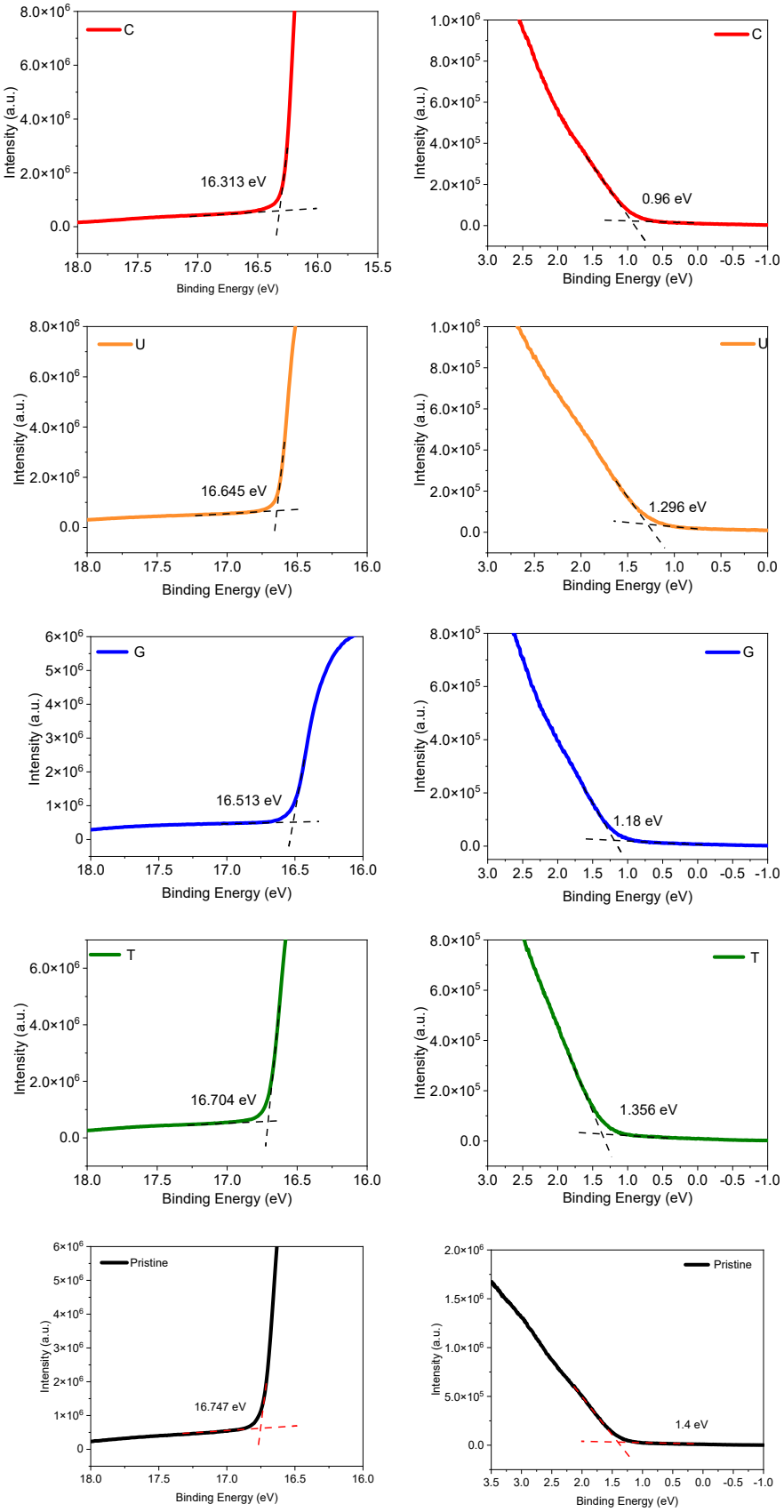

Fig. S11 UPS spectra of various perovskite films.

