Electronic Supplementary Material (ESI) for Analyst.

Supplementary Information for

A long-wavelength activable AIEgen fluorescent probe for HClO and cell apoptosis imaging

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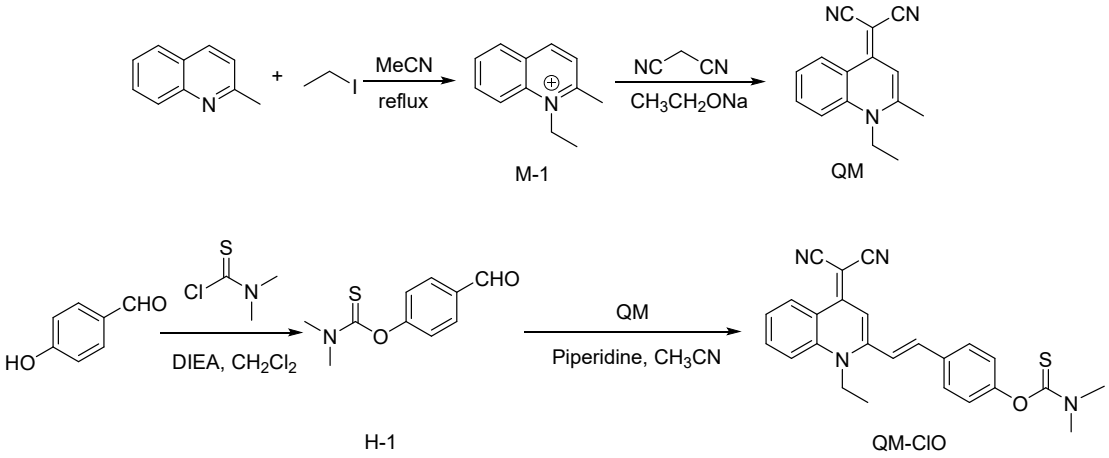
EXPERIMENTAL SECTION



Scheme S1. Synthetic route of **QM-ClO**.

Synthesis of M-1. Under N_2 atmosphere, 2-methylquinoline (1.43 g, 10 mmol) and iodoethane (4.71 g, 30 mmol) were dissolved in acetonitrile (20 mL) and refluxed for 12 h. Then the reaction product was concentrated under reduced pressure to obtain a light yellow solid M-1 as a crude product, which can be used in the next reaction without further purification.

Synthesis of QM. Under ice-water bath conditions, compound M-1 (1.74 g, 6 mmol) and malononitrile (1.00 g, 15 mmol) were dissolved in absolute ethanol (20 mL), and sodium ethoxide solution (20 mL anhydrous Ethanol, 0.97 g sodium). After 4 hours of

reaction, the mixture was poured into 500 mL ice water, and the pH was adjusted to 7-8 with 1 M hydrochloric acid solution. The resulting precipitate was filtered, washed with distilled water and dried in vacuum to obtain the desired product QM: yellow solid (1.06 g, 78%).

Synthesis of H-1. P-Hydroxybenzaldehyde (2 mmol, 0.12 g) and dimethylthiocarbamoyl chloride (10 mmol, 1.24 g) were dissolved in 10 mL of anhydrous dichloromethane, then 400 μL DIEA was added, and the mixture was stirred at room temperature for 4 hours. Concentrated under reduced pressure to remove dichloromethane, and then purified by column chromatography(0.17 g, 40%).

Apparatus. Absorption and fluorescence emission spectrawere measured usingHP-8453 UV/Visspectrometerand F-4600 FL spectrophotometer. The slit width is 5 nm/5 nm, excitation voltage is 700V. Nuclear magnetic resonance (NMR) spectra were carried out by using Bruker DTX-400 spectrometer.High-resolution mass spectrometry(HRMS) was performed on Agilent ESI-Q-TOF mass instrument.ESI mass spectra were implemented on the HPLCQ-Tof HR-MS. The fluorescence imaging of cellswere tested by confocallaser-scanning microscope (Leica TCS SP8). Dynamic light scattering (DLS) was performed usingNanoPlus-3 DLS particle size/zeta potential analyzer.

