

## Electronic Supplementary Information for

### **A red-emission fluorescent probe for visual monitoring of the lysosomal pH changes during mitophagy and cell apoptosis**

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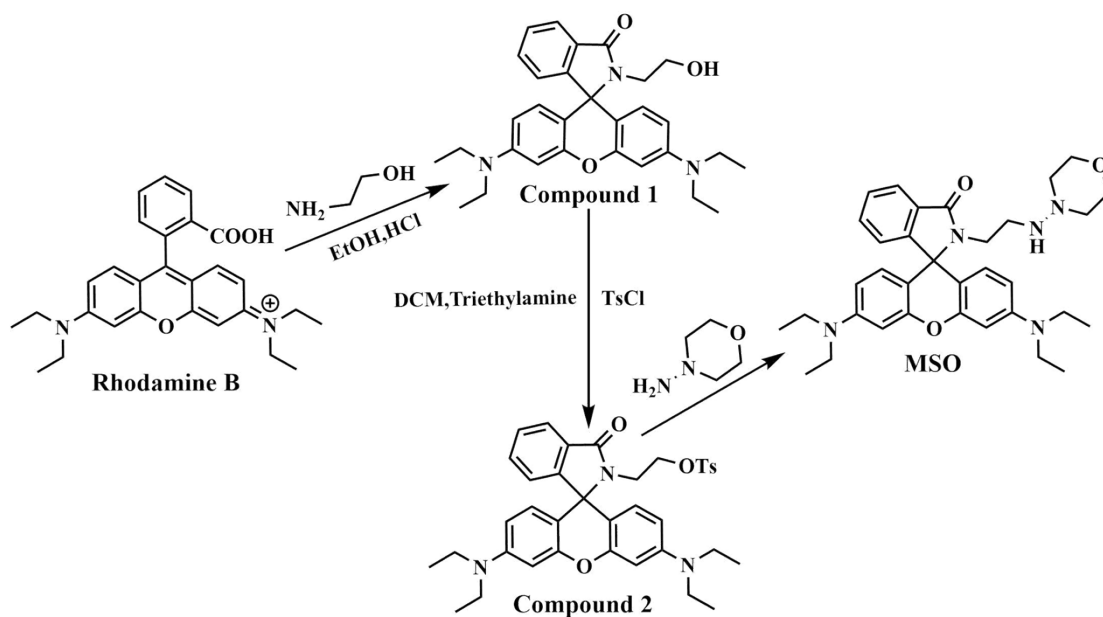
**Fig. S3  $^1\text{H}$  NMR-spectra of MSO at various pH values**

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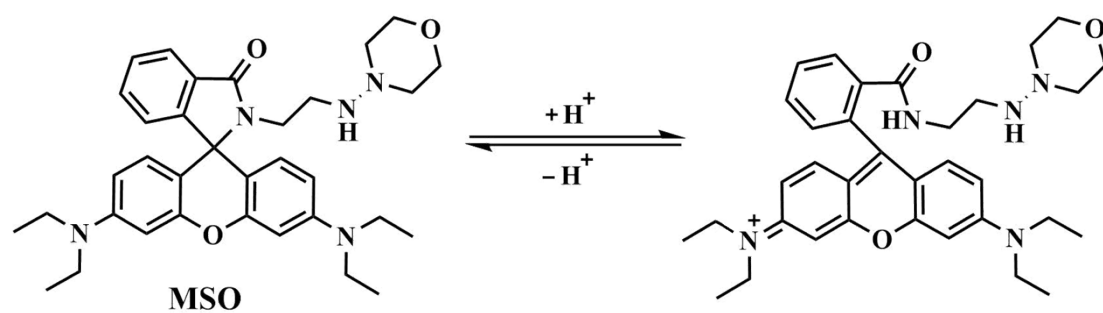
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**Fig. S6 Photostability of MSO**

