# Supporting Information

# A fast-response near-infrared fluorescent probe for detection of $H_2S$ in living cells

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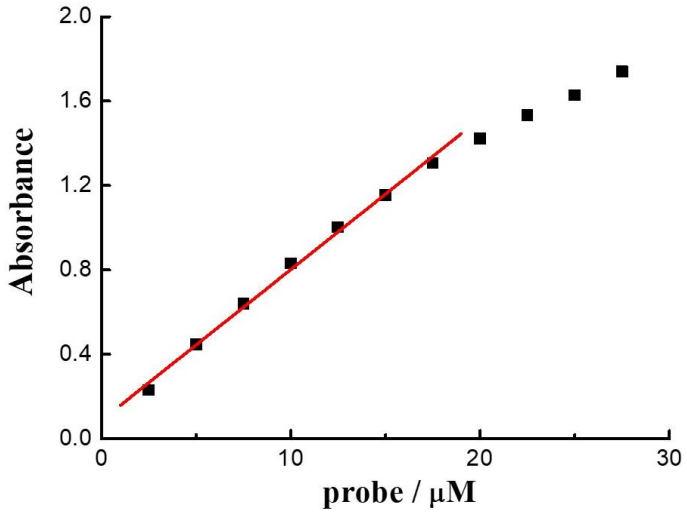



