Electronic Supplementary Material (ESI) for RSC Advances.

Electronic supplementary information

Quaternary Alloy Quantum Dots with Widely Tunable Emission – A Versatile System to Fabricate the Dual-Emission Nanocomposites for Bio-Imaging

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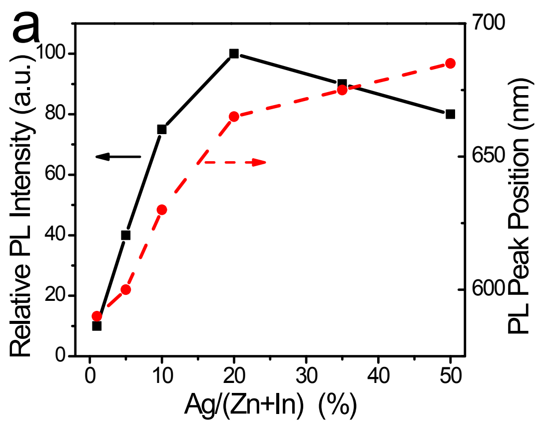

Fig. S1 Summarization of the dependence of relative PL intensity and peak position of the Zn-Ag-In-Se core QDs on (a) the Ag/(Zn+In) ratio ([In]=[Zn]=19 mM) and (b) the In/Zn ratio ([Ag]=7.6 mM).

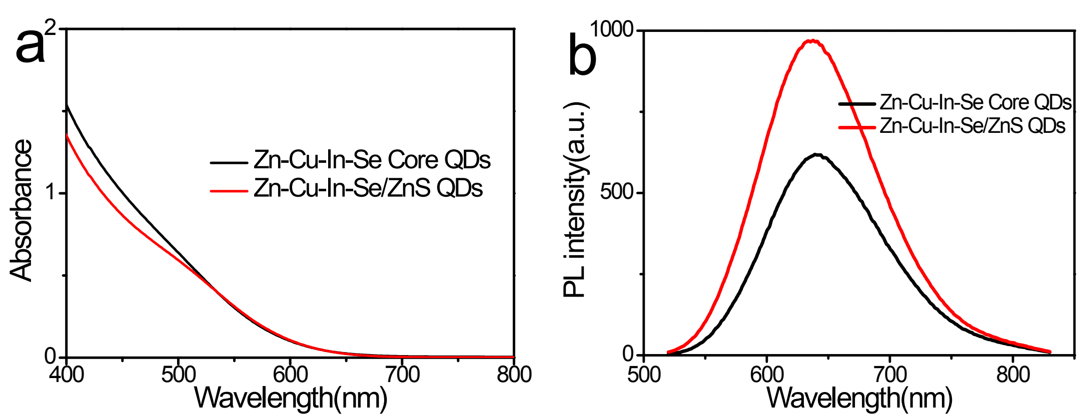

Fig. S2 Absorption (a) and PL (b) spectra of initial ZCISe core QDs and the resulting ZCISe/ZnS core/shell QDs (λ_{ex}=450 nm)

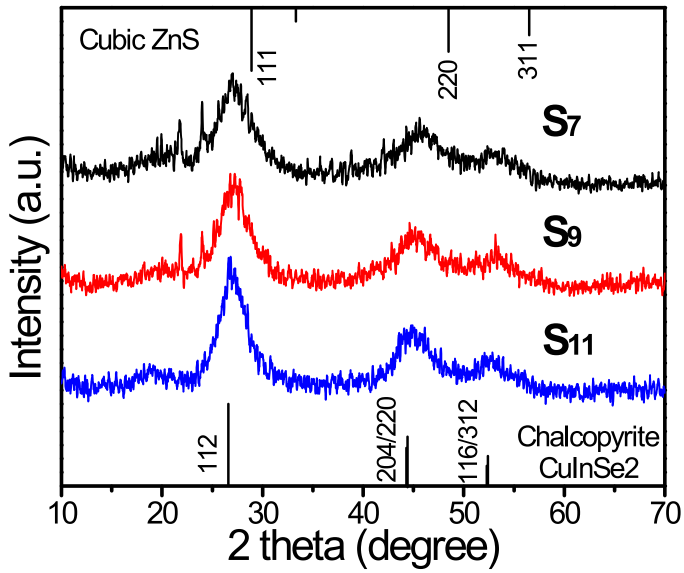

Fig. S3 The XRD patterns of the samples S7, S9 and S11. The pattern of $CuInSe_2$ chalcopyrite is provided as a reference.

