

## Supplementary data

### **A systematic series of fluorescence chemosensors with multiple binding sites for Hg(II) based on pyrenyl-functionalized cyclotriphosphazenes and their application in live cell imaging**

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## Captions for Supplementary data

**Fig. S1.**  $^{13}\text{C}$  NMR spectra of **a) 1**, **b) 2** and **c) 3** in  $\text{CDCl}_3$ .

**Fig. S2.** MALDI-MS spectra of **a) 1**, **b) 2** and **c) 3**.

**Fig. S3.** Fluorescence spectra of (1  $\mu\text{M}$ ) **a) 1**, **b) 2** and **c) 3** in different solvents (Excitation wavelength = 365 nm).

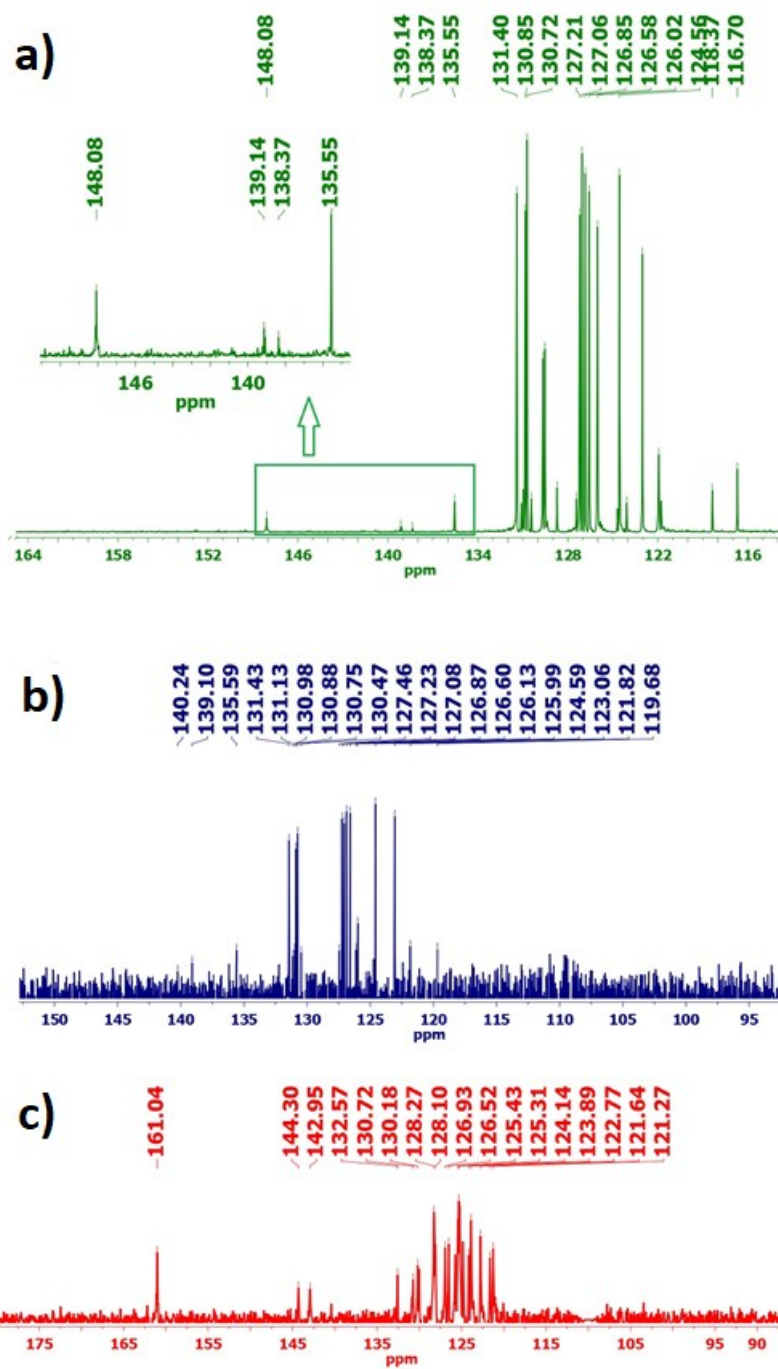
**Fig. S4.** Change of fluorescence response of **a) 1**, **b) 2** and **c) 3** in ACN and after addition of 50  $\mu\text{M}$ , 25  $\mu\text{M}$  and 20  $\mu\text{M}$  different metal ions.

