Electronic Supplementary Information

Biocompatible Ag_2S quantum dots for highly sensitive detection of copper ions

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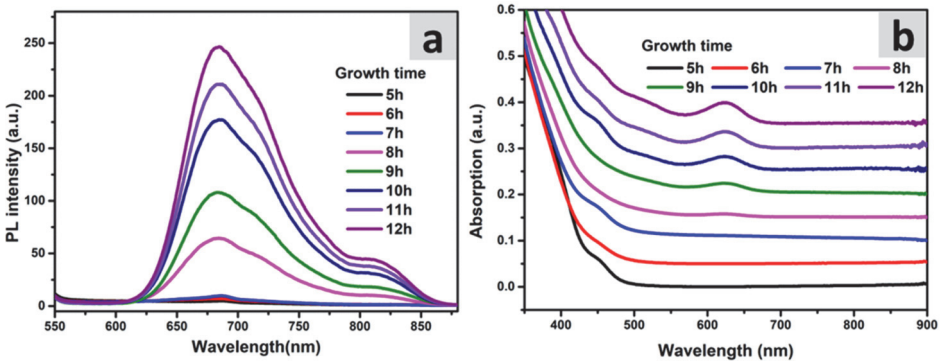

Fig. S1 Temporal evolution of PL spectra (a) and absorption spectra (b) of Ag_2S NCs grown at 60 °C.

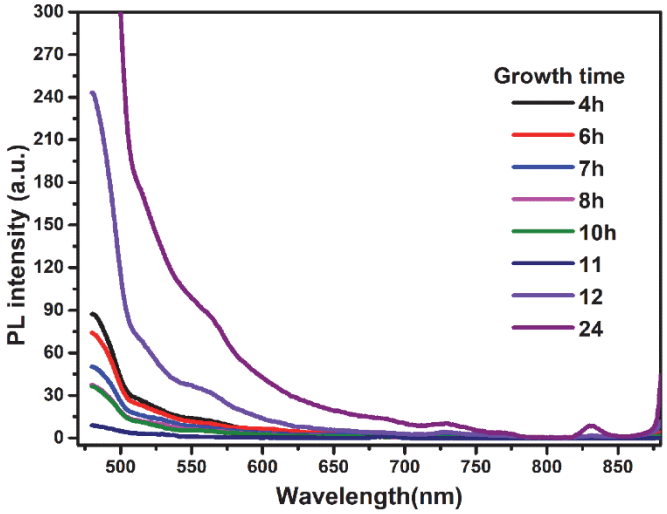

Fig. S2 Temporal PL spectra evolution of reaction aliquots in the absence of GSH.

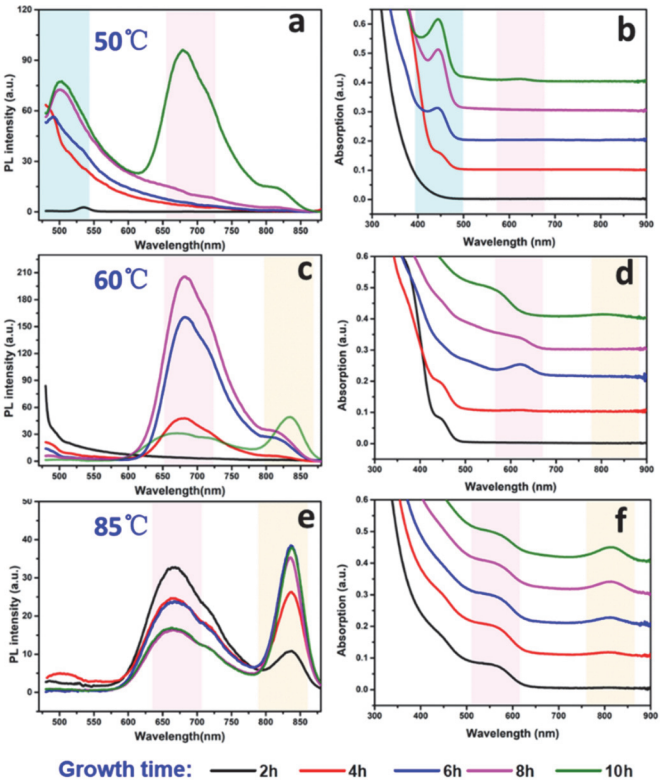

Fig. S3 Temporal evolution of PL spectra (a, c, d) and the corresponding absorption spectra (b, d, f) of Ag_2S NCs grown at 50 °C, 60 °C and 85 °C, respectively.

