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Supporting Information

Yellow emission N-doped fluorescent carbon dots as fluorescent nanoprobe for the detection of L-threonine in real samples

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Experimental

Chemicals

L-threonine and o-phenylenediamine are purchased from Sinopharm Chemical Reagent Co., Ltd. and Tianjin Fuchen Chemical Reagent Factory, respectively. 1,3-naphthalene diphenol, ascorbic acid (AA), amino sulfonic acid (MSDS), dopamine (DA) are obtained from Aladdin Reagent Co., Ltd. NaOH, HCl, NaCl, KCl, $MgCl_2$ and $CaCl_2$ are purchased from Tianjin Guangfu Technology Development Co., Ltd. The ultrapure water used in the whole experiment are prepared by BK-10B system (Dongguan Qianjing environmental protection equipment Co., Ltd.).

Characterization

The size and morphology of the prepared yellow emission CDs are observed by transmission electron microscopy (TEM)/high resolution transmission electron microscopy (HRTEM) and atomic force microscopy (AFM). The Fourier transform infrared (FT-IR) spectra of fluorescent CDs are obtained using the KBr particle technique on a Bruker Vertex 70 V Fourier infrared spectrometer. Fluorescence spectrometer (FLS980) from Techcomp (Ltd). is used to determine the quantum yield of fluorescent CDs. The UV-vis absorption spectra and fluorescence spectra of the CDs are measured using FS5 spectrophotometer, respectively. X-ray photoelectron spectroscopy (XPS) analysis is performed using an ESCALAB 250 spectrometer with a monochromatic X-ray source Al Ka excitation.

Detection of L-threonine

For L-threonine detection, different concentrations of L-threonine are added to the aqueous solution containing 50 mL CDs, respectively. Then, the fluorescence spectra are recorded at 450 nm and 700 nm wavelength range at 410 nm excitation wavelength.

Determination of L-threonine in environmental water

For real sample analysis, real water samples are filtered through a filter membrane to remove impurities and stored in a thermostatic refrigerator for later use. Different contents of L-threonine are directly added to the 10 mL water sample, and mixed well at room temperature. Under the optimum conditions, the 2.95 mL of real water sample is added to the centrifuge tube, and then 50 mL of CDs solution is added to the above mixed solution, and the fluorescence spectra are recorded at 410 nm excitation wavelength.

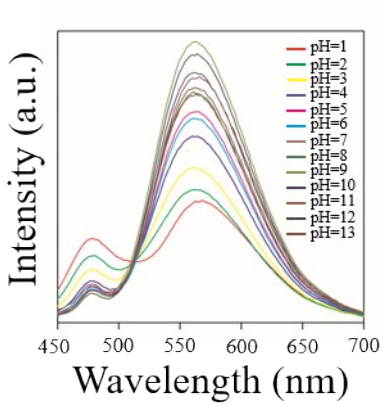

Fig. S1. Fluorescence spectra of yellow emission CDs at different pH values (1-13).

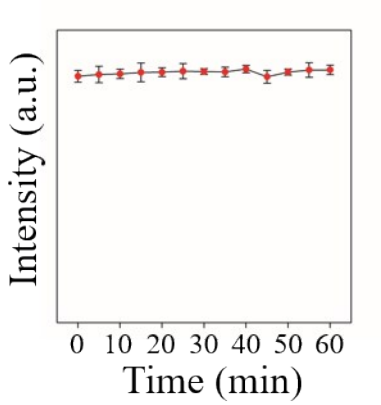

Fig. S2. The emission intensity of CDs at different time (0-60 min).

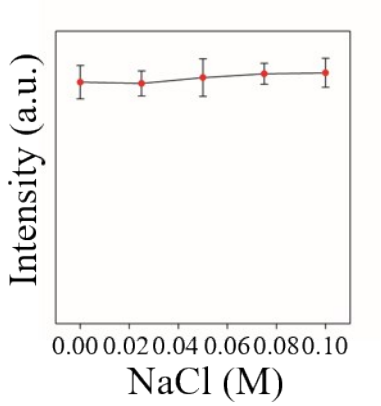

Fig. S3. Effect of different salt solutions on fluorescence intensity of CDs.

Probe	Linear range	Detection limit	References
Ag/Qu/WGE	0.1-1 μM/L	0.1 μM/L	1
CDs	0.1-0.5 mM	6.15 μM	This work

Table 1 Overview on the reported methods for determination of L-threonine.

1 S. Li, J. Zhang, L. Zhang, et al. *J. Food Sci. Biotechnol*. 2020, **39(7)**, 59-66.