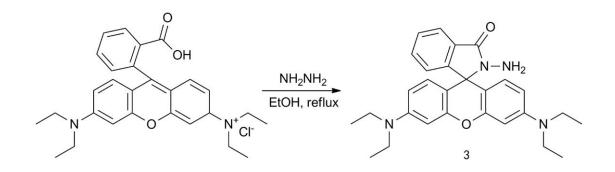
## Through-bond energy transfer cassette based on spirobifluorene-tetrrhodamine for the colorimetric and ratiometric investigation towards trace Hg<sup>2+</sup>

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Scheme S1 The Synthesis route of compound 3

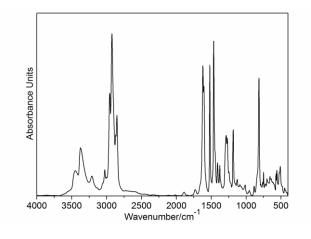


Fig.S1 FT-IR spectrum of compound 1.

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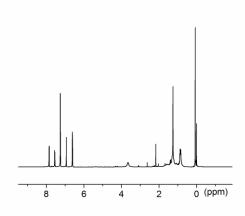


Fig. S2 <sup>1</sup>H NMR spectrum of compound 1.

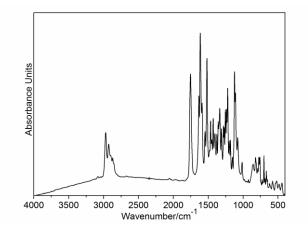


Fig. S3 FT-IR spectrum of compound 2.

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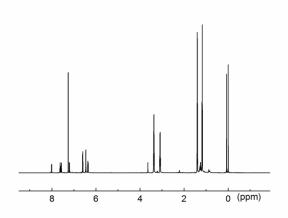


Fig. S4 <sup>1</sup>H NMR spectrum of compound 2.

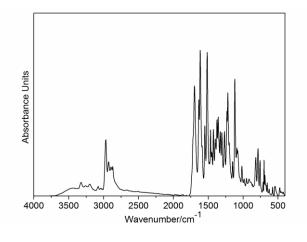


Fig. S5 FT-IR spectrum of compound 3.

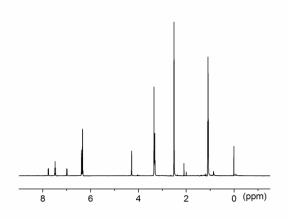


Fig. S6 <sup>1</sup>H NMR spectrum of compound 3.

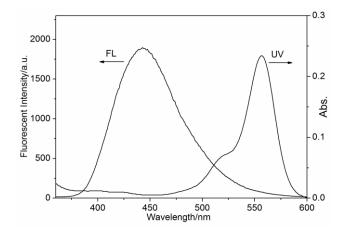


Fig. S7 Absorption of rhodamine moiety in compound 2 (right) and emission spectrum of compound 1 (left). Shaded area indicates the spectral overlap between the emission of compound 1 and the rhodamine moiety characteristic absorption.

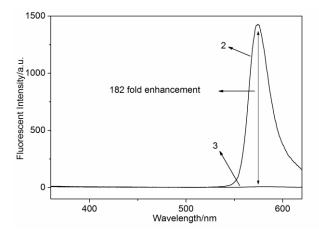


Fig. S8 Fluorescence emission spectra of compound 2 (10  $\mu$ M) in the presence of Hg<sup>2+</sup> (100  $\mu$ M) and compound 3 (40  $\mu$ M) in the presence of Hg<sup>2+</sup> (100  $\mu$ M) in methanol/H<sub>2</sub>O (4:1, v/v).  $\lambda_{ex}$ =314 nm. Equation used (I-I<sub>0</sub>/I<sub>0</sub>), I<sub>0</sub>=fluorescence intensity of compound 3 at 570 nm after the addition of Hg<sup>2+</sup>; I=fluorescence intensity at 570 nm of compound 2 after the addition of Hg<sup>2+</sup>.

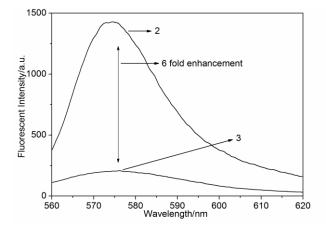


Fig. S9 Fluorescence emission spectra of compound 2 (10  $\mu$ M) in the presence of Hg<sup>2+</sup> (100  $\mu$ M) with an excitation at 314 nm in methanol/H<sub>2</sub>O (4:1, v/v) and compound 3 (40  $\mu$ M) in the presence of Hg<sup>2+</sup> (100  $\mu$ M) with an excitation at 550 nm in methanol/H<sub>2</sub>O (4:1, v/v). Equation used (I-I<sub>0</sub>/I<sub>0</sub>), I<sub>0</sub>=fluorescence intensity of compound 3 at 570 nm after the addition of Hg<sup>2+</sup>; I=fluorescence intensity at 570 nm of compound 2 after the addition of Hg<sup>2+</sup>.

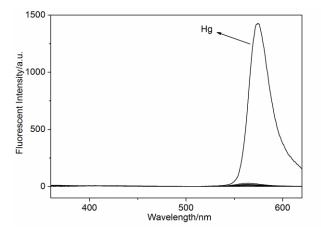


Fig. S10 Fluorescence emission spectra recorded of compound 2 (10  $\mu$ M) in the presence of different metal ions (100  $\mu$ M) in methanol/H<sub>2</sub>O (4:1, v/v).  $\lambda_{ex}$ =314 nm.

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