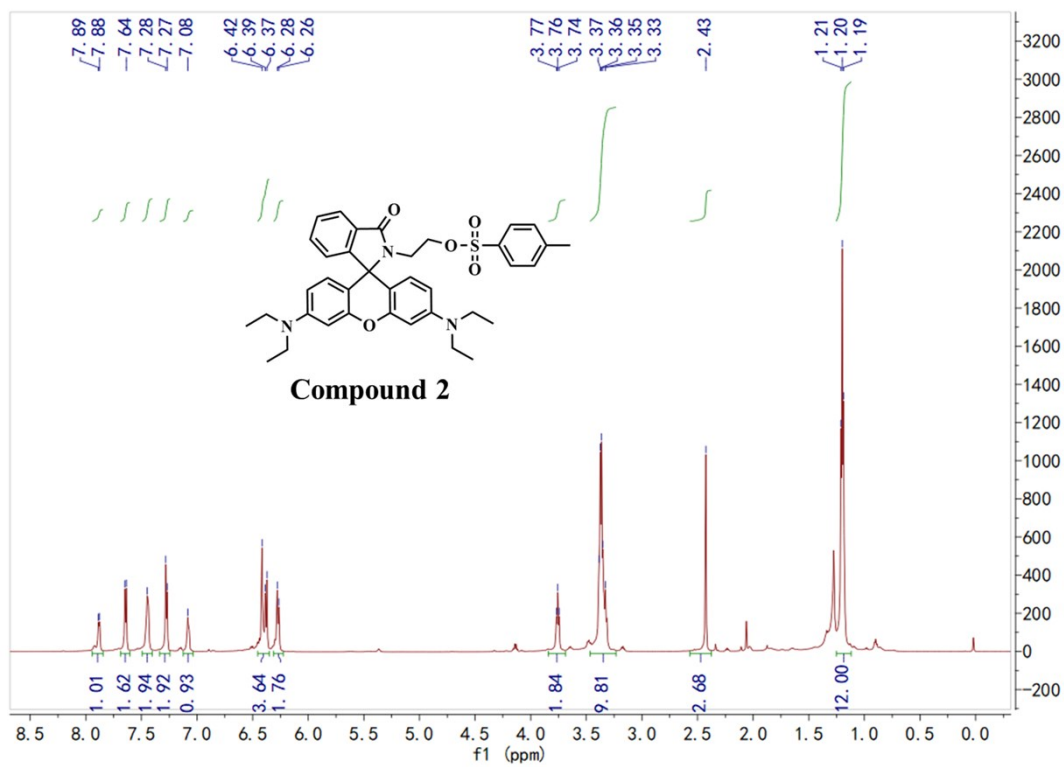
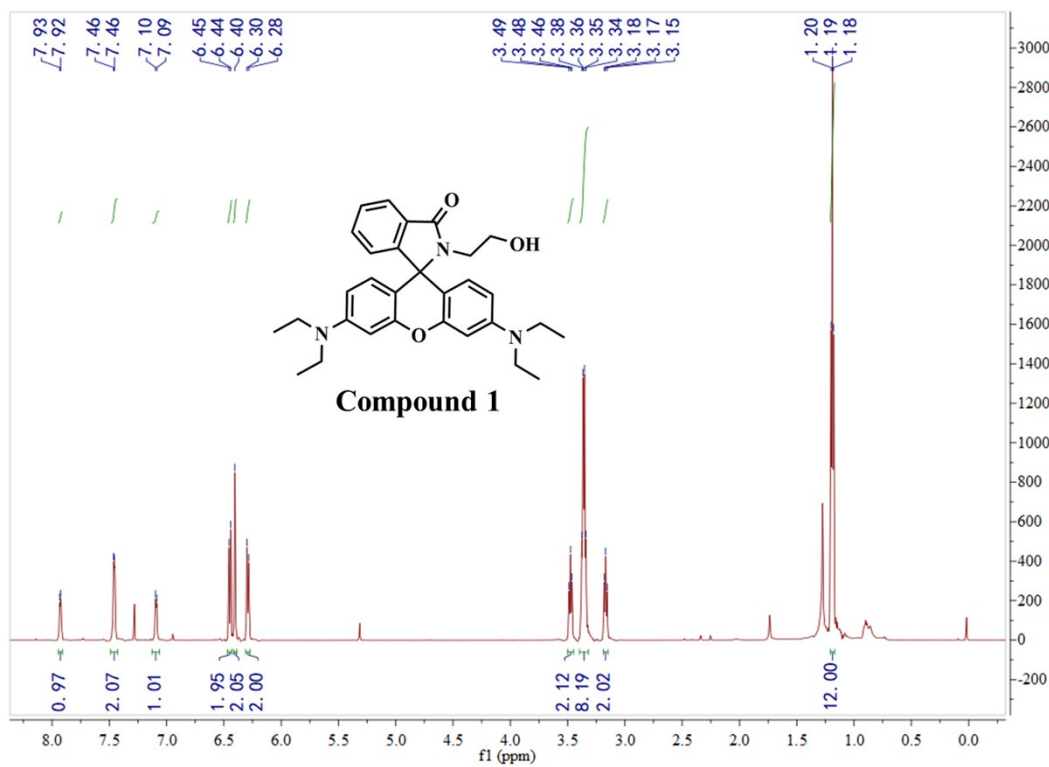
**Fig. S7 Cytotoxic effect of MSO on HeLa cells**

