Electronic Supplementary Material (ESI) for Analytical Methods.

Supplementary Materials for:

Concentration-dependent multicolor fluorescent carbon dots for colorimetric and fluorescent bimodal detections of Fe^{3+} and L-ascorbic acid

Lihong Shi[a,*], Zhipeng Hou[a], Caihong Zhang[a], Guomei Zhang[a], Yan Zhang[a], Chuan Dong[a], Shaomin Shuang[a,*]

[a]*College of Chemistry and Chemical Engineering, Shanxi University, Taiyuan 030006, PR China*

[*] *Corresponding author.E-mail address: shilihong@sxu.edu.cn, smshuang@sxu.edu.cn*

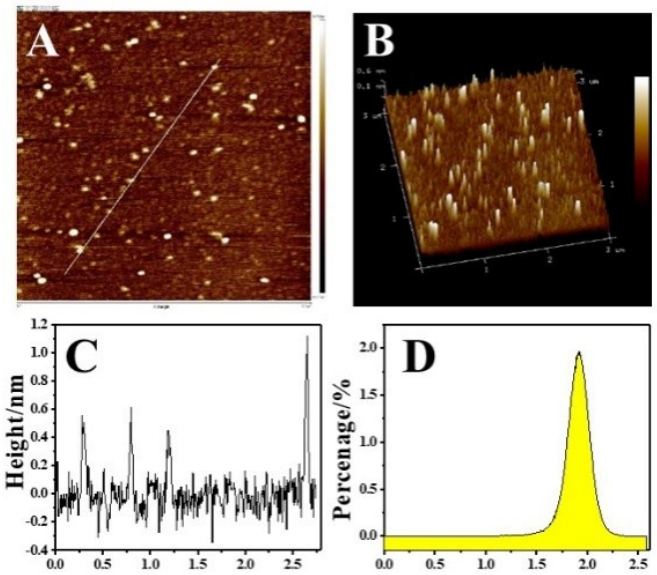

Fig. S1 (A) AFM topography image of CDs. (B) AFM three-dimensional image of CDs. (C) Height profile along the line in AFM topography image. (D) Height distribution of CDs.

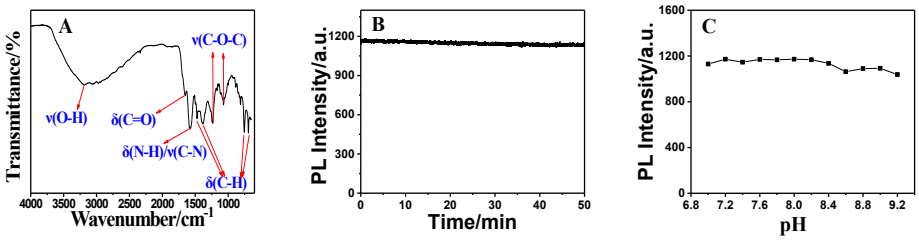

Fig. S2 (A) FTIR spectrum of CDs. (B) Effect of excitation time on PL intensity of Y-CDs (38.4 mg L^{-1}). (C) Effect of pH on PL intensity of Y-CDs (38.4 mg L^{-1}).

Table S1 Comparison of different fluorescent CDs based probes for Fe^{3+} detection.

Starting material of synthesis	Range	Detection limit	Ref.
catechol and triethylene tetramine	25–200 μM	58.82 nM	[1]
Phyllanthus acidus and aqueous ammonia	2–25 μM	900 nM	[2]
maminobenzoic acid	0 -1.6 μM	50 nM	[3]
DL-malic acid	6 -200 μM	800 nM	[4]
garlic	0.002-3 μM	0.22 nM	[5]
ethylenediaminetetraacetic acid and urea	0-25 μM	13.6 nM	[6]
coffee, salvia, and urea	0.5 -175 μM	27.8 nM	This work

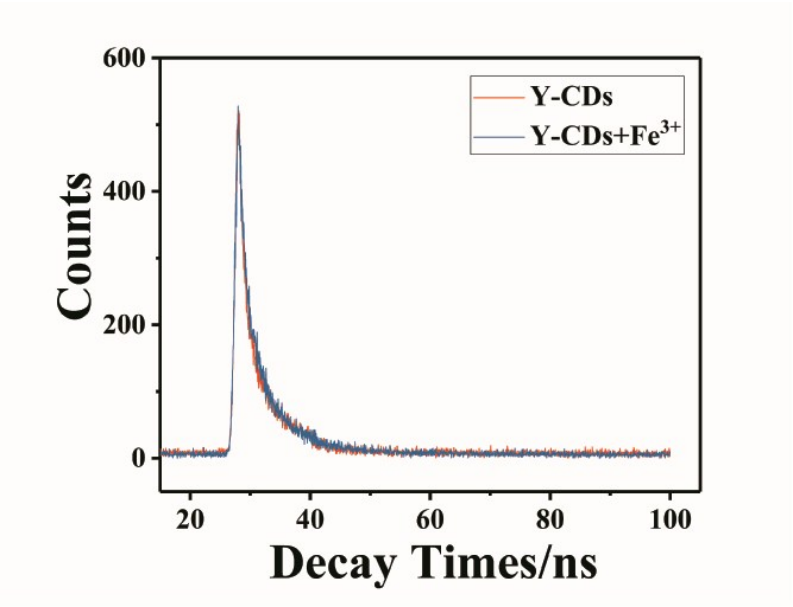

Fig. S3 Fluorescence decay curves of Y-CDs and Y-CDs/Fe^{3+}.