**Figure S1.** Probe **1** solubility test shows linearity from abs at 620 nm vs concentration (1-20 μM).

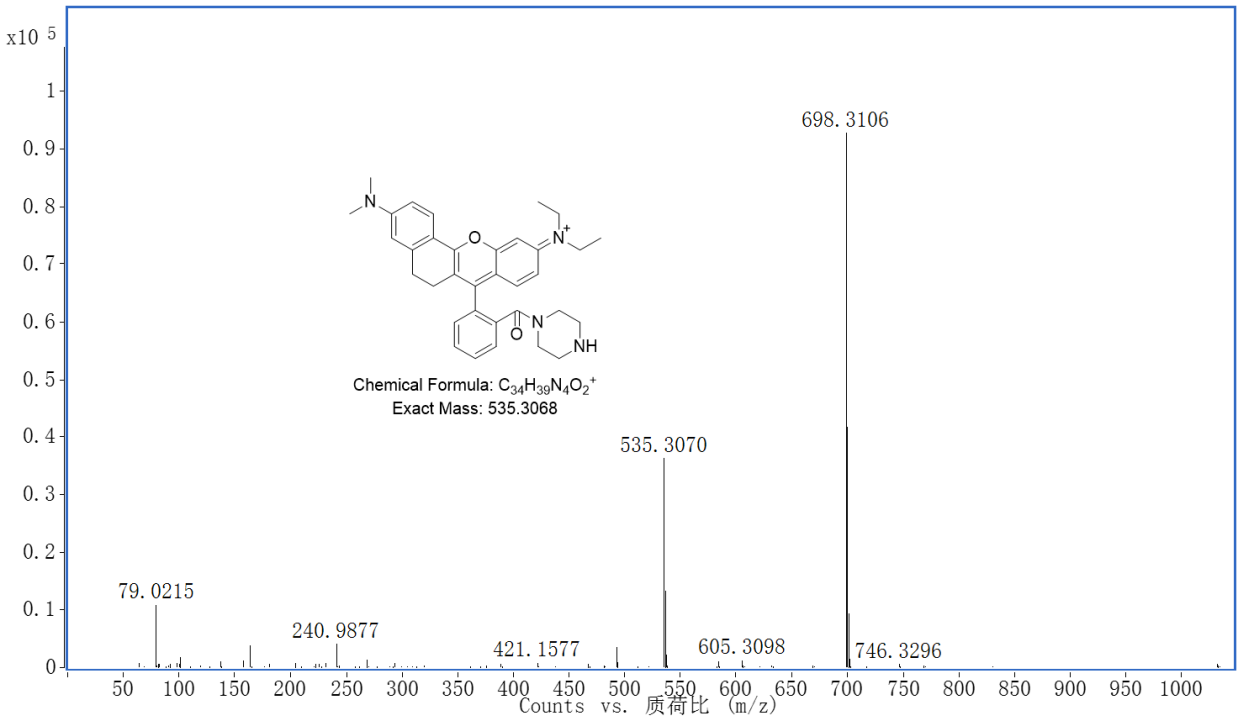



**Figure S2.** HRMS spectrum of probe **1** (1 mM) in the presence of $H_2S$ (5 mM).

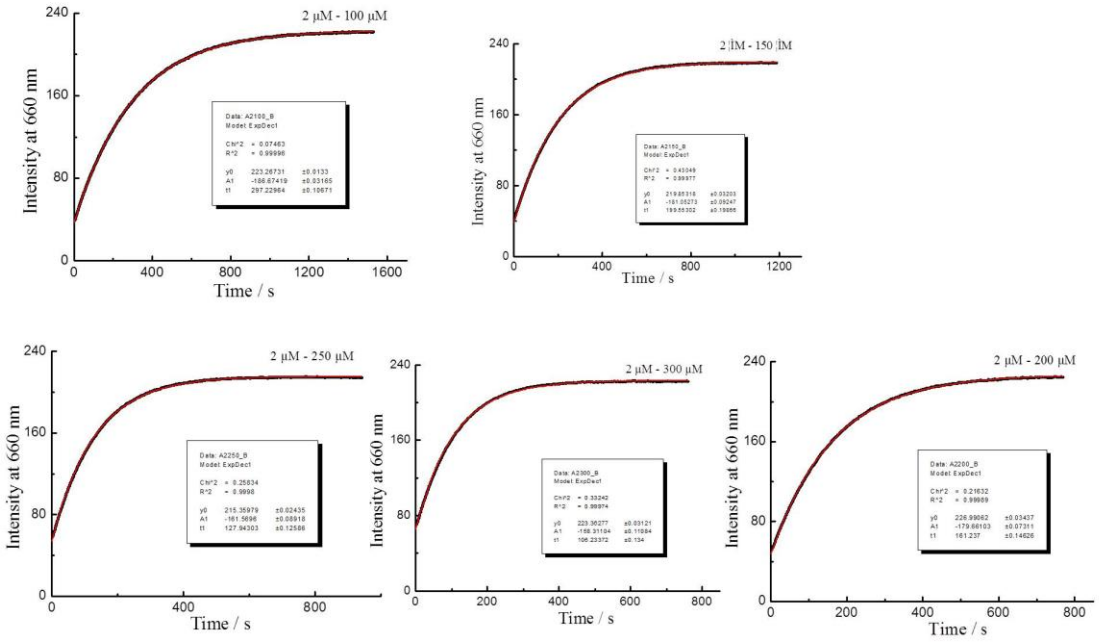



**Figure S3**. Time-dependent fluorescence intensities change of probe **1** (2 μM) at 660 nm, when treated with different concentrations of $Na_2S$ (100 μM; 150 μM; 200 μM; 250 μM; 300 μM) in PBS buffer.

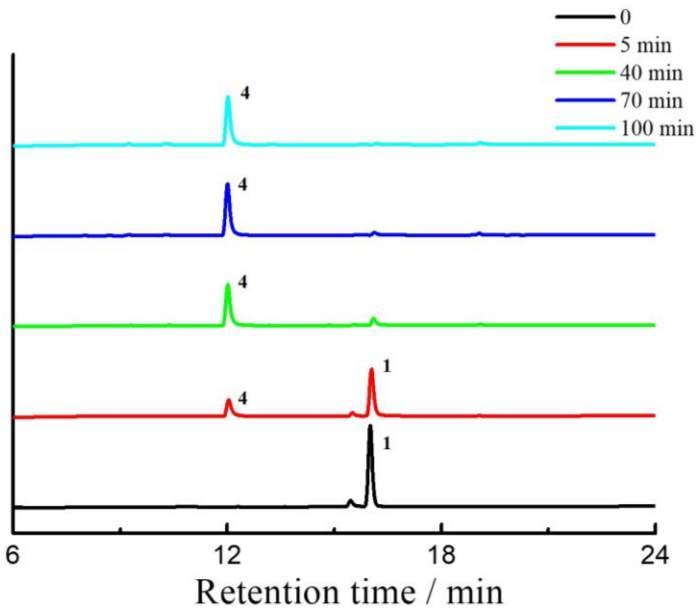



**Figure S4**. Time-dependent HPLC traces of the reaction of **1** (200 μM) with $Na_2S$ (2 mM) to give 4. Conditions: Venusil MP C18 column with 4.6 mm x 250 mm; wavelength: 274 nm; flow 1 mL / min; buffer A: 0.1% (v / v) trifluoroacetic acid in water; buffer B: Methanol; elution condition: 0-3

min, B: 5-50%; 3-20 min, B: 50-95%; 20-25 min, B: 95-5%; 25-27 min, B: 5%.

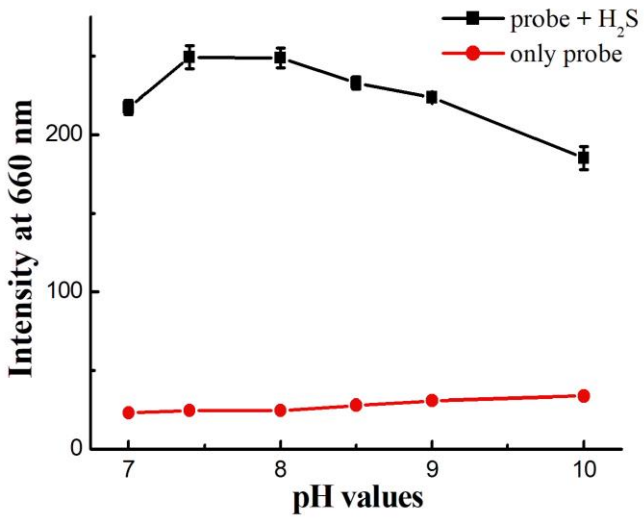



**Figure S5.** The emission intensity at 660 nm of **1** (2 μM) at the indicated pH values in the absence or presence of $H_2S$ (200 μM).