**Fig. S5.** Fluorescence decay profile of (1  $\mu\text{M}$  in ACN) **a) 1** and **1** +  $\text{Hg}^{2+}$  **b) 2** and **2** +  $\text{Hg}^{2+}$  and **c) 3** and **3** +  $\text{Hg}^{2+}$  using laser excitation source of 390 nm.

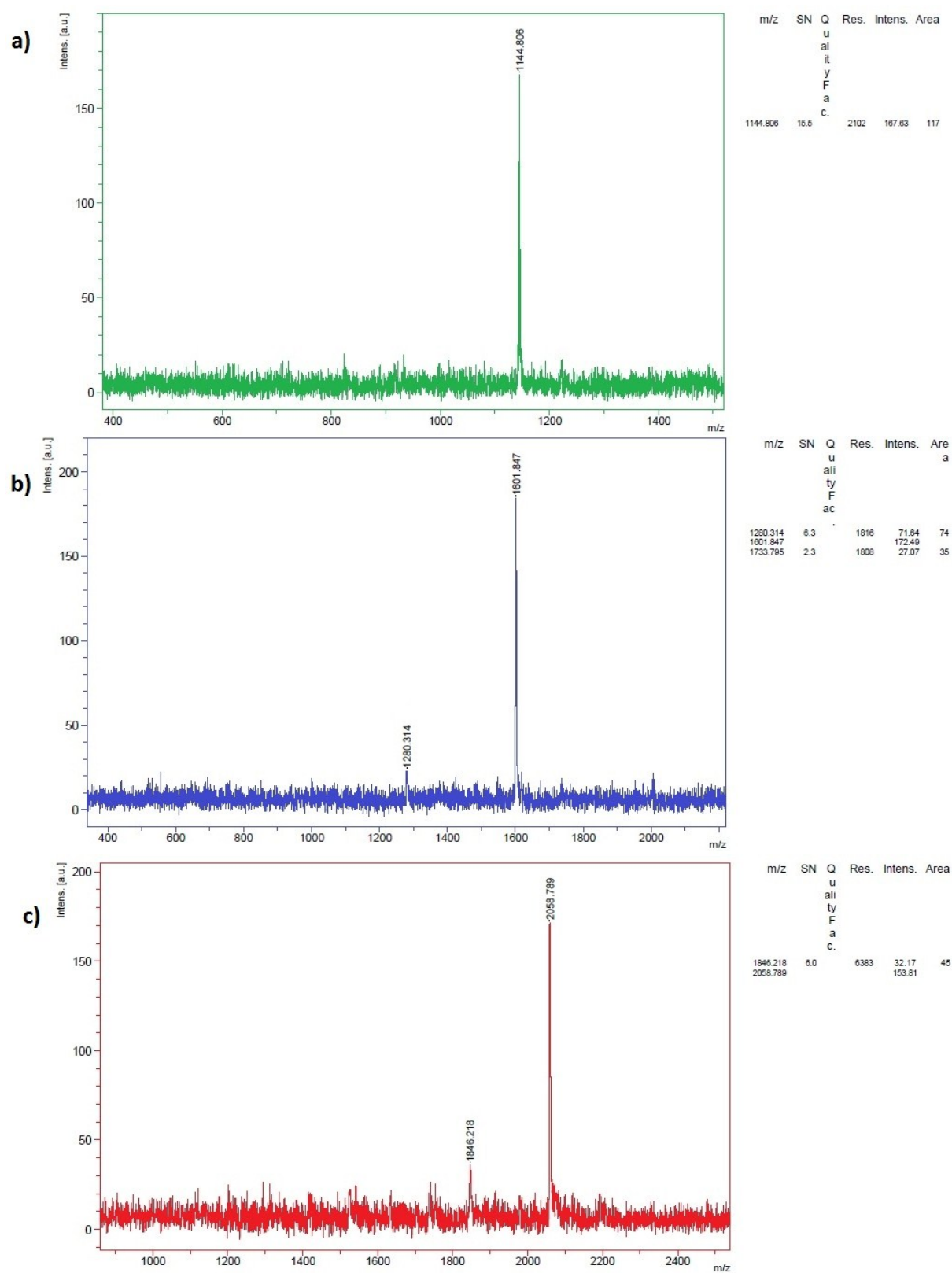
**Fig. S6.** The photo stability of (1  $\mu\text{M}$  in ACN) **a) 1** and **1** +  $\text{Hg}^{2+}$  **b) 2** and **2** +  $\text{Hg}^{2+}$  and **c) 3** and **3** +  $\text{Hg}^{2+}$  (Excitation wavelength = 365 nm).

