Electronic Supplementary Information

Carbon Dots Tailored with Fluorophore for Sensitive and Selective Detection of Hydrogen Sulfide based on Ratiometric Fluorescence Signal

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Fig. S1 HRMS spectrum of P-NBD.

Fig. S2 TEM image of as-prepared CDs. Inset: the HRTEM image of the CDs.
Fig. S3 XRD pattern of the as-synthesized CDs.

Fig. S4 Raman spectra of the as-synthesized CDs.
Fig. S5 FTIR spectrum of the as-synthesized CDs.

Fig. S6 XPS full survey (a), high-resolution XPS of C 1s (b), N 1s (c), O 1s (d) and Cl
2p spectra of CDs (e).

**Fig. S7** Stability of the fluorescence intensity ratio of the ratiometric probe.

**Fig. S8** Detection of hydrogen sulfide by probe under different pH conditions. a), b), c) is the response of the probe to different concentrations of H$_2$S at pH=6, 7, 8. d) Response curve of probe to hydrogen sulfide at pH 4-8. F, F$_0$ is the fluorescence intensity of probe in the absence and presence of H$_2$S, respectively.
**Fig. S9** The fluorescence emission and excitation spectra of the CDs-PNBD and the absorption spectrum (pink) of the NBD-based derivatives, respectively.

**Fig. S10** The ratio fluorescence curves of reactions with hydrogen sulfide (0, 5, 10, 15 µM, respectively) at three probe concentrations.
**Fig. S11** Time courses of the responses between fluorescence probe (5 µL) with H₂S at different concentrations (50, 100, 150 µM, respectively) in 3 mL PBS solution (pH 6.64), $\lambda_{ex} = 340$ nm, $\lambda_{em} = 543$ nm.

**Fig. S12** LC-MS spectrum of NBD-SH. P-NBD in Methanol (2 ml) and 100 µL 100 mM Na₂S were co-incubated for 2 h at room temperature. Then the reaction mixture was submitted into LC-MS without purification.