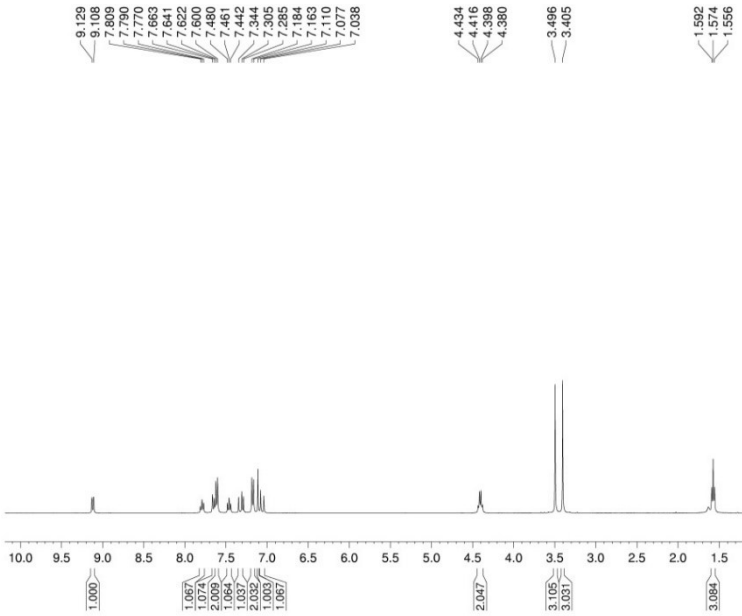


Fig S1. ^{1}H NMR spectrum of **QM-ClO** in $CDCl_3$.

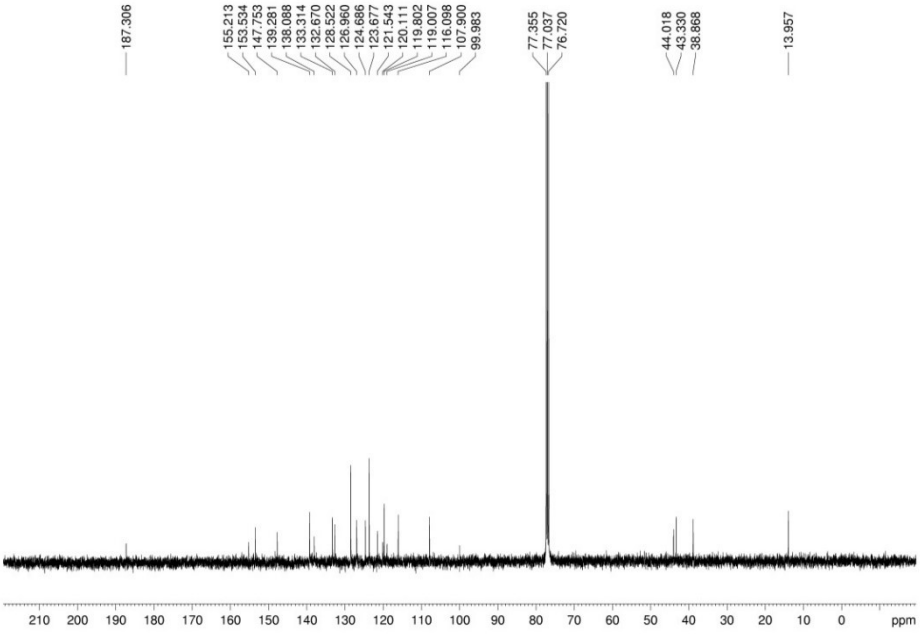


Fig S2. ^{13}C NMR spectrum of **QM-ClO** in $CDCl_3$.