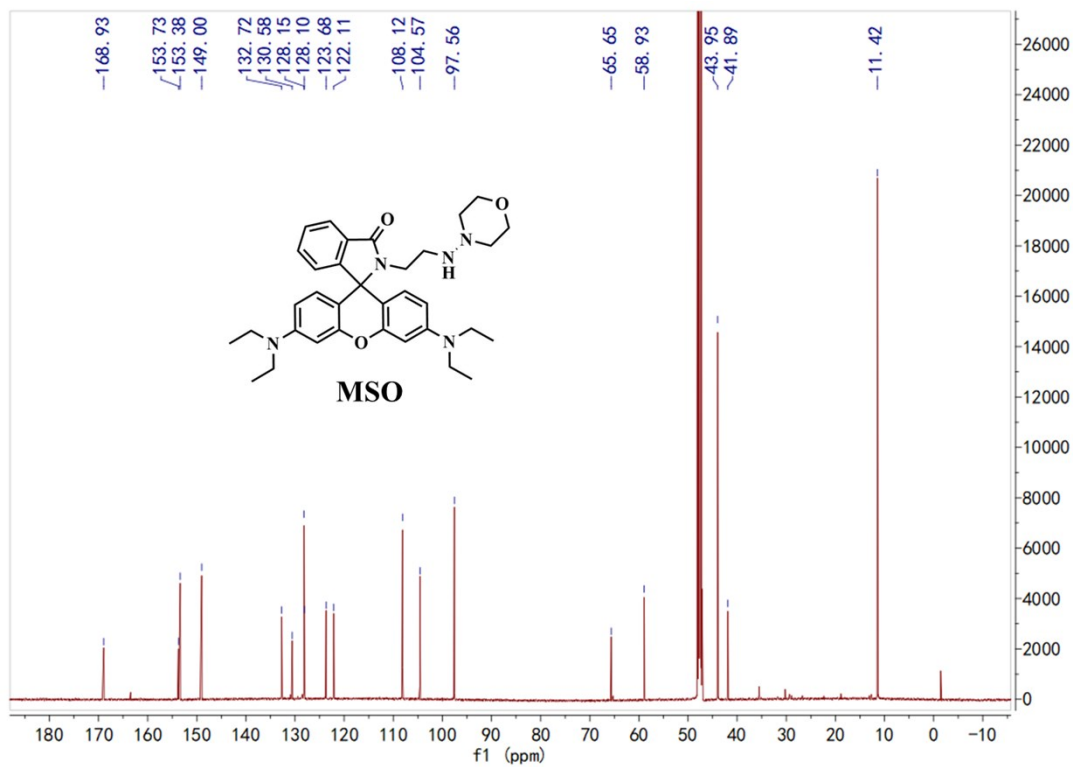
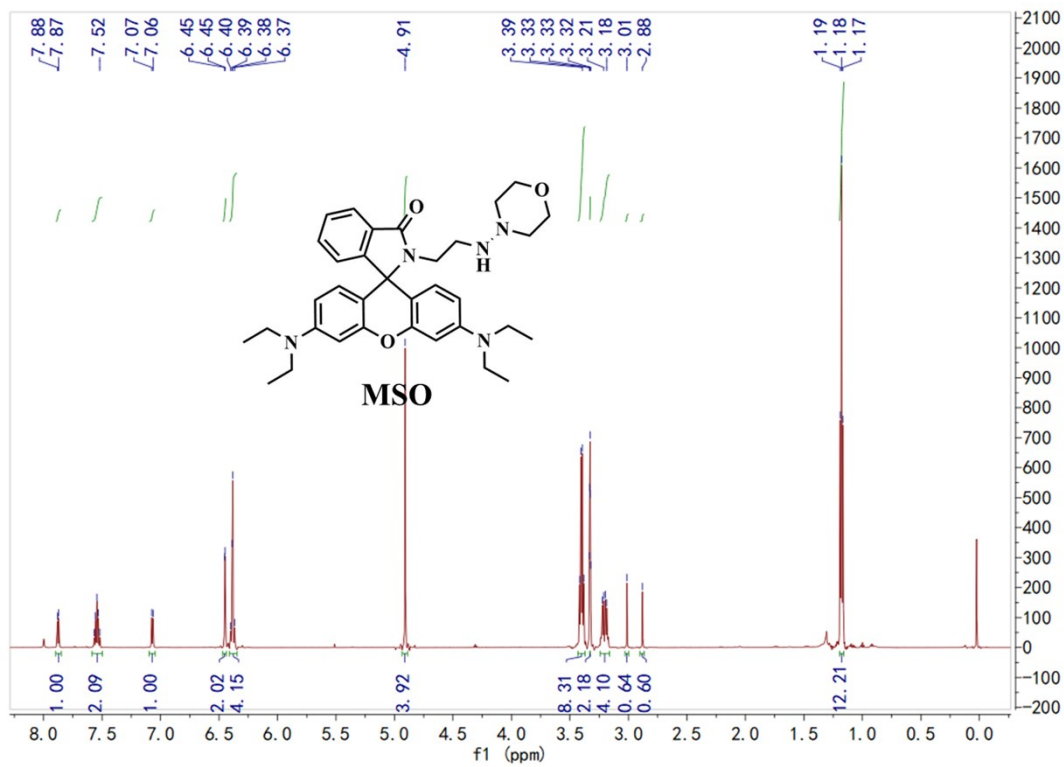