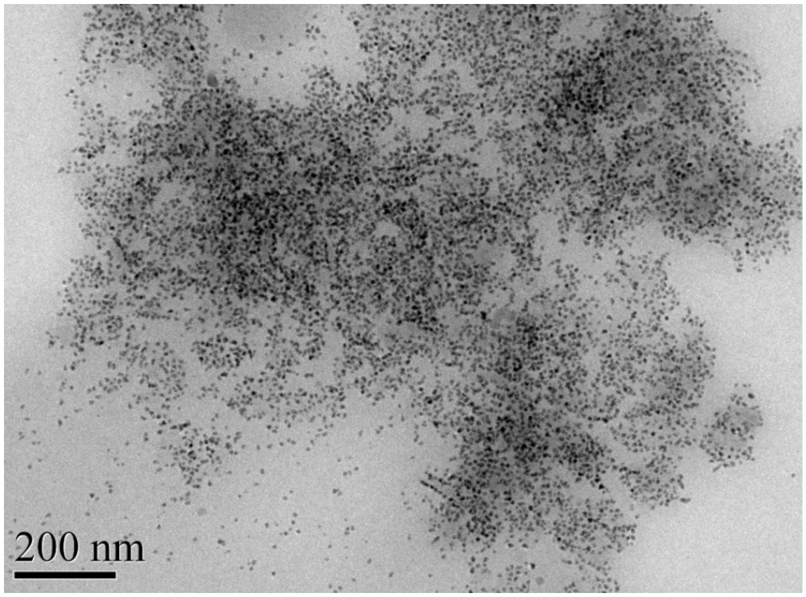

Fig. S4 TEM image of the as-prepared ZCISe/ZnS core/shell QDs (the sample S11). The average diameter is about 6 nm.

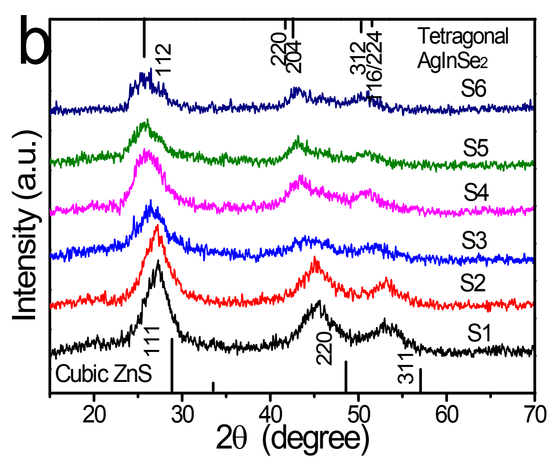

Fig. S5 The XRD patterns of the samples S1–S6.

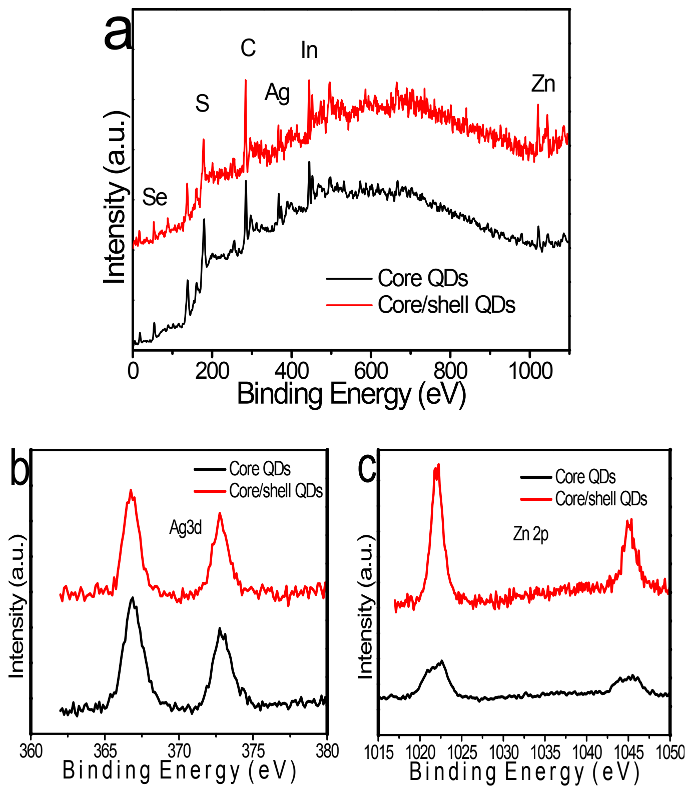

Fig. S6 (a) XPS survey spectra of initial ZAISe core and as-prepared ZAISe/ZnS core/shell QDs, and the corresponding XPS spectra of (b) Ag 3d and (c) Zn 2p. These QDs all contain Zn, Ag, In, Se and S, while the Zn content in core/shell QDs increases as compared with that in core QDs. Here, the content of the S element in QDs cannot be determined accurately due to the presence of DT.

