# Electronic Supplementary Information

*for*

# N-doped carbon dots as robust fluorescent probes for the rapid detection of hypochlorite

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## 1. Preparation of N-doped carbon dots

Citric acid (0.50 g, 2.6 mmol) and 4-methoxybenzene-1,2-diamine (0.5 g, 3.6 mmol) were dispersed in 20 mL deionized water. Then, the solution was transterred to a poly(tetrafluoroethylene) autoclave (50 mL), and heated at 180 ºC for 6 h. Afterwards, the autoclave was cooled to room temperature naturally. The crude products were centrifuged (at 10000 rpm for 10 min) and filterd with 0.22 μm filter membrane to remove agglomerated larger particles. The filtrate was dialyzed with dialysis membrane (MWCO: 1000 Da) for 24 h to get rid of salt and impurities. Finally, the sample was freeze-dried and the MeO-NCDs was obtained thereby.

$CF_3$-NCDs and $NO_2$-NCDs were prepared using similar synthetic method.

## 2. Quantum yield measurements of four N-doped carbon dots

Quinine sulfate (0.1 M $H_2SO_4$ as solvent, $\Phi_F$ = 54%) was employed as the standard to measure the quantum yields (QYs) of NCDs through slope method [S1]. The QYs were calculated by comparing the integrated fluorescence intensity (excited at 360 nm) and the absorbance value (the value was below 0.1 at the excitation wavelength). The slope method equation was as follows:

$$\Phi_x = \Phi_{st}(K_x/K_{st})(\eta_x/\eta_{st})^2$$

Where $\Phi$ is the quantum yield, K is the slope of linear fitting curves and $\eta$ is the refractive index of the corresponding solvent. The subscript “st” refers to standard substance (quinine sulfate) and “x” refers to the tested sample. For the diluted solutions, $\eta_x/\eta_{st} = 1$.

