Electronic Supplementary Material

A rhodamine-based dual chemosensors for the naked-eyes detection of Hg^{2+} and enhancement of the fluorescence emission for Fe^{3+}

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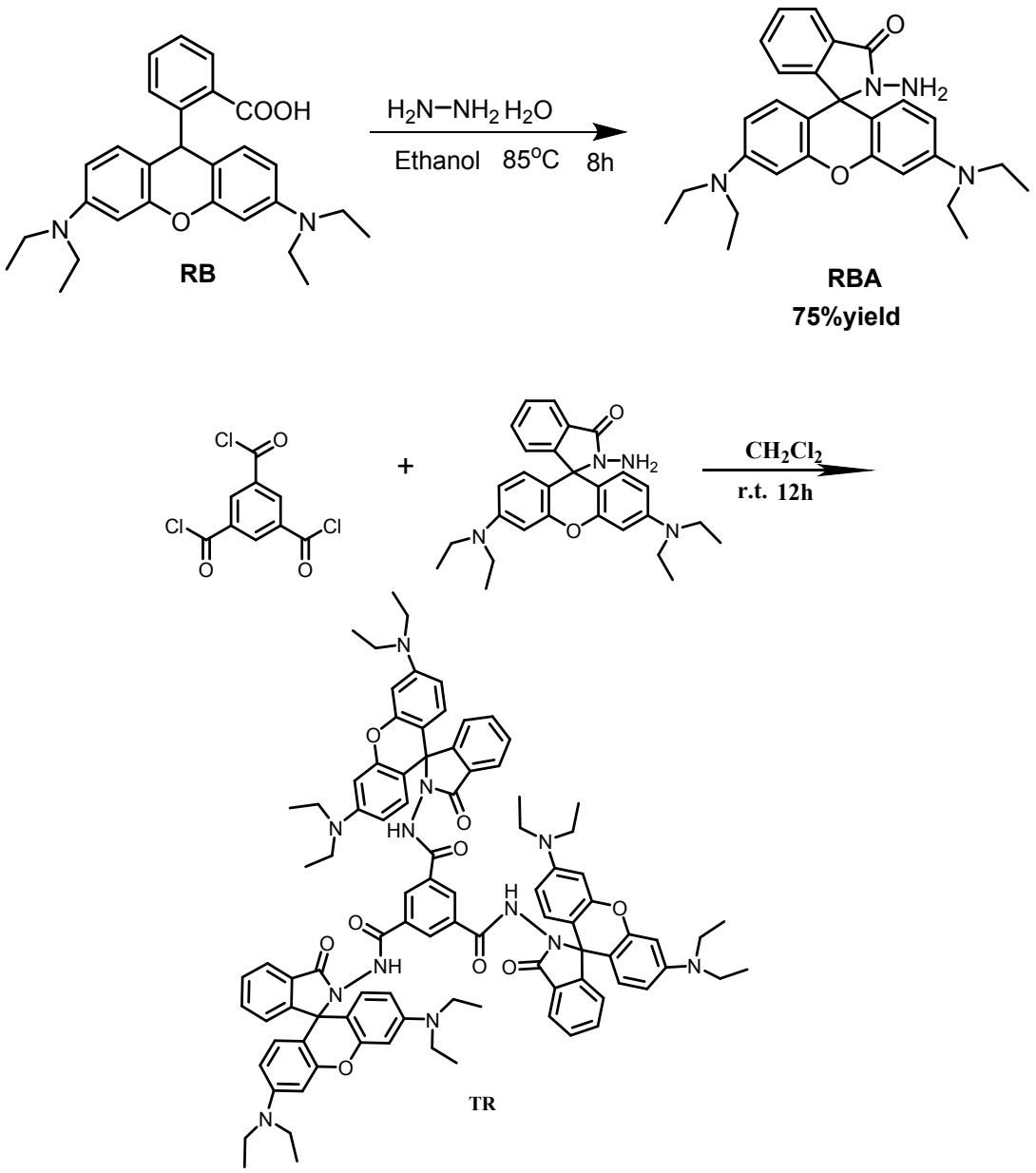
Content

The synthetic route of **TR**.



