Supporting information

A simple Low Temperature Synthesis of Fluorescence Boron Quantum Dots for versatile Applications

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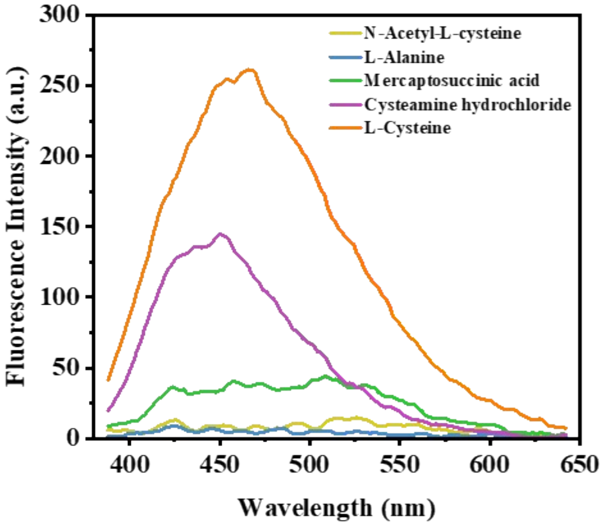

Fig. S1 Fluorescence spectra of synthetic products in the presence of N-Acetyl-L-Cysteine, L-alanine, mercaptosuccinic acid, cysteine hydrochloride, L-Cysteine.

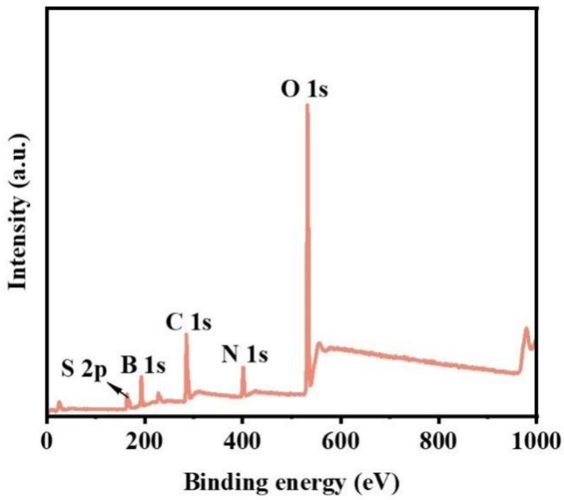

Fig. S2 XPS total spectrum of BQDs.

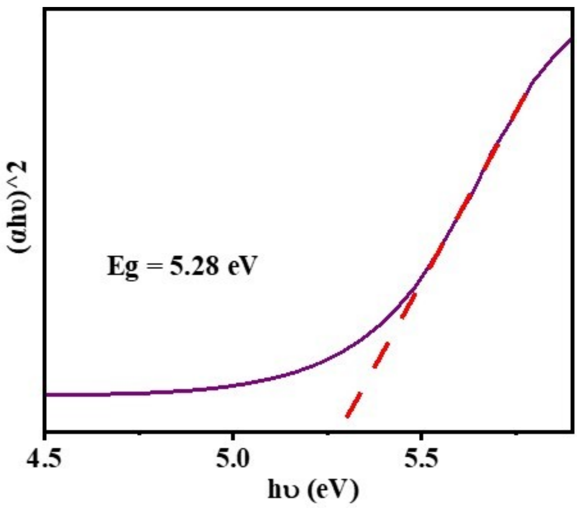

Fig. S3 Tauc plot of BQDs.

