

Supplementary Information

Facile one-step synthesis of quaternary AgInZnS quantum dots and their applications for bioeffect and detecting Cu²⁺

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Table S1. Parameters of *S. cerevisiae* growth at different concentrations of QDs.

QDs	c [nmol·L ⁻¹]	k [10 ⁻³ min ⁻¹]	R	P_m [mW]	Q_{total} [J]	I [%]	IC_{50} [nmol·L ⁻¹]
O-CdTe	0	6.80	0.998	2.22	0.79	0	17.07
	4.9	6.10	0.999	2.19	0.78	10.29	
	7.9	5.40	0.997	1.69	0.84	20.58	
	11.9	4.65	0.997	1.27	0.84	31.62	
	14.9	3.76	0.995	1.14	0.83	44.70	
	29.7	2.71	0.999	0.90	0.84	60.15	
	89.1	0.05	0.997	0.62	0.85	92.05	
	198.1	0.03	0.980	0.33	0.78	95.89	
G-CdTe	0	7.28	0.998	2.35	0.81		80.81
	28.6	7.66	0.999	2.31	0.78	-5.22	
	47.6	7.25	0.997	2.34	0.81	0.41	
	61.9	5.45	0.997	2.12	0.82	24.83	
	76.2	4.01	0.995	1.67	0.86	44.69	
	95.2	2.65	0.999	1.32	0.86	63.45	
	133.3	1.07	0.997	0.93	0.85	85.24	
	209.4	0.8	0.997	0.69	0.79	98.89	
NAC-CdTe	0	6.40	0.908	0.46	0.91	0	89.8
	38.08	7.39	0.999	0.49	1.01	-15.5	
	57.12	5.39	0.997	0.43	1.04	15.8	
	76.16	4.09	0.993	0.37	1.05	36.1	
	95.20	2.64	0.995	0.29	1.04	58.8	
	190.40	0.53	0.992	0.13	0.88	91.7	
MPA-CdTe	0	6.10	0.998	0.48	1.22	0	56.2
	6.24	5.21	0.999	0.46	1.18	14.6	
	31.20	4.20	0.997	0.39	1.28	31.2	
	93.60	1.95	0.997	0.26	1.32	68.0	
	187.20	0.87	0.995	0.20	1.22	85.7	
	312.00	0.25	0.999	0.16	1.04	95.9	
GSH-CdTe	0	5.82	0.998	0.48	0.86	0	15.3
	6.24	4.72	0.99	0.45	0.80	19.9	
	12.48	3.38	0.997	0.28	0.89	42.6	
	24.96	1.48	0.997	0.22	0.88	71.5	
	49.92	0.97	0.995	0.17	0.88	88.7	
	99.84	0.37	0.980	0.09	0.74	97.2	

Table S2. The comparison of cytotoxicity of different types of QDs to *S. cerevisiae* cells^{17,18}

QDs	O-CdTe	G-CdTe	NAC-CdTe	MPA-CdTe	GSH-CdTe	AIZS
IC_{50} [nmol·L ⁻¹]	17.07	80.81	89.8	56.2	15.3	1000

Table S3. Comparison of different QDs-based assays for the detection of Cu²⁺.

QDs	Emission Peak/nm	Size/nm	LOD	Dynamic Range	Ref.
AIZS QDs	583	3.51	100.28 nM	0-35 μM	-
TGA-CdTe QDs	~ 550	-	-	0.1-5 μ M	40
Silicon quantum dots (Si QDs)	460	2.3	0.5 μ M	5×10^{-7} - 1×10^{-5} M	41
GQDs@GSH-CdTe QDs	420&572	-	53 nM	0.1-1.0 μ M	13
MPA-Ag ₂ S QDs	695	2.5 \pm 0.6	27.6 nM	25 nM-10 μ M	12
Au@Ag NPs-CDots	-	33.8 \pm 3.4/ 3.3 \pm 0.4	4.81 nM	0.005-1 μ M	42
Zinc-doped AgInS ₂ QDs	561	3.64	27.3 nM	0-340 μ M	43
AIZS-GO nanocomposites	~ 600	5.2	0.18 μ M	0-850 μ M	44

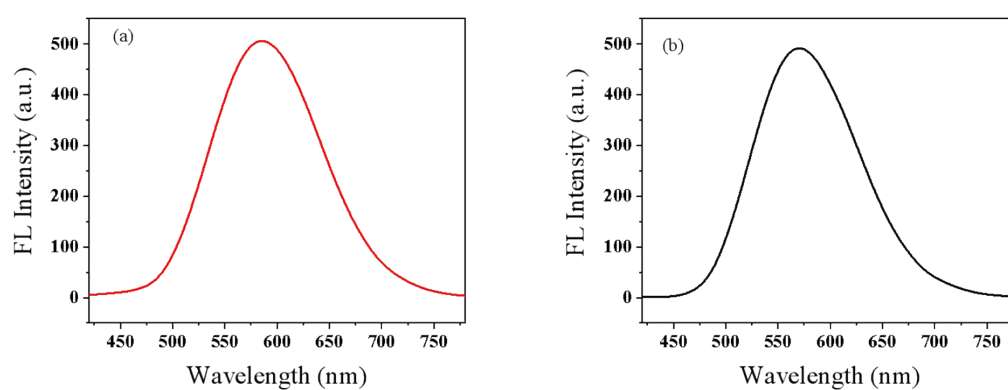


Fig. S1. The fluorescence emission spectra of AIZS QDs synthesized by adjusting the pH value (pH=8.50) of the reaction system before (a) and after (b) the addition of sodium sulfide.