Scheme S1. The synthesis of **TR**.

Synthesis of **RBA**. Rhodamine B (1.20 g, 2.5 mmol) was placed in a 100mL flask and subsequently dissolved in 30 mL ethanol. Stirred at room temperature for 30 min and dropped 3.0 mL of hydrazine hydrate (85%) into it. The stirred mixture was heated at 85 ℃ and refluxed for 8 h. The solution changed from dark purple to light orange and became clear. The mixture was cooled and the solvent was removed under reduced pressure. Add 1 mol/L (about 50 mL) to the flask to produce a clear red solution. On this basis, 1mol/L (about 70 mL) was added and stirred until the

solution pH reached 9~10. The resulting precipitate was filtered and washed 3 times with 15 mL of water. Then thoroughly dried under vacuum and the reaction afforded 0.83 g (75%) as pink solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ (ppm): 7.94 (s, 1H), 7.44 (d, J = 6.9 Hz, 2H), 7.11 (s, 1H), 6.46 (s, 2H), 6.41 (s, 2H), 3.61 (s, 2H), 3.33 (s, 8H), 1.16 (t, J = 7.0 Hz, 12H). ^{13}C NMR (400 MHz, $CDCl_3$) δ 166.1, 153.8, 151.5, 148.9, 132.5, 128.1, 123.8, 122.9, 108.0, 104.6, 99.98, 65.9. ESI-MS m/z:$(M + H)^+$ calculated $C_{28}H_{33}N_4O_2$ 457.2595; Found 457.2597.