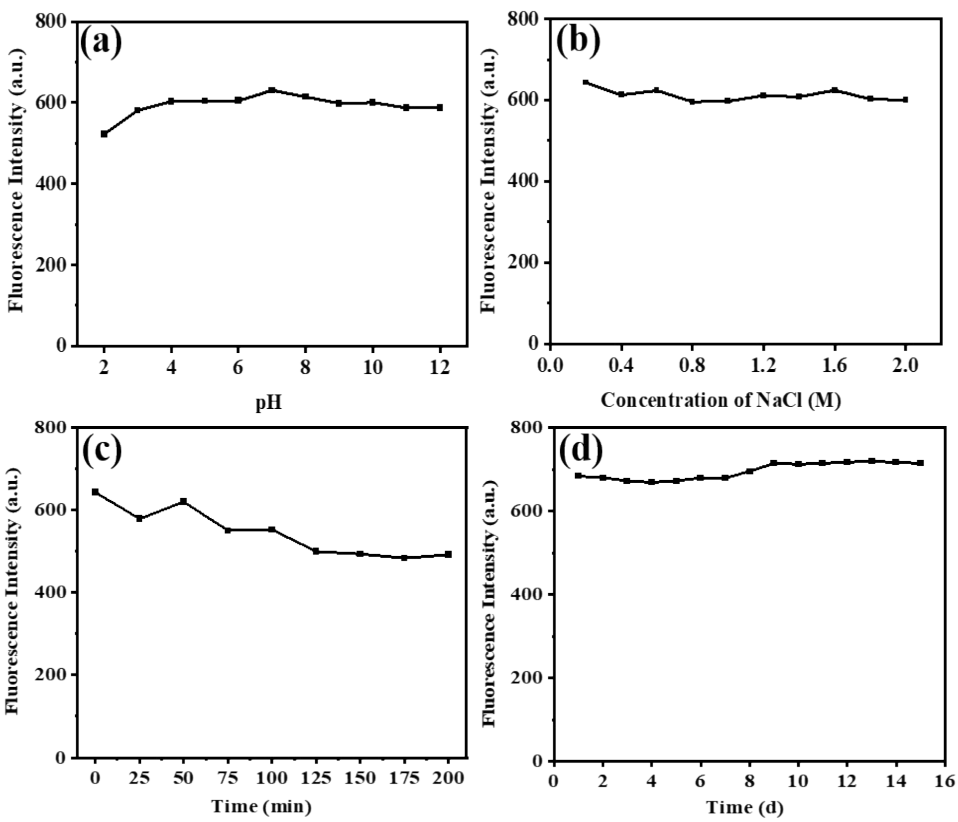

Fig. S4 Effect of pH (a), ionic strength (b), UV irradiation time (c), Storage time (d) on the fluorescence of BQDs.

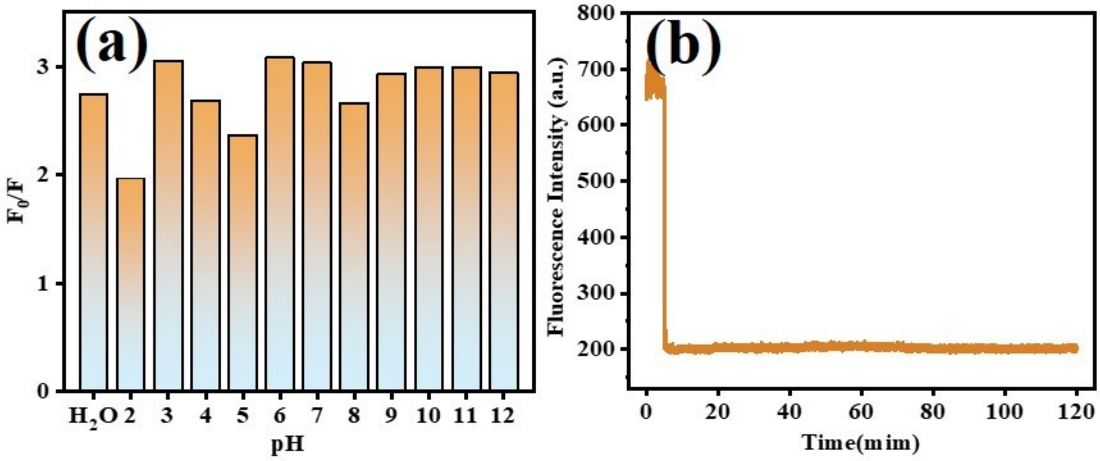

Fig. S5 (a) Effect of pH on the fluorescence intensity ratio (F_0/F) of BQDs in the presence of SSZ, (b) The relationship of fluorescence intensity with time before and after adding SSZ.

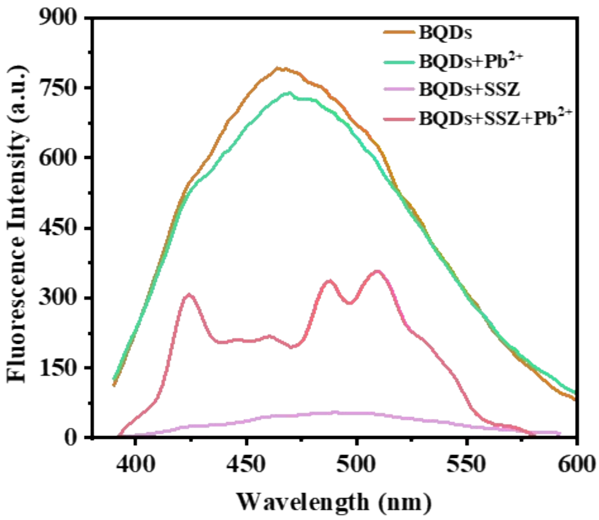

Fig. S6 Fluorescence spectra of BQDs, BQDs+Pb^{2+}, BQDs+SSZ and BQDs+SSZ+Pb^{2+} system.

