Supporting information for

A Phenanthroimidazole-based Fluorescent Sensor for Imaging

Hydrogen Sulfide in Living Cells

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Calculation of fluorescence quantum yield¹ Fluorescence quantum yield was determined in EtOH using optically matching solutions of quinine sulfate ($\Phi_f = 0.546$ in 1N H₂SO₄²) as standard at an excitation wavelength of 350 nm and the quantum yield was calculated using the following equation:

$$\Phi_{\rm s} = \Phi_{\rm r} \left(A_{\rm r} F_{\rm s} / A_{\rm s} F_{\rm r} \right) \left(n_{\rm s}^2 / n_{\rm r}^2 \right)$$

where, s and r denote sample and reference, respectively, A is the absorbance, F is the relative integrated fluorescence intensity, and n is the refractive index of the solvent.



Figure S1. The absorption spectra of the free sensor $PI-N_3$ (\blacksquare) and the reference compound 3 (\bullet).

Detection limit: The detection limit was determined from the fluorescence titration data based on a reported method.³ According to the result of titration experiment, the fluorescent intensity data at 423 nm were normalized between the minimum intensity and the maximum intensity. A linear regression curve was then fitted to these normalized fluorescent intensity data (Figure S2), and the point at which this line crossed the axis was considered as the detection limit (8.79×10^{-7} M).



Figure S2. Normalized response of fluorescence signal to changing NaHS concentrations.



Figure S3. ESI-MS spectrum of PI-N₃ (25 μ M) with NaHS (100 μ M).



Figure S4. The pH influence on the fluorescence intensity of **PI-N**₃ (5 μ M) in the absence (•) or presence (•) of NaHS (25 μ M). Emission at 423 nm.



Figure S5. Time-dependent (0 to 7 min) fluorescence responses of **PI-N₃** (5 μ M) to NaHS (25 μ M) in DMF. Inset: fluorescence intensity changes at 428 nm of **PI-N₃** (5.0 μ M) with different time points. Time points represent 0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0 and 7.0 min.



Figure S6. Time-dependent (0 to 7 min) fluorescence responses of **PI-N₃** (5 μ M) to NaHS (25 μ M) in EtOH. Inset: fluorescence intensity changes at 428 nm of **PI-N₃** (5.0 μ M) with different time points. Time points represent 0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 4.0, 5.0 and 7.0 min.



Figure S7. ¹H NMR spectrum of compound **2**.



Figure S8. ¹³C NMR spectrum of compound **2**.



Figure S9. ¹H NMR spectrum of compound **3**.



Figure S10. ¹³C NMR spectrum of compound 3.



Figure S11. ¹H NMR spectrum of PI-N₃.



Figure S12. ¹³C NMR spectrum of PI-N₃.

References

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