## **Supporting Information**

## Superior Photoconversion Efficiency of Nanocrystal Sensitized Solar Cells Based on All-Inorganic CsPbX<sub>3</sub> (X=Br, I) Perovskites

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**Figure S1**: Tauc plots of (a) CsPbI<sub>3</sub> and (b) CsPbBr<sub>3</sub> showing the optical band gap of perovskite QDs.



**Figure S2**: Biexponentially fitted curves of time-resolved photoluminescence plots of (a) CsPbI<sub>3</sub> with radiative lifetime  $\tau_2$ =130 ns and nonradiative lifetime  $\tau_1$ =38.5 ns and (b) TiO<sub>2</sub>/CsPbI<sub>3</sub> with  $\tau_1$ = 7.9 ns and  $\tau_2$ = 58.9 ns.



**Figure S3**: Biexponentially fitted curves of time-resolved photoluminescence of (a) CsPbBr<sub>3</sub> with  $\tau_1$ = 3.1 ns and  $\tau_2$ =18.4 ns and (b) TiO<sub>2</sub>/CsPbBr<sub>3</sub> with  $\tau_1$ = 0.4 ns and  $\tau_2$ =8.6 ns.



**Figure S4**: Topography of (a) mesoporous  $TiO_2$  and (b) perovskite-adsorbed  $TiO_2$  recorded using atomic force microscopy. The RMS of the bare  $TiO_2$  surface reduces from 12.5 nm to 6.7 nm, when perovskite quantum dots are adsorbed on it.



Figure S5: Current density vs voltage curves of (a)  $CsPbBr_3$  and (b)  $CsPbI_3$  as measured for ten devices.



Figure S6: Statistical analysis of PNCSSC efficiency.