

Fig. S1. ^1H NMR spectra of **1o** in $\text{DMSO-}d_6$.

Fig. S2. ESI-MS spectrum of **1o**.

Fig. S3. Fatigue resistance of **1o**.

Fig. S4. The binding constant of Hg^{2+} with **1o** was calculated to be $0.42 \times 10^4 \text{ M}^{-1}$

Fig. S5. The detection limit of Hg^{2+} was calculated to be $0.14 \mu\text{M}$.

Fig. S6. Changes in fluorescence of **1o**- Hg^{2+} induced by UV/vis lights.

Fig. S7. ^1H NMR spectra measured during the titration of **1o** with Hg^{2+} in $\text{DMSO-}d_6$.

Fig. S8. Linear fitting of the absorption intensity at 555 nm vs Cu^{2+} concentration.

Fig. S9. The association constant of **1o** to Cu^{2+} was found to be $1.76 \times 10^4 \text{ M}^{-1}$.

Fig. S10. The detection limit for Cu^{2+} was estimated to be $0.51 \mu\text{M}$

Fig. S11. Job's plot for determining the stoichiometry of **1o** and Cu^{2+} .

Fig. S12. ESI-MS spectrum of **1o** upon addition of Cu^{2+} .

Fig. S13. ^1H NMR spectra measured during the titration of **1o** with Cu^{2+} in $\text{THF-}d_8$.

Fig. S14. Corresponding truth table of the combined logic circuit.

