

Electronic Supplementary Information (ESI)

Simple Fluorescent Probe Derived from Tetraphenyl-ethylene and Benzoquinone for Instantaneous Biothiol Detection

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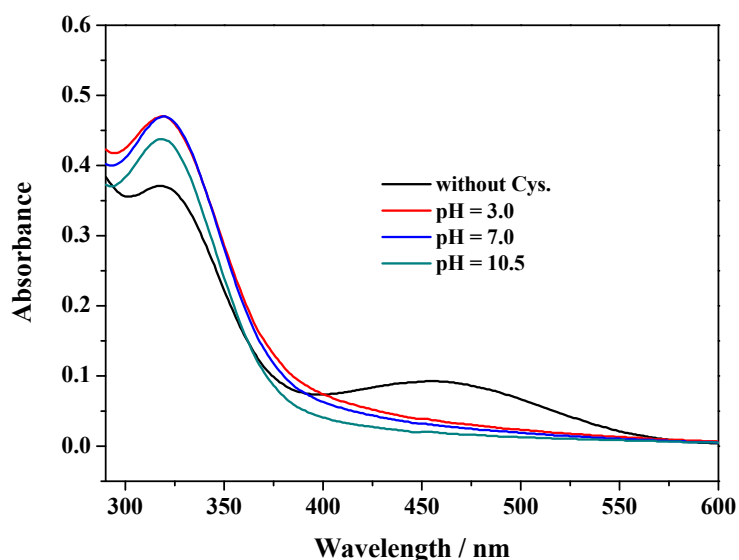


Fig. S1 UV-vis spectra of 2.0×10^{-5} M TPE-BQ in THF/H₂O (5/95, v/v) solution at various pH upon addition of 5 equiv. Cys.

Indicating that the probe is available for Cys in acid, alkaline and neutral conditions.

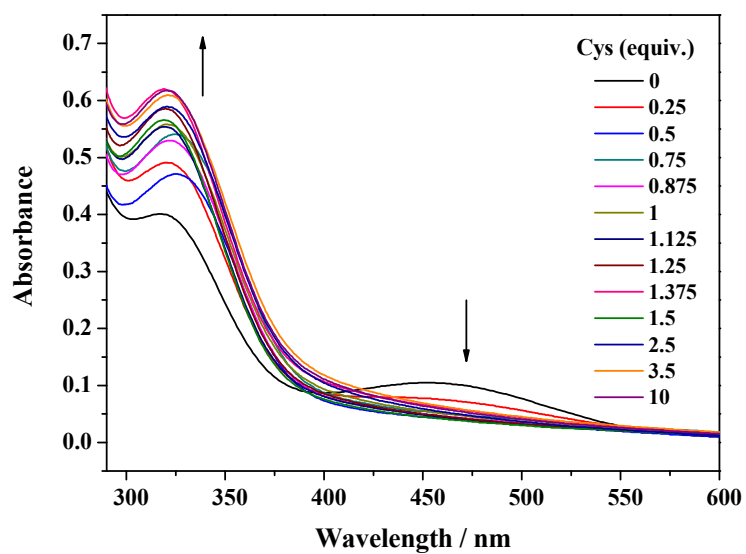


Fig. S2 UV-vis spectra of 2.0×10^{-5} M TPE-BQ (in THF/H₂O mixture, 5/95, v/v) upon addition of various concentrations of Cys (0-10 equiv.).

Limit of detection (LOD)