^{1}H NMR spectrum of **RBA**

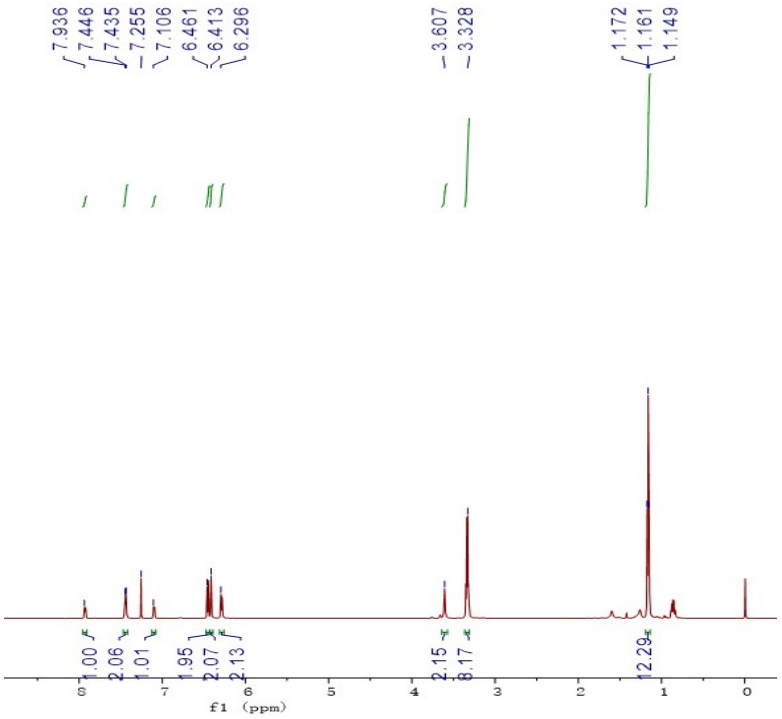


Figure S1. ^{1}H NMR spectrum of **RBA** in $CDCl_3$

^{13}C NMR spectrum of **RBA**

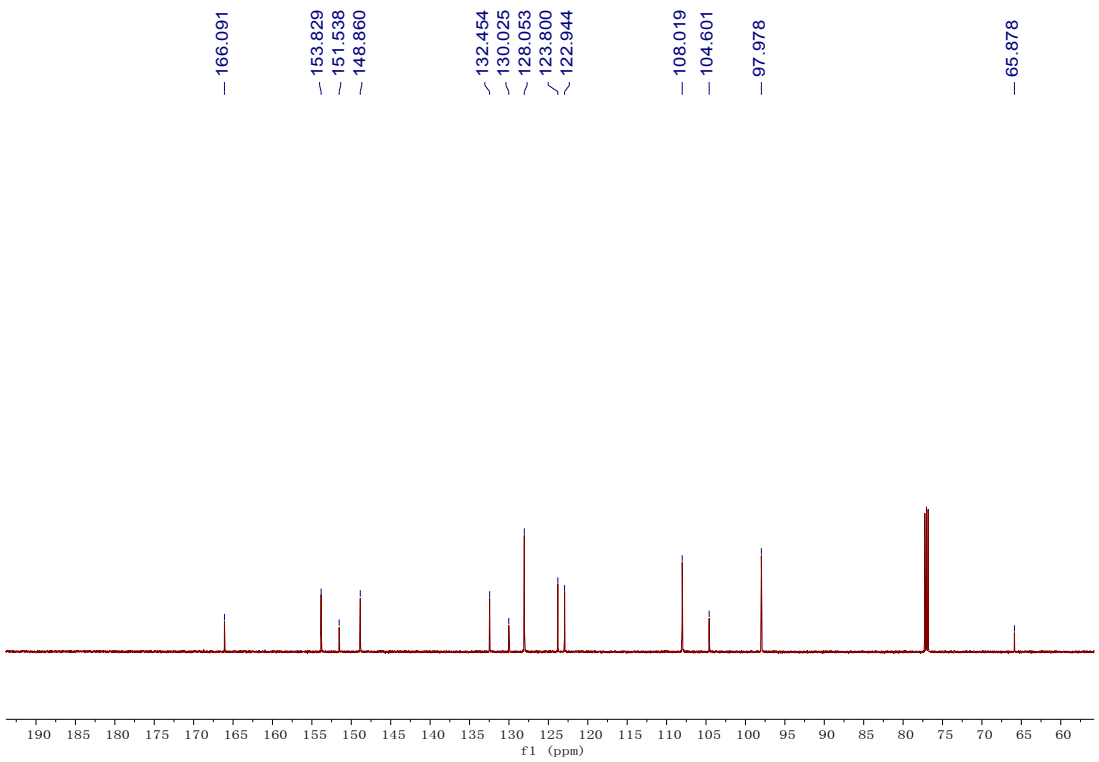


Figure S2. ^{13}C NMR spectrum of **RBA** in $CDCl_3$