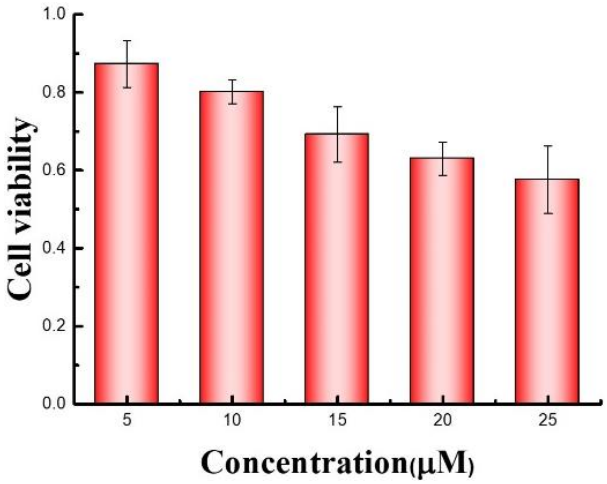



**Figure S6.** Concentration-dependent normalized cell viability in the presence of probe **1** (5-25 μM) for 24 h.

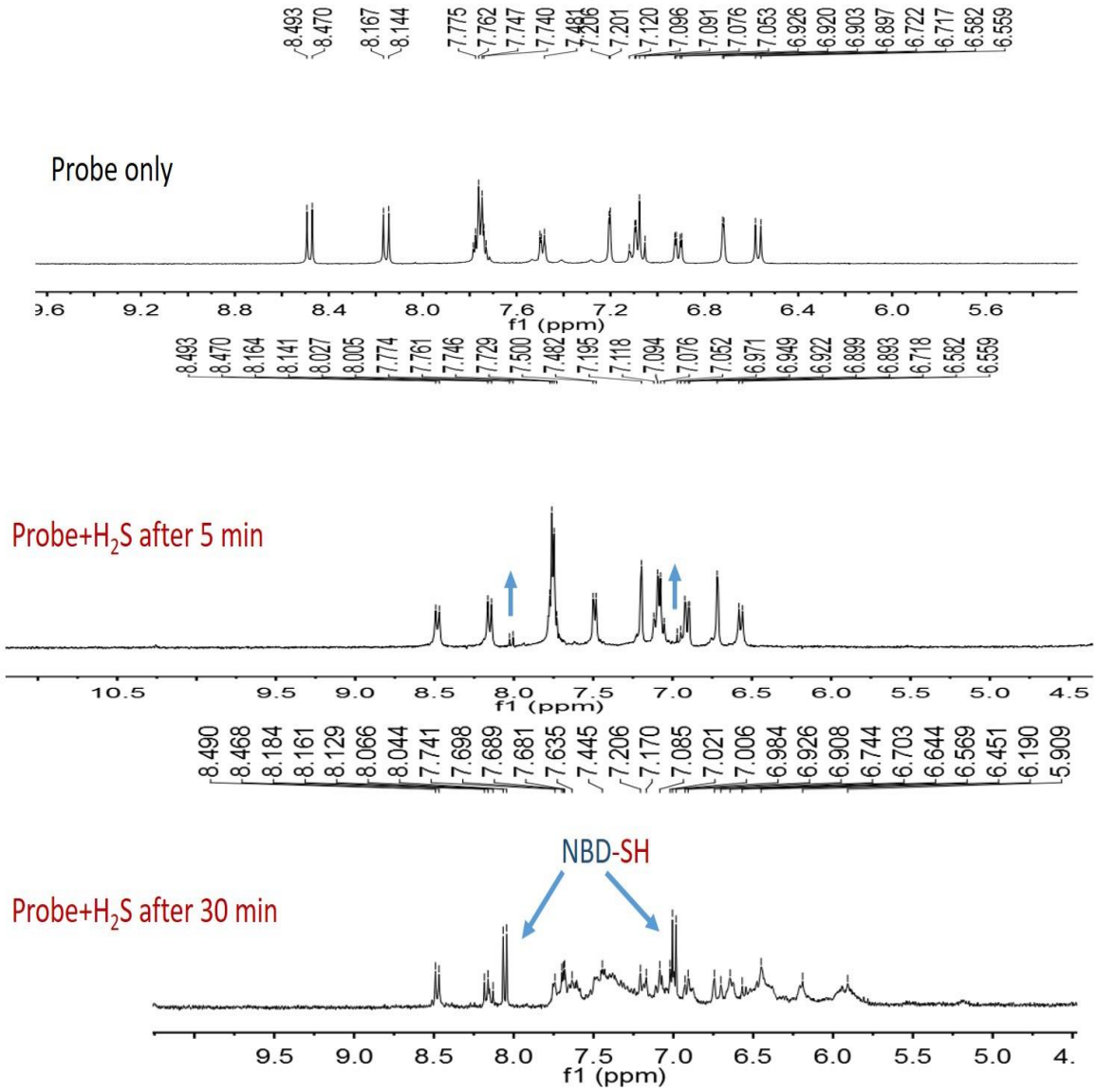
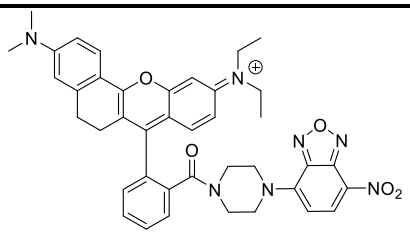
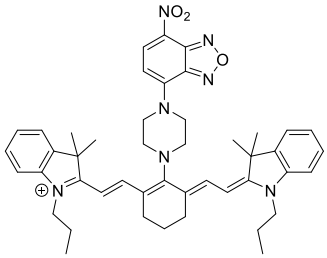
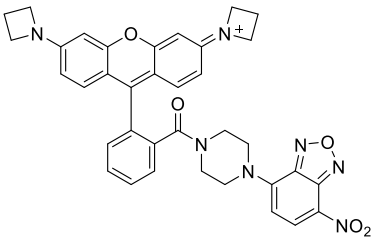
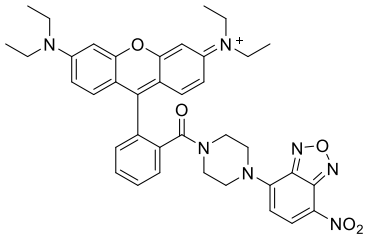
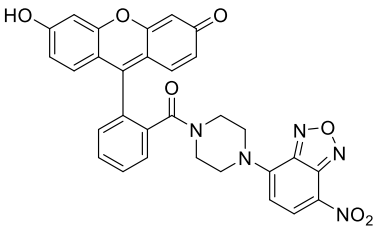
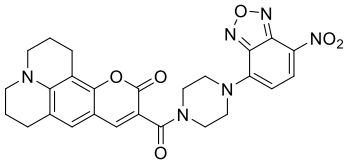
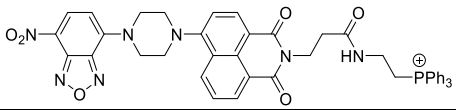



