Electronic Supplementary Material (ESI) for RSC Advances.

Synthesis of N-doped carbon dots and application in vanillin detection based on collisional quenching

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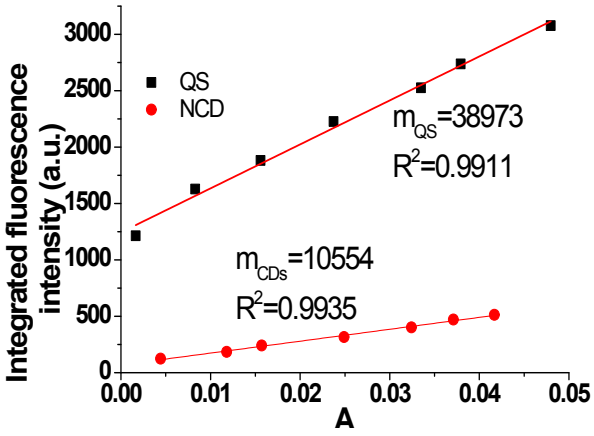

Figure S1 The integrated fluorescence and absorbance of NCD and quinine sulfate.

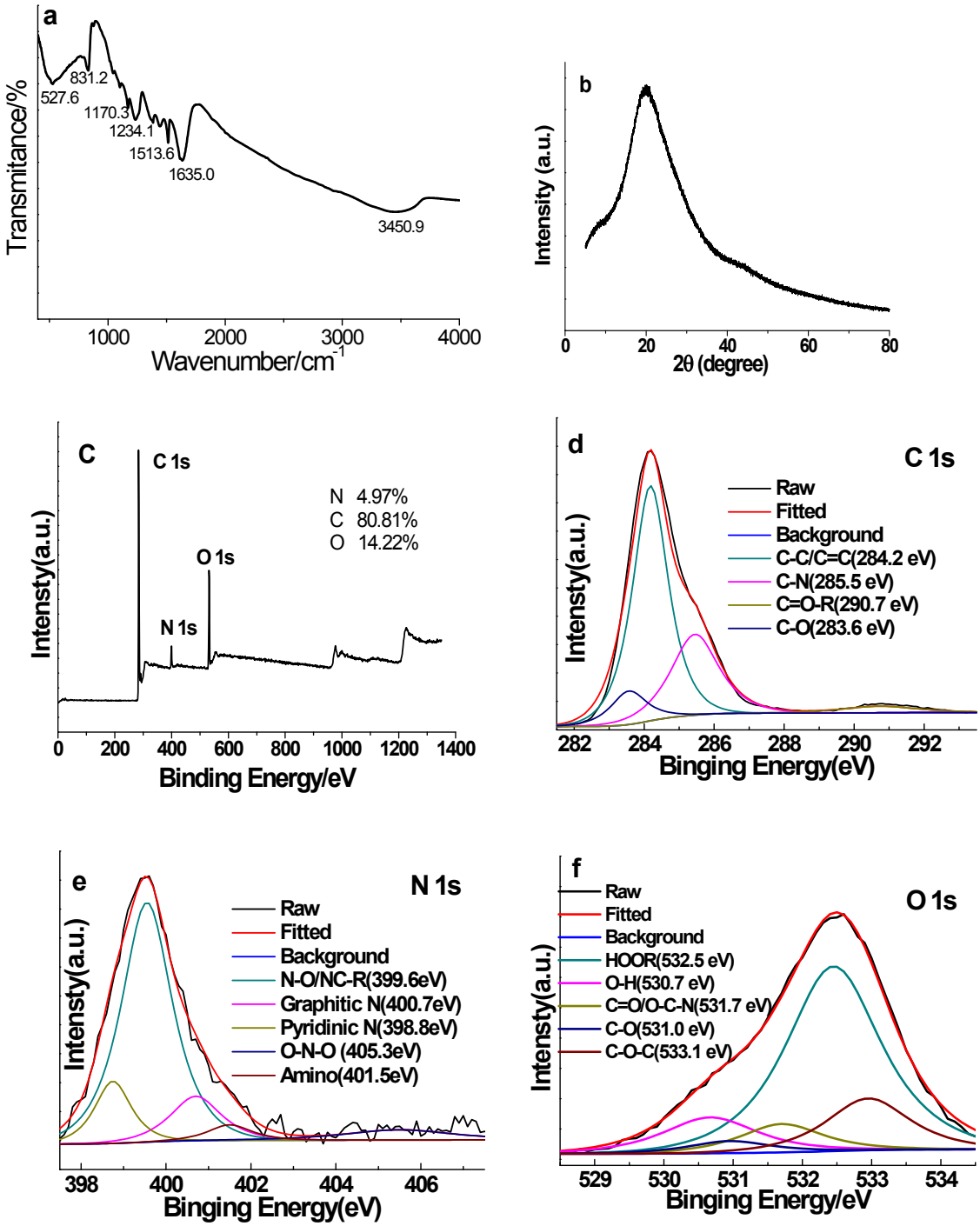

