

## Supplementary Material for

# **Silicon doped carbon dots based multivariate fluorometric and colorimetric probe for simultaneous determination of heavy metal ions and dopamine**

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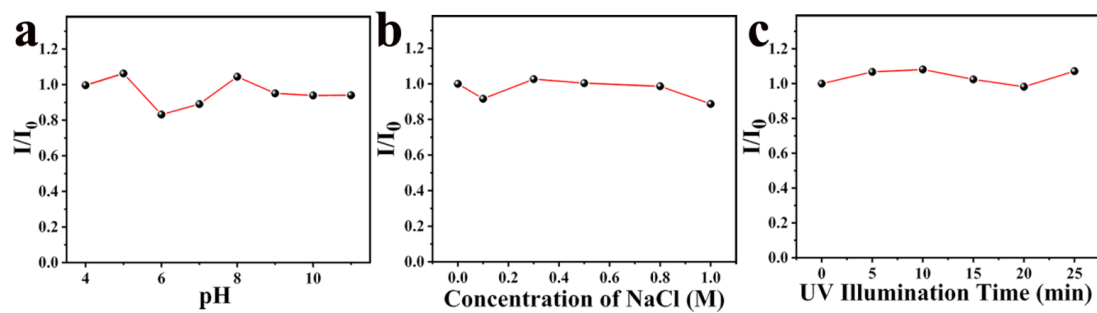
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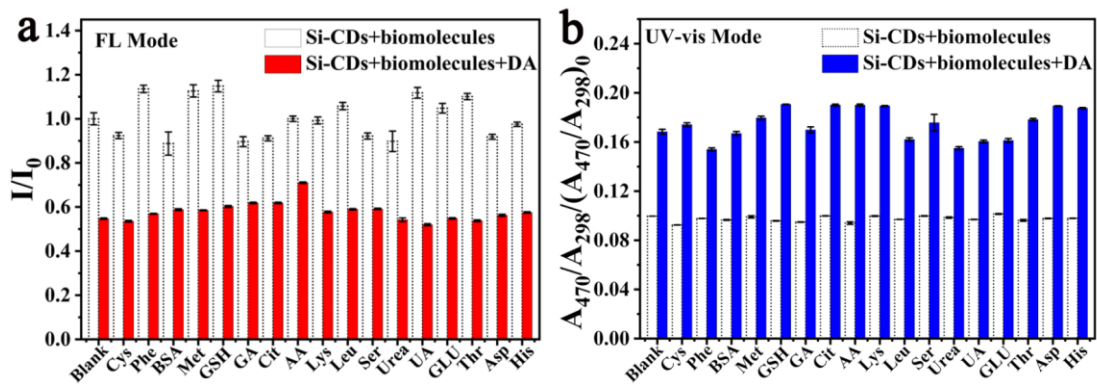
## Partial experimental section

**Materials.** P-Phenylenediamine (PPD), (3-Aminopropyl) trimethoxysilane (APTMS), Bovine serum albumin (BSA), L-serine (Ser), Uric Acid (UA), L-methionine (Met), Urea (Urea), cysteine (Cys), glutathione (GSH), L-histidine (His), glucose (GLU), lysine (Lys), citrulline (Cit), leucine (Leu), glutamic acid (GA), threonine (Thr), aspartic acid (Asp), phenylalanine (Phe), dopamine (DA) and ascorbic acid (AA) were procured from Aladdin (Shanghai, China), and mercuric nitrate were supplied by Beijing Chemical Reagent Company. The abovementioned reagents were of analytically pure and used as received without further purification. All stock and work solutions throughout the experiments were prepared using ultrapure water ( $18.2 \text{ M}\Omega \text{ cm}^{-1}$ ).

**Characterization.** Transmission electron microscopy (TEM) (TECNAI G2 F20, FEI Company, USA) was applied to depict the morphology and particle size of as-prepared Si-CDs. X-ray diffraction (XRD) patterns at diffraction angles from  $10^\circ$  to  $60^\circ$  were recorded via a D/Max-2600/PC. X-ray photoelectron spectroscopy (XPS) measurements were carried out with a Thermo Fisher Scientific K-Alpha (USA) to investigate elemental component of Si-CDs. Fourier transformed infrared spectra (FT-IR) of Si-CDs dispersed in KBr pellets were used to analyze the functional group information of as-synthesized Si-CDs through a JASCOFT/IR-420 (Japan). The optical properties of Si-CDs, including UV-vis absorption spectra, fluorescence spectra and fluorescence lifetime were analyzed using a UV-2550 spectrophotometer (SHIMADZU, Japan), PerkinElmer LS-55 fluorescence spectrometer (Japan) and FLS980 (America), respectively. Fluorescence and colorimetric photographs were captured from iPhone.



**Fig. S1.** Different (a) pH, (b) ionic strength and (c) radiation time of UV lamp on the fluorescence intensity ratio  $I/I_0$  of Si-CDs.



**Fig. S2.** Histogram of the fluorescence intensity ratios ( $I/I_0$ ) (a) and absorbance intensity ratios ( $(A_{470}/A_{298}/(A_{470}/A_{298})_0)$ ) (b) of the Si-CDs with different biomolecules without (left bar) and with DA (right bar).

**Table S1.** Analysis results of DA in serum samples based on the colorimetric and fluorescent method (n=3).

<b>Method</b>	<b>Sample</b>	<b>Material</b>	<b>Spiked (<math>\mu\text{M}</math>)</b>	<b>Found (<math>\mu\text{M}</math>)</b>	<b>Recovery (%)</b>	<b>RSD (%)</b>
fluorescence analysis	serum	DA	0.4 0.5	0.381 0.491	95.2 98.2	1.19 0.69
colorimetric analysis	serum	DA	4.8 4.5	5.290 5.045	110.2 112.1	0.45 1.41