**Figure S7.** Real time [1]HNMR spectra, showing thiolysis reaction by the formation of NBD-SH.

**Table S1** comparison of properties of our probe with other probes operating

| Probe | λex/λem (nm) | Fluorescence enhancement | ϕ | LOD/μM | Rate/$K_2$ | Ref |
|---|---|---|---|---|---|---|
|  | 620/660 | ~10 | 0.29 | 0.27 | 29.8 $M^{-1}s^{-1}$ | This work |
|  | 730/796 | ~87 | ND | 0.04 | 14.9 $M^{-1}$ $s^{-1}$ | 1 |
|  | 565/585 | ~19 | 0.77 | 0.36 | 27.8 $M^{-1}s^{-1}$ | 2 |
|  | 567/589 | ~4.5 | 0.36 | 0.58 | 113 $M^{-1}$ $s^{-1}$ | 3 |
|  | 502/530 | ~65 | 0.64 | 0.057 | 28 $M^{-1}$ $s^{-1}$ | 3 |
|  | 449/496 | ~200 | 0.81 | 0.9 | 7.6 $M^{-1}$ $s^{-1}$ | 4 |
|  | 394/532 | ~68 | ND | 2.46 | 20.4 $M^{-1}$ $s^{-1}$ | 5 |

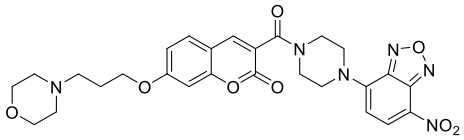
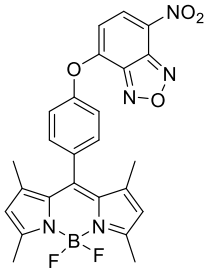
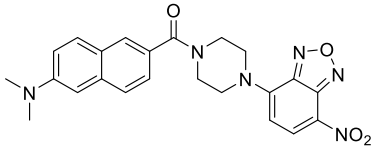
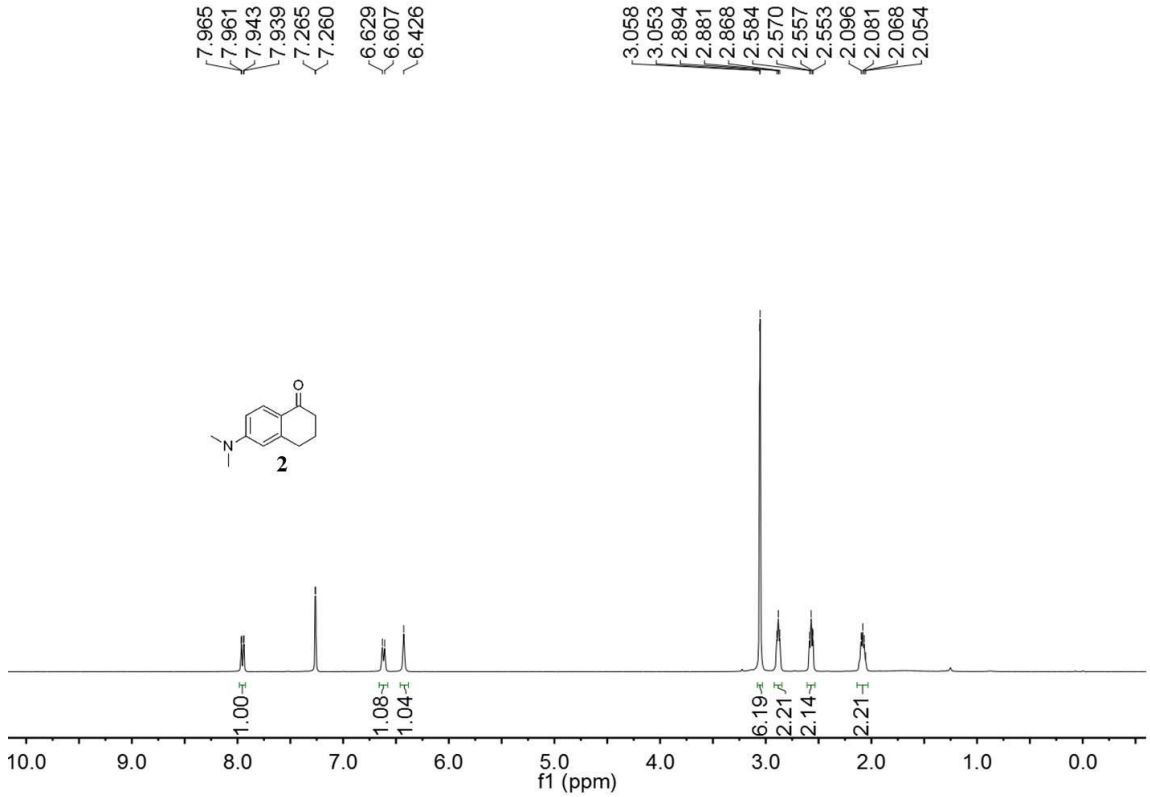
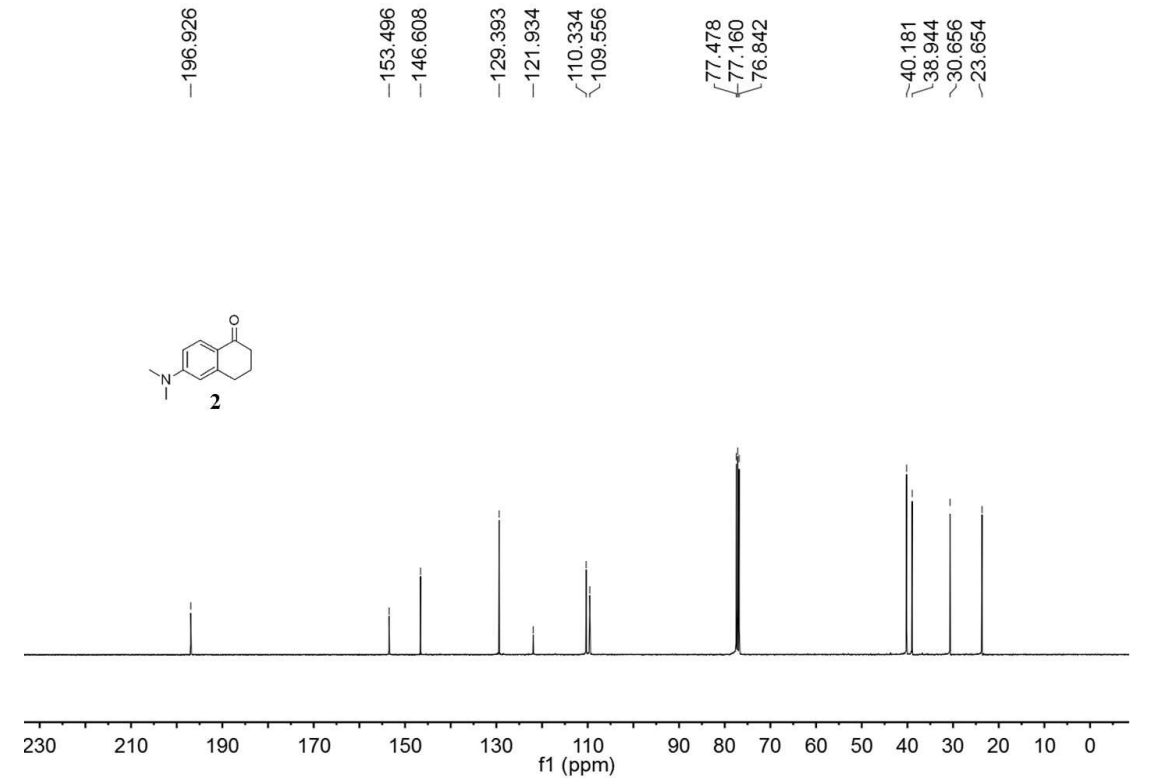
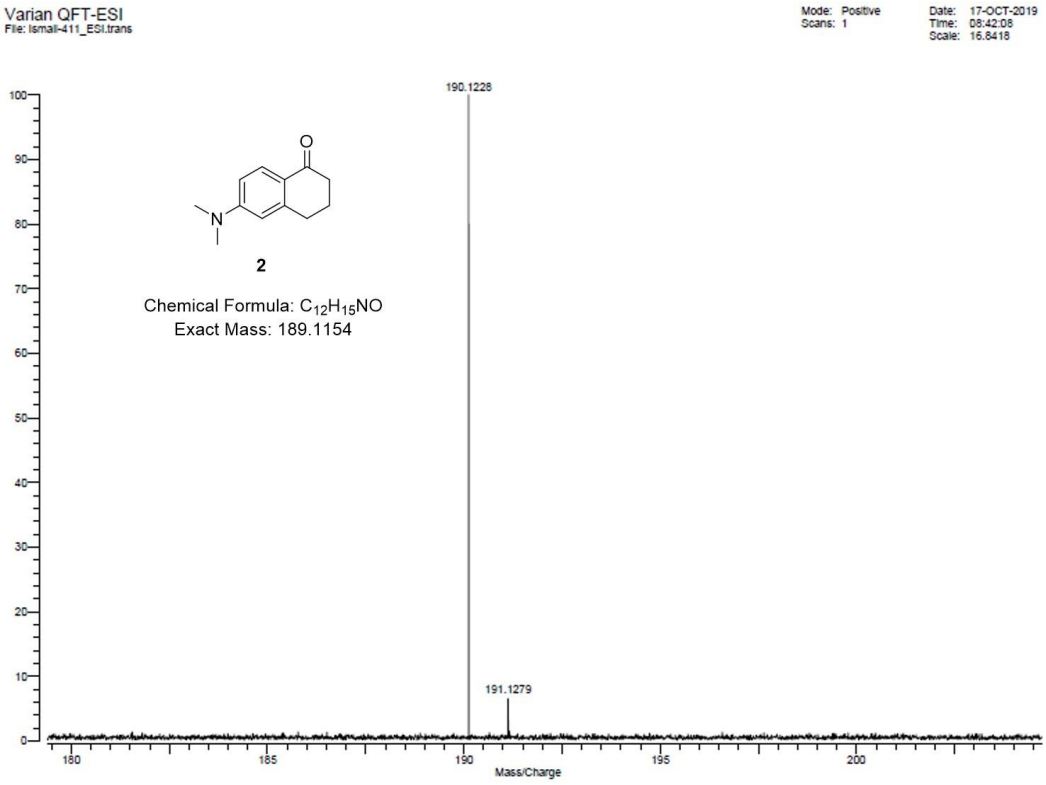
| | | | | | | |
|---|---|---|---|---|---|---|
|  | 415/560 | ~273 | ND | 0.43 | 6.8 $M^{-1}$ $s^{-1}$ | 6 |
|  | 480/510 | ~150 | ND | 2.6 | ND | 7 |
|  | 330/468 | ~29 | ND | 0.024 | ND | 8 |

