Supporting information

A highly efficient fluorescent probe based on tetrahydroxanthylium-coumarin for

detection bisulfite in mitochondria

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| Fig. S1 Absorption spectra of probe 1 (10 μ M) in different solvents. The maximum absorption peak of probe 1 in different solvents (DCM (708 nm), TCM (670 nm), Tol (655 nm), MeOH (648 nm), THF (677 nm), EtOH (659 nm), H ₂ O (628 nm)) |
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Fig. S1 Absorption spectra of probe 1 (10 μ M) in different solvents. The maximum absorption peak of probe 1 in different solvents (DCM (708 nm), TCM (670 nm), Tol (655 nm), MeOH (648 nm), THF (677 nm), EtOH (659 nm), H₂O (628 nm))



Fig. S2 Excitation spectra of probe **1** (10 μ M, λ_{em} = 514 nm, slit width: 3 nm/5 nm) towards the HSO₃⁻ in PBS buffer (20 mM, pH = 7.4) containing 10% acetonitrile.



Fig. S3 Determination of detection limit. (a) Fluorescence spectra of probe 1 (1 μ M) towards HSO₃⁻ (0–1.8 μ M, λ_{ex} = 443 nm, slit width: 5 nm/10 nm). (b) Plot of fluorescence intensity of probe 1 with HSO₃⁻ (0–1.8 μ M).



Fig. S4 Determination of response time. Fluorescence spectra of probe 1 (10 μ M) towards HSO₃⁻ (120 μ M, λ_{ex} = 443

nm, slit width: 3 nm/5 nm).



Fig. S5. (a, c) The pH-dependent response for free probe **1** and probe **1** + HSO_3^- (120 μ M, λ_{ex} = 443 nm, slit width: 3 nm/1.5 nm). (b, d) The pH-dependent response for free probe **1** and probe **1** + HSO_3^- (120 μ M, λ_{ex} = 443 nm, slit width: 3 nm/5 nm).



Fig. S6 Percentages of HeLa cells viabilities remaining after cell treatment with probe **1** (untreated cells were considered to have 100% survival). Cell viabilities were assayed by the MTT method.

| Probe | Journal | Detection limit/nM | Response time /s | Organelles |
|-------------|--|-----------------------|------------------------|--------------|
| COOEt CN | Anal. Methods,2016, 8,1572 | 12 | 30 | / |
| COOH | Anal. Methods, 2017, 9, 3790 | 100 | 2400 | Cytoplasm |
| | New J. Chem., 2018, 42, 3063 | 292 | 60 | Mitochondria |
| | Chem. Commun., 2015, 51, 1154 | 3 | 200 | Cytoplasm |
| | Sens Actuators B Chem., 2017, 241, 239 | 69 | 180 | Mitochondria |
| | Talanta, 2018, 176 389 | 28 | 160 | Mitochondria |

| | Talanta 165 (2017) 625– 631 | 30 | 240 | Cytoplasm |
|-------------|---|------|------|--------------|
| | Dyes and Pigments 162 (2019) 459– 465 | 31.6 | 50 | / |
| | Biomaterials 133 (2017) 82e93 | 3.5 | 60 | Cytoplasm |
| | Biosensors and Bioelectronics 77 (2016) 725– 732 | 10 | 40 | Mitochondria |
| | Dyes and Pigments 136 (2017) 830e835 | 860 | 300 | Cytoplasm |
| S N N | Talanta 168 (2017) 203– 209 | 43 | 10 | Mitochondria |
| | Talanta 162 (2017) 107– 113 | 230 | 2400 | Cytoplasm |
| | This work | 22.8 | 10 | Mitochondria |





Fig. S7 ¹H-NMR spectrum of probe 1.



Fig. S8 ¹³C-NMR spectrum of probe 1



Fig. S9 HRMS(ESI⁺) spectrum of probe 1.