ESI/MS of **RBA**

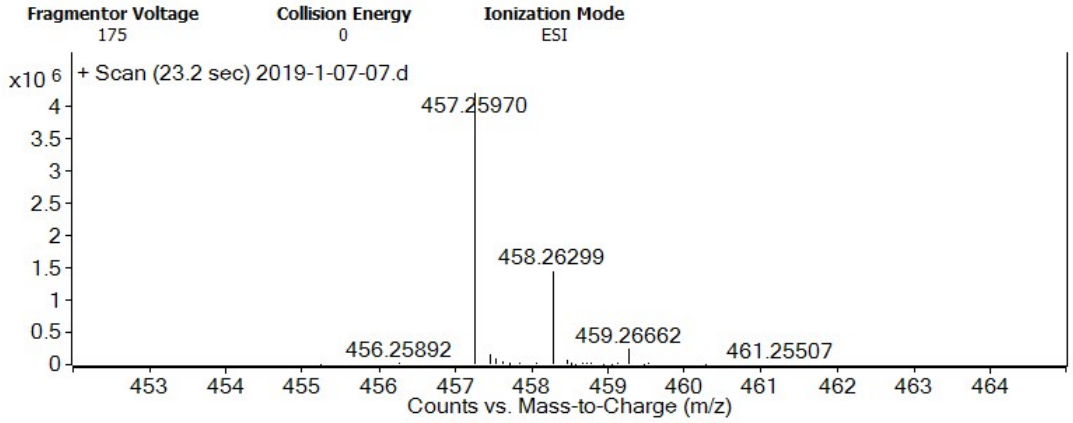


Figure S3. The ESI/MS of **RBA** in CH_3CN

^{1}H NMR spectrum of **TR**

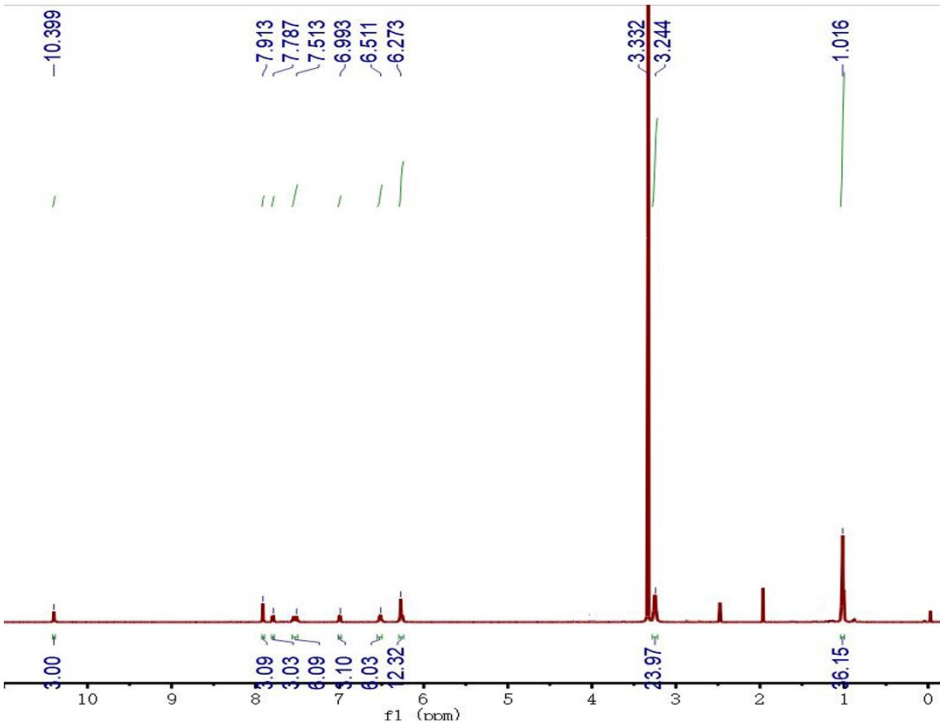


Figure S4. ^{1}H NMR spectrum of **TR** in DMSO-d_6.