**Scheme S1** Synthetic scheme of **MSO**.

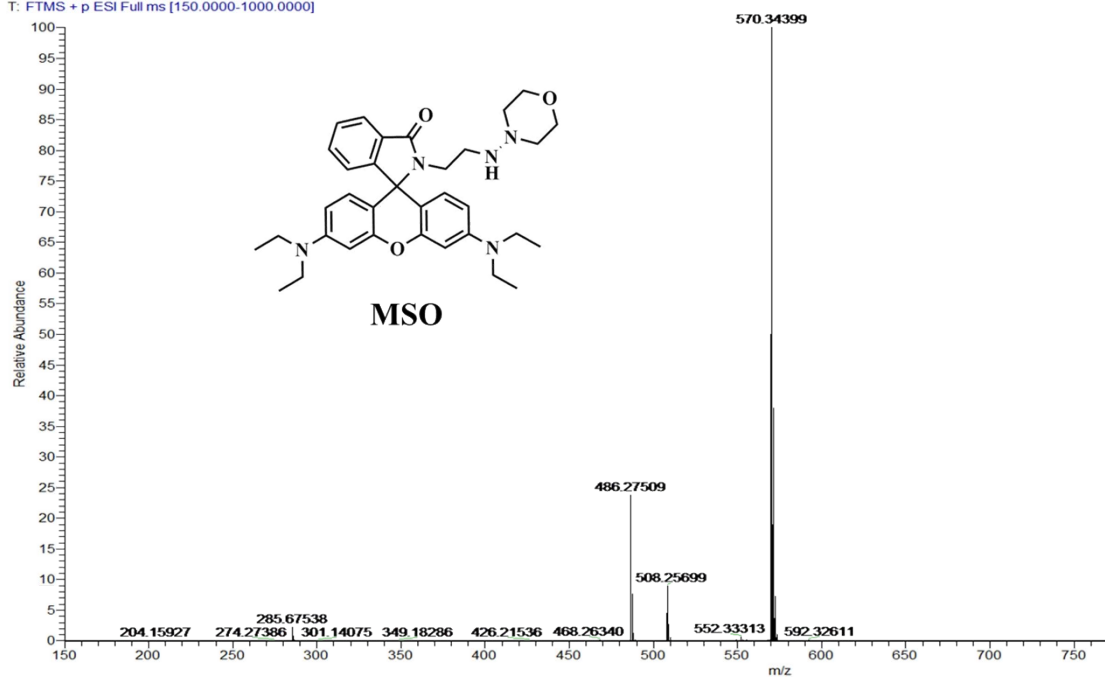


**Scheme S2** Sensing mechanism of **MSO** for pH.