**Fig. S7.** Normalized fluorescence spectra of **a) 1** and **1** +  $\text{Hg}^{2+}$ , **b) 2** and **2** +  $\text{Hg}^{2+}$  and **c) 3** and **3** +  $\text{Hg}^{2+}$  in different concentration, excitation wavelengths and solvent systems. 500  $\mu\text{M}$  of  $\text{Hg}^{2+}$  for ACN:water, 50  $\mu\text{M}$  of  $\text{Hg}^{2+}$  for ACN).

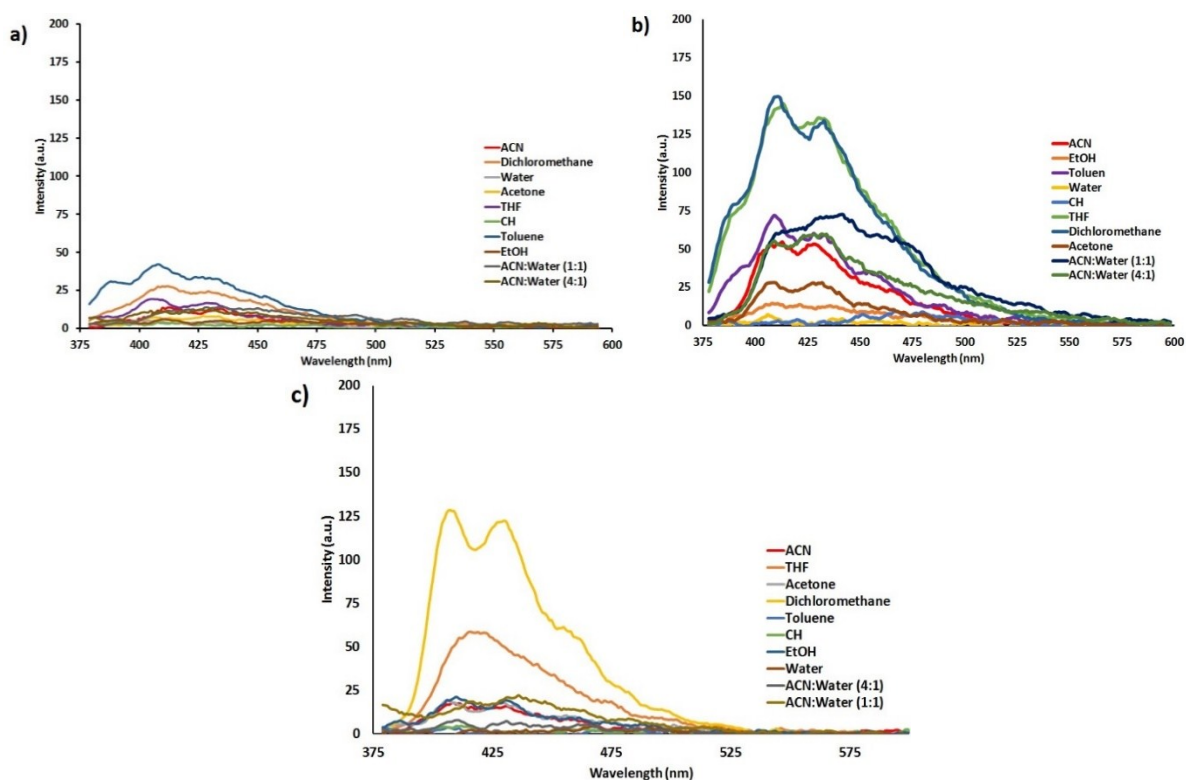
**Fig. S8.** Color change of **1**, **2** and **3** and their complexes with  $\text{Hg}^{2+}$  : The pictures of under 365 nm fluorescence light source. **a)** 5  $\mu\text{M}$  of **1**, **2**, **3** in ACN and their complexes with  $\text{Hg}^{2+}$  (500  $\mu\text{M}$ ), **b)** 50  $\mu\text{M}$  of **1**, **2**, **3** in ACN:water (1:1) and their complexes with  $\text{Hg}^{2+}$  (500  $\mu\text{M}$ ).



