Supporting Information

Anthracene carboxyimide-based selenide as fluorescent probe for ultrasensitive detection of hypochlorous acid

Contents

1. Preparation of reactive oxygen species (ROS) and reactive nitrogen species (RNS)

All the stocking solutions of ROS/RNS were prepared based on the reported literature [1]**.** The stock hydrogen peroxide (H_2O_2), sodium hypochloride (NaOCl) and tert-Butyl hydroperoxide (TBHP) slolutions were purchased from Sigma-Aldrich. Superoxide anion (O_2^-) solution was prepared by fully dispersing the potassium dioxide in anhydrous DMSO via ultrasonic treatment. Hydroxyl radicals (·OH) and tert-butoxy radical (tBuO·) were prepared by Fenton reaction, the molar ratio of $FeSO_4$:H_2O_2 and $FeSO_4$:TBHP was 1:10. Peroxyl radicals (ROO·) was generated from 2,2'-azobis(2-amidinopropane)dihydrochloride. Peroxynitrite ($ONOO^-$) solution was prepared by 3-morpholinosydnonimine hydrochloride (SIN-1). NO· were diluted from the commercially available 2,2'-azobis (2-amindinopropane) dihydrochloride and sodium nitroferricyanide(III) dihydrate (SNP) to ultrapure water.

2. Determination of the detection limit

The detection limit was calculated based on the method reported in the previous literature by the equation as follows:

$$\text{Detection limit} = 3\sigma/k \quad [2]$$

Where σ is the standard deviation of blank measurement, k is the slope of the equation between fluorescence intensity and the concentrations of NaOCl. We measured the fluorescence intensity of the probe **AC-Se** without NaOCl for six times to obtain the standard deviation, and the slope k was obtained according to the linear equation of the fluorescence intensity of F_{542} with the increasing concentration of NaOCl.