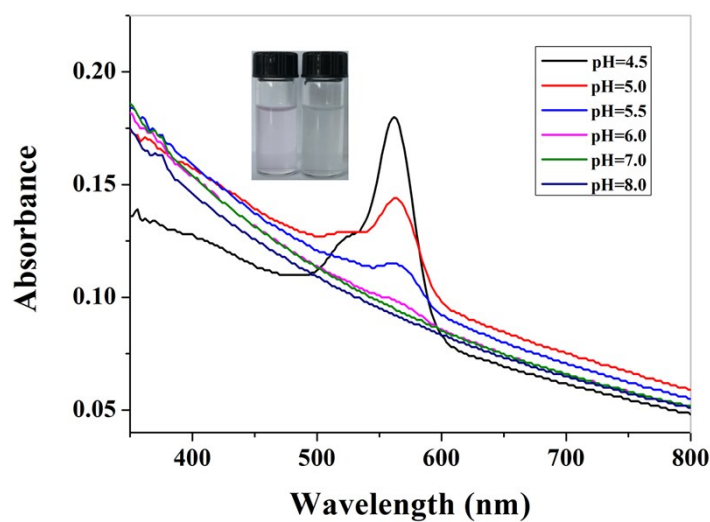




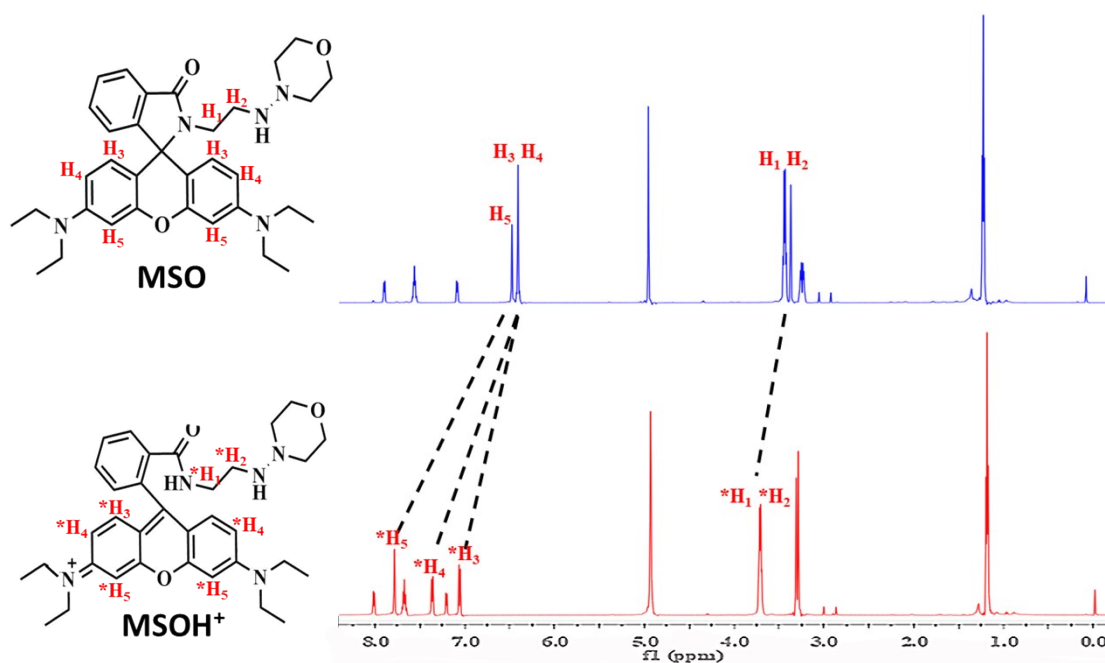
WXD1101 #25 RT: 0.27 AV: 1 NL: 2.16E9  
T: FTMS + p ESI Full ms [150.0000-1000.0000]



