Supporting Information

Controlling of SiO_2 coating on hydrophobic $CsPbBr_3$ nanocrystals towards aqueous transfer and high luminescence

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Table S1 Preparation conditions of samples

	PH-TMOS (μL)	TMOS (μL)	Undisturbed Time (h)	H_2O (μL)
Cs_4PbBr_6-TMOS	2	--	--	--
$CsPbBr_3@SiO_2$	2	10	12	300
$CsPbBr_3$-SiO_2-1	0	10	12	300
$CsPbBr_3$-SiO_2-2	0	30	12	300
$CsPbBr_3$-SiO_2-3	10	20	12	300
$CsPbBr_3$-SiO_2-4	0	10	1	300
$CsPbBr_3$-SiO_2-5	2	10	12	1500
$CsPbBr_3$-Blank	0	0	12	300

Table S2 Components B_1/ B_2/ B_3, time constants τ_1 /τ_2/ τ_3, and $\tau_{average}$

Sample	τ_1	τ_2	τ_3	B_1	B_2	B_3	$\tau_{average}$	CHISQ
$CsPbBr_3@SiO_2$	17.53	49.30	3.87	35.16	60.29	4.55	43.60	1.04
$CsPbBr_3$-SiO_2-1	14.78	49.74	3.89	43.93	47.96	8.11	41.87	1.09
$CsPbBr_3$-SiO_2-2	14.43	45.73	3.89	43.21	48.38	8.41	38.45	1.07
$CsPbBr_3$-SiO_2-3	12.58	44.03	2.66	47.75	42.79	9.47	36.09	1.08
$CsPbBr_3$-Blank	10.92	3.83	37.03	46.09	31.57	22.34	25.21	1.04

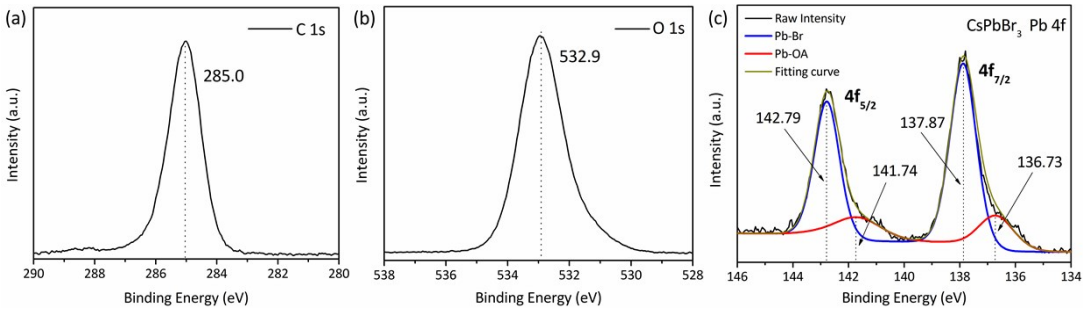

Fig. S1 XPS C 1s (a) and O 1s (b) spectrum of $CsPbBr_3$@SiO_2, which were calibrated at 285.0 eV. (c) Peak fitting of the Pb 4f spectra of $CsPbBr_3$. Reproduced with permission from Ref. 1. Copyright 2018. The Royal Society of Chemistry.

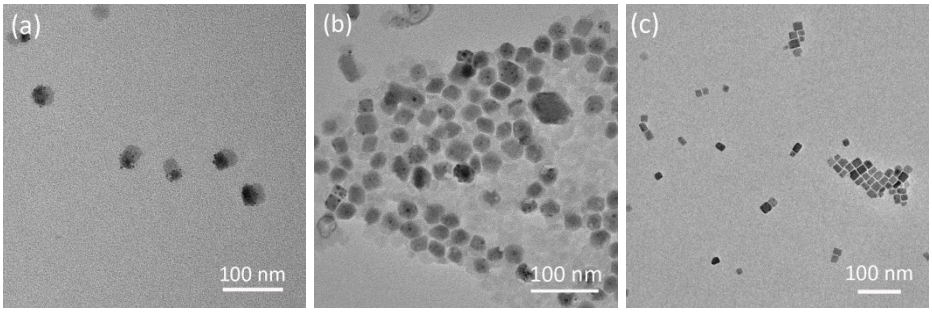

Fig. S2 TEM image of sample $CsPbBr_3$-SiO_2-4, $CsPbBr_3$-SiO_2-5, and $CsPbBr_3$-Blank.

