

## Supplementary Information

### Improving the performance of inorganic perovskite solar cells by perovskite quantum dots dynamic assisted film growth method

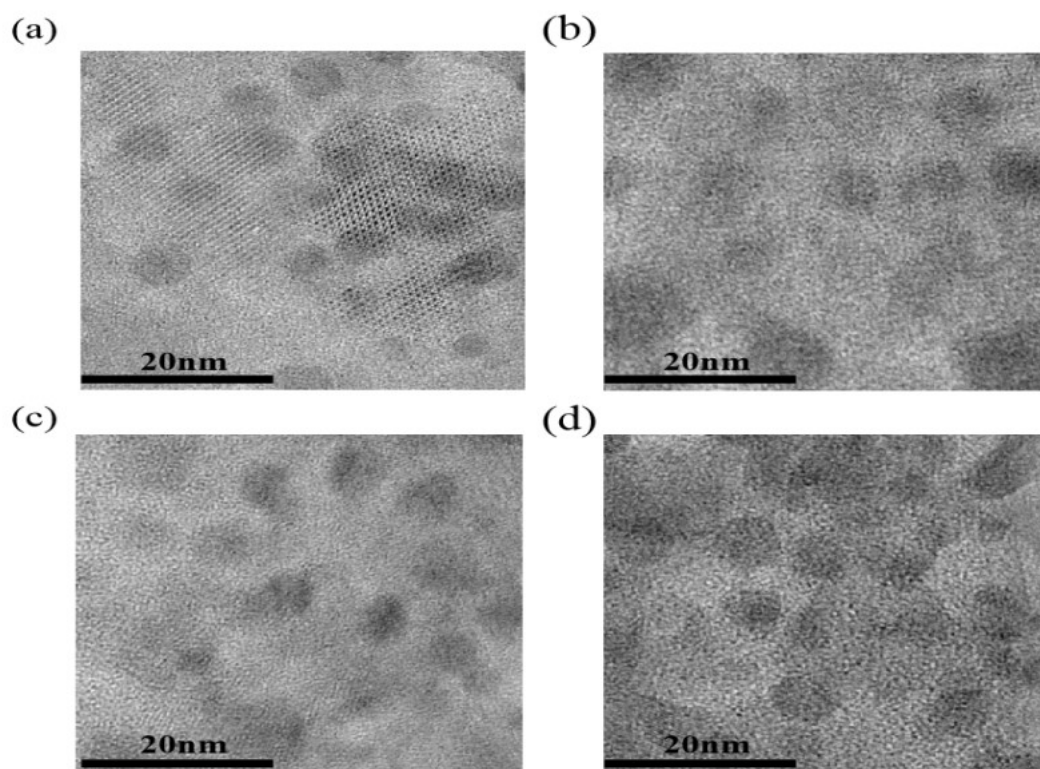
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Fig. S1 TEM images of CsPbI<sub>3</sub>:Ce<sub>x</sub> QDs (a) x=0, (b) x=5%, (c) x=10%, (d) x=15% (mass ratio).