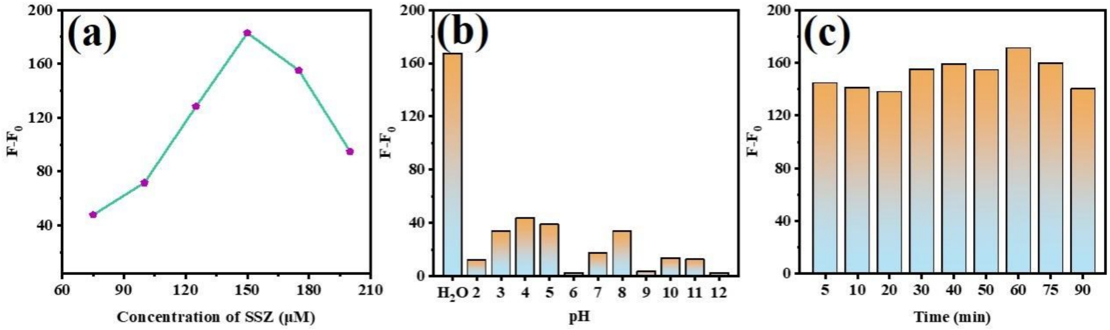

Fig. S7 Effect of the SSZ concentration (a), pH (b) and the reaction time (c) on fluorescence recovery of BQDs-SSZ system.

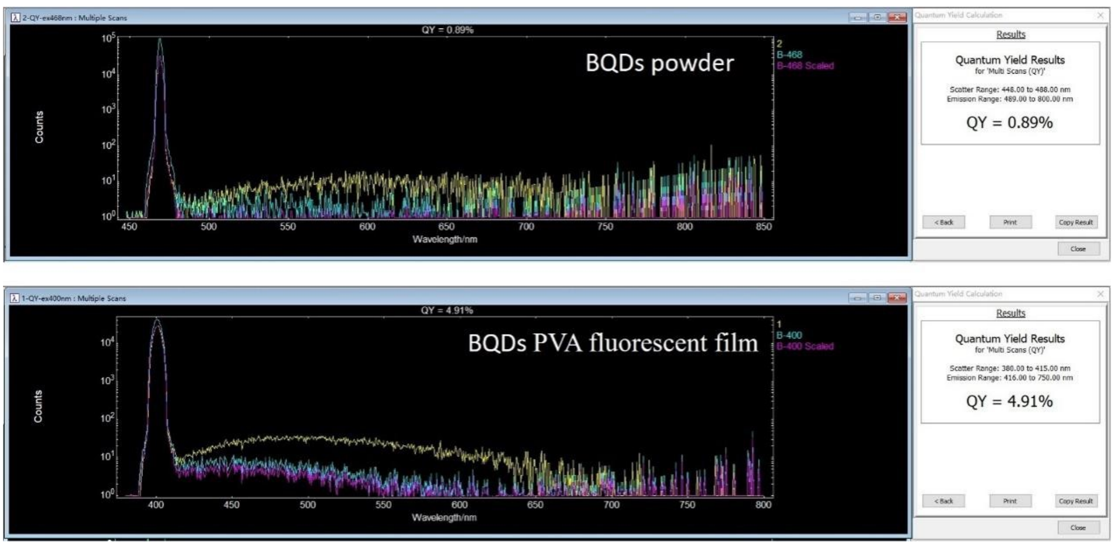

Fig. S8 Fluorescence quantum yield data of PVA film and solid powder.

Table S1 Optimization process and quantum yields of BQDs (λ_{ex} = 370 nm)

Ammonium pentaborate (g)	Boric acid (g)	L-Cys (g)	Time (h)	QY (%) in water
0.3	0.1	0.1	24	0.62
0.3	0.15	0.1	24	0.64
0.3	**0.3**	0.1	24	**0.89**
0.3	0.45	0.1	24	0.73
0.3	0.3	0	24	—
0.3	0.3	0.075	24	0.67
0.3	0.3	**0.1**	24	**0.89**
0.3	0.3	0.15	24	0.69
0.3	0.3	0.3	24	0.57
0.3	0.3	0.1	24	0.89
0.3	0.3	0.1	48	0.94
0.3	0.3	0.1	**72**	**1.14**
0.3	0.3	0.1	96	1.04

Table S2 K_{SV}、K_q、K_A and binding site of BQDs-SSZ system

T/K	K_{SV}/(L/mol)	K_q/[L/(mol•s)]	R^2	K_A/(L/mol)	n
283	4.36×10^4	7.61×10^{12}	0.998	3.87×10^5	1.2104
293	3.66×10^4	6.39×10^{12}	0.996	7.48×10^4	1.0732
303	3.35×10^4	5.84×10^{12}	0.995	3.67×10^4	1.0136

Table S3 Thermodynamic parameters of BQDs-SSZ system

T/K	ΔH/(kJ/mol)	ΔG/(kJ/mol)	ΔS/[J/(mol•K)]
283		-30.25	
293	-85.2	-27.84	-194.24
303		-26.47	

Table S4 Detection of SSZ in actual samples (n = 5）

Spiked (μmol/L)	Found (μmol/L)	Recovery (%)	RSD (%)
0	5.47	—	0.47
5	10.29	96.40	0.37
25	32.19	106.88	1.91
50	56.66	102.38	0.53

Table S5 Detection of Pb^{2+} in actual samples (n = 5）

Spiked (μmol/L)	Found (μmol/L)	Recovery (%)	RSD (%)
0	0	—	—
100	108.15	108.15	0.91
80	84.92	106.16	5.04
55	58.31	106.01	4.84