1) Based on UV spectra

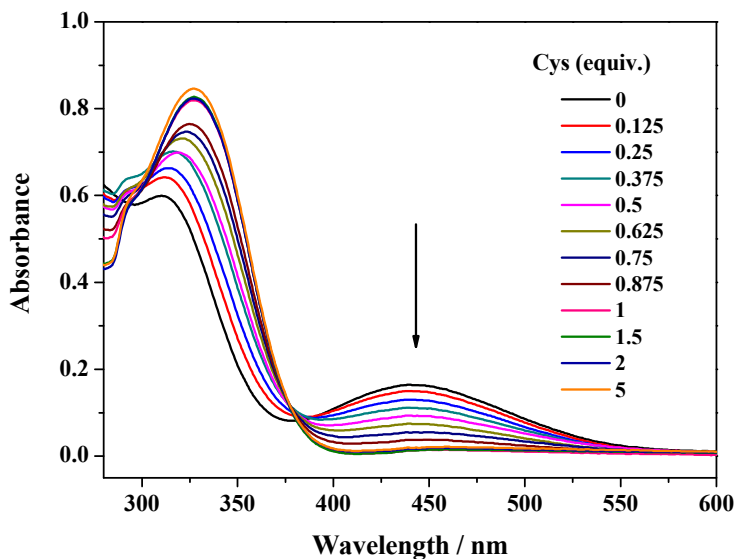


Fig. S3 UV-vis spectra of 4.0×10^{-5} M TPE-BQ in H₂O/THF (1/3, v/v) solution (10 mM HEPES buffer, pH 7.3) upon addition of various concentrations of Cys (0-5 equiv.).

Cys (equiv.)	A (440 nm)	0.1648-A
0	0.1648	0
0.125	0.1504	0.0144
0.250	0.1307	0.0341
0.375	0.1118	0.053
0.500	0.0935	0.0713
0.625	0.0742	0.0906
0.750	0.0546	0.1102
0.875	0.0374	0.1274
1.00	0.0130	0.1518
1.50	0.0130	0.1518
2.00	0.0170	0.1478
5.00	0.0190	0.1458

Where A is absorbance; x is Cys concentration. Let $y=0.1648-A$ and get a linear fitting function $y=-0.0032+0.1515x$ ($R=0.9993$). $y_0=0.01 \times 0.0144=0.000144$, $x_0=0.0221$ (equiv.)
 Then, $LOD=0.0221 \times 4.0 \times 10^{-5} \text{ M} = 8.8 \times 10^{-7} \text{ M}$

2) Based on PL spectra

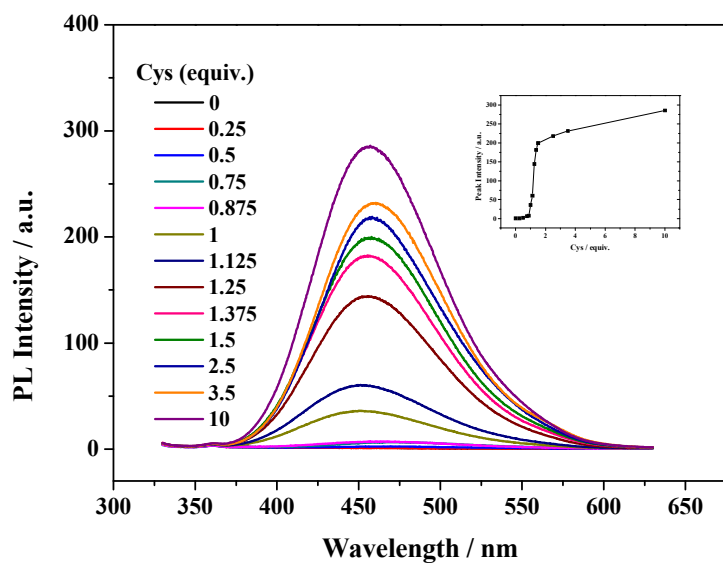


Fig. S4 Fluorescence spectra of 2.0×10^{-5} M TPE-BQ (in THF/H₂O mixture, 5/95, v/v) upon addition of various concentrations of Cys (0-10 equiv) under excitation at 320 nm. Inset: fluorescence intensity versus the concentration of the respective Cys.

The LOD was obtained according the literature method (generalized 3σ method)¹

$3\sigma=0.8931$;

Linear fitting function (linear part in S-type curve, inset) $y=-297.1+338.5x$ ($R=0.9803$)

$y_0=0.8931$, $x_0=0.8803$ (equiv.);

$\text{LOD}=0.8803 \times 2.0 \times 10^{-5} \text{ M} = 1.8 \times 10^{-5} \text{ M}$

Reference

1. H. Xu and M. Hepel, *Anal. Chem.* 2011, **83**, 813.