Figure S2 FT-IR spectra (a), XRD pattern (b), XPS spectra (c), and high resolution XPS spectra of C 1s (d), N 1s (e), O 1s (f), for as-synthesized NCD.

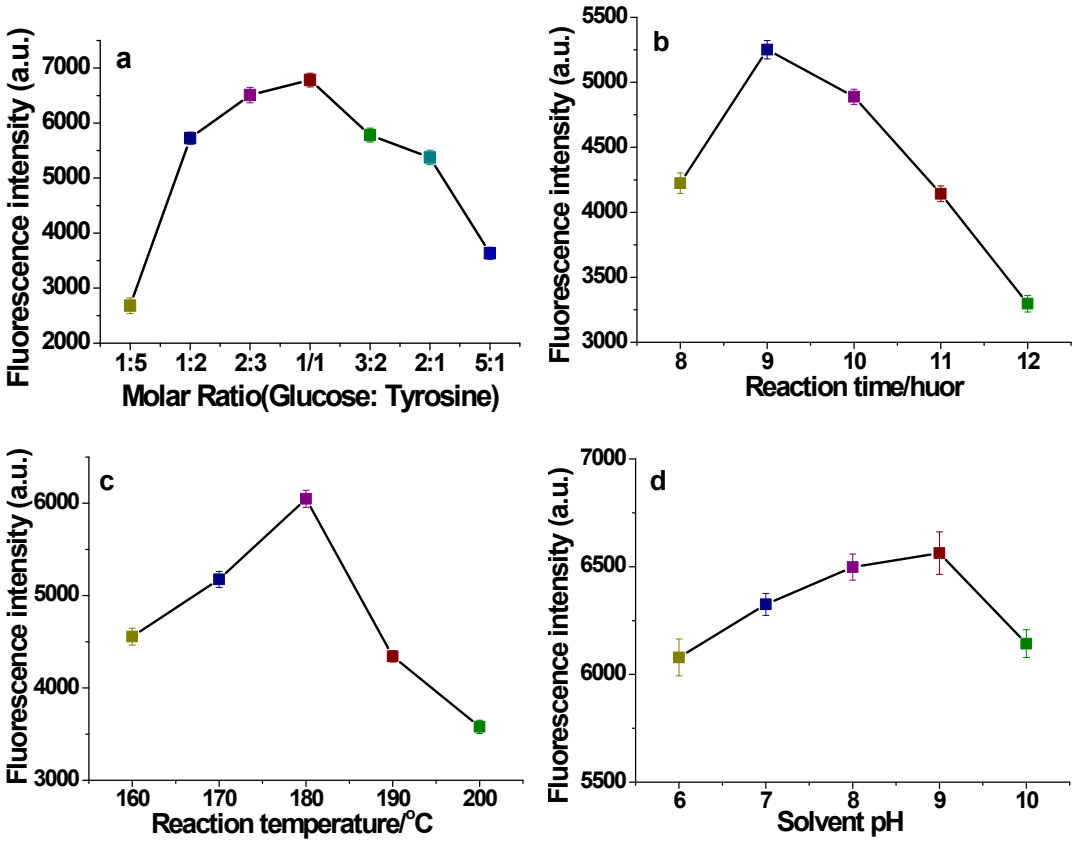

Figure S3 Effect of molar ratio of glucose and tyrosine (a), reaction time(b), temperature (c) and pH (d) on fluorescence intensity of NCD, respectively. The data showed here the average of three separate measurements.