ESI/MS of **TR**

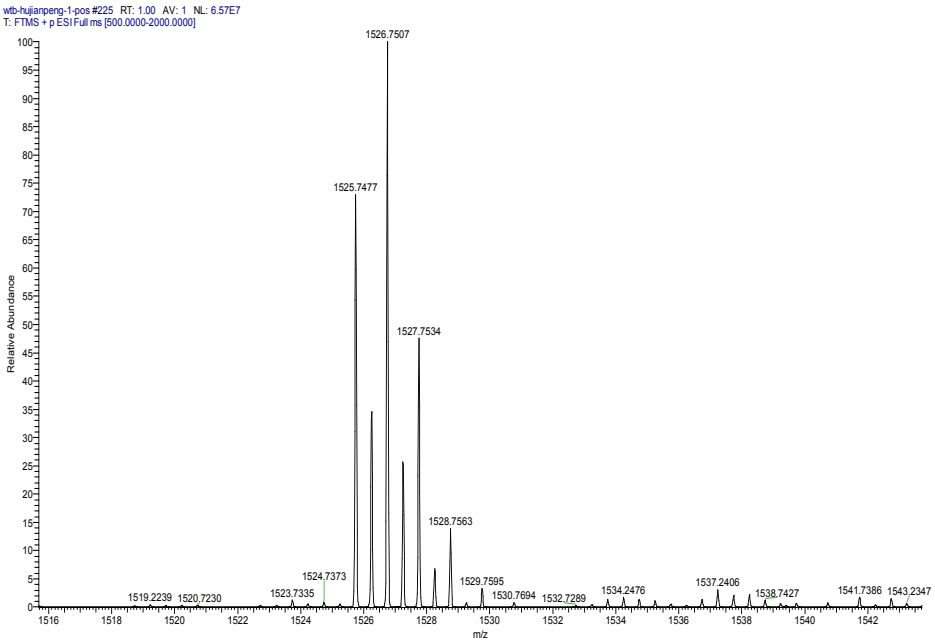


Figure S5. The ESI/MS of **TR** in CH_3CN.

UV-vis of sensor (**TR**) for different aqueous systems of Hg^{2+}.

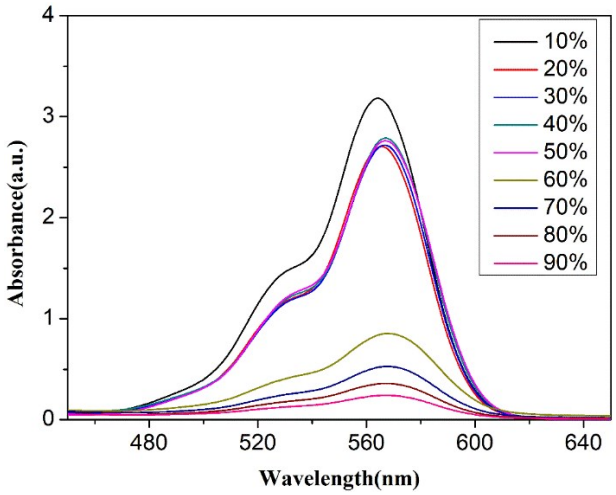


Figure S6. UV-vis of sensor **TR** for different aqueous systems of Hg^{2+}.

Fluorescence spectra of sensor **TR** for different aqueous systems of Fe^{3+}.