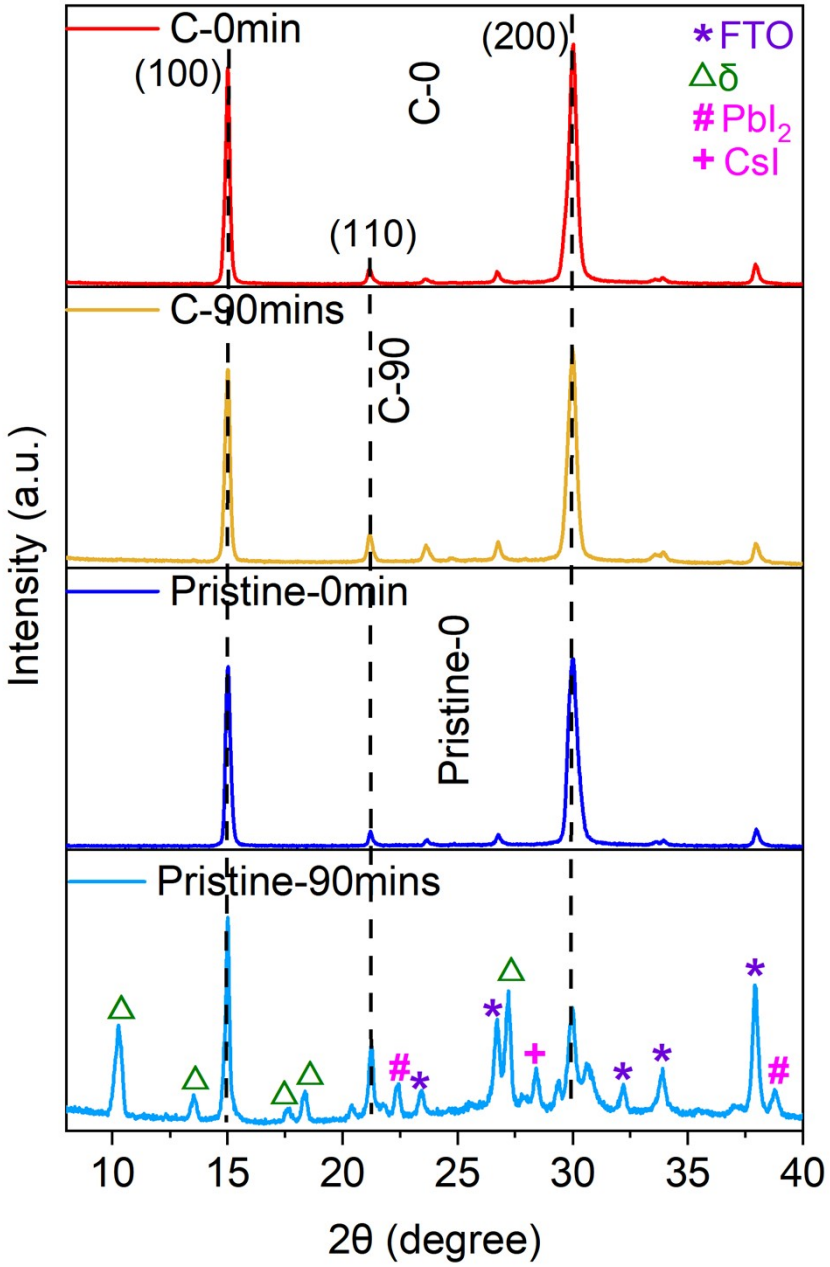

Fig. S12 XRD spectra of perovskite films on TiO_2 substrates before and after aging treatment.

