Electronic Supplementary Material (ESI) for Analytical Methods.

Supplementary Material

A Sensitive Sensor Based on Carbon Dots for the Determinations of Fe^{3+} and Ascorbic Acid in Foods

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Apparatus of characterization

Ultraviolet-visible (UV–vis) absorption spectra were examined on a UV-2910 UV-vis spectrophotometer (Shimadzu, Japan). The fluorescence spectra were performed on F-4500 fluorescence spectrophotometer (Hitachi, Japan). Transmission electron microscopy (TEM) image was acquired on HT7700 transmission electron microscope (Hitachi, Japan). Fourier transform infrared (FT-IR) spectra was recorded using Frontier FT-IR spectrometer (PerkinElmer, USA). The X-ray photoelectron spectroscopy (XPS) data was obtained with a K-Alpha photoelectron spectrometer (Thermo Fisher, USA). The fluorescent lifetimes were detected using FLS1000 fluorescence spectrometer (Edinburgh, U.K.). The zeta potential was measured on the ZS90 laser particle size analyzer (Malvern Panalytical, U.K.)

Fig. S1. Fluorescence intensity of N, S-CDs influenced by (a) different molar ratios of raw materials, (b) different reaction temperatures and (c) different reaction times.

Fig. S2. FT-IR spectrum of N, S-CDs.

Fig. S3. Fluorescence emission spectra of N, S-CDs (a) in different pH values, (b) at different NaCl concentration, (c) after 35 minutes irradiation under continuous xenon lamp, (d) at different storage time.

Fig. S4. The fluorescence intensity of N, S-CDs solution in the presence of various metal ions and biomolecules (110 μmol L^{-1}).

Fig. S5. (a) Visualization of fluorescence image of N, S-CDs solution at increasing concentration of Fe^{3+} (0-100 μmol L^{-1}), (b) Fluorescence recovery of N, S-CDs-Fe^{3+} solution in the presence of AA (0-60 μmol L^{-1}).

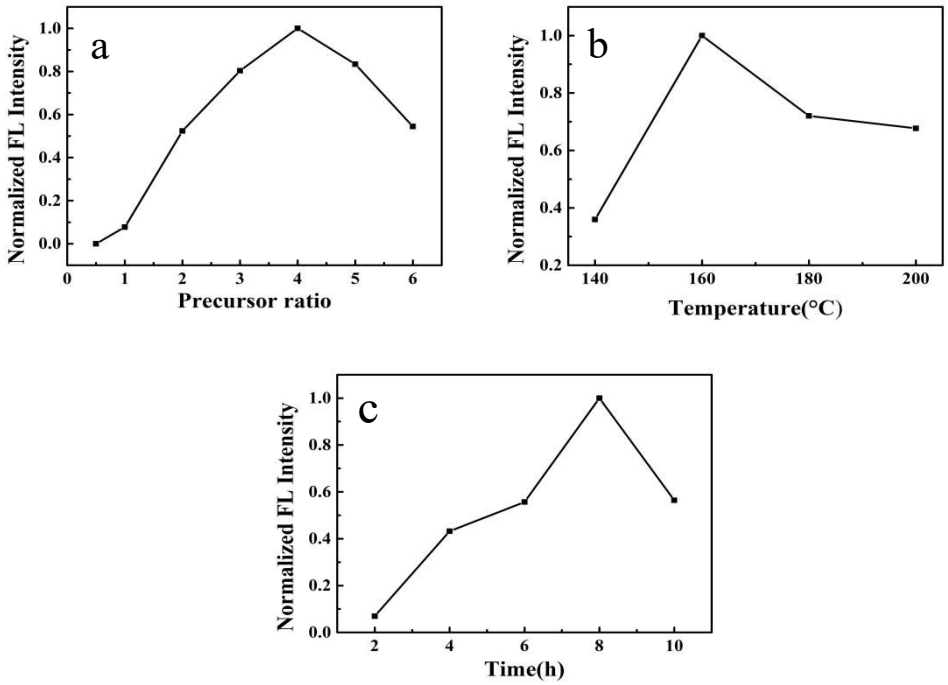
a
Normalized FL Intensity
Precursor ratio
b
Normalized FL Intensity
Temperature(°C)
c
Normalized FL Intensity
Time(h)

