Supporting Information

Enhancing light-emitting performance and stability in CsPbBr₃ perovskite

quantum dots via simultaneous doping and surface passivation

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Supporting Figure 1. (a, b) HRTEM, TEM and particle size histograms of CoBr₂-doped CsPbBr₃ QDs.



Supporting Figure 2. Tauc plots of (a) control and (b) Co(AC)₂-doped CsPbBr₃ QDs.



Supporting Figure 3. The error bar analysis of the FWHM (a) and PLQY (b).



Supporting Figure 4. PXRD patterns of Control and Co(AC)₂-doped CsPbBr₃ QDs (left)

and the detailed comparison of the peak position of (200) plane (right).



Supporting Figure 5. (a) XPS spectra for a survey scan about control and Co(AC)₂doped and high-resolution XPS spectra of (b) Co 2p of Co(AC)₂-doped, (c) Cs 3d, (d) Pb 4f and (e) Br 3d in 3 samples.

Sample	τ_1 (ns)	A ₁ (%)	$\tau_2(ns)$	A ₂ (%)	$ au_{ave}(ns)$
Control	5.03	77.82	17.05	22.18	10.94
CoBr ₂	4.10	78.10	18.00	21.19	11.63

81.07

S)

17.93

Supporting Table 1. PL lifetime value extracted from Figure 2a.

4.17

 $Co(AC)_2$

The average lifetime was calculated using equation: $\langle \tau \rangle = (f_1 \tau_1^2 + f_2 \tau_2^2)/(f_1 \tau_1 + f_2 \tau_2)$ τ_1 and A_1 represent the decay time and percentage of intrinsic radiative recombination, respectively; τ_2 and A_2 represent the decay time and percentage of nonradiative recombination, respectively; τ_{ave} is the average PL lifetime fitting by biexponential functions.

27.02

18.93

Supporting Table 2. The atomic ratios of the major elements in the XPS test results.

Ratio of the element	Cs (%)	Pb (%)	Br (%)	Co (%)
Control	2.60	2.35	6.11	0
$Co(AC)_2$	2.62	2.34	6.85	0.17