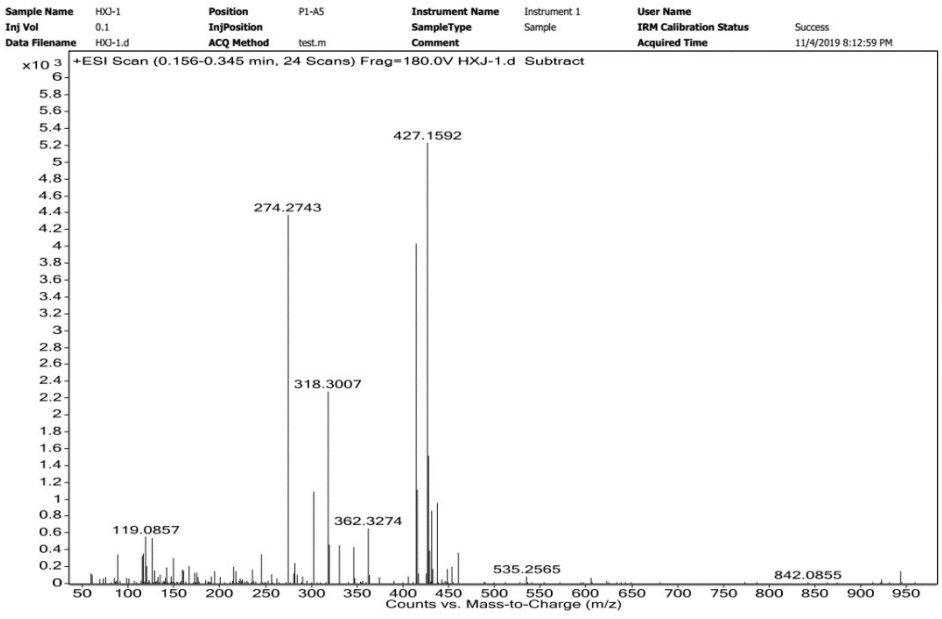


Fig S3. HR-MS spectra of **QM-ClO**.

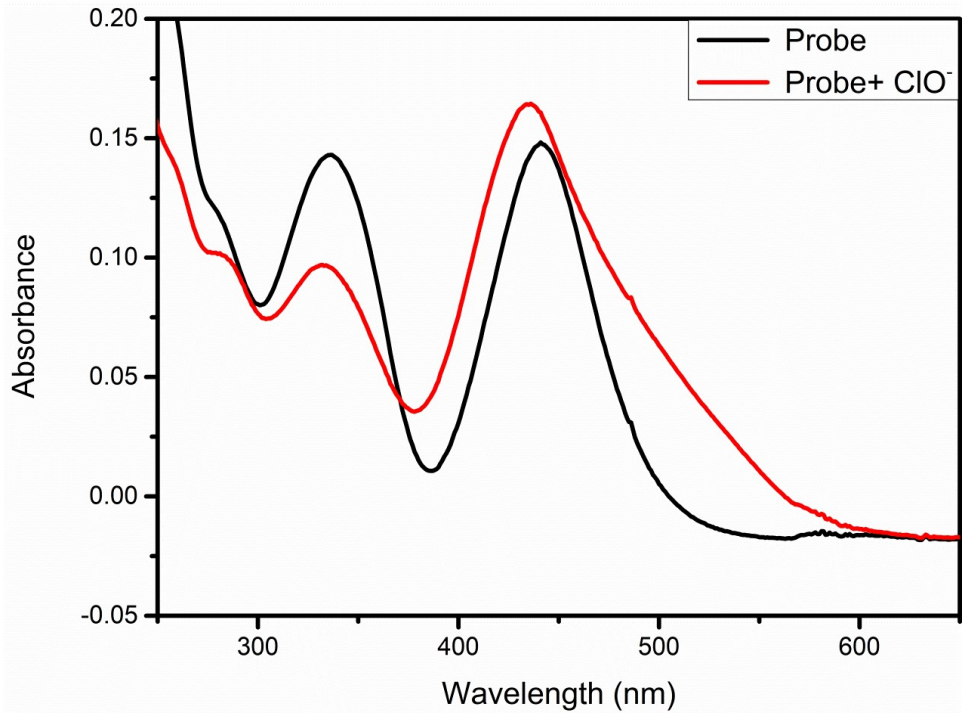


Fig S4. The UV-vis spectra ofprobe **QM-ClO** (10.0 μM) in the presence of ClO^-.

