# Supporting information

# Mitochondrial Directed Ratiometric Fluorescent Probe for Quantitively Detection of Sulfur Dioxide Derivatives

Congcong Gao, Yong Tian, Rubo Zhang*, Jing Jing*, Xiaoling Zhang*

Key Laboratory of Cluster Science of Ministry of Education, Beijing Key Laboratory of Photoelectronic/Electrophotonic Conversion Materials, School of Chemistry, Beijing Institute of Technology, Beijing 100081, PR China. Corresponding author. Tel/fax: +86 010 88875298. E-mail addresses: zhangxl@bit.edu.cn, hellojane@bit.edu.cn, zhangrubo@bit.edu.cn.

Contents:

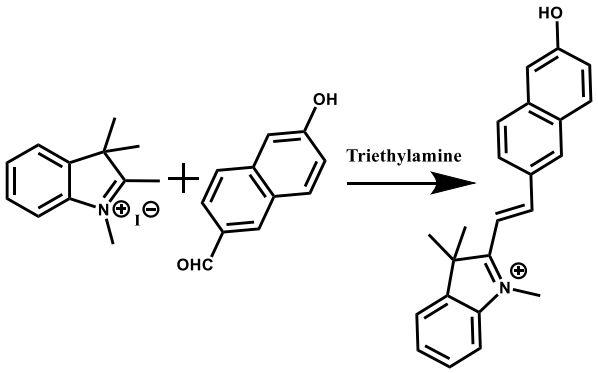


**Cytotoxicity assay**

HeLa cells were cultured in culture media (DMEM) in an atmosphere of 5% $CO_2$ and 95% air at 37 °C. The cells were seeded into 96-well plates at a density of $5 \times 10^3$ cells per well in culture media, then 0, 5, 10, 15, 20, and 25 μM **MN** (final concentration) were added, respectively. Next, the cells were incubated at 37 °C in an atmosphere of 5% $CO_2$ and 95% air for 24 h. Finally, 10 μL 3-(4,

5-dimethylthiazol-2-yl)-2, 5-diphenyltetrazolium bromide (MTT, 5 mg/mL) was added and the cells were cultured for another 4 h, respectively. When the purple precipitate is clearly visible under the microscope, add 100 μL DMSO to all wells, and swirl gently. Then measure the absorbance in each well, including the blanks, at 570 nm in a microtiter plate reader (Bio-Rad 680).

**Supplement Date**




Scheme. S1 The synthesis route of the probe **MN**

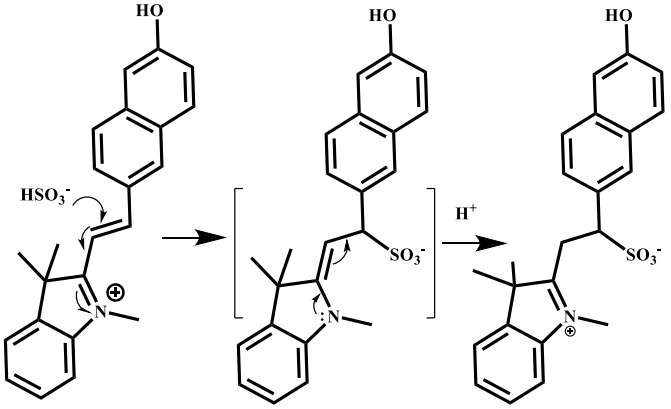



Fig. S1 Proposed reaction mechanism of **MN** with $SO_3^{2-}$/$HSO_3^-$

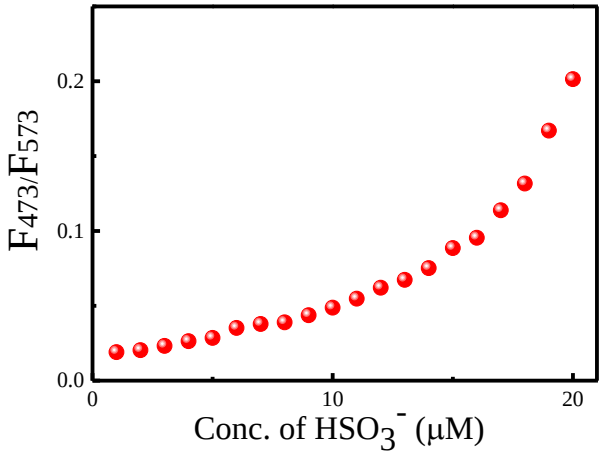



Fig. S2 The linear relationship between the fluorescence intensity ratio of the probe (10 μM) and the $SO_3^{2-}$/$HSO_3^-$ concentration(1，2，3，4，5，6，7，8，9，10，11，12，13，14，15，16，17，18，19，20 μM). Excitation at 405 nm.