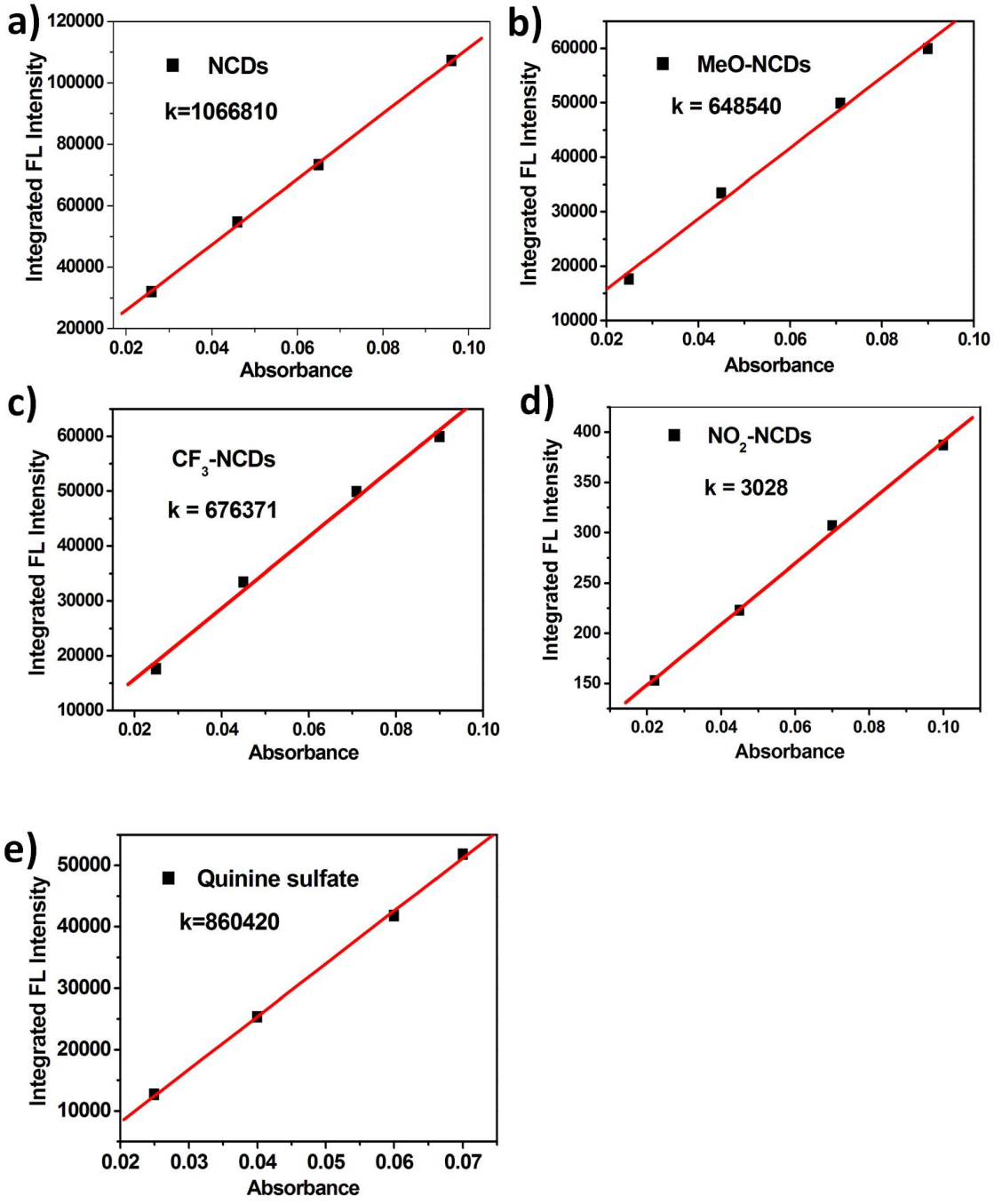


**Figure S1** Fluorescence and absorbance of the (a) NCDs, (b) MeO-NCDs, (c) $CF_3$-NCDs, (d) $NO_2$-NCDs and (e) quinine sulfate, respectively.

## 3. UV-vis Absorption Spectra Analysis

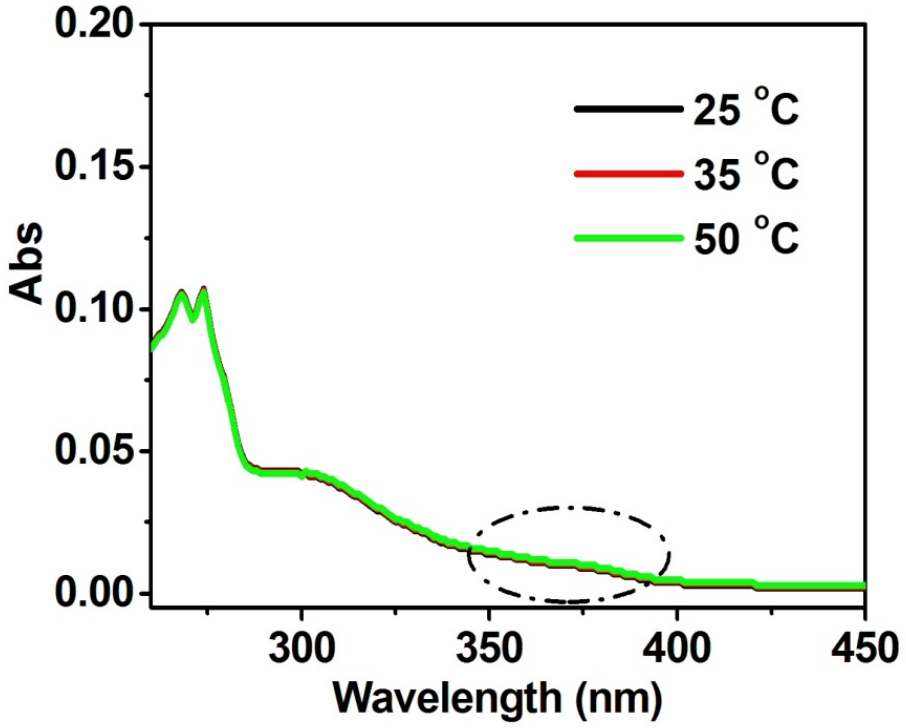


**Figure S2** Absorption of the mixed system of NCDs (10 μg/mL) and NaClO (7 μM) under the different temperatures (25 ºC, 35 ºC and 50 ºC).