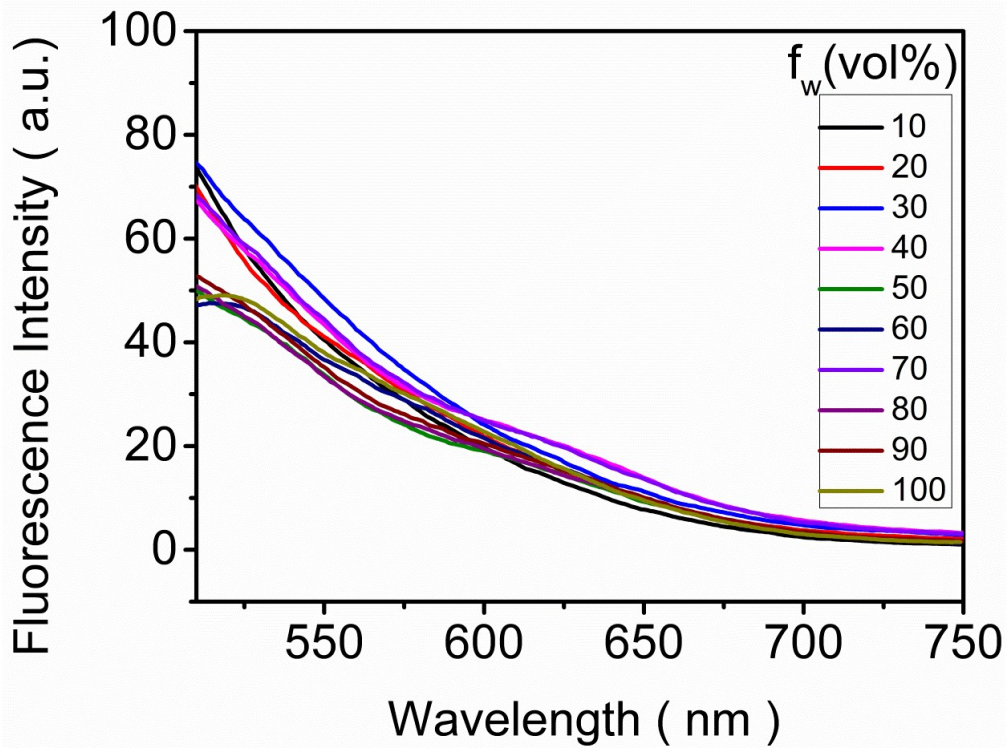


Fig S5 Spectrum character and diameterof **QM-ClO** (f_w) in a different ratios of PBS/DMSO.