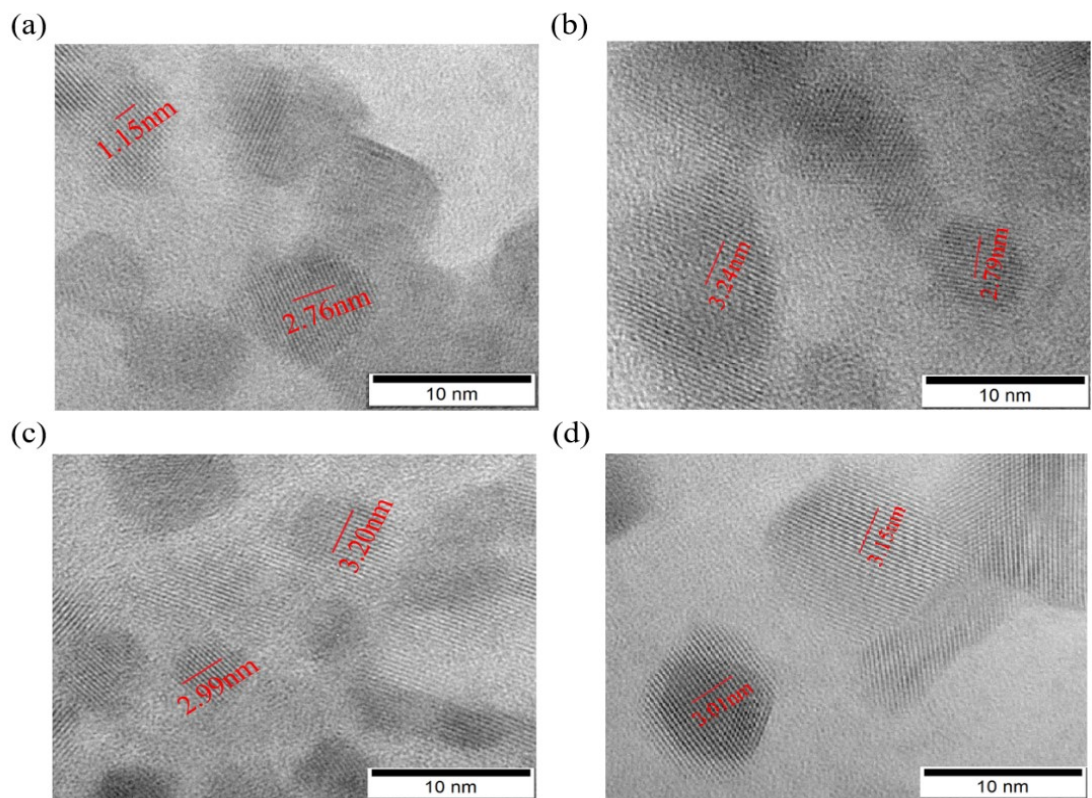


Fig. S2 TEM image of the lattice spacing values of CsPbI<sub>3</sub>:Ce<sub>x</sub> QDs (a) x=0, (b) x=5%, (c) x=10%, (d) x=15% (mass ratio).

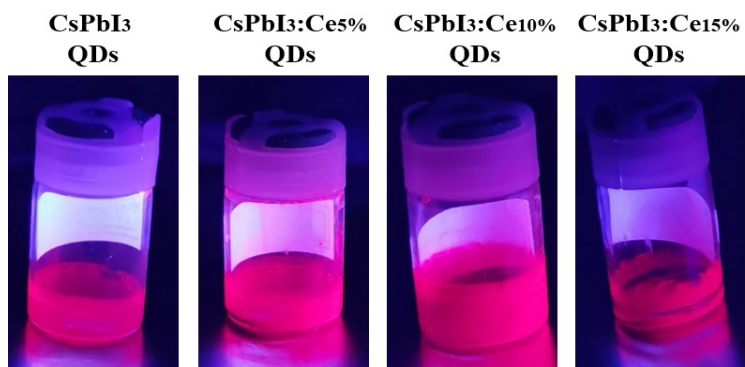


Fig. S3 Photography picture of PQDs under ultraviolet light.

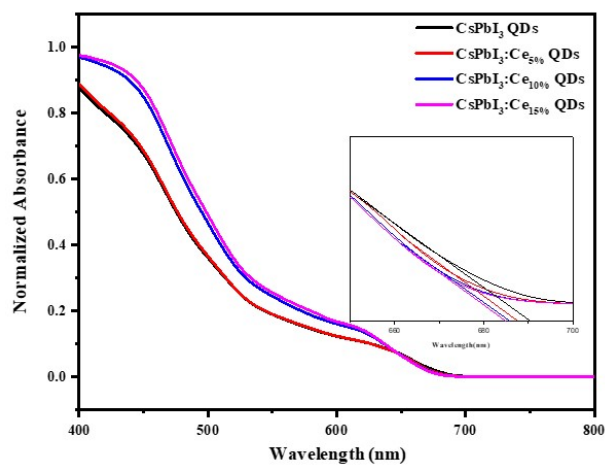


Fig. S4 Normalized UV-Vis absorption spectra of PQDs in toluene solution.