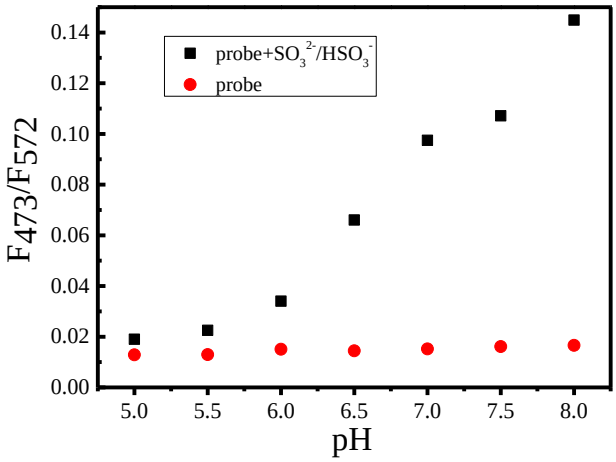



Fig. S3 The fluorescence intensity of probe **MN** (10 μM) in the absence and presence of $SO_3^{2-}$/$HSO_3^-$ (10 μM) changes with the pH of PBS buffer solution (pH 7.4, $PO_4^{3-}$ = 20 mM). Excitation at 405 nm.

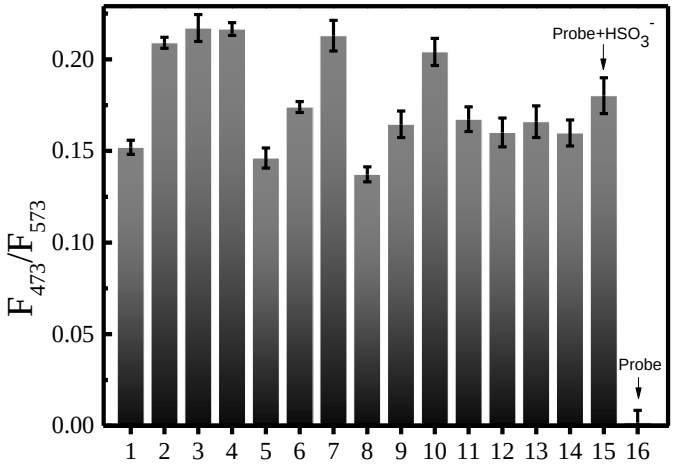



Fig. S4 Fluorescence responses of the probe (10 μM) toward various analytes: (100 μM): (1) $Br^-$; (2) $Cl^-$; (3) $ClO^-$; (4) Hcy; (5) Cys; (6) GSH; (7) $HPO_4^{2-}$; (8)$SO_4^{2-}$; (9) $NO_2^-$; (10) $NO_3^-$; (11) $ACO^-$; (12) $HS^-$; (13) $S^{2-}$; (14) $S_2O_3^{2-}$; (15) probe **MN**; (16) $SO_3^{2-}$/$HSO_3^-$ (20 μM) ( except : GSH 1 mM, Hcy 1 mM, Cys 1 mM) in PBS buffer solution (pH 7.4, $PO_4^{3-}$ = 20 mM).