Fig. S1

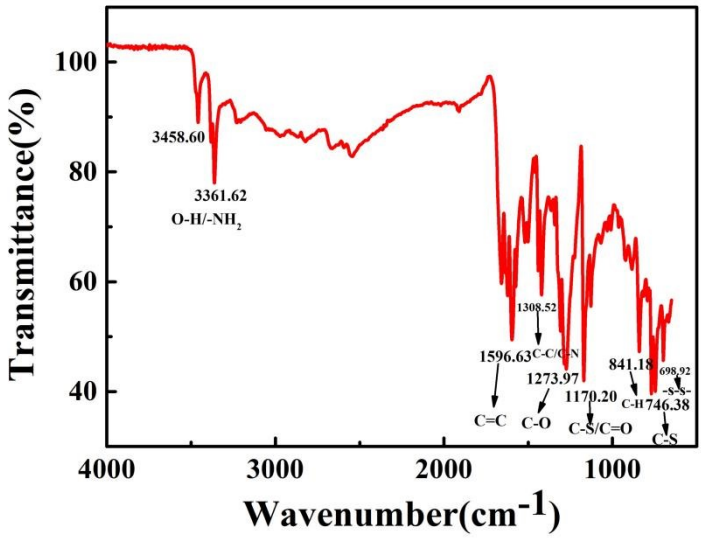
Transmittance(%)
100
80
60
40
4000
3000
2000
1000
Wavenumber(cm-1)
3458.60
3361.62
O-H/-NH2
1596.63
C=C
1308.52
C-C/C-N
1273.97
C-O
1170.20
C-S/C=O
841.18
C-H
698.92
-S-S-
746.38
C-S

Fig. S2

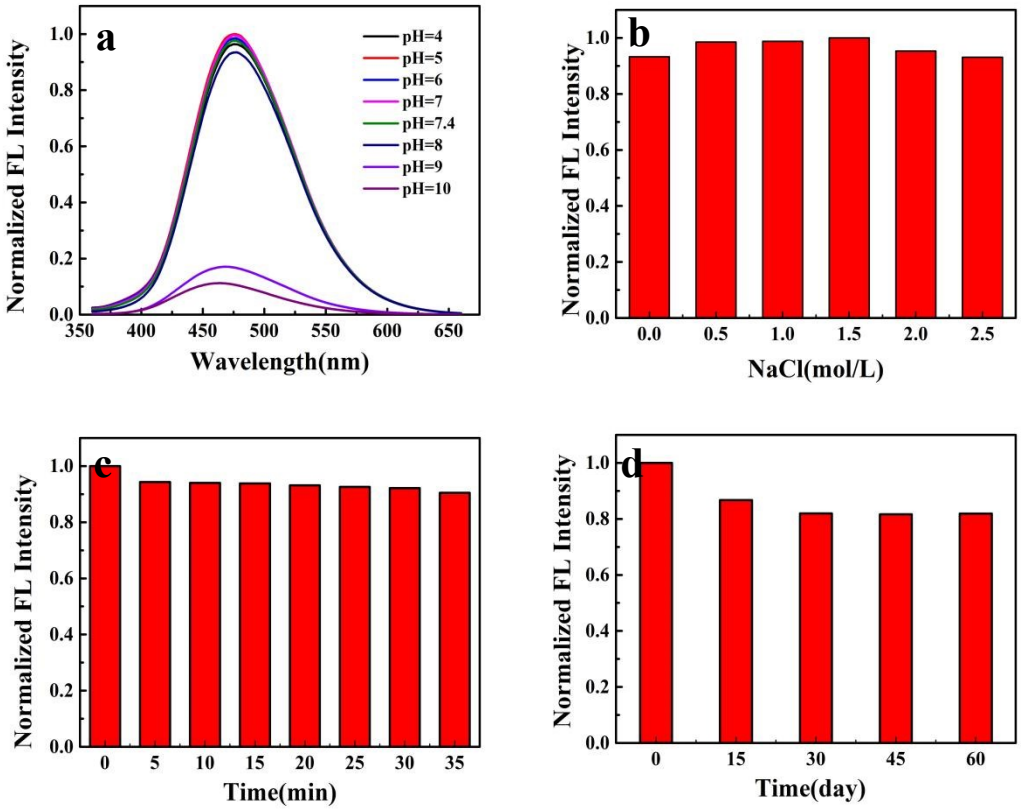
a
Normalized FL Intensity
Wavelength(nm)
pH=4
pH=5
pH=6
pH=7
pH=7.4
pH=8
pH=9
pH=10
b
NaCl(mol/L)
c
Time(min)
d
Time(day)