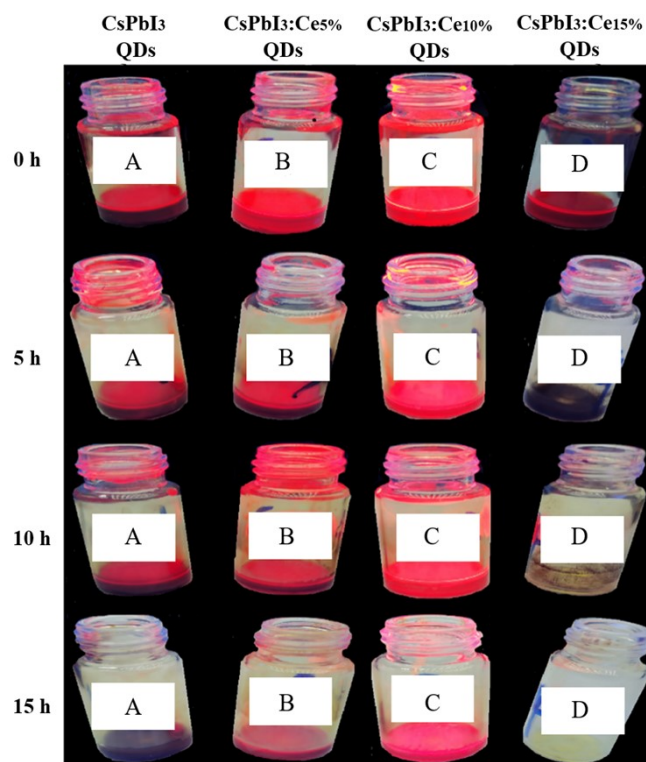


Fig. S5 The evolution of fluorescence effect of CsPbI<sub>3</sub>:Ce<sub>x</sub> QDs in octane solutions at 125 °C under 365 nm ultraviolet light.

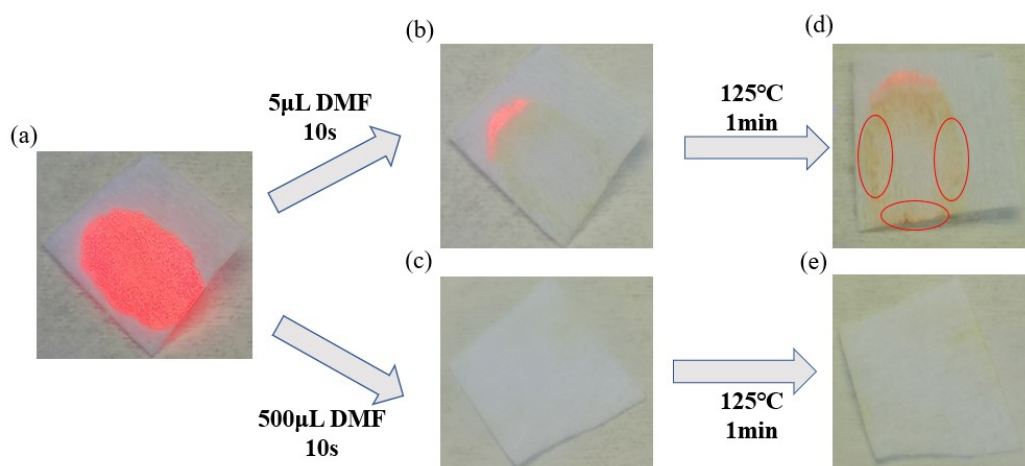


Fig. S6 Solvent stability test of PQDs under 365 nm ultraviolet light.