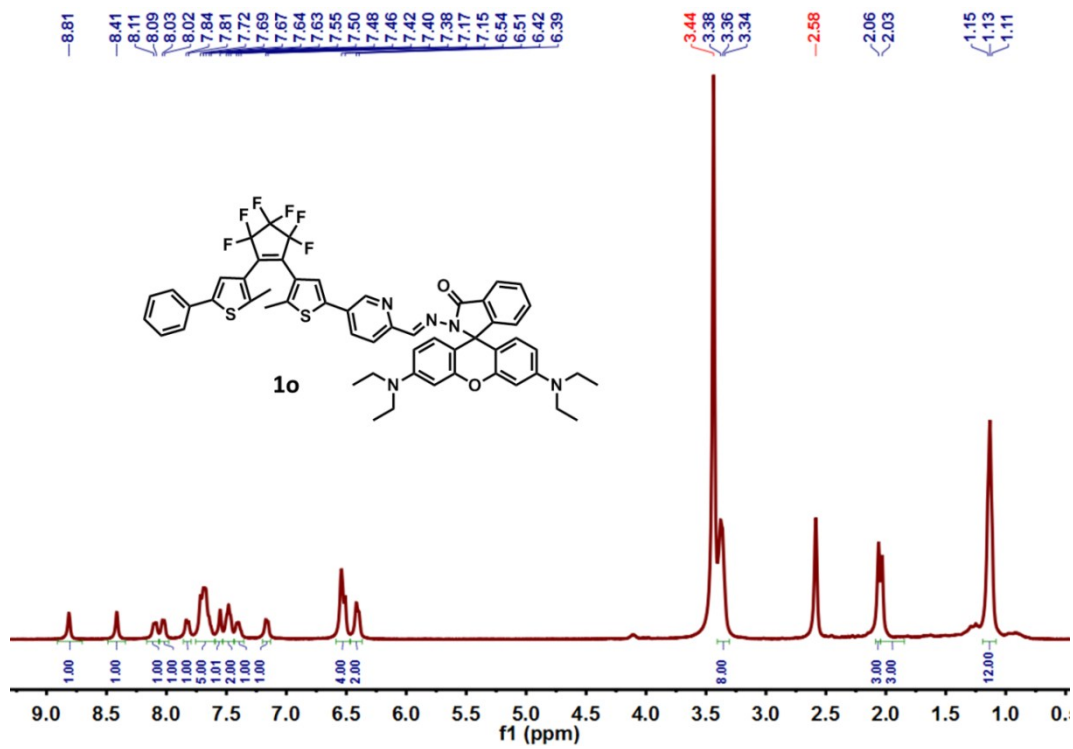


Fig S1

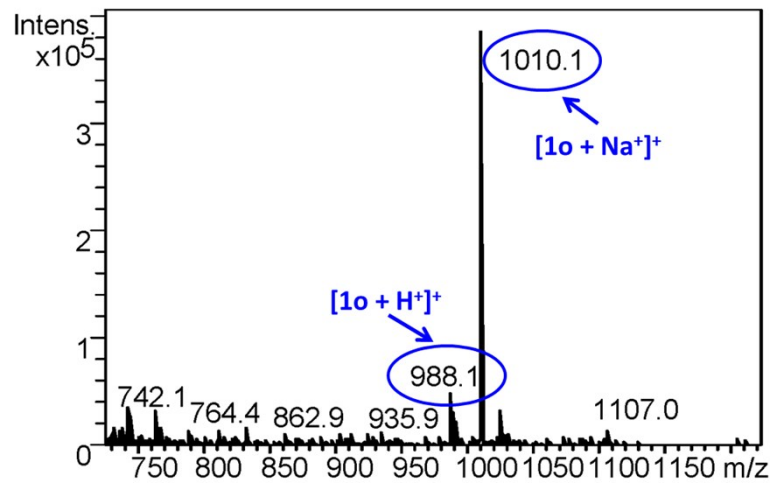


Fig S2

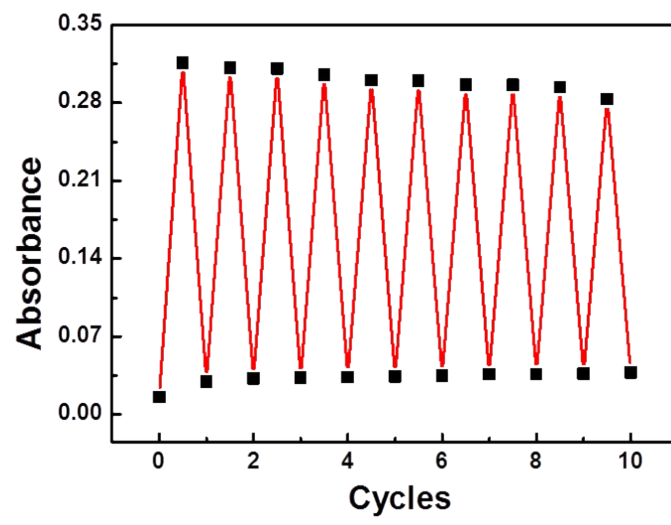


Fig. S3

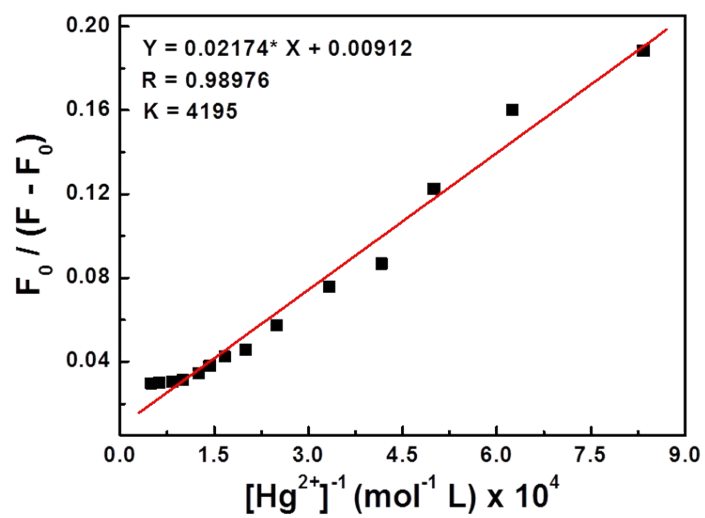


Fig. S4

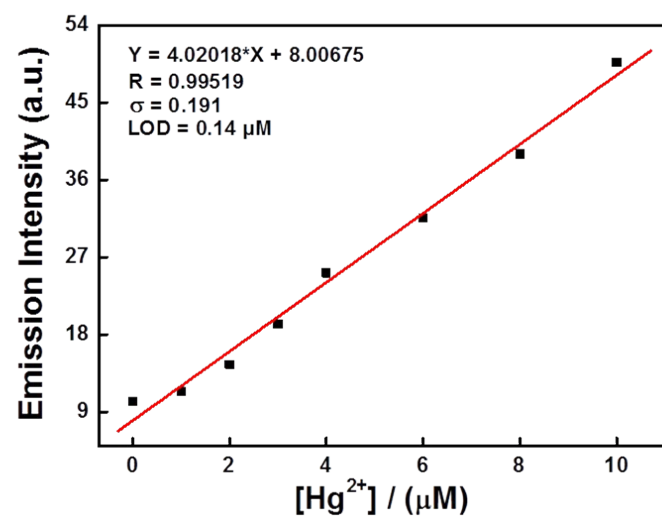