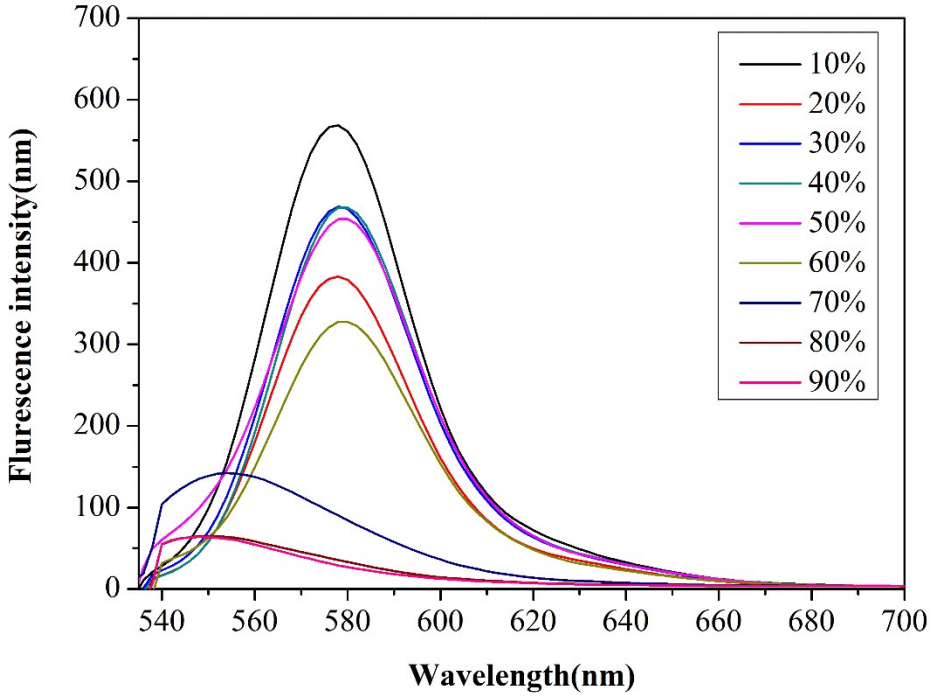
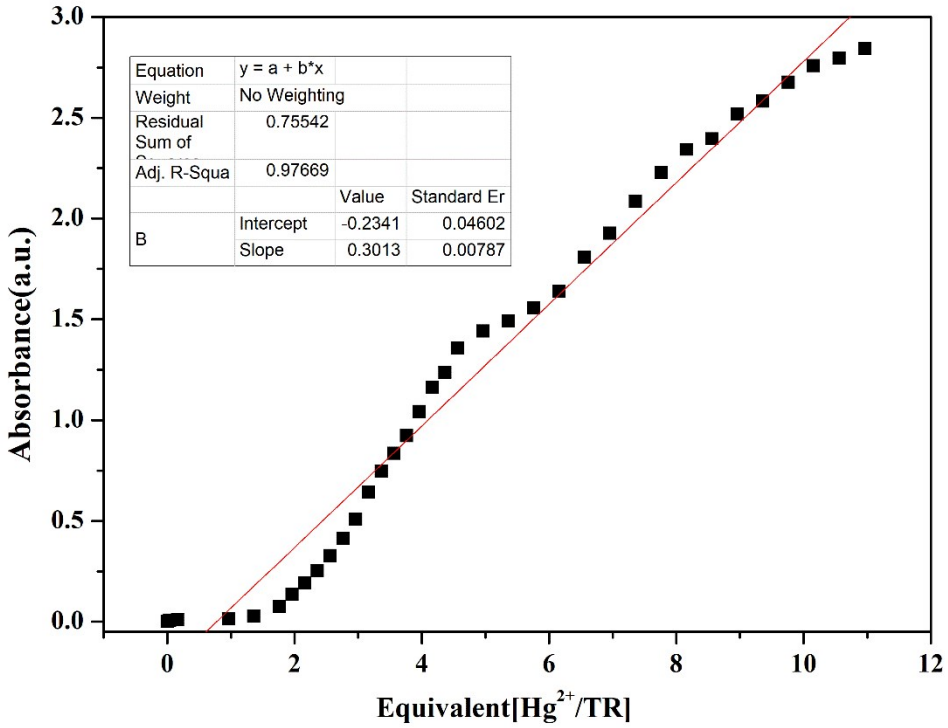


Figure S7. Fluorescence spectra of sensor **TR** for different aqueous systems of Fe^{3+}.

Determine of the UV-vis detection limit for Hg^{2+}



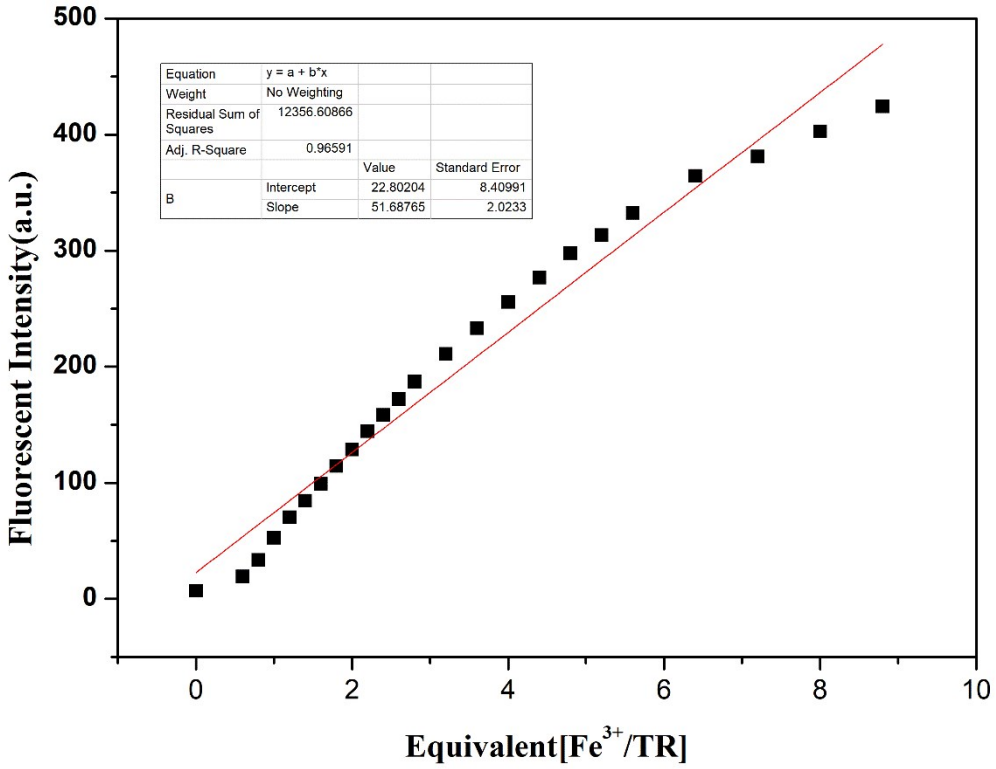
Linear Equation: Y = 0.3013 X-0.2341 R = 0.97669