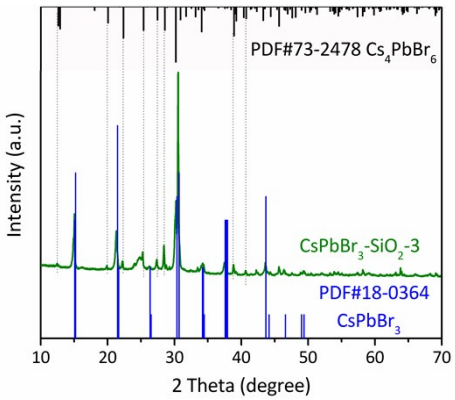

Fig. S3 XRD pattern of sample $CsPbBr_3$-SiO_2-3.

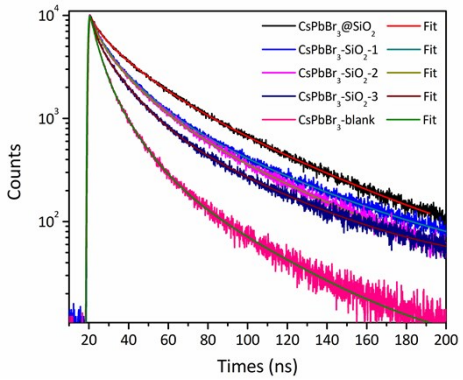

Fig. S4 Time-resolved PL decay curves.

* A tri-exponential function was applied to fit the decay curves:

$$F(t) = A + B_1\exp\left(-t/\tau_1\right) + B_2\exp\left(-\frac{t}{\tau_2}\right) + B_3\exp\left(-\frac{t}{\tau_3}\right) \quad (1)$$

in which B_1, B_2, and B_3 is the normalized amplitudes of each components. τ_1, τ_2, and τ_3 represent the time constants. The average lifetime ($\tau_{average}$) was calculated by:

$$\tau_{average} = (B_1\tau_1^2 + B_2\tau_2^2 + B_3\tau_3^2)/(B_1\tau_1 + B_2\tau_2 + B_3\tau_3) \quad (2)$$

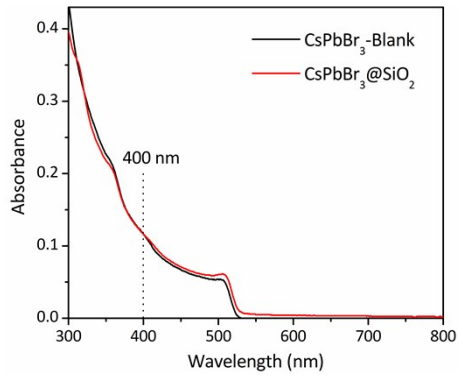

Fig. S5 Absorption spectra of sample $CsPbBr_3$-Blank and $CsPbBr_3@SiO_2$ NCs. The intensity was the same at 400 nm.

Table S3 Properties of sample $CsPbBr_3$-Blank and $CsPbBr_3@SiO_2$

Sample	Absorption peak (nm)	PL peak (nm)	Fwhm (nm)	PLQY (%)	Morphology	Mean Size (nm)	Stabilities against EtOH
$CsPbBr_3$-Blank	506	523	17.18	80	Cubic	16.76	5 min: PL quenched
$CsPbBr_3@SiO_2$	506	521	16.44	65	Core-shell	core: 12.25 total: 47	30 min: 62% of initial PL intensity

Reference

1 M. Li, X. Zhang, K. Matras-Postolek, H.-S. Chen and P. Yang, *J. Mater. Chem. C,* 2018, **6**, 5506-5513.