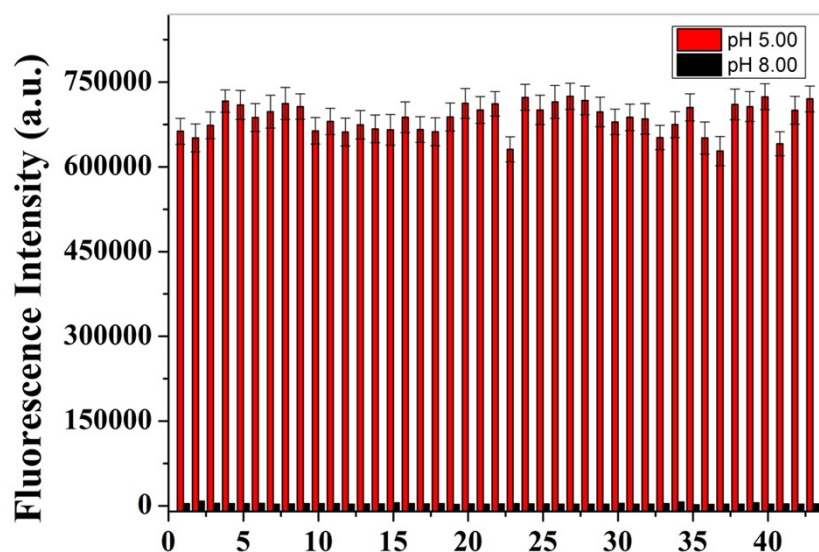
**Fig. S1**  $^1\text{H}$  NMR,  $^{13}\text{C}$  NMR spectra and HR-MS analysis of compound 1/compound 2 and MSO.



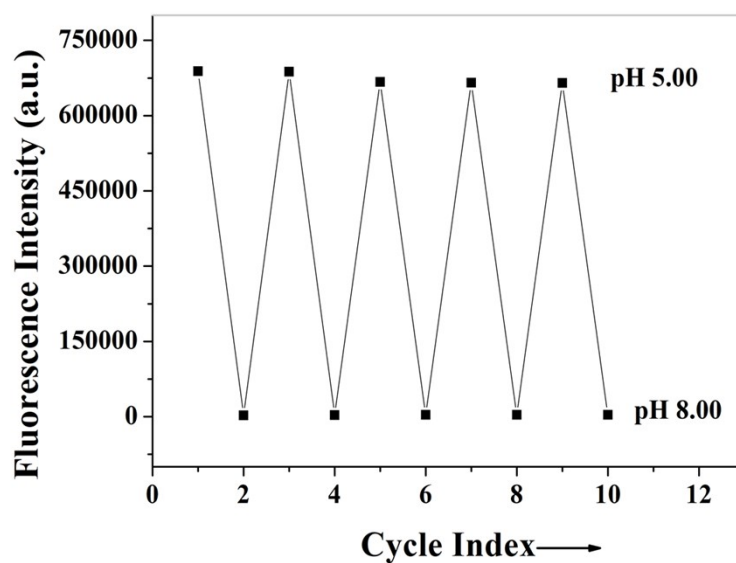
**Fig. S2** Absorption spectra changes of **MSO** (25  $\mu$ M) with the pH value reducing from 8.00 to 4.50. Inset: the color of solution changes from colorless to pink with the pH decreasing.