$$S = 0.3013 \times 10^{6} \qquad \delta = \sqrt{\frac{\Sigma(A-\bar{A})2}{(N-1)}} = 0.002473(N = 20) \qquad K = 3$$

$$LOD = K \times \delta / S = 2.46 \times 10^{-8}\ M$$

Figure S8. The photograph of the UV-vis absorption spectral linear range for Hg^{2+}.

Determine of the fluorescent detection limit for Fe^{3+}



Linear Equation: Y = 51.68765X+22.80204 R = 0.6591

$S = 51.68765 \times 10^6$ $\delta = \sqrt{\frac{\Sigma(F-\bar{F})2}{(N-1)}} = 0.707935$ (N = 20) K = 3

$LOD = K \times \delta / S = 4.11 \times 10^{-8}$ M

Figure S9. The photograph of the fluorescent spectrum linear range for Fe^{3+}.

Fluorescence spectra of **TR** in various pH values EtOH /H_2O (9:1, v/v) HEPES buffer solution

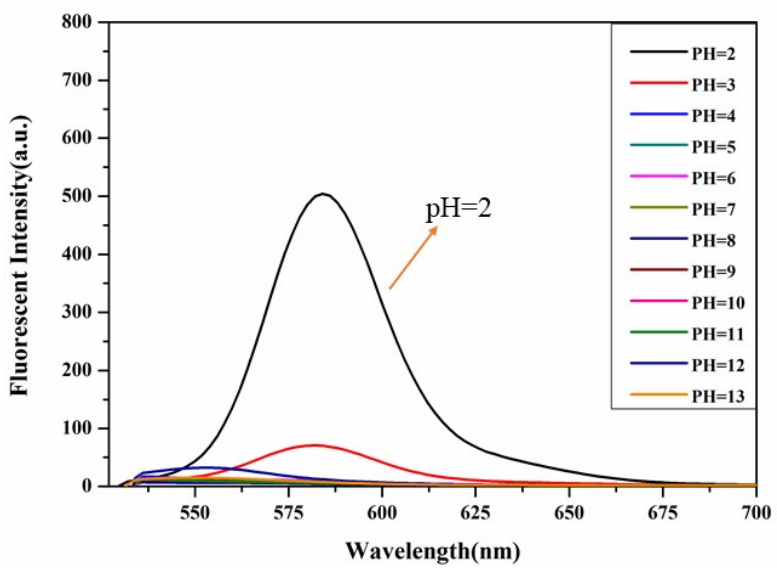


Figure S10. Fluorescence spectra of **TR** in various pH values EtOH /H_2O (9:1, v/v) HEPES buffer solution

Mass spectrum between **TR** and Hg^{2+}.