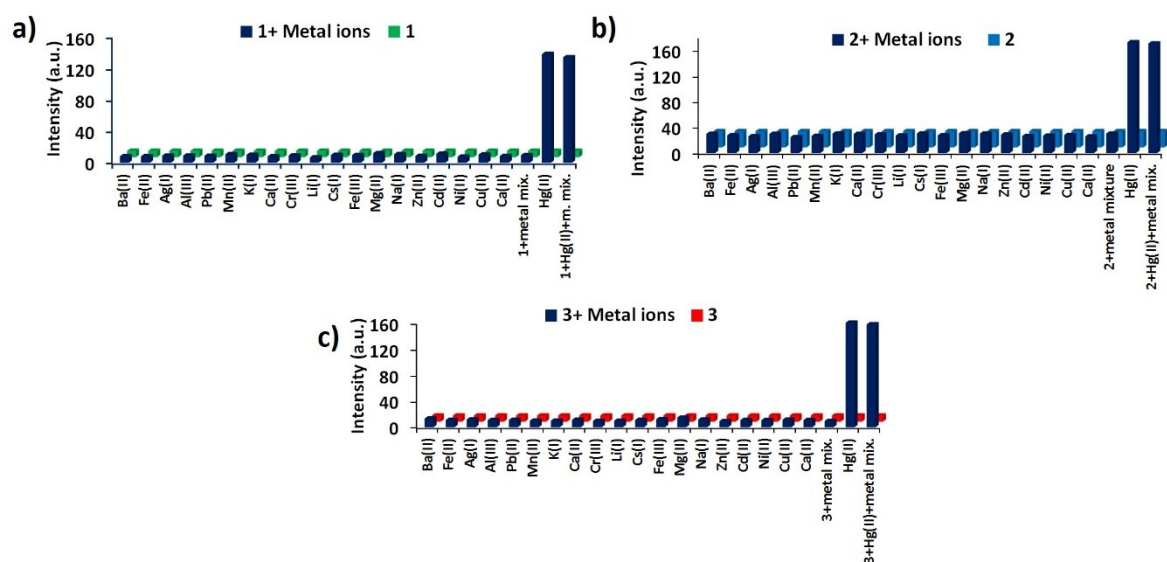
**Fig. S1.**  $^{13}\text{C}$  NMR spectra of **a)** **1**, **b)** **2** and **c)** **3** in  $\text{CDCl}_3$ .