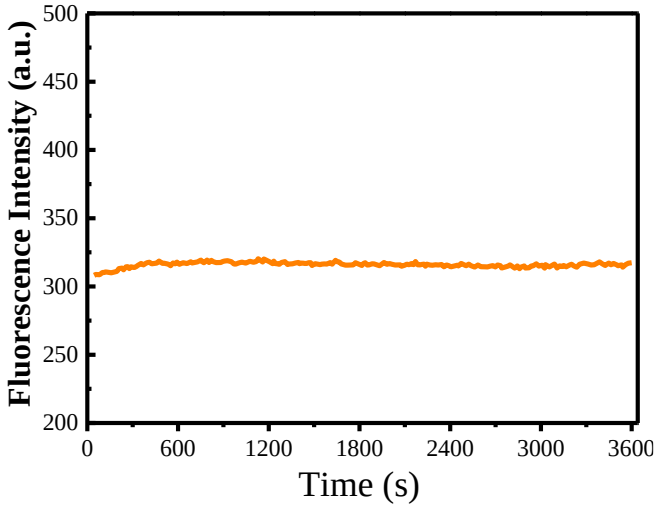


Fig. S5 The photostability of the probe (10 μM) detected in PBS buffer, pH = 7.4, 20 mM at room temperature. Slit width: 5 nm/5 nm.

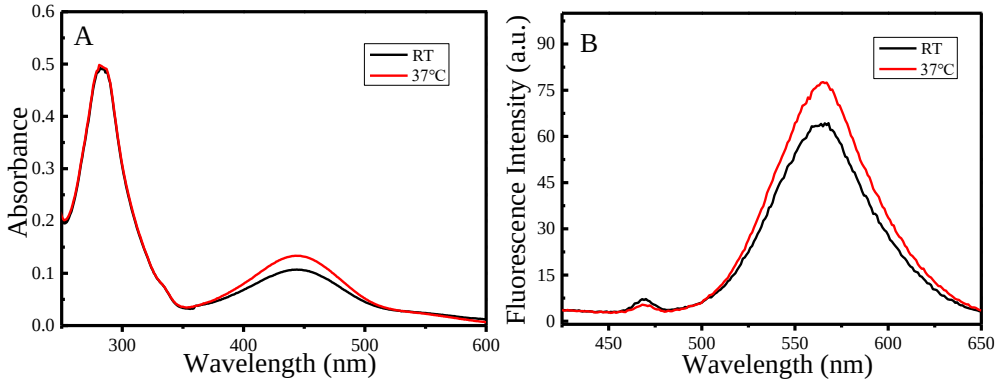



Fig.S6 (A) Absorption spectra and (B) fluorescence spectra of MN (10 μM) in the absence of $SO_3^{2-}/HSO_3^-$ (10 μM) at room temperature and 37℃, respectively. The measurements were performed in PBS (20 mM, pH = 7.4). Excitation wavelength = 405 nm. Slit width: 5 nm/5 nm.

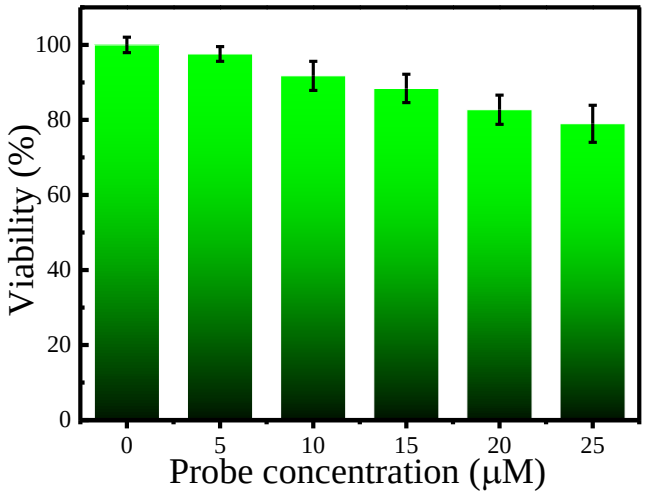



Fig. S7 Cytotoxicity assays of **MN** in HeLa cells. Cells were treated with different concentrations of probe MN for 24 h. Data are expressed as the mean ± SD