3. HR-MS data of AC-Se and the reaction mixture of AC-Se with ClO^-

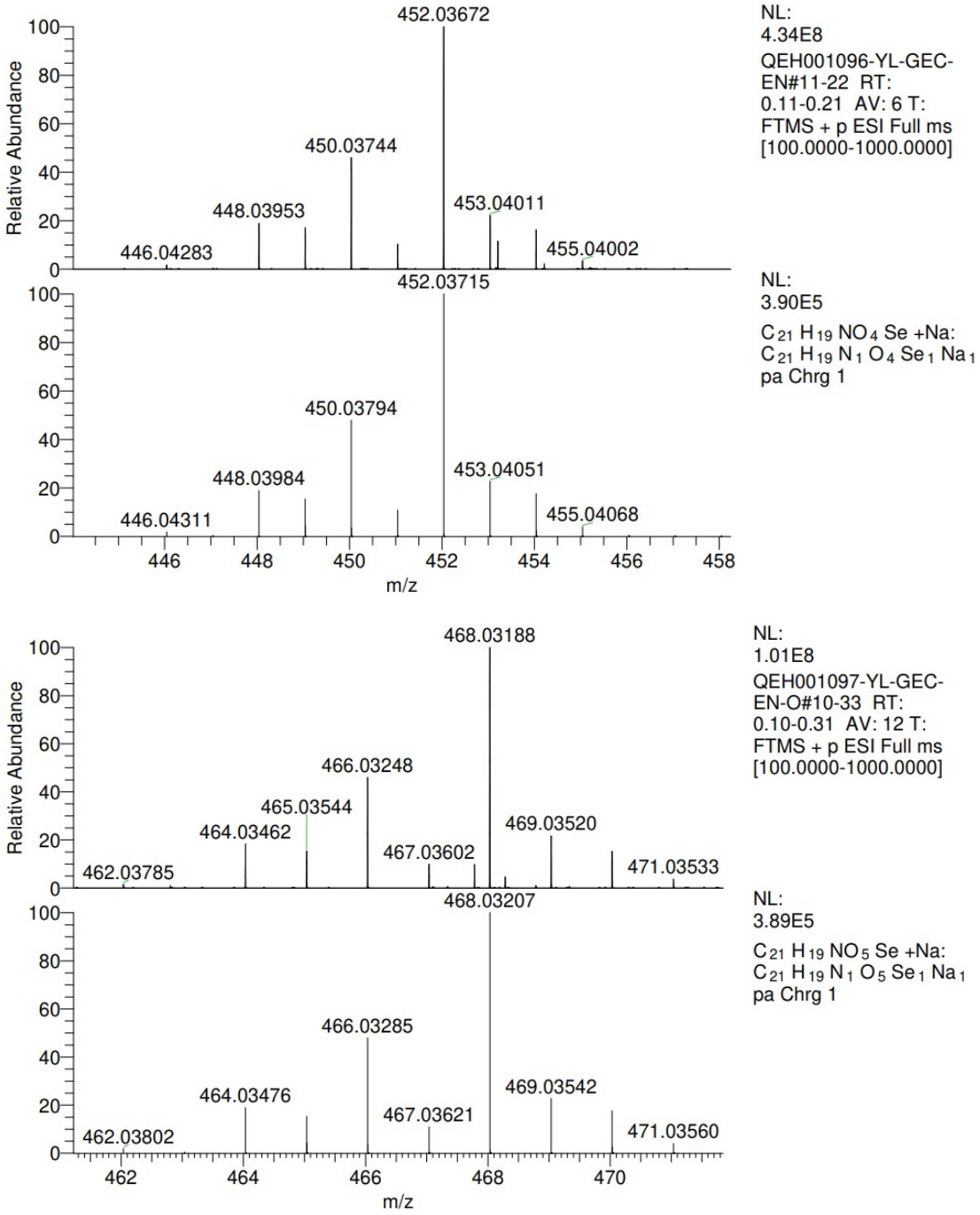

Fig. S1 HR-MS spectra of **AC-Se** and the reaction mixture of **AC-Se** with ClO^-.

4. Photostability of probe AC-Se and the oxidation product toward ClO^-

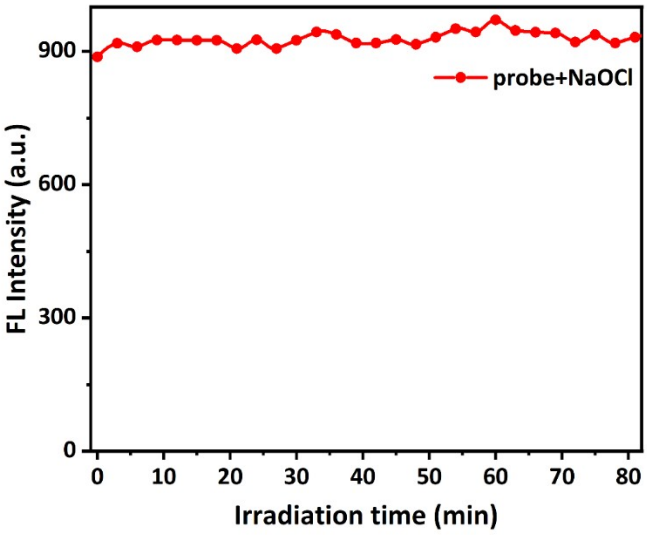

Fig. S2 Time-dependent fluorescence intensity changes of **AC-Se** (10 μM) under the irradiation by a 450W lamp, λ_{ex} = 470 nm, slits = 2/2 nm.

5. Cytotoxicity assays

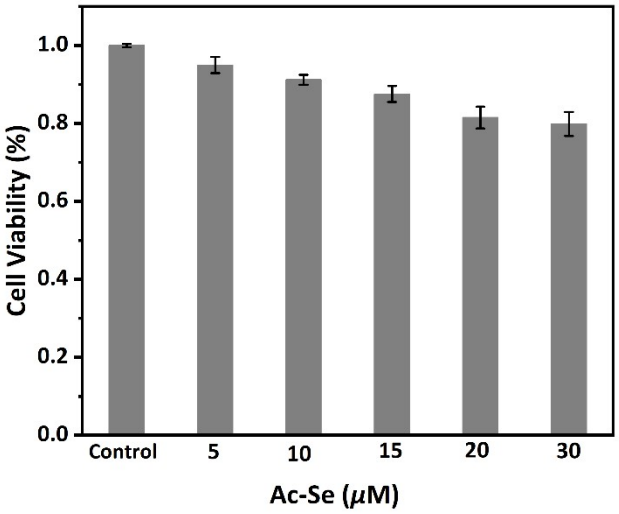

Fig. S3 Cell viability of HeLa cells treated with different concentrations of **AC-Se** (0, 5, 10, 15, 20, 30 μM) for 24 h.