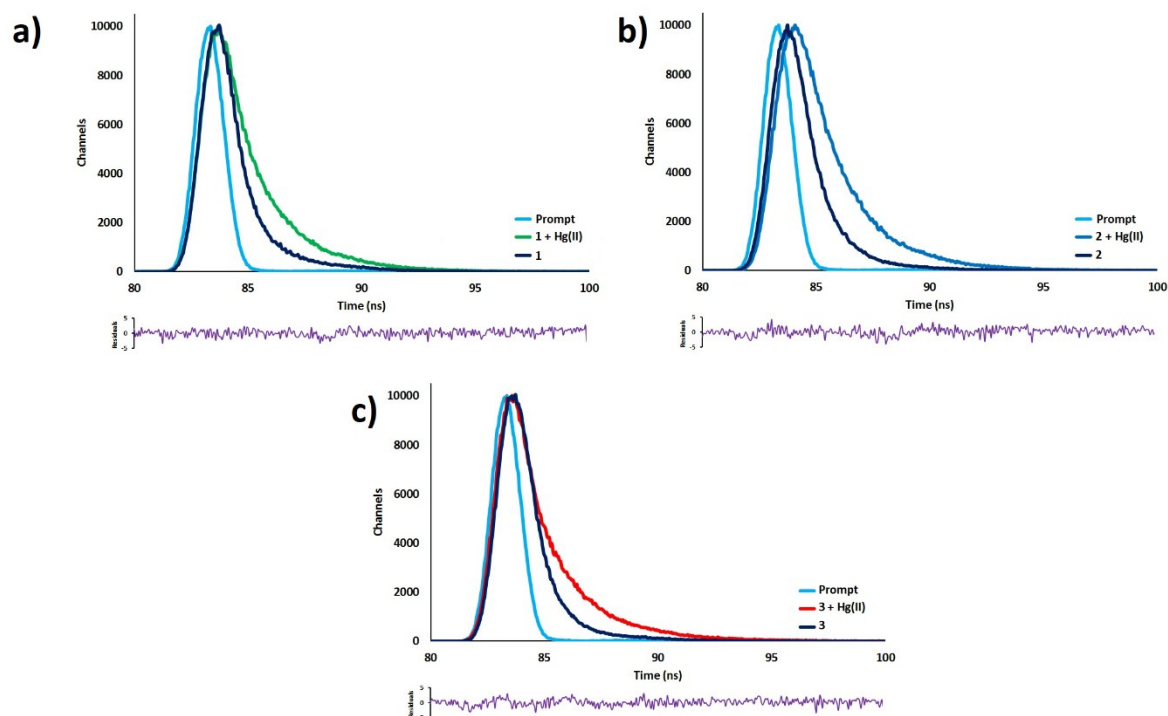
**Fig. S2.** MALDI-MS spectra of a) 1, b) 2 and c) 3.



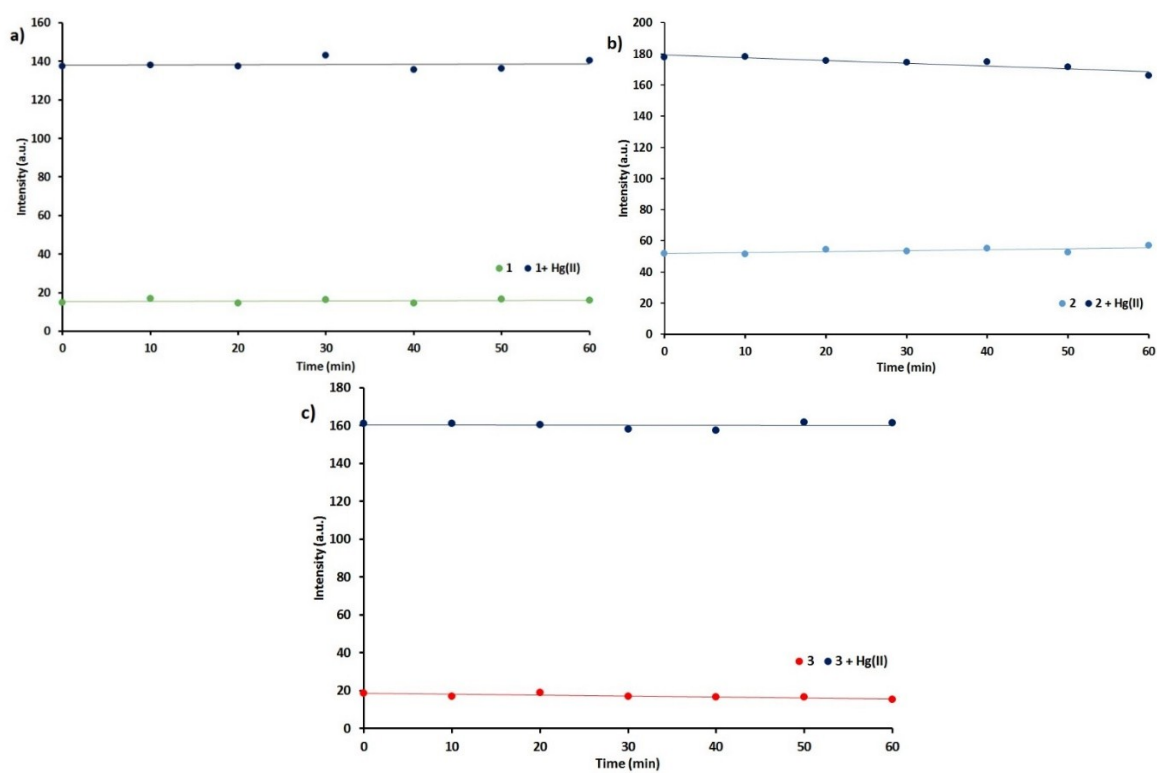
**Fig. S3.** Fluorescence spectra of (1  $\mu$ M) a) 1, b) 2 and c) 3 in different solvents (Excitation wavelength = 365 nm).



