

Fig. S1 Top view FESEM image of (a)TiO₂, (b) TiO₂/CdS, (c) TiO₂/CdS/CdSe, (d) TiO₂/CdS/CIS

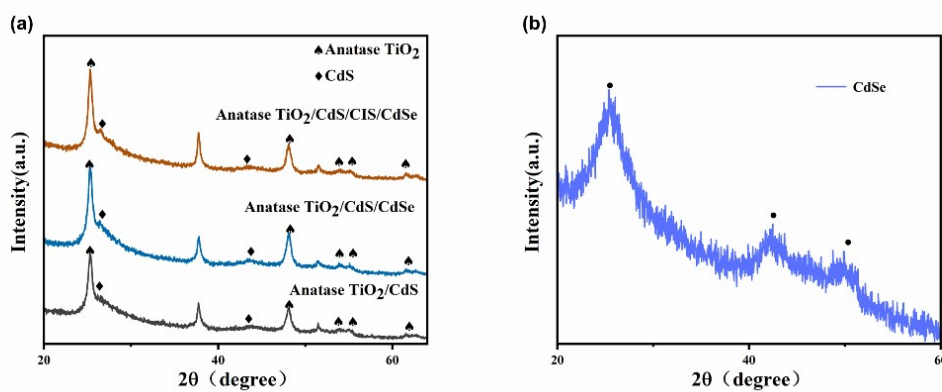


Fig. S2. (a) XRD pattern of the CdS, CdS/CdSe, CdS/CIS/CdSe QDs sensitized TiO₂ films, (b) XRD pattern of pure QDs.

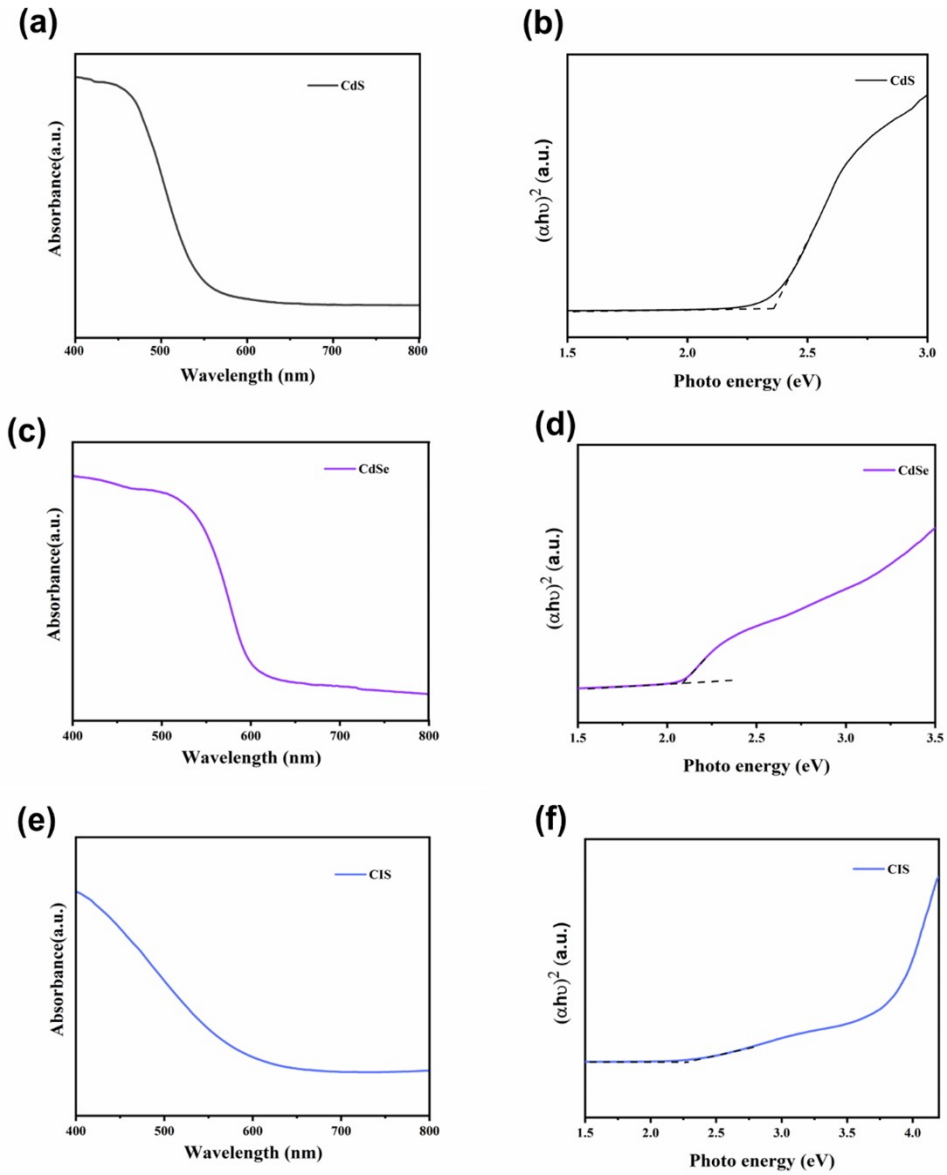


Fig. S3 (a) (c) and (e): UV-vis absorption light spectra and (b) (d) (f): absorption and bandgap conversion curves of pure CdS, CdSe, and CIS QD films on FTO substrate.