6. Real-time imaging

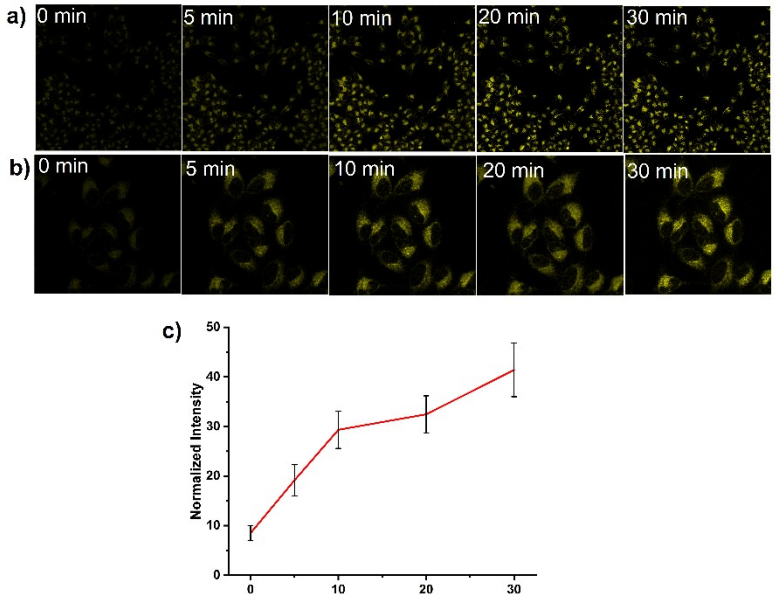

Fig. S4 (a) Time course of fluorescence intensity (0-30 minutes) of HeLa cells after addition of **AC-Se** (5 μM). (b) Time course of fluorescence intensity (0-30 minutes) of local HeLa cells from Fig. S4a. (c)Average fluorescence intensity from image S4b respectively. λ_{exc} = 488 nm, λ_{em} = 540-560 nm.

7. NMR spectra

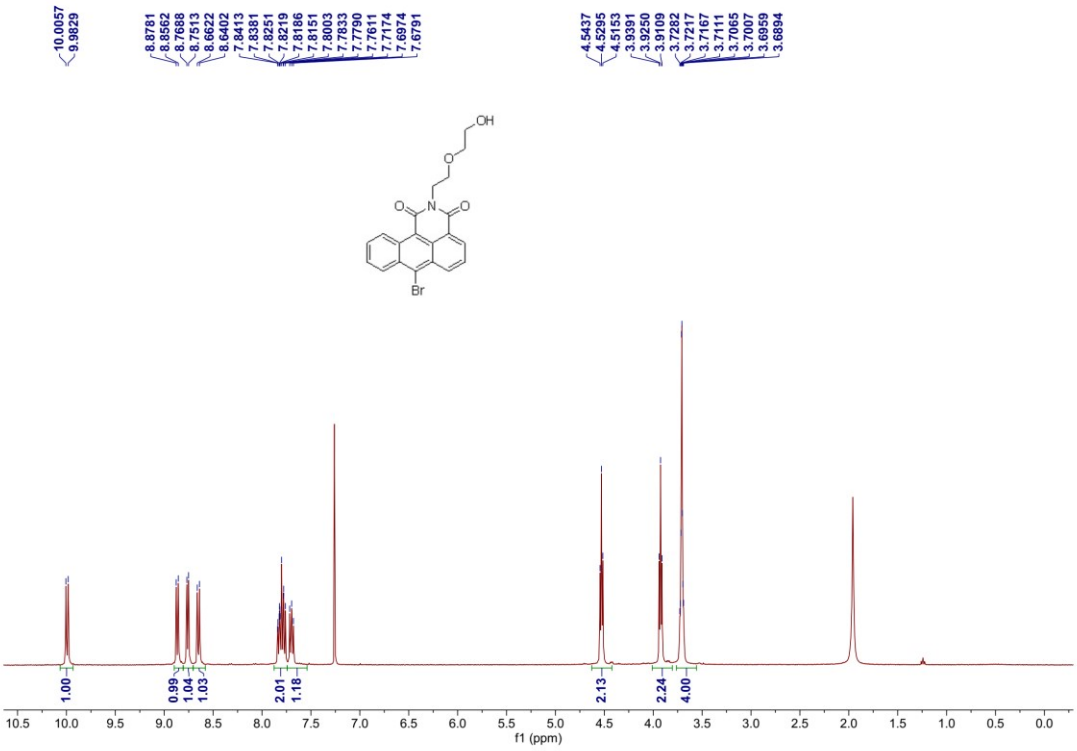

Fig. S5 ^{1}H NMR (400 MHz) spectrum of **AC-Br** in $CDCl_3$.