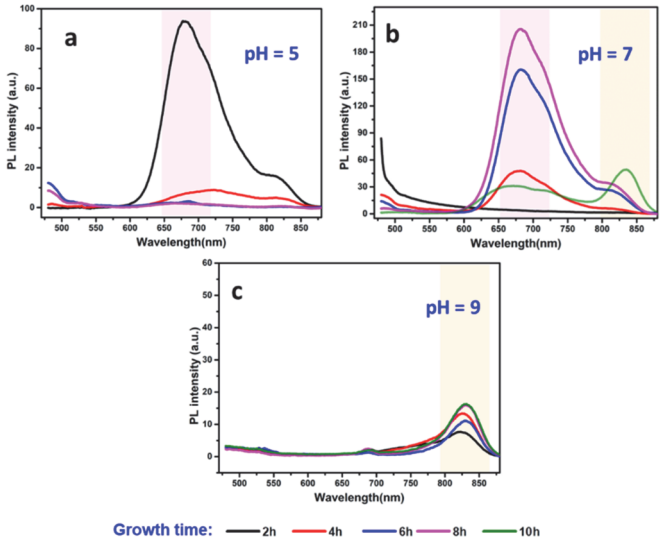

Fig. S4 Temporal evolution of PL spectra of Ag_2S NCs grown at pH=5(a), pH=7 and pH=9, respectively.

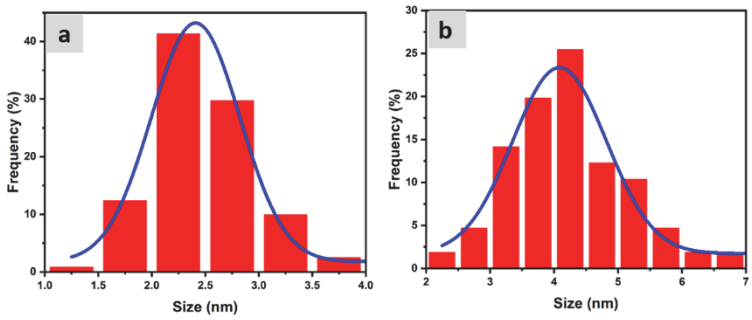

Fig. S5 Size distribution histograms of the red (a) and NIR (b) emitting Ag_2S QDs

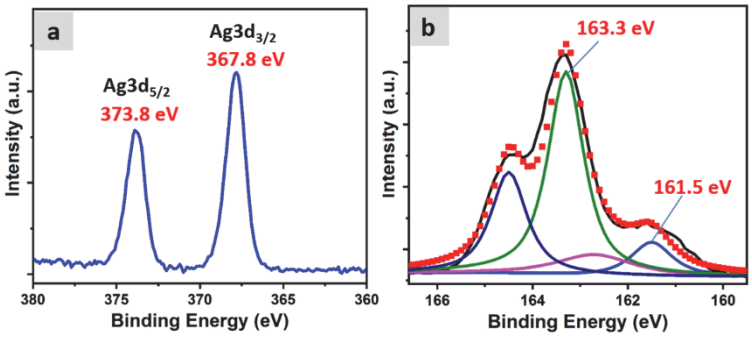

Fig. S6 High-resolution XPS spectrum of Ag3d (a) and S2p (b) of the synthesized Ag_2S QDs. The raw XPS spectrum of S2p (black line) was curve-fitted into four peaks using a nonlinear least-squares fitting program.

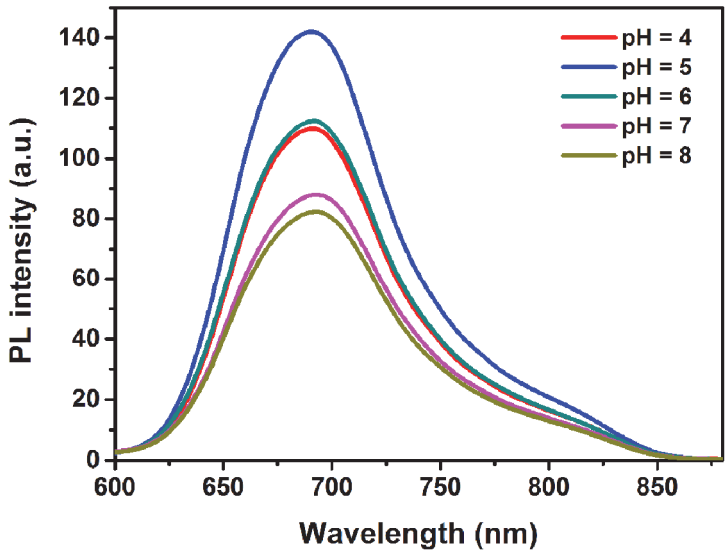

Fig. S7 pH effect on the PL intensity of Ag_2S QDs.