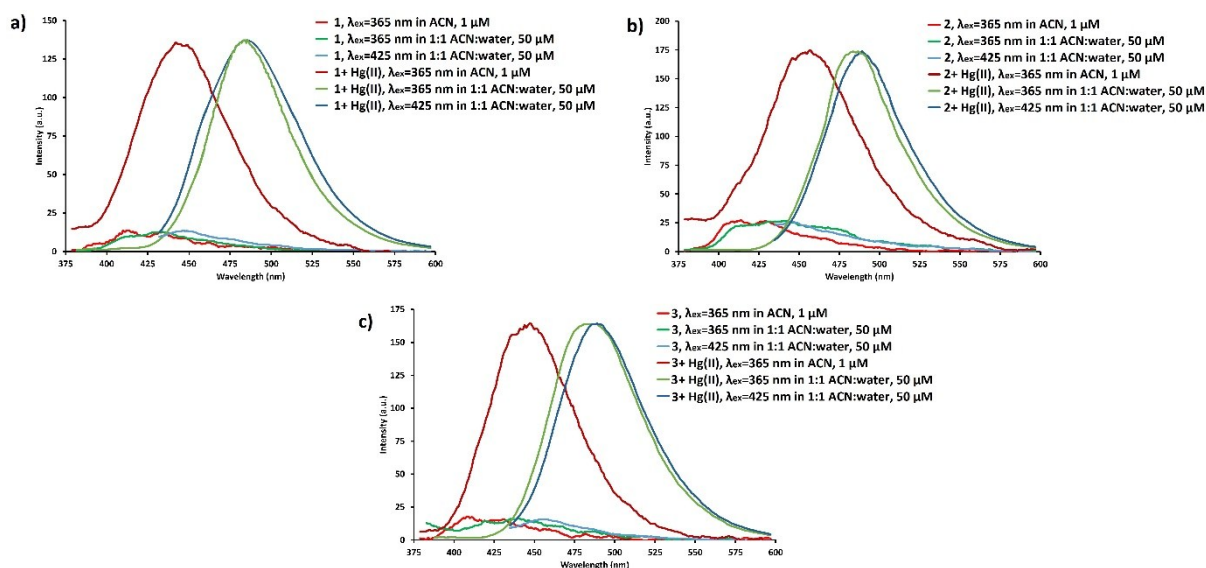
**Fig. S4.** Change of fluorescence response of a) 1, b) 2 and c) 3 in ACN and after addition of 50  $\mu$ M, 25  $\mu$ M and 20  $\mu$ M different metal ions.