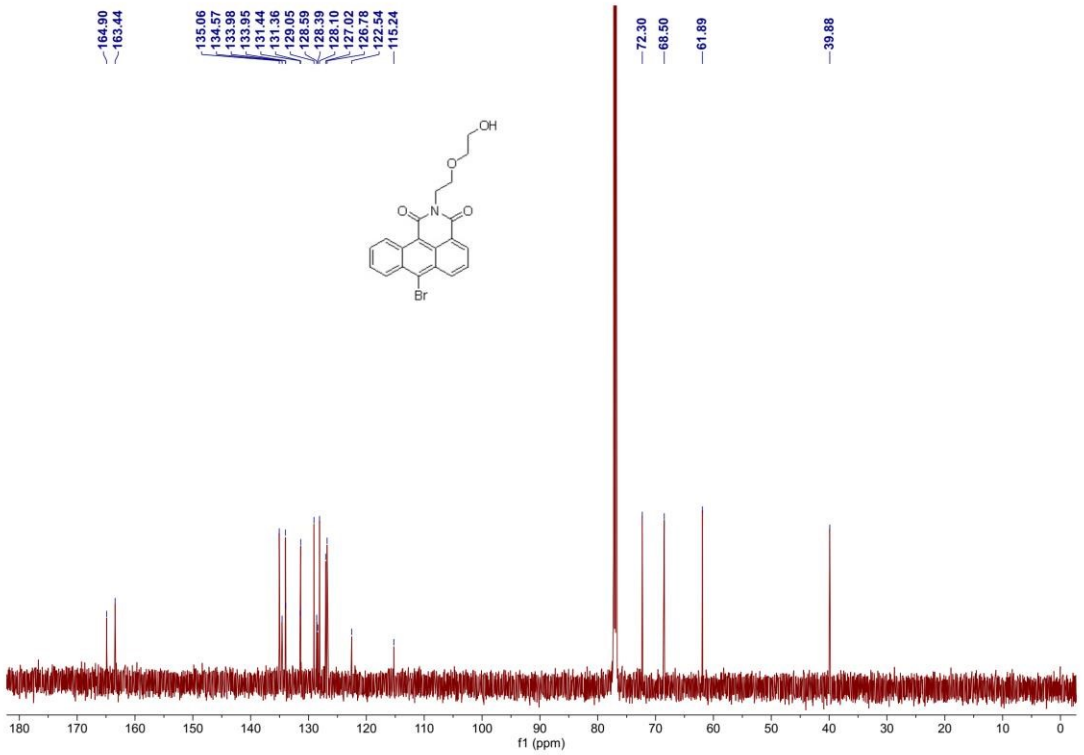

Fig. S6 ^{13}C NMR (151 MHz) spectrum of **AC-Br** in $CDCl_3$.