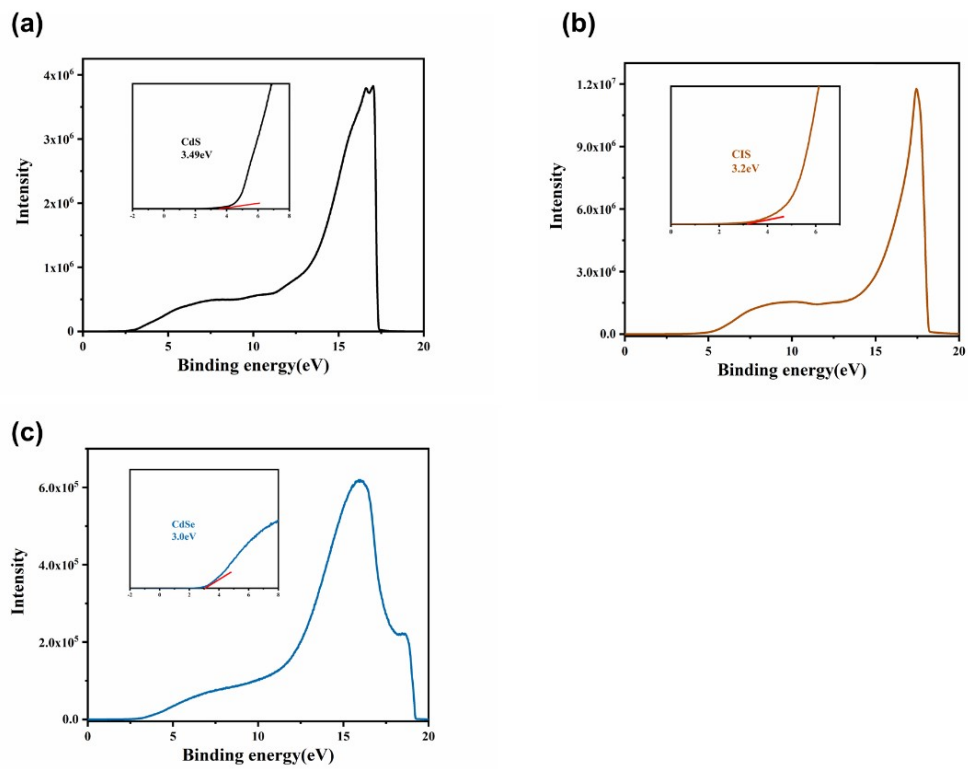


Fig. S4 UPS spectra for (a) CdS, (b) CIS and (c) CdSe QDs.

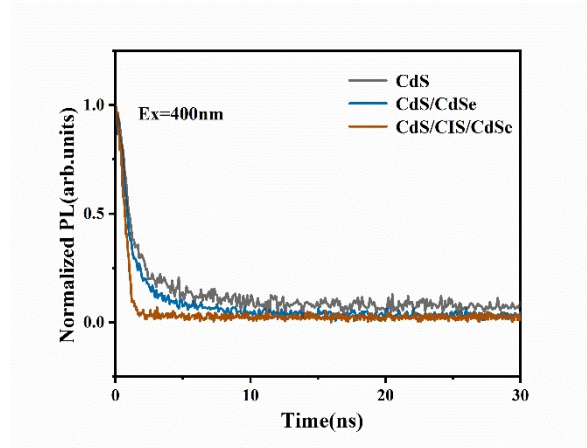


Fig. S5 Results of Time-resolved photoluminescence (TRPL) spectroscopy for CdS, CdS/CdSe and CdS/CIS/CdSe QDs.

Table S1 Fitting parameters of photoluminescence decay for the investigated CdS, CdS/CdSe and CdS/CIS/CdSe QDs. The average lifetimes(τ_{av}) of the samples are calculated based on this equation.

$$\tau_{av} = (A_1 \tau_1 + A_2 \tau_2) / (A_1 + A_2)$$

Sample	A_1	A_2	τ_1	τ_2	R^2	τ_{av}
CdS	0.94	0.07	1.16	14.58	0.956	7.64
CdS/CdSe	0.98	0.07	1.03	10.58	0.976	5.07
CdS/CIS/CdSe	1.11	0.012	0.73	3.39	0.943	0.86