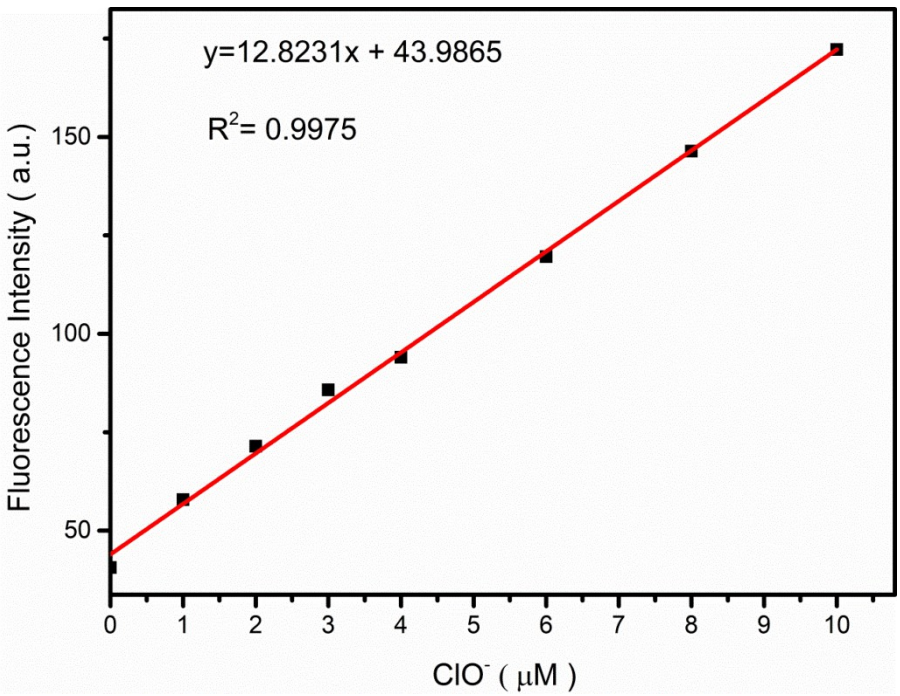


Fig S6. Linear plot of the fluorescence emission against ClO^- concentrations. (λ_{ex} = 430 nm).

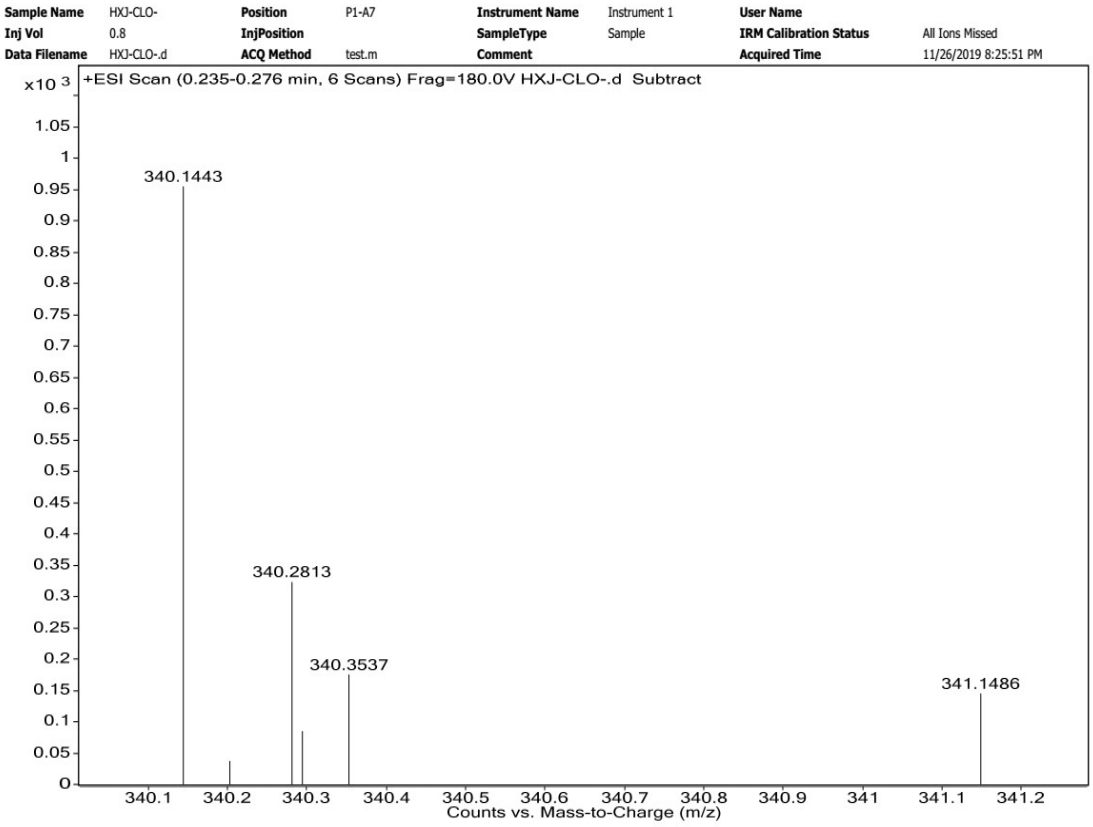
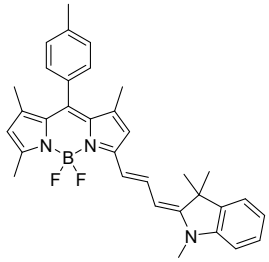
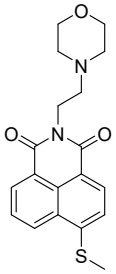
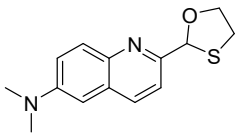
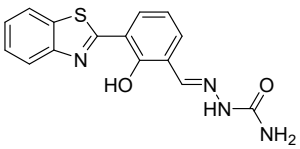
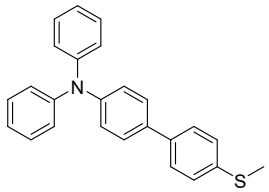
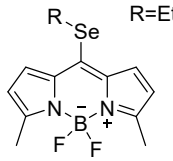
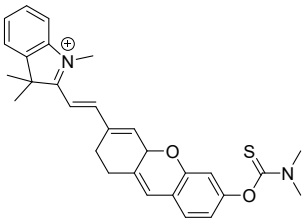
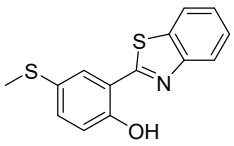
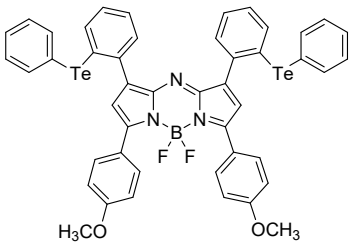
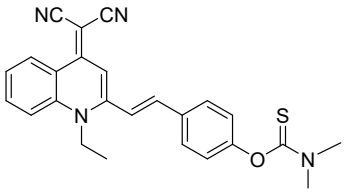