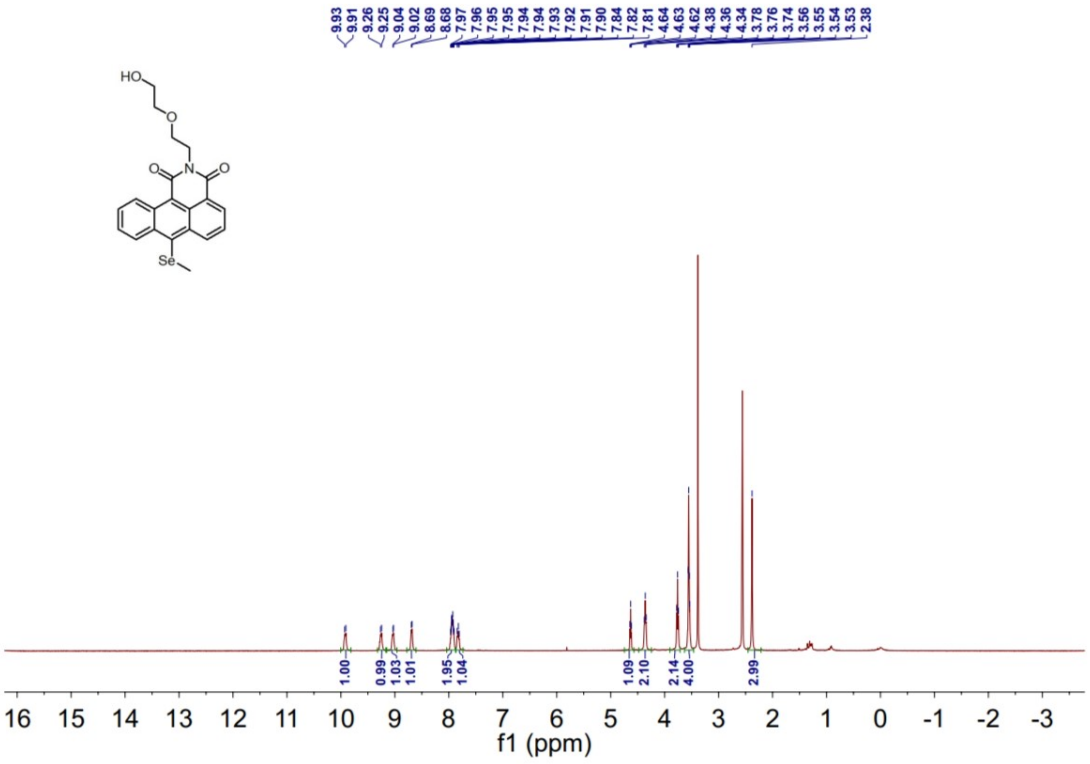

Fig. S7 ^{1}H NMR (600 MHz) spectrum of **AC-Se** in DMSO-d_6.

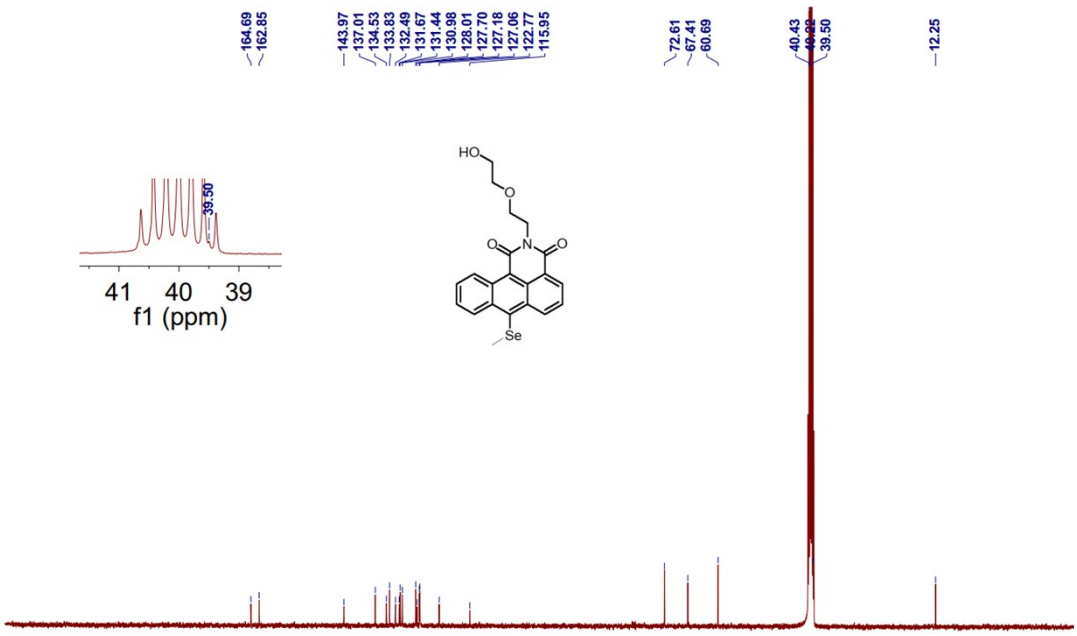

Fig. S8 ^{13}C NMR (151 MHz) spectrum of **AC-Se** in DMSO-d_6.

1. Zhu, B.; Gao, C.; Zhao, Y.; Liu, C.; Li, Y.; Wei, Q.; Ma, Z.; Du, B.; Zhang, X., A 4-hydroxynaphthalimide-derived ratiometric fluorescent chemodosimeter for imaging palladium in living cells. *Chem. Commun.* **2011,** 47, (30), 8656-8658.
2. Zeng, L.; Xia, T.; Hu, W.; Chen, S.; Chi, S.; Lei, Y.; Liu, Z., Visualizing the Regulation of Hydroxyl Radical Level by Superoxide Dismutase via a Specific Molecular Probe. *Anal Chem* **2018,** 90, (2), 1317-1324.