Table S2. Triple-exponential fitting of Y-CDs and Y-CDs/Fe^{3+} decay curves.

Sample name	Y-CDs	Y-CDs/Fe^{3+}
τ_1 (ns)/A_1 (%)	0.85/0.01	1.20/0.005
τ_2 (ns)/A_2 (%)	0.85/0.01	1.20/0.005
τ_3 (ns)/A_3 (%)	5.27/99.98	5.45/99.99
Average τ (ns)	5.27	5.45

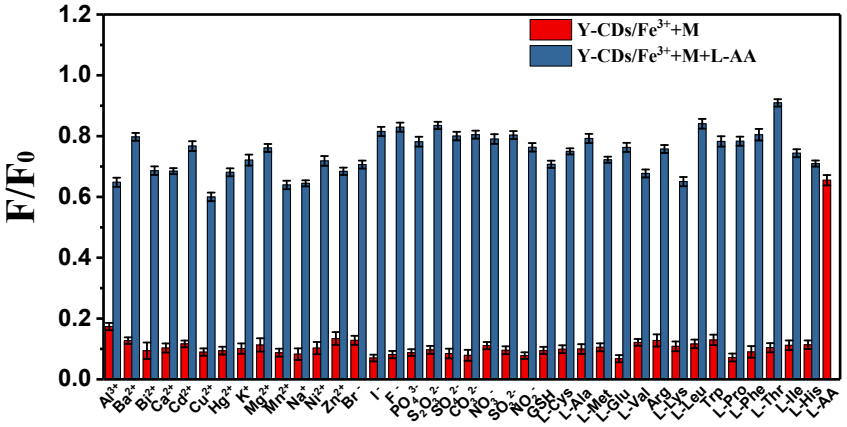

Fig. S4 Selectivity and interference experiment of Y-CDs/Fe^{3+} solution for L-AA over cation, anions, amino acids and small molecules under pH 7.4 condition at 470 nm excitation. (F_0 is the fluorescence intensity of Y-CDs, F is the fluorescence intensity of Y-CDs/Fe^{3+} in presence of external substances, respectively).

Table S3 Comparison of different fluorescent CDs based probes for L-AA detection.

Starting material of synthesis	Range	Detection limit	Ref.
catechol and triethylene tetramine	25 –300 μM	0.236 μM	[1]
2, 5-diaminobenzene-sulfonic acid and 4-aminophenyl boronic acid	1–110 μM	0.3 μM	[7]
Saccharomyces cerevisiae, Escherichia coli, Staphylococcus aureus, and Aspergillus niger	0–500 μM	1.2 μM	[8]
citric acid	0.03–0.1 mM	----	[9]
coffee, salvia, and urea	3.23–22.08 mM	1.8 mM	This work

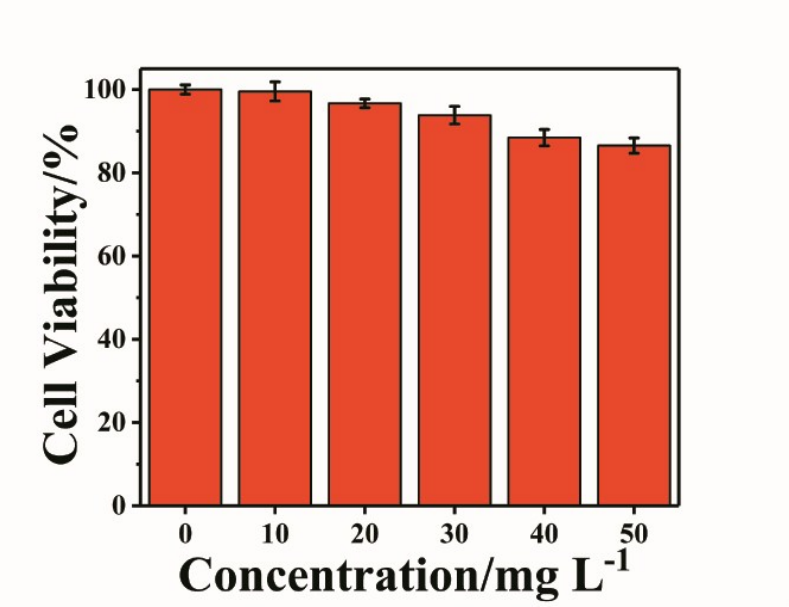

Fig. S5 Cytotoxic effect of CDs on SMMC-7721 cells.

References

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