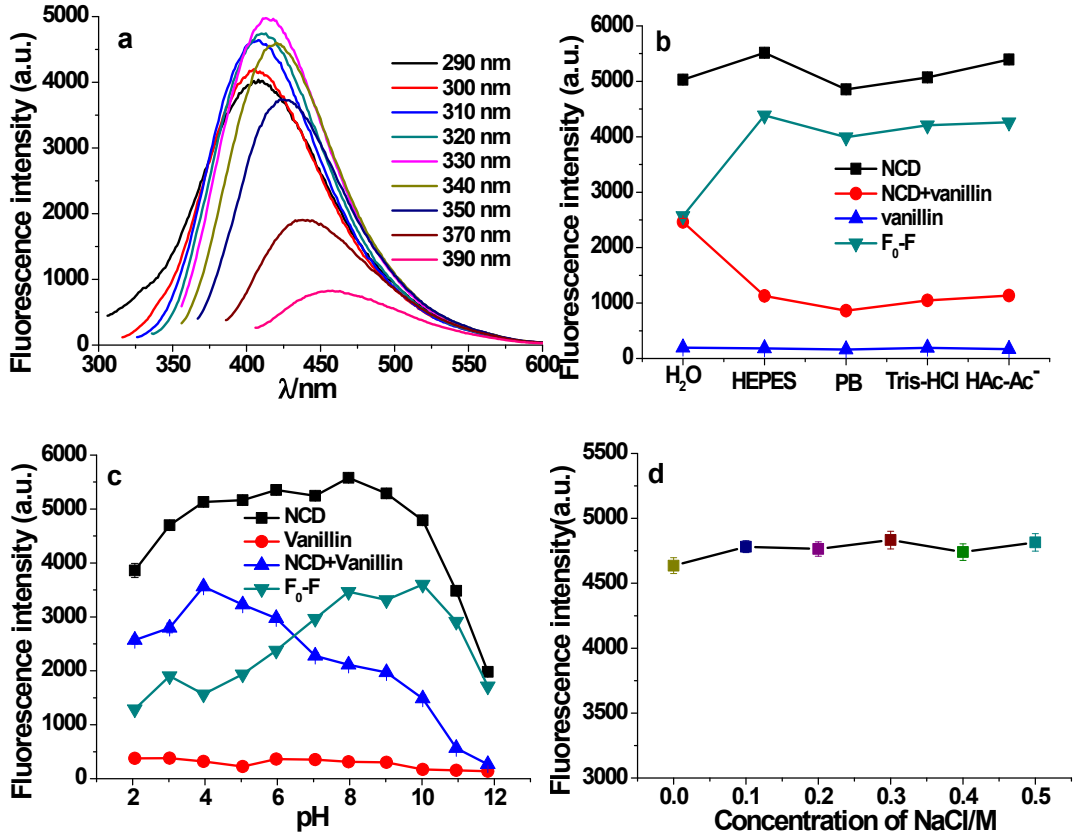

Figure S4 Excitation wavelength-dependent fluorescence spectra of NCD (a), and effect of pH 8.0 buffer species (b), pH (c), and concentration of NaCl (d) on the fluorescence intensity of NCD and NCD with vanillin, respectively.

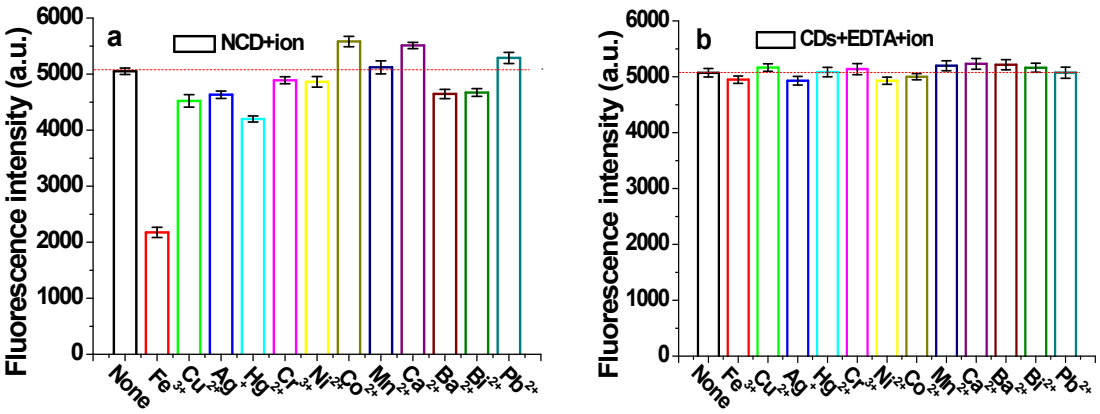

Figure S5 Selectivity test for the determination of vanillin in the presence of common metal ions without (a) and with EDTA (b). The error bars were obtained from three separate measurements with RSD less than 1.0%. (Concentration: NCD 0.49 mg/ml, vanillin 200μM, metal ions 200μM, and EDTA 1 mM, respectively.)