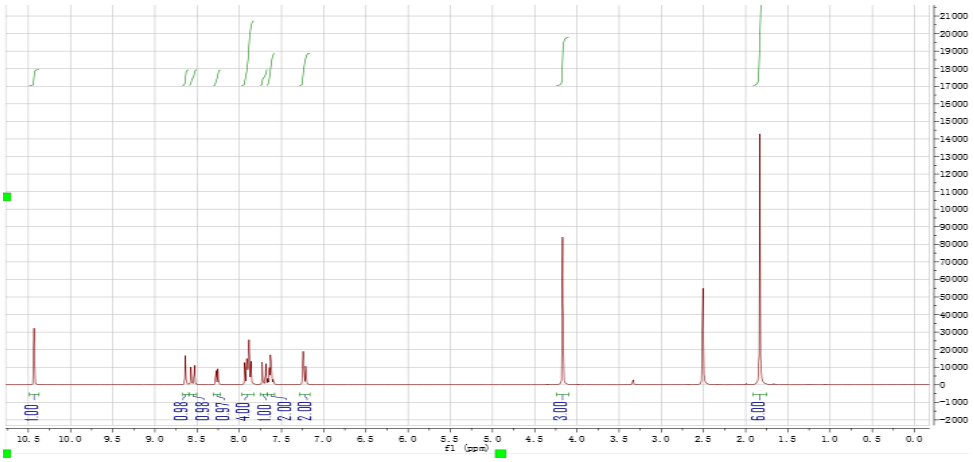


Fig. S8 $^1$H NMR spectrum of probe **MN**

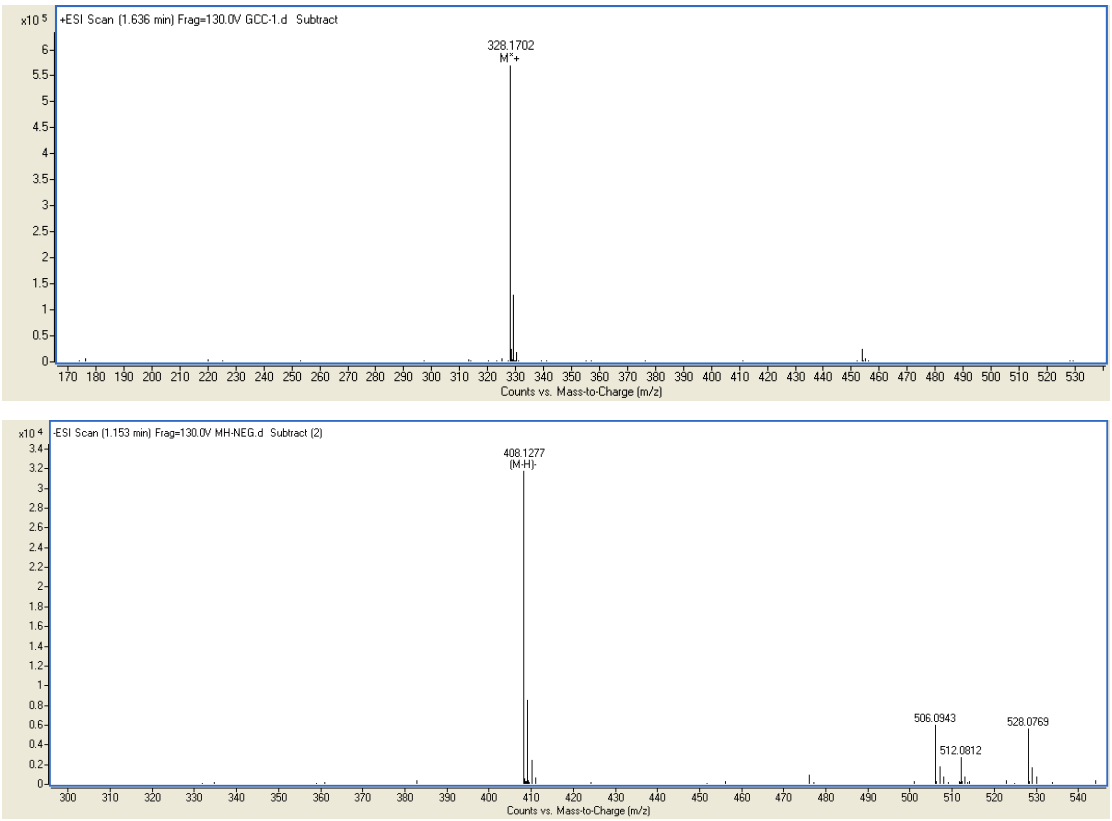



Fig. S9 High resolution HRMS chart of probe **MN** treated without and with $SO_3^{2-}$/$HSO_3^-$