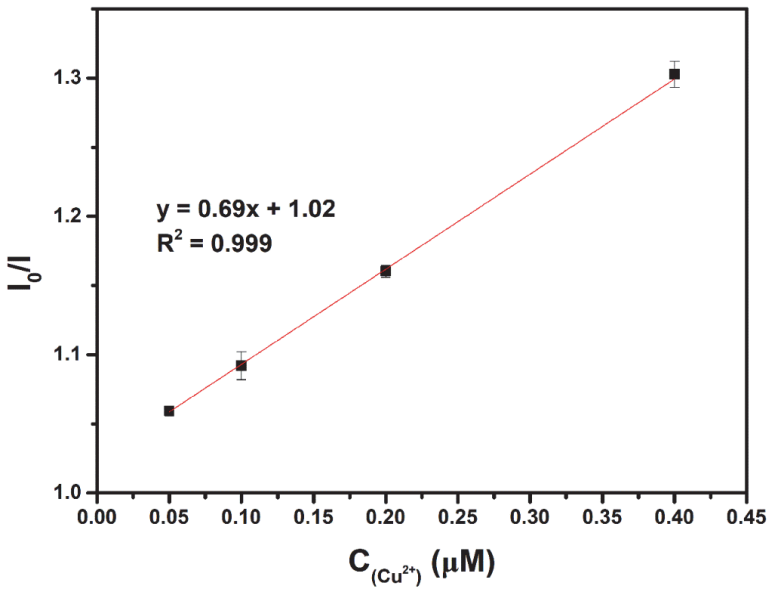

Fig. S8 Plot of PL emission intensity change (I_0/I) in the Cu^{2+} spiked standard solutions as a function of the Cu^{2+} concentration, where I_0 and I are the emission intensity of QDs in the absence and presence of Cu^{2+}.

Table S1 Fitting results of fluorescence lifetimes of Ag_2S QDs in the absence and presence of Cu^{2+} with different concentration

Cu^{2+}/μM	τ_1	τ_2	a_1	a_2	τ [a]
0	8.982	0.400	5.027	0.822	8.920
0.5	0.233	11.010	6.312	0.520	8.809
2	6.640	0.646	3.177	1.044	6.454
5	3.903	0.339	1.371	0.460	3.802

[a] The mean lifetime (τ) were calculated using the following equation:

$$t = \frac{(a_1 * \tau_1^2 + a_2 * \tau_2^2)}{(a_1 * \tau_1 + a_2 * \tau_2)}$$

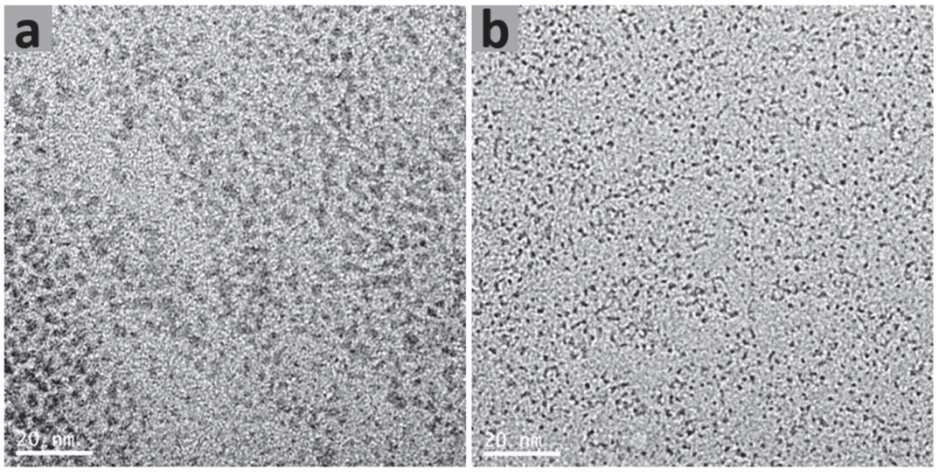

Fig. S9 TEM images of pure Ag_2S QDs (a) and Ag_2S QDs incubated with 10 μM Cu^{2+} for 30 days (b). It showed that the size of QDs decreased obviosly after incubated with 10 μM Cu^{2+} for 30 days.