**Fig. S3**  $^1\text{H}$  NMR titration spectra of **MSO** with decreasing pH from 7.40 (top) to 4.80 (bottom).

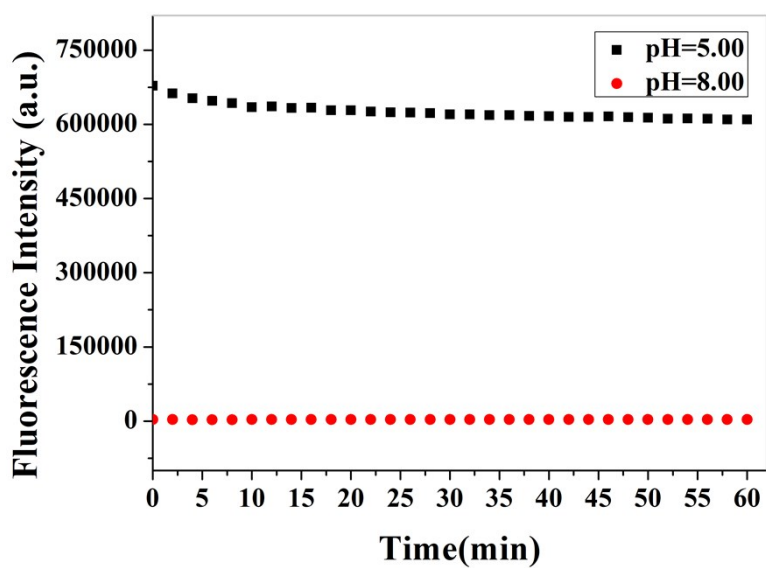


**Fig. S4** Selectivity of **MSO** (10  $\mu$ M) to different potential interfering substances in 40 mM B-R buffer solution at pH 8.00 and 5.00, respectively; (1): blank, (2):  $K^+$  (150 mM), (3):  $Na^+$  (150 mM), (4):  $Mg^{2+}$  (2 mM), (5):  $Ca^{2+}$  (2 mM), (6):  $Ba^{2+}$  (0.2 mM), (7):  $Cu^{2+}$  (0.2 mM), (8):  $Fe^{2+}$  (0.2 mM), (9):  $Fe^{3+}$  (0.2 mM), (10):  $Ni^{2+}$  (0.2 mM), (11):  $Zn^{2+}$  (0.2 mM), (12):  $Cl^-$  (10 mM), (13):  $SO_4^{2-}$  (0.2 mM), (14):  $SO_3^{2-}$  (0.2 mM), (15):  $NO^-$  (0.2 mM), (16):  $Ac^-$  (0.2 mM), (17):  $H_2O_2$  (0.1 mM), (18):  $ClO^-$  (0.1 mM), (19):  $^1O_2$  (0.1 mM), (20): Cys (0.1 mM), (21): GSH (0.1 mM), (22): Hcy (0.1 mM), (23): Ala (0.1 mM), (24): His (0.1 mM), (25): Arg (0.1 mM), (26): Lys (0.1 mM), (27): Phe (0.1 mM), (28): Met (0.1 mM), (29): Leu (0.1 mM).

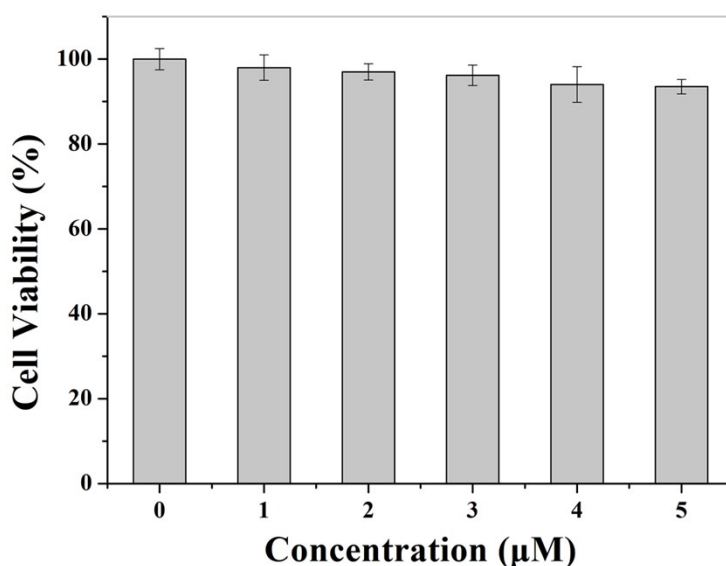


**Fig. S5** Fluorescence intensity changes of **MSO** between pH 5.00 and 8.00. Conditions:  $\lambda_{ex} = 574$  nm;  $\lambda_{em} = 590$  nm.





**Fig. S6** Changes in fluorescence emission of **MSO** with times at pH 5.00 and 8.00, respectively. Conditions:  $\lambda_{\text{ex}} = 574 \text{ nm}$ ;  $\lambda_{\text{em}} = 590 \text{ nm}$ .



**Fig. S7** Cell viability of **MSO** on HeLa cells by a standard MTT assay. 0, control; 1, 1  $\mu\text{M}$ ; 2, 5  $\mu\text{M}$ ; 3, 10  $\mu\text{M}$ ; 4, 15  $\mu\text{M}$ ; 5, 20  $\mu\text{M}$ . Data are expressed as mean values  $\pm$  standard error of the mean of three independent experiments, each performed in three triplicate.