Fig. S3

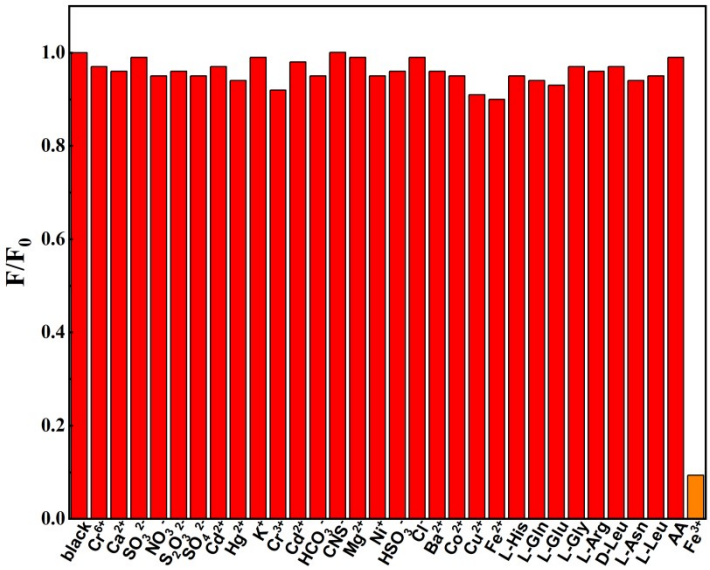
F/F0
1.0
0.8
0.6
0.4
0.2
0.0
black
Cr6+
Ca2+
SO3 2-
NO3 -
S2O3 2-
SO3 2-
Cd2+
Hg2+
K+
Cr3+
Cd2+
HCO3 -
CNS-
Mg2+
Ni+
HSO3 -
Cl-
Ba2+
Co2+
Cu2+
Fe2+
L-His
L-Gln
L-Glu
L-Gly
L-Arg
D-Leu
L-Asn
L-Leu
AA
Fe3+

Fig. S4

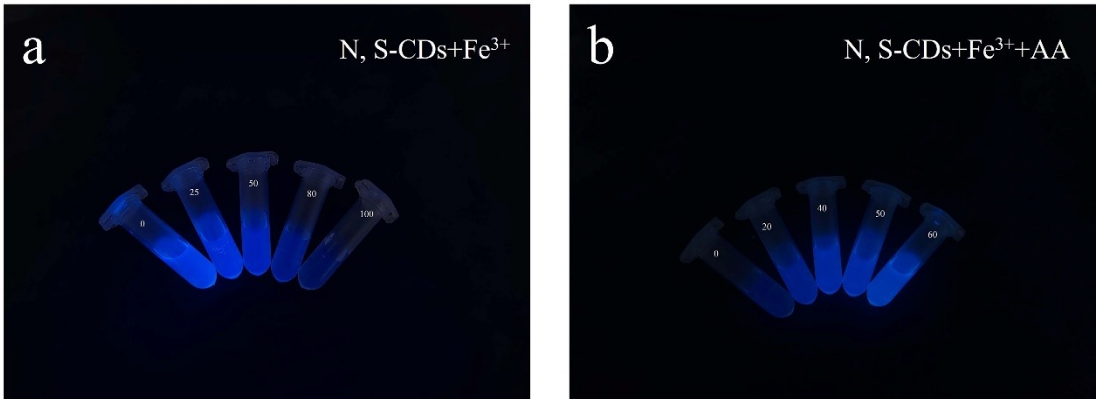

Fig. S5

Table S1 The results of the titration degree of 2,6-dichloro-indopheno

No.	Concentration of AA (mg/mL)	The volume of AA standard solution (mL)	Volume of 2,6-dichloro-indopheno used (mL)	Volume of 2,6-dichloro-indopheno used by black(mL)	T (mg/mL)	
					Calculated value	Mean
1	1.0000	1.00	10.32	0.25	0.09930	0.09891
2		1.00	10.42		0.09830	
3		1.00	10.34		0.09912	