Fig. S5

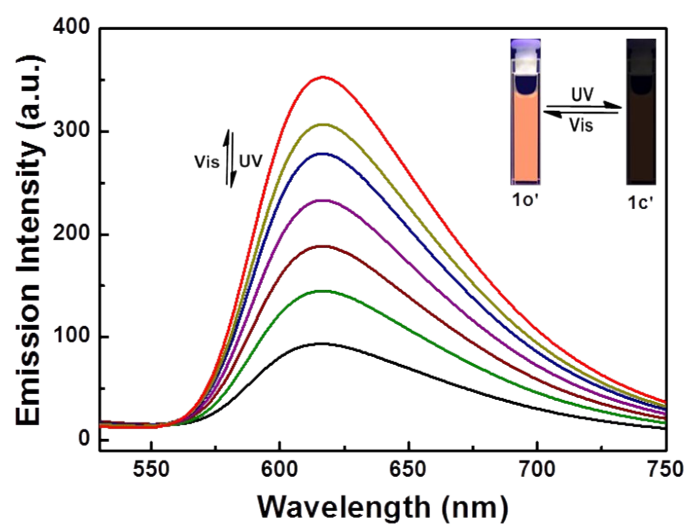


Fig. S6

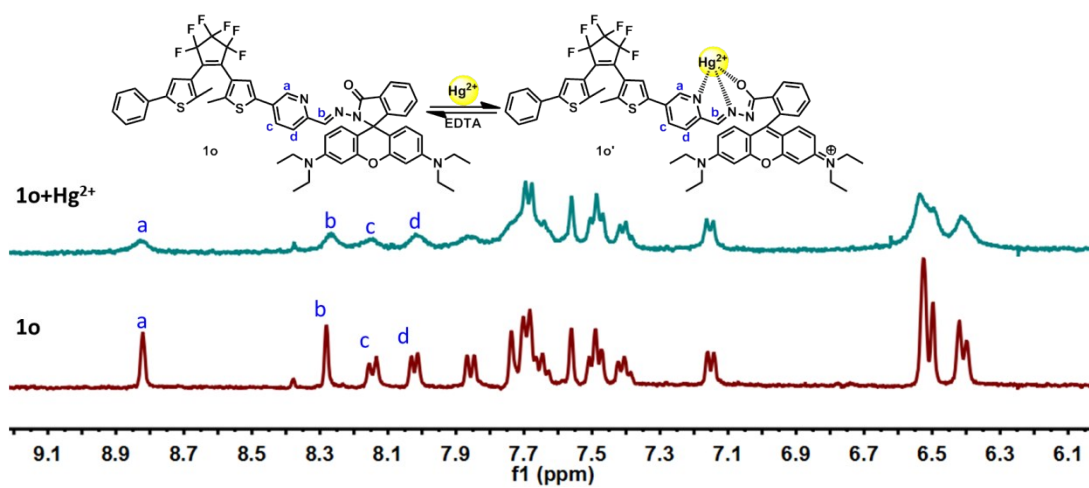


Fig. S7

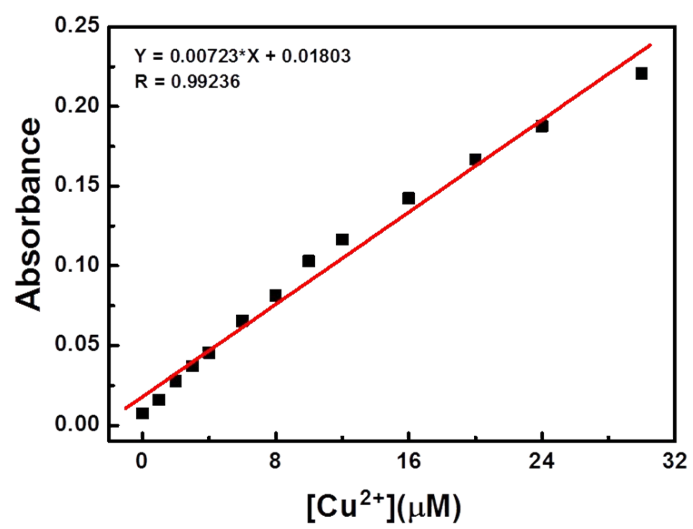


Fig S8

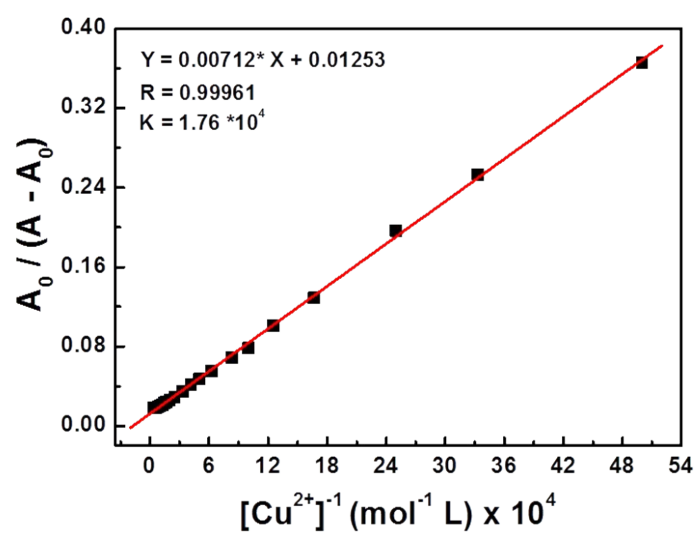


Fig. S9

