

Supporting information

Highly Sensitive Detection of Tb³⁺ and ATP Based on A Novel Asymmetric Anthracene Derivatives

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Z51 1H NMR/14
Z51 1H NMR