## 3. Density Functional Theory (DFT) calculation

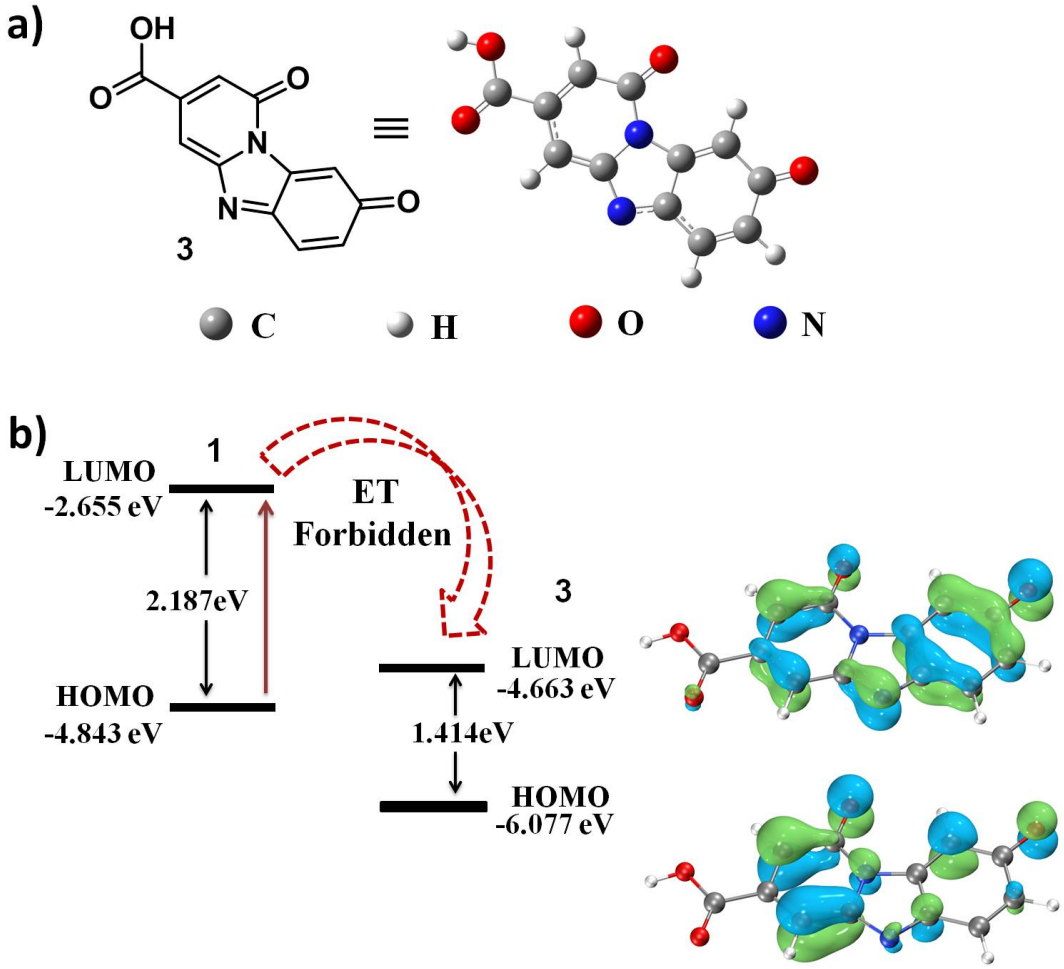


**Figure S3** (a) The optimized molecular geometry of another possible fluorophore unit **3** of Ox-NCDs. (b) HOMO-LUMO energy levels of **1** and **3**, respectively.

The optimized molecular geometry of another possible fluorophore unit **3** are shown in Figure S5. According to the LUMO levels of **1** and **3**, the electron transfer (ET) process of excited light from **1** to **3** hardly took place due to the higher energy level difference (2.48 eV). Moreover, the energy gap **3** ($E_g$ = 1.414 eV) is much lower than that of **1** ($E_g$ = 2.187 eV), indicating **3** can emit fluorescence of much longer wavelength than that of **1** ($\lambda$ = 370 nm). Unfortunately, this phenomenon is not observed. Therefore, **3** is not proposed as the most possible fluorophore of Ox-NCDs.

## 4. QYs of NCDs in the presence of hypochlorite

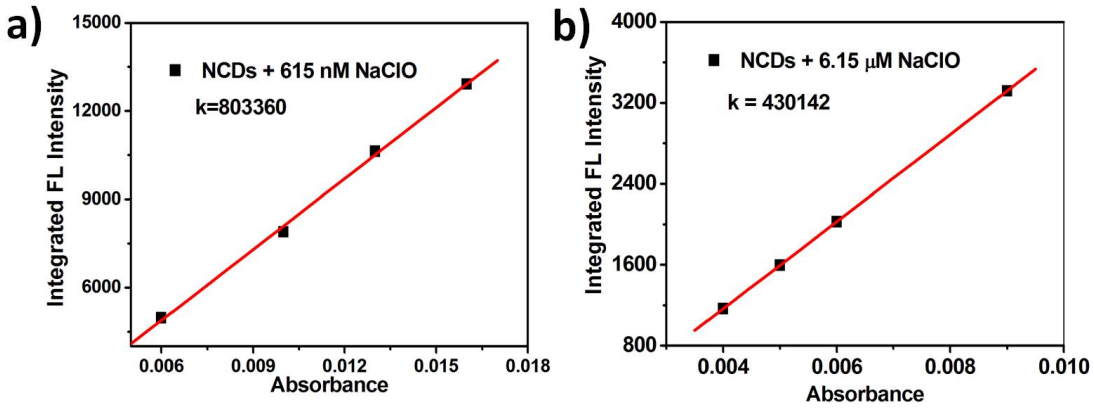


**Figure S4** Fluorescence and absorbance of NCDs with the addition of 615 nM NaClO (a), NCDs in the presence of 6.15 μM NaClO (b), respectively.

## References

S1. S. Zhu, Q. Meng, L. Wang, J. Zhang, Y. Song, H. Jin, K. Zhang, H. Sun, H. Wang and B. Yang, *Angew. Chem. Int. Ed.*, 2013, **52**, 3953-3957.