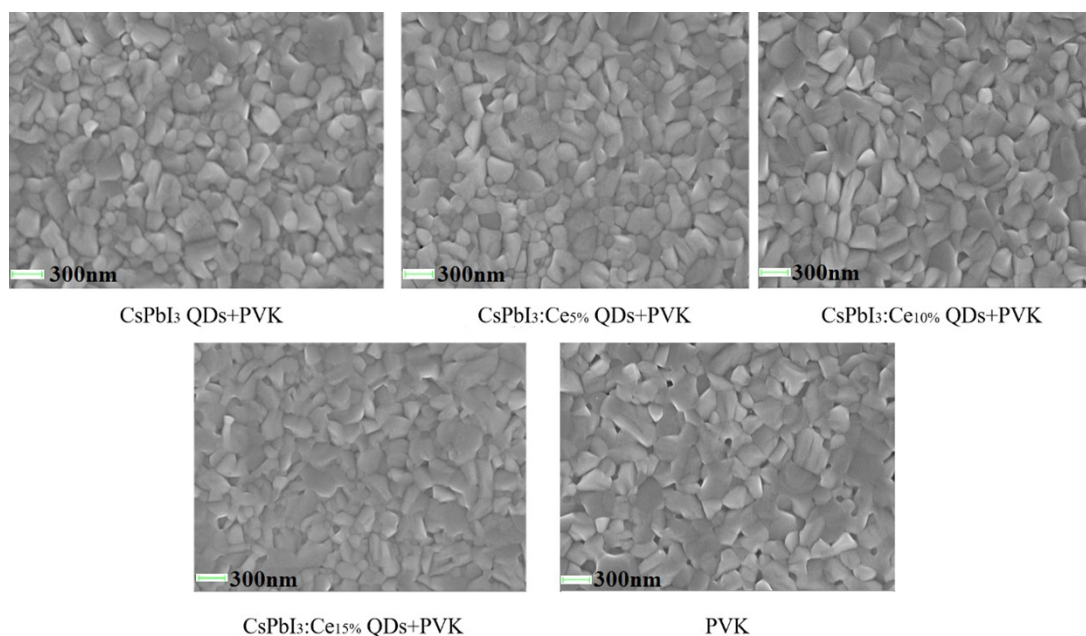


Fig. S7 Surface SEM images of perovskite film prepared with and without PQDs.

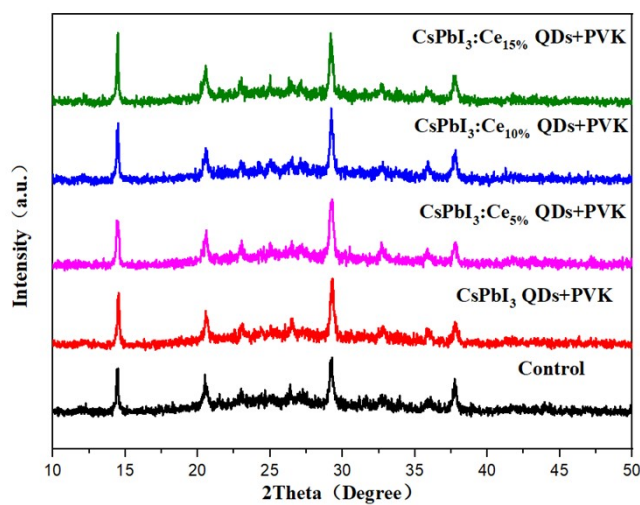


Fig. S8 XRD images of perovskite film prepared with and without PQDs.

