Electronic Supplementary Material (ESI) for Analytical Methods

Electronic Supplementary Information

Fluorescence Turn-off Detection of Hydrogen Peroxide and Glucose Directly Using Carbon Nanodots as probes

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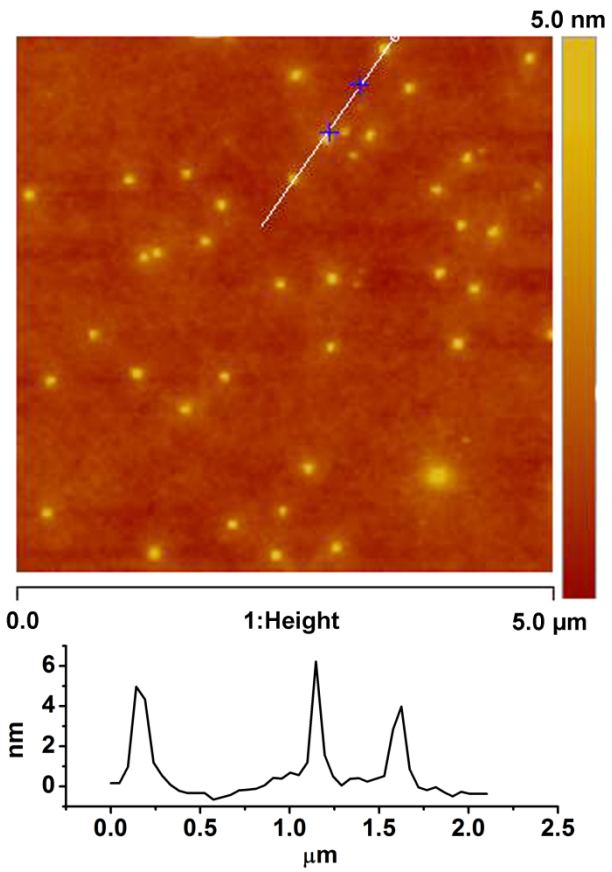

Fig. S1 AFM of C-dots

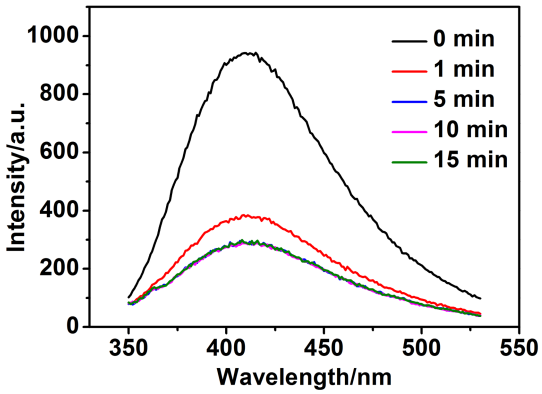

Fig. S2 Time-dependent fluorescence changes of C-dots in the presence of H_2O_2 (100 μM) and Fe^{2+} (0.34 mM)

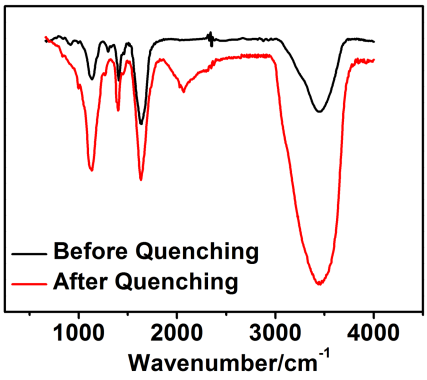

Fig. S3 FTIR of C-dots before and after quenching by Fe^{2+} and H_2O_2

According to the results from FTIR (fourier transform infrared spectroscopy), (Fig. S3) it can be seen that the formation of unsaturated (C≡C or C≡N) (2064 cm^{-1}) bond in the quenched C-dots. It is reasonable to think that the unsaturated bond is formed due to the dehydrogenation caused by hydroxyl radical[1]. Further research is required to make a clearer acknowledge. Futhermore, The absorption of O-H at 3450 cm^{-1}, the strecthing vibration band of C=O at 1700 cm^{-1} and the strecthing vibration band of C-O at 1100 cm^{-1} indicate the presence of carboxylic acid.[2]

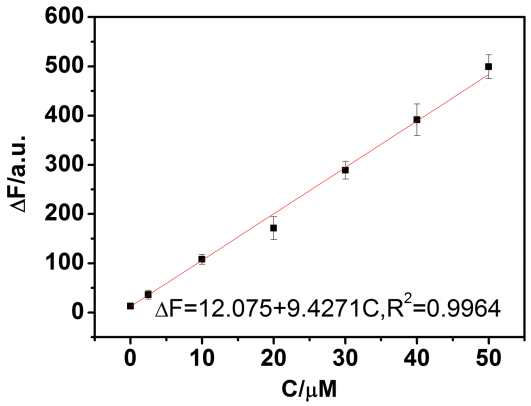

Fig. S4 Plots of absolute changes of the fluorescence intensity of C-dots at 410 nm versus the concentration of choline.

In order to sensitively detect the concentration of choline, we added 0.75 Units/mL ChOx in the 0.05 M PB solution (pH 8.0) containing different concentration of choline. The ChOx catalyzed the oxidation of choline to betaine with the concomitant formation of H_2O_2. The pH of the solution was adjusted to 3.0 when the enzyme reaction processed for 30 min. After that, C-dots and 0.34 mM Fe^{2+} was added and the change of fluorescence intensity was determined. According to the procedure, the ΔF at different concentration of choline was recorded, and was used to plot working curve. Fig. S2 shows the calibration curve for choline, which displayed good linearity for concentrations ranging from 0.025 to 50 μM (R^2=0.9964).

References

1. A. Conde, L. Vilella, D. Balcells, M. M. Diaz-Requejo, A. Lledos and P. J. Perez, *J Am Chem Soc*, 2013, **135**, 3887-3896.
2. Q. Liang, W. Ma, Y. Shi, Z. Li and X. Yang, *Carbon*, 2013, **60**, 421-428.