**Figure S8.** $^{1}H$ NMR, $^{13}C$ NMR and MS spectra of compounds

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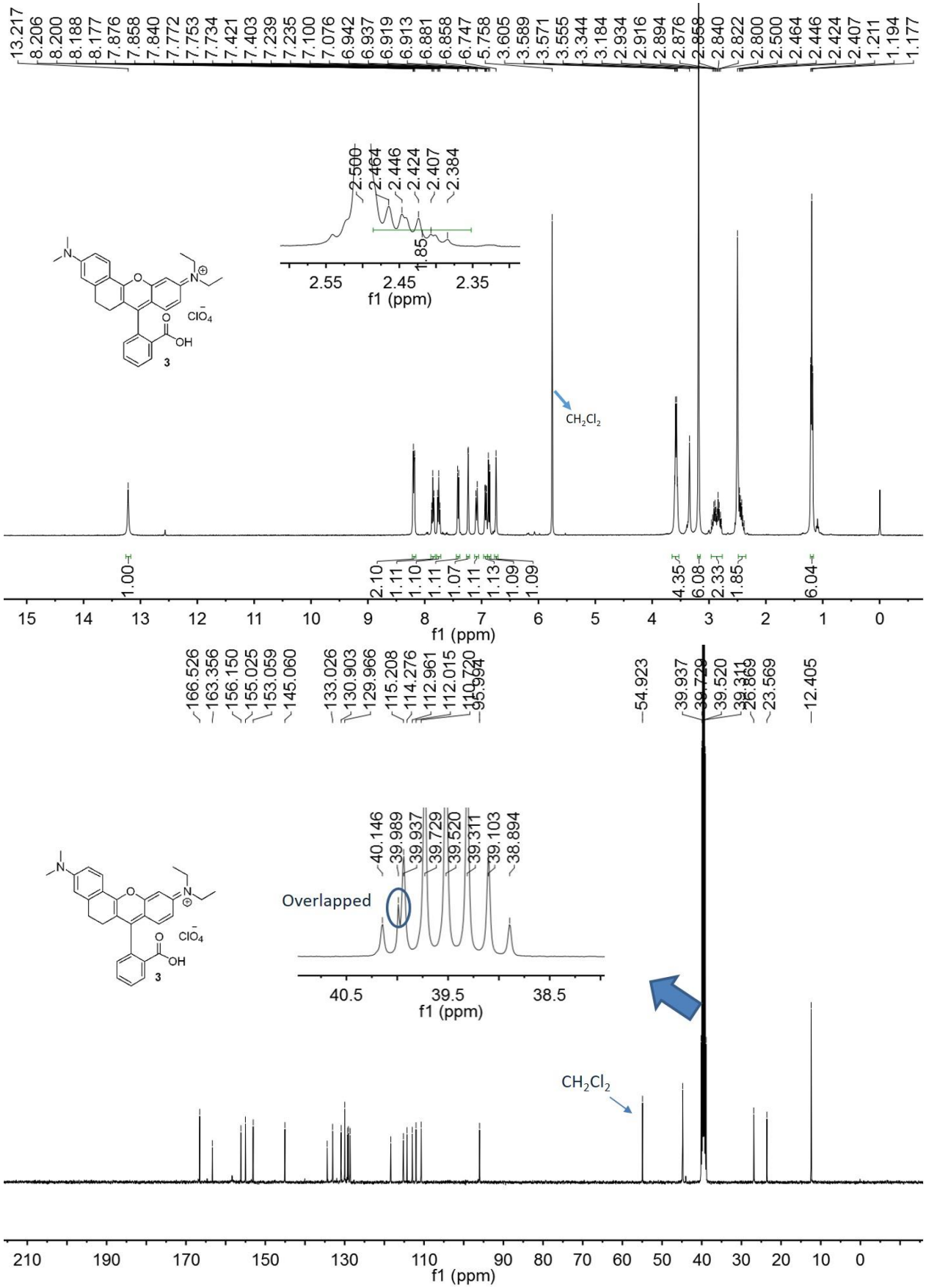
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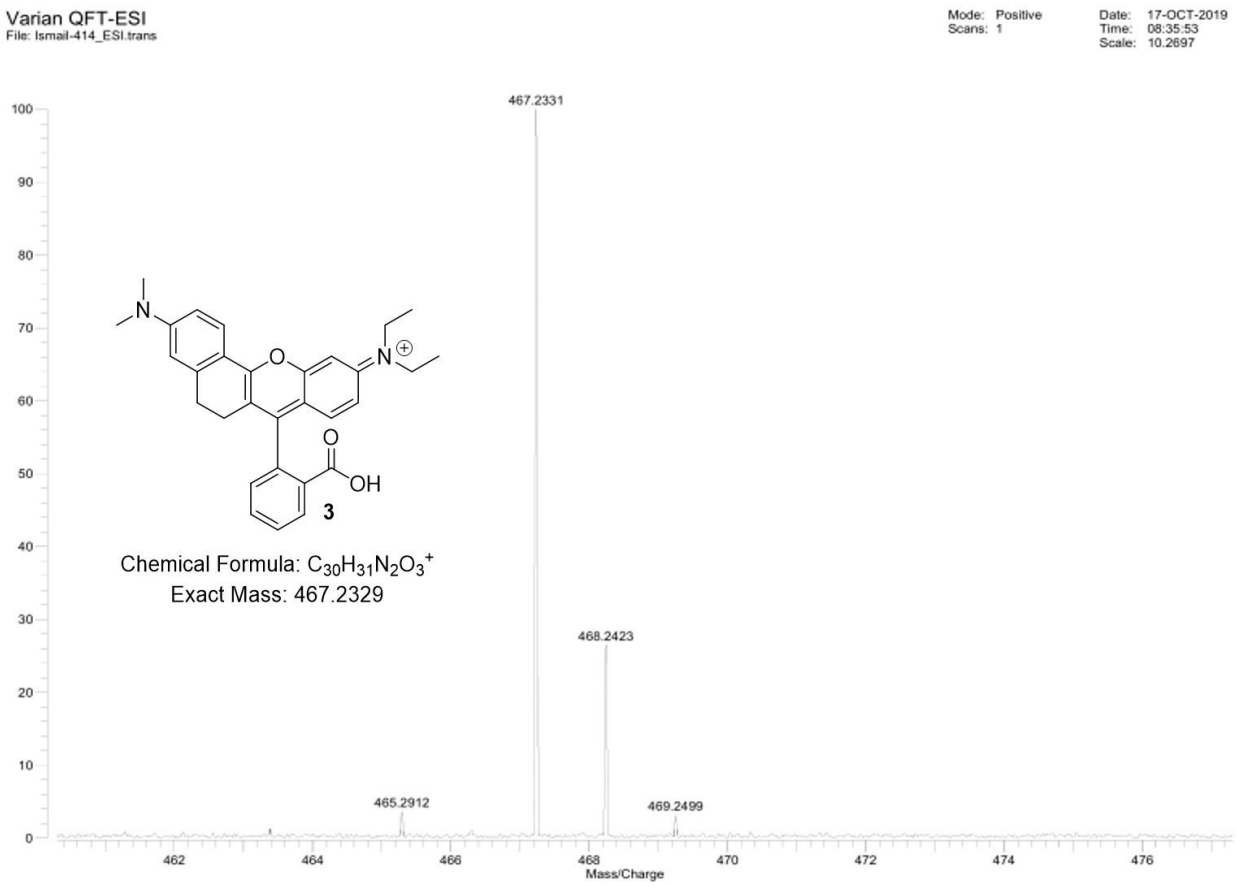
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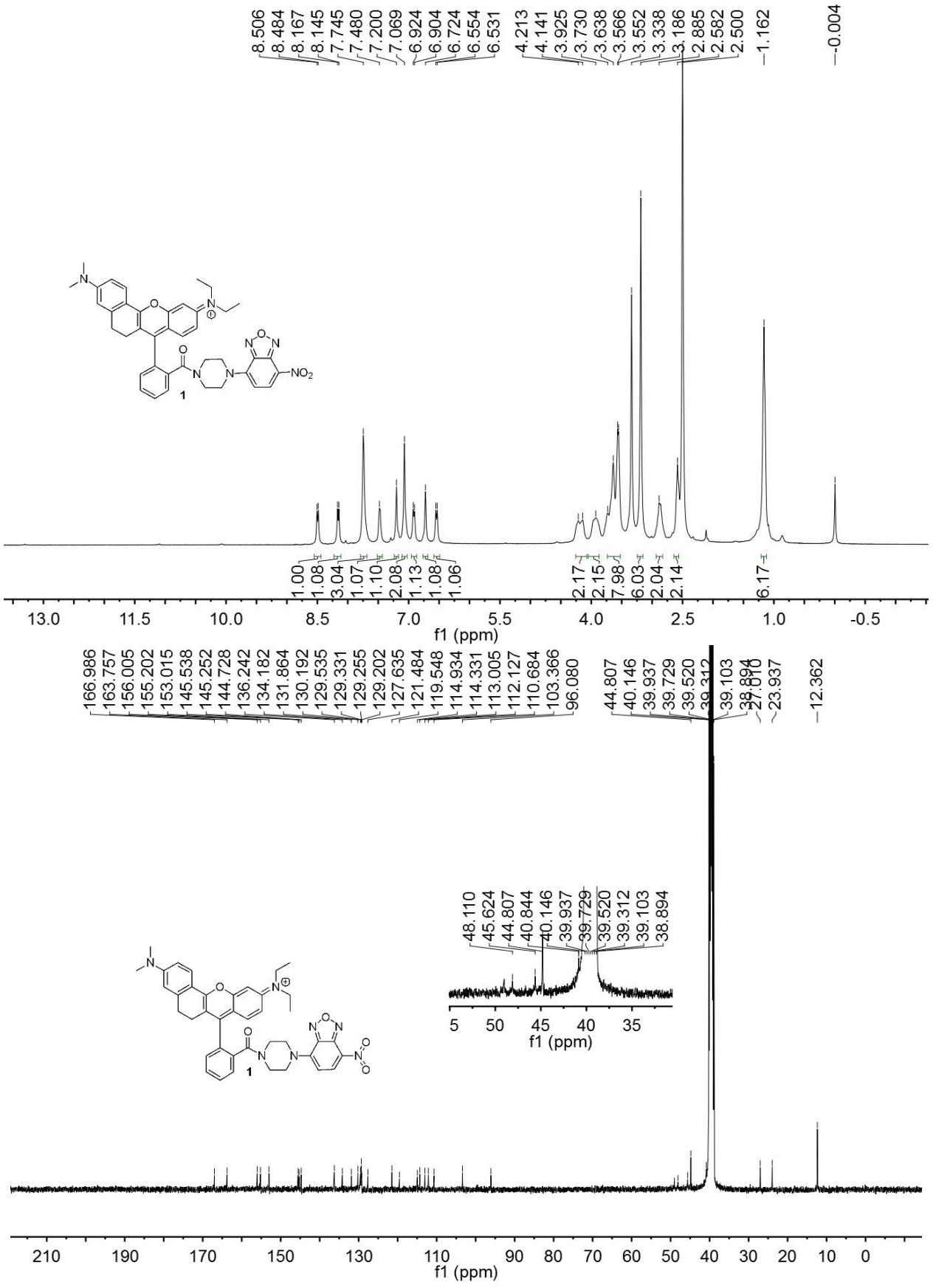