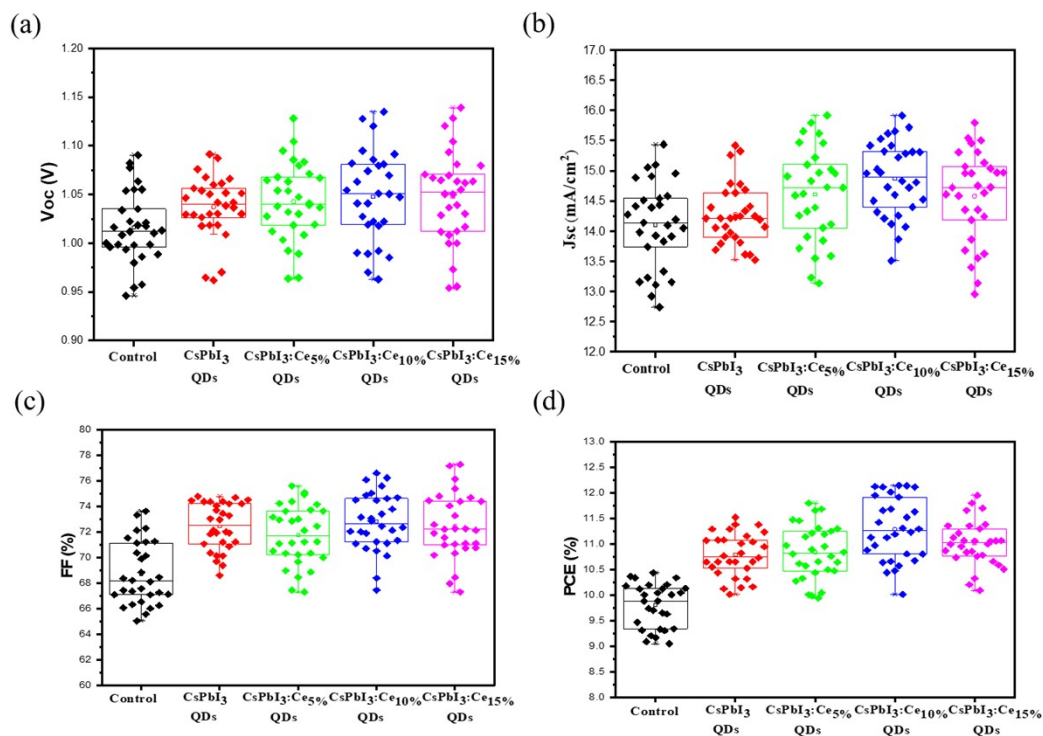


Fig. S9 Statistics distributions of (a)  $V_{oc}$ , (b)  $J_{sc}$ , (c)  $FF$  and (d)  $PCE$  of the 30  $CsPbI_2Br$ -based PSCs for each kind prepared with and without PDMG process.

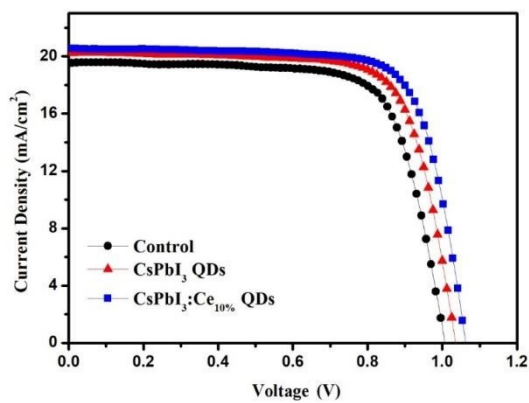


Fig. S10 J-V curves of  $CsPbI_3$ -based PSCs prepared with and without PDMG process.

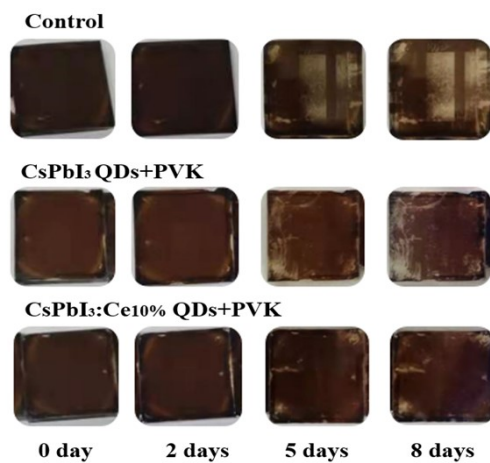


Fig. S11 The stability tests of CsPbI<sub>2</sub>Br-based perovskite film made with or without PQDs in air environment (20-25 °C, 25-30% RH).

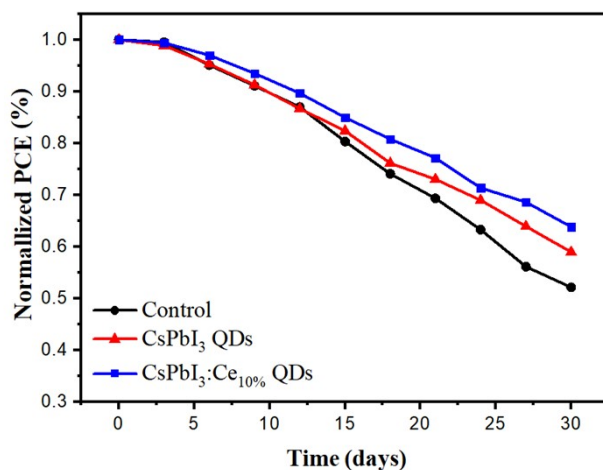


Fig. S12 Long-term stability tests of CsPbI<sub>2</sub>Br-based PSCs made with or without PQDs in N<sub>2</sub> glove box for 30 days.

Table S1 A summary of the cell parameters measured for a set of 20 CsPbI<sub>3</sub>-based PSCs

	$V_{oc}$ (V)	$J_{sc}$ (mA/cm <sup>2</sup> )	$FF$	PCE (%)
Control PVK	1.006±0.022	19.537±0.31	0.733±0.015	14.43±0.50
CsPbI <sub>3</sub> QDs PVK	1.035±0.023	20.224±0.36	0.740±0.020	15.49±0.36
CsPbI <sub>3</sub> :Ce <sub>10%</sub> QDs PVK	1.062±0.034	20.550±0.44	0.749±0.011	16.38±0.32