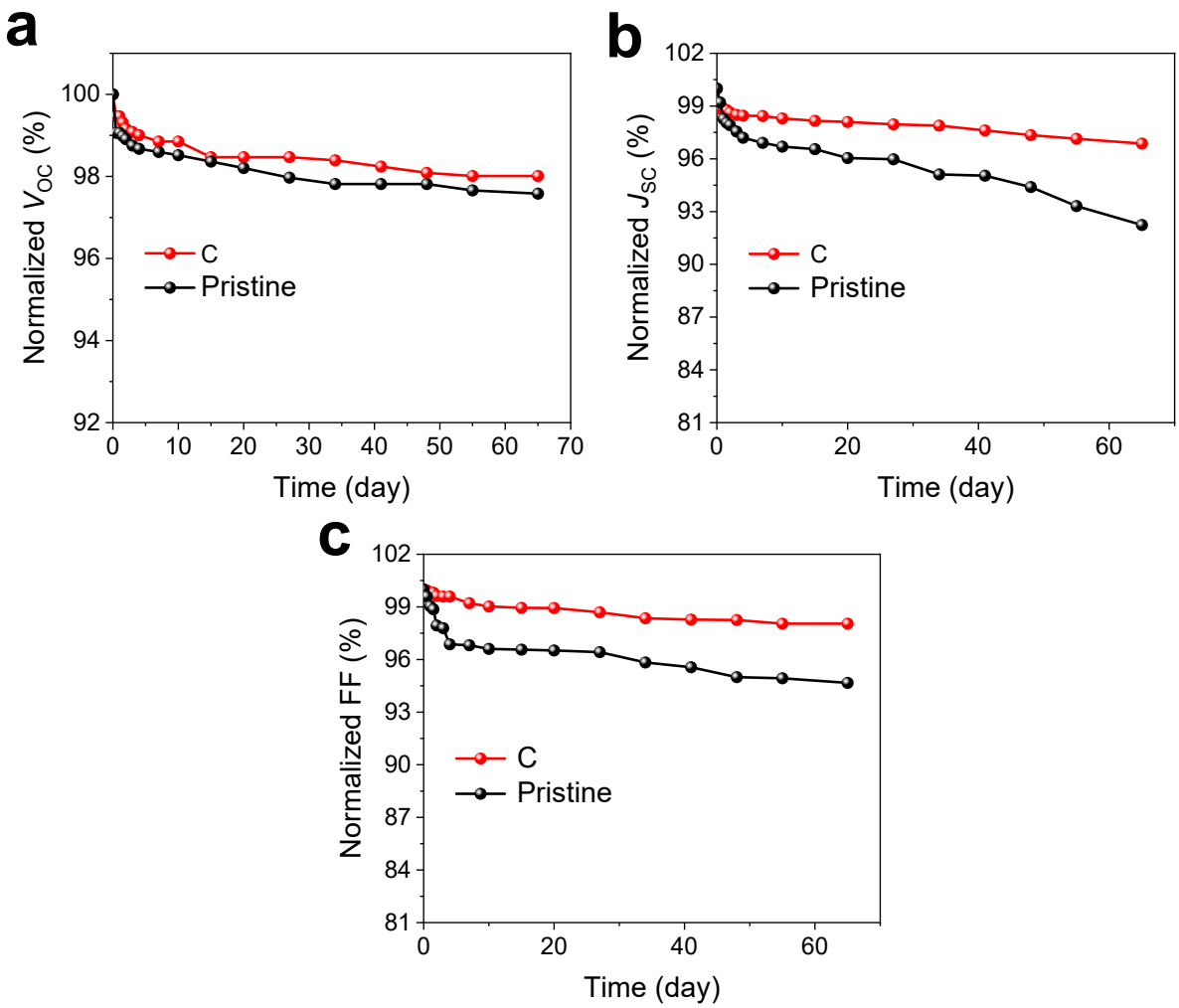

Fig. S13 Normalized photovoltaic parameters of PSCs treated with and without Cytosine including (a) J_{SC}, (b) V_{OC} and (c) FF under 25 °C and 10% RH.

Table S1 Photovoltaic parameters of $CsPbI_2Br$ PSCs treated by cytosine with various concentrations.

Cytosine (mg mL^{-1})	V_{OC} (V)	J_{SC} (mA cm^{-2})	FF (%)	PCE (%)
0.050	1.284	14.707	74.74	14.11
0.075	1.317	14.712	77.34	15.00
0.100	1.306	14.656	75.25	14.40

Table S2 Photovoltaic parameters of $CsPbI_2Br$ PSCs treated by guanine with various concentrations.

Guanine (mg mL^{-1})	V_{OC} (V)	J_{SC} (mA cm^{-2})	FF (%)	PCE (%)
0.025	1.281	14.39	72.74	13.36
0.050	1.303	14.42	78.70	14.79
0.075	1.299	14.03	74.74	13.83
0.100	1.295	14.13	73.30	13.59

Table S3 Photovoltaic parameters of $CsPbI_2Br$ PSCs treated by uracil with various concentrations.

Uracil (mg mL^{-1})	V_{OC} (V)	J_{SC} (mA cm^{-2})	FF (%)	PCE (%)
0.025	1.269	13.969	70.82	12.55
0.050	1.399	14.163	71.04	14.20
0.075	1.255	14.701	77.17	13.11
0.100	1.247	14.388	72.48	13.00

Table S4 Photovoltaic parameters of $CsPbI_2Br$ PSCs treated by thymine with various concentrations.

Thymine (mg mL^{-1})	V_{OC} (V)	J_{SC} (mA cm^{-2})	FF (%)	PCE (%)
0.050	1.265	13.865	75.56	13.25
0.070	1.260	14.441	74.88	13.62
0.100	1.286	14.066	76.23	13.79
0.150	1.265	13.864	75.07	13.73