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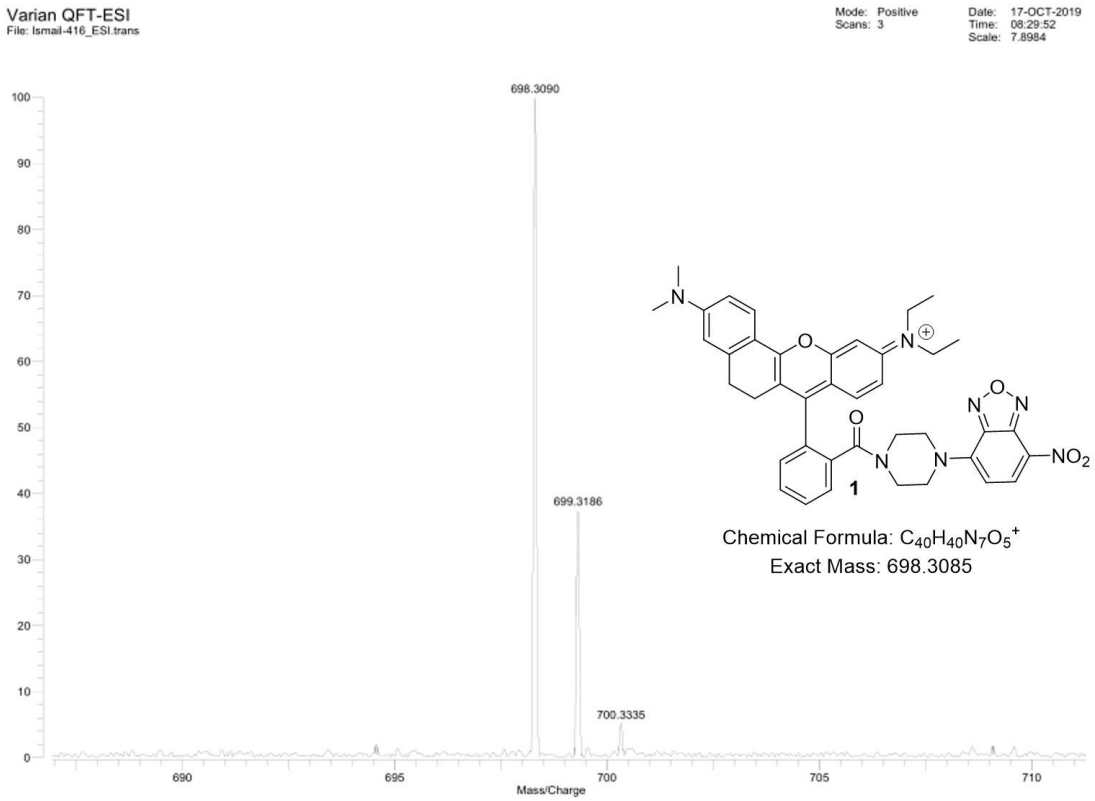


## Supporting reference


1. Zhang, K.; Zhang, J.; Xi, Z.; Li, L.Y.; Gu, X.; Zhang, Q.Z.; Yi, L. A new $H_2S$-specific near-infrared fluorescence-enhanced probe that can visualize the $H_2S$ level in colorectal cancer cells in mice. *Chem. Sci.* **2017**, *8*, 2776-2781.
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probe for visualizing $H_2S$ in lysosomes. *Tetrahedron*. **2015**, *71*, 8572-8576.
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8. Tang, Y.; Jiang, G. F. A novel two-photon fluorescent probe for hydrogen sulfide in living cells using an acedan-nbd amine dyad based on fret process with high selectivity and sensitivity. *New J. Chem*. **2017**, *41*, 6769-6774.