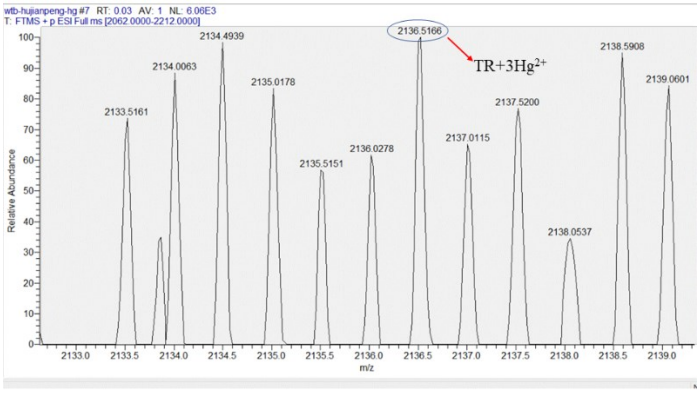


Figure S11. Mass spectrum between **TR** and Hg^{2+}.

Mass spectrum between **TR** and Fe^{3+}.

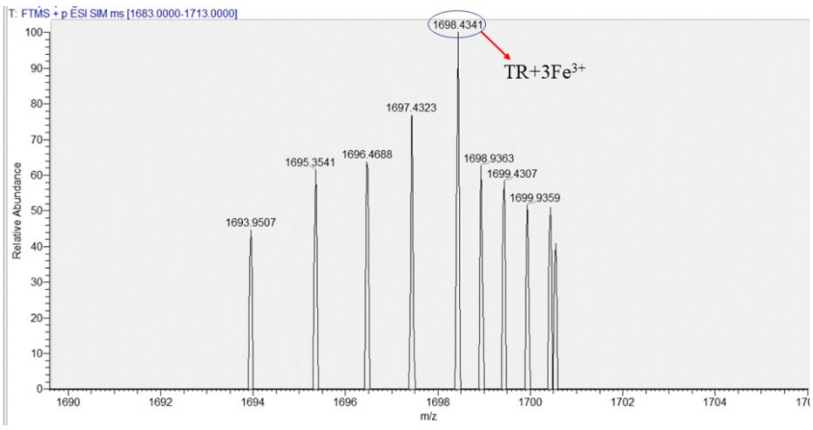


Figure S12. Mass spectrum between **TR** and Fe^{3+}.

IR spectra of compound **TR**、**TR+Hg^{2+}**and **TR+Fe^{3+}**

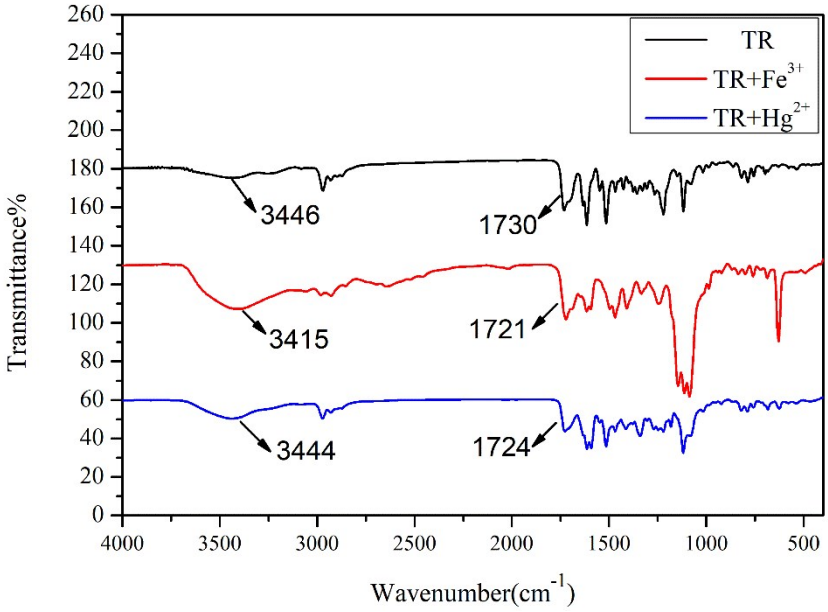


Figure S13. IR spectra of compound **TR**、**TR+Hg^{2+}and TR+Fe^{3+}**.