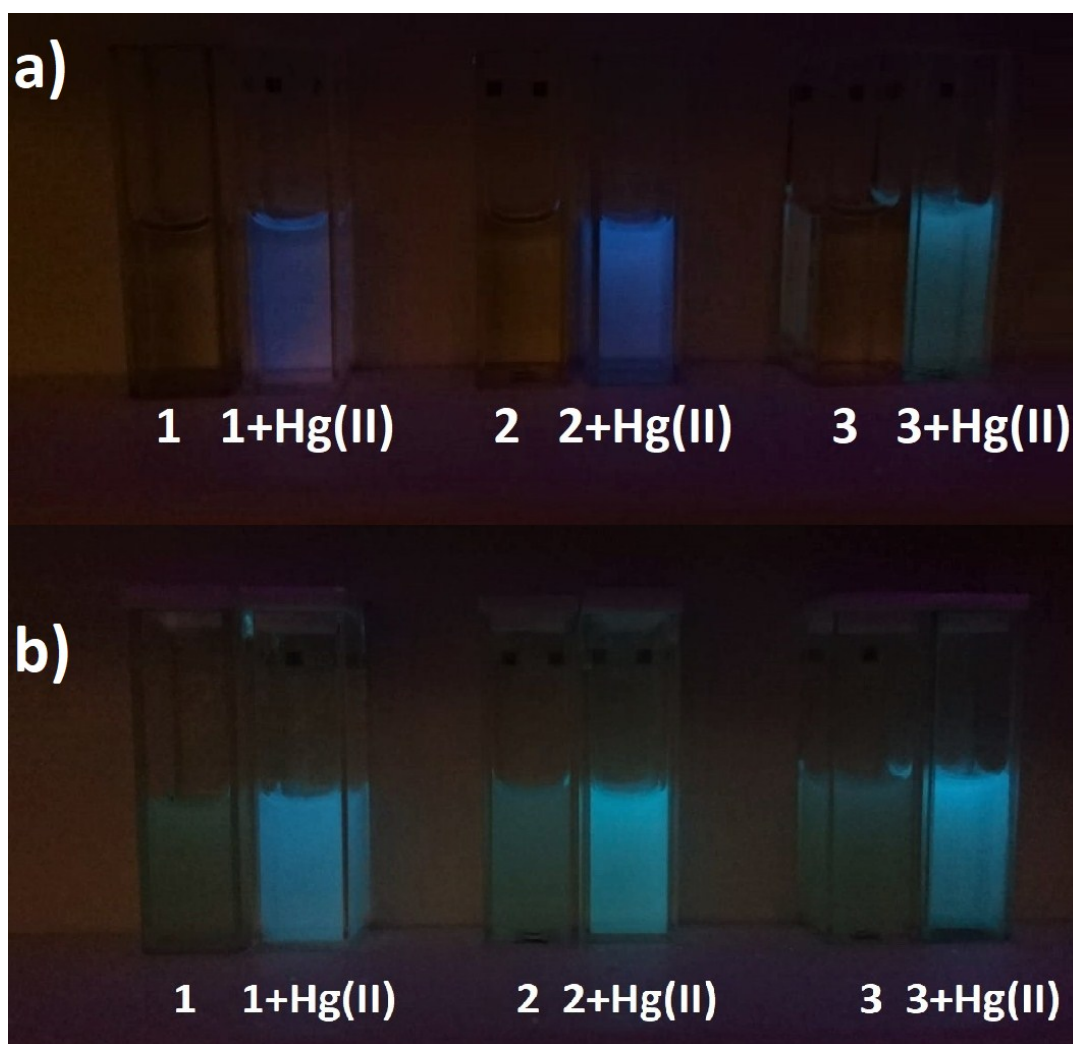
**Fig. S5.** Fluorescence decay profile of (1  $\mu\text{M}$  in ACN) **a)** **1** and **1** +  $\text{Hg}^{2+}$  **b)** **2** and **2** +  $\text{Hg}^{2+}$  and **c)** **3** and **3** +  $\text{Hg}^{2+}$  using laser excitation source of 390 nm.



**Fig. S6.** The photo stability of (1  $\mu\text{M}$  in ACN) **a)** **1** and **1** +  $\text{Hg}^{2+}$  **b)** **2** and **2** +  $\text{Hg}^{2+}$  and **c)** **3** and **3** +  $\text{Hg}^{2+}$  (Excitation wavelength = 365 nm).



**Fig. S7.** Normalized fluorescence spectra of **a) 1** and **1 + Hg<sup>2+</sup>**, **b) 2** and **2 + Hg<sup>2+</sup>** and **c) 3** and **3 + Hg<sup>2+</sup>** in different concentration, excitation wavelengths and solvent systems. 500  $\mu\text{M}$  of Hg<sup>2+</sup> for ACN:water, 50  $\mu\text{M}$  of Hg<sup>2+</sup> for ACN).



**Fig. S8.** Color change of **1**, **2** and **3** and their complexes with  $\text{Hg}^{2+}$  : The pictures of under 365 nm fluorescence light source. **a)** 5  $\mu\text{M}$  of **1**, **2**, **3** in ACN and their complexes with  $\text{Hg}^{2+}$  (500  $\mu\text{M}$ ), **b)** 50  $\mu\text{M}$  of **1**, **2**, **3** in ACN:water (1:1) and their complexes with  $\text{Hg}^{2+}$  (500  $\mu\text{M}$ ).