Fig S7. HR-MS spectra of **QM-ClO** in the presence of ClO^- (10 equiv.)

Table S1. **Comparison of reported probes for recognition of HClO.**

Structure	$\lambda_{ex}/\lambda_{em}$ (nm)	Responsetime	Detection limit	AIE	Cell imaging
 Sensors and Actuators B: Chemical **2017**246 293-299	488/511 635/713	10 s	10.6nM	NO	Endogenous and exogenous hypochlorous acid in cell lysosomes.
 Anal. Chem. **2017**, 89, 10384-10390	405/505	150 s	0.674 μM	NO	Detection of HClO in intracellular lysosomes.
 Chem. Sci., **2018**, 9, 6035	426/492, 562	60 s	89 nM	NO	The production of HClO during wound healing in mice.
 Sensors and Actuators B **2018**260 832-840	360/465	20 min	8.2×10^{-9} M	NO	Membrane permeability and low toxicity
 Chem. Commun., **2019**, 55, 12912	365/437, 497	60 s	16 nM	NO	Production of hypochlorous acid during alcohol-induced liver injury

 J. Mater. Chem. B, **2019**, 7, 6861	532/548 530/545 532/550	2 s 5 s 100 s	0.3 nM 0.8 nM 9.2 nM	NO	Exogenous and endogenous hypochlorous acid, and localized in mitochondria
 Sensors and Actuators: B. Chemical **2021**327 128884	680/710	5s	0.09 μM	NO	Fluctuations in endogenous hypochlorous acid produced by the immune system during Staphylococcu s aureus infection and muscle tissue injury in live mice
 Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy **2020** 239 118515	365/450, 580	3 min	4.2×10^{-7} M	NO	Cellular imaging of hypochlorous acid
 Talanta**2021** 233 122581	630/738	immediate	0.09 μM	NO	Exogenous and endogenous detection HClO
 This work	430/620	100 s	30.8 nM	Yes	Changes of hypochlorous acid content during CCCP-induced cell apoptosis