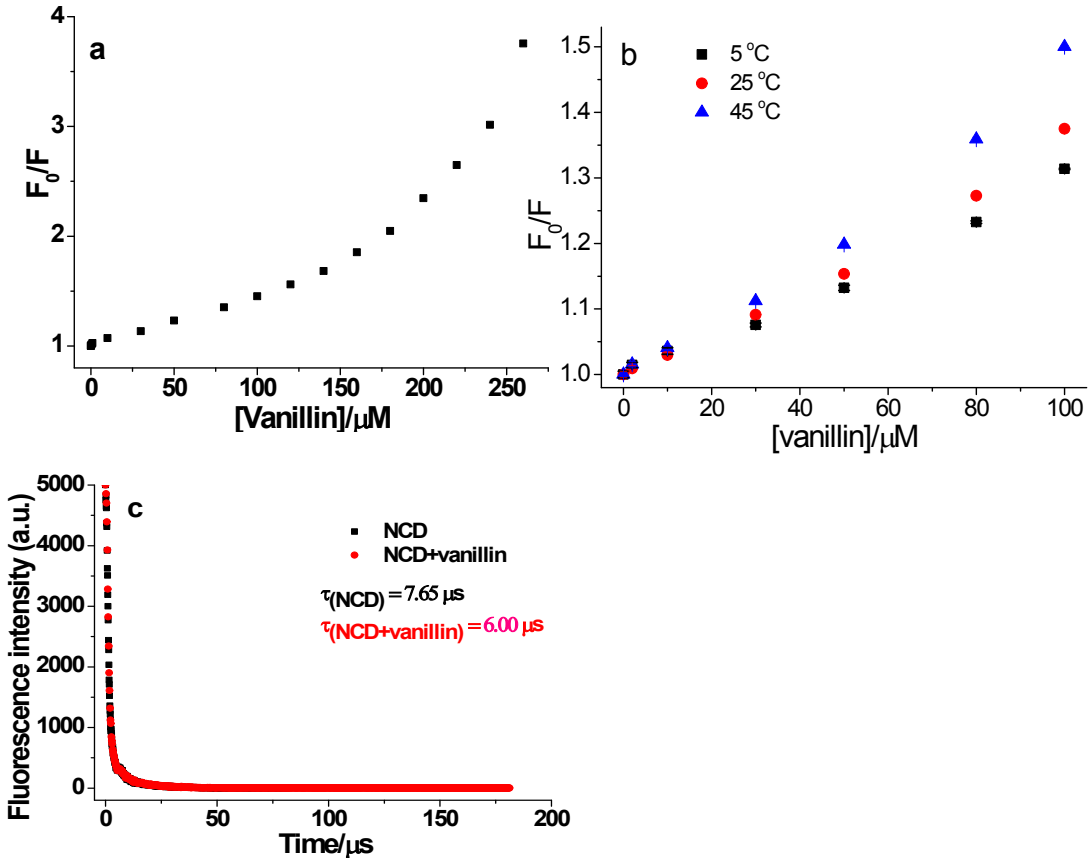

Figure S6 Plot of F_0/F to concentration of vanillin (a), Stern-Volmer curves of NCD-vanillin system under different temperatures (b), and fluorescence decay of NCD and NCD-vanillin as a function of time (c). (Concentration: NCD 0.49 mg/ml, vanillin 0-250 μM (a), 0-100 μM (b), and 100 μM (c))

Table S1 The dynamic quenching constant of NCD-vanillin

Temperature (℃)	Linear relationship	K_D (L mol^{-1})	K_q (L mol^{-1}s^{-1})	Square of linear coefficient (R^2)
5	Y=3111.6934X+0.9933	2958.59	3.87× 10^8	0.9831
25	Y=3650.2687X+0.9934	3245.99	4.24× 10^8	0.9962
45	Y=4612.9367X+0.9953	4168.93	5.45× 10^8	0.9930