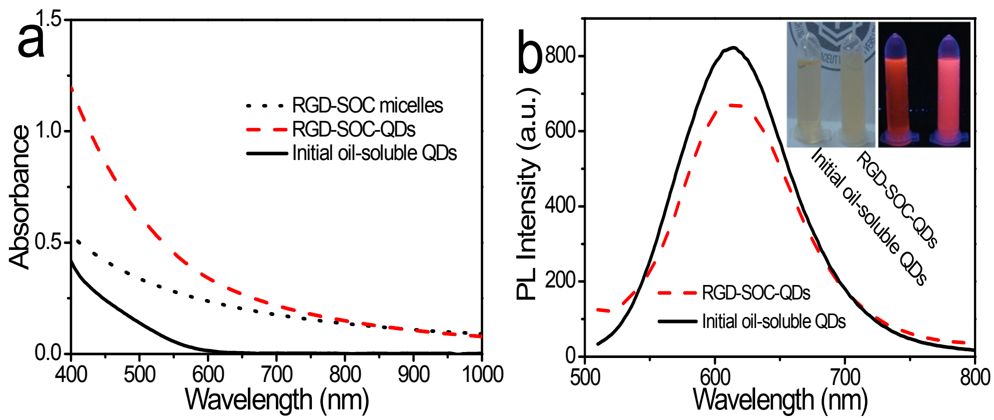

Fig. S7 The absorption spectrum of RGD-SOC micelles, and the absorption and PL spectra of ZAISe/ZnS QDs before and after transferred into RGD-SOC micelles (here, RGD-SOC micelles do not show detectable fluorescence signal). The insets of panel b represent the corresponding digital photographs under room light and UV lamp (λ_{max}=365 nm).

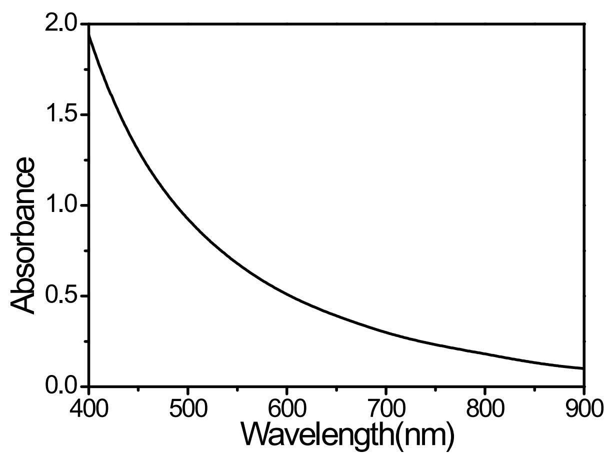

Fig. S8 The absorption spectrum of the mixed ZAISe/ZnS (sample S3) and ZCISe/ZnS QDs (the sample S11) after water transfer using RGD-SOC micelles.

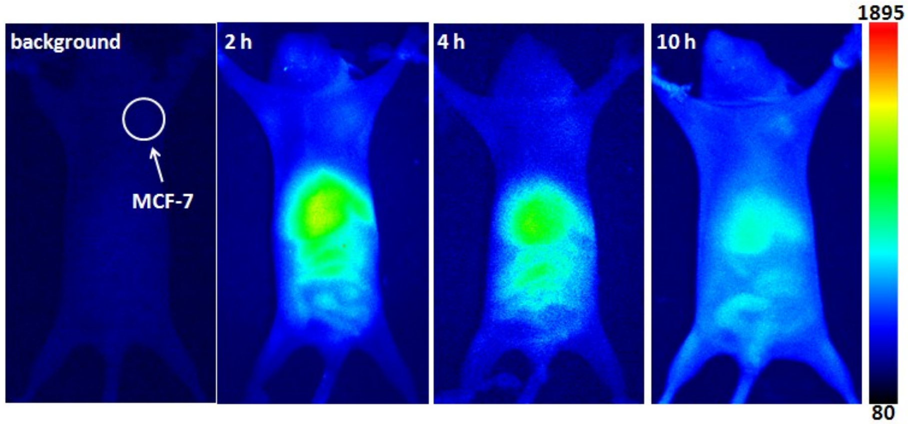

Fig. S9 The dynamic distribution of the mixed QDs-loaded RGD-SOC micelles in nude mice bearing $\alpha_v\beta_3$ intergrin receptor-negative MCF-7 tumors monitored using the NIR fluorescence imaging system (λ_{ex}=766 nm).

Table S1. Summarization of the Zn/Ag/In/Se molar ratios in the ZAISe/ZnS core/shell QDs (namely, the sample S1–S6) measured by XPS, in which the content of Se in QDs was normalized. The corresponding content of element S in QDs cannot be determined by XPS because of the presence of the dodecanethiol on the QDs surface.

Sample	Zn	Ag	In	Se
S1	1.28	0.06	0.1	1
S2	1.1	0.1	0.26	1
S3	1.1	0.16	0.43	1
S4	0.93	0.28	0.53	1
S5	0.9	0.46	0.54	1
S6	0.61	0.45	0.49	1