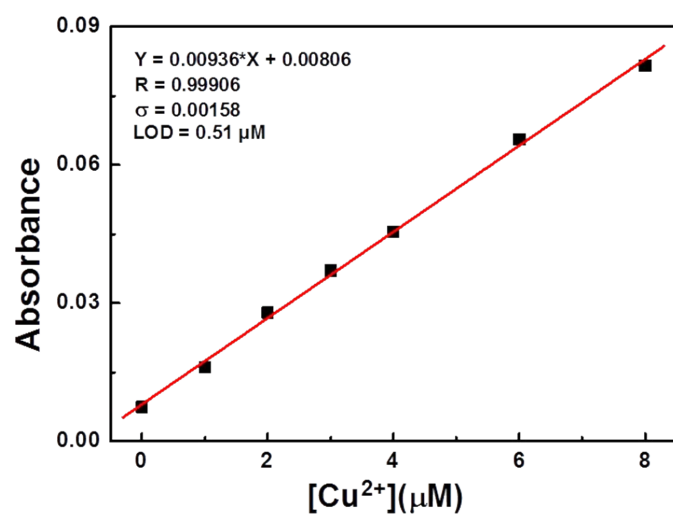


Fig. S10

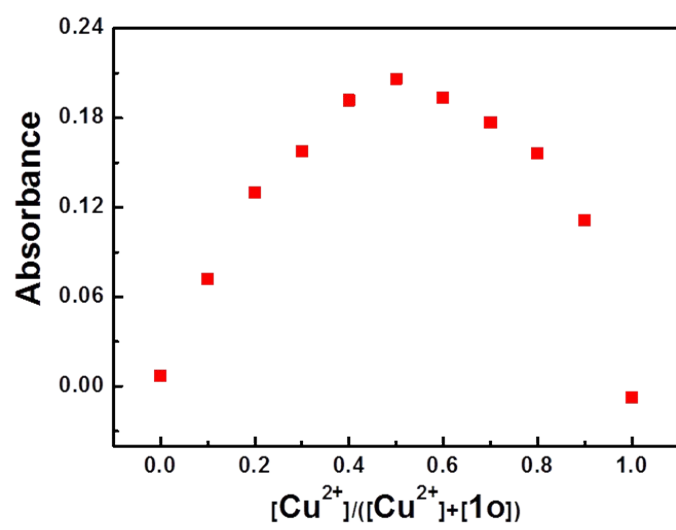


Fig S11

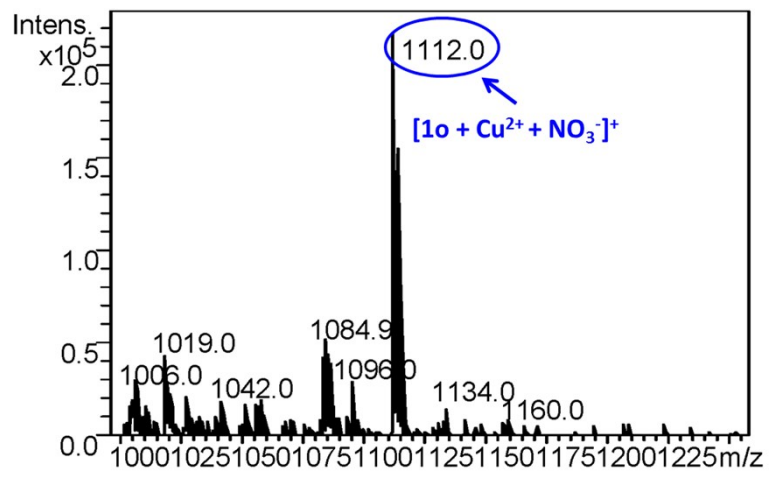


Fig S12

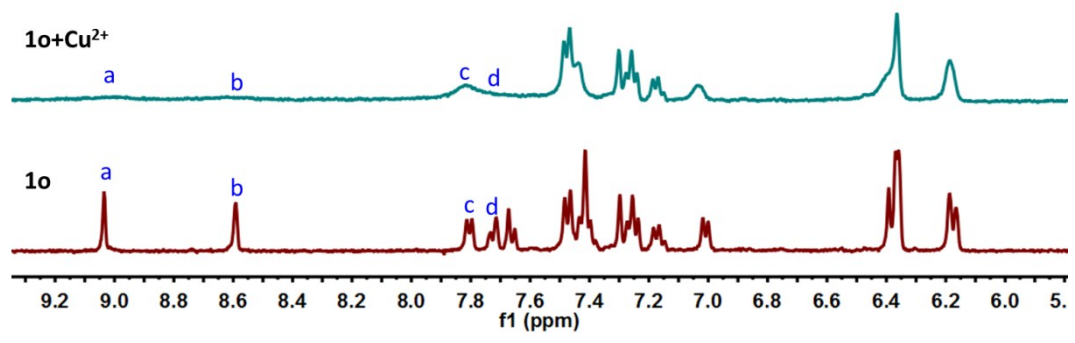


Fig S13

Inputs				Output
In 1 (UV)	In 2 (Vis)	In 3 (Hg ²⁺)	In 4 (EDTA)	Out1 (F _{617 nm})
0	0	0	0	0
1	0	0	0	0
0	1	0	0	0
0	0	1	0	1
0	0	0	1	0
1	1	0	0	0
1	0	1	0	0
1	0	0	1	0
0	1	1	0	1
0	1	0	1	0
0	0	1	1	0
1	1	1	0	1
1	1	0	1	0
1	0	1	1	0
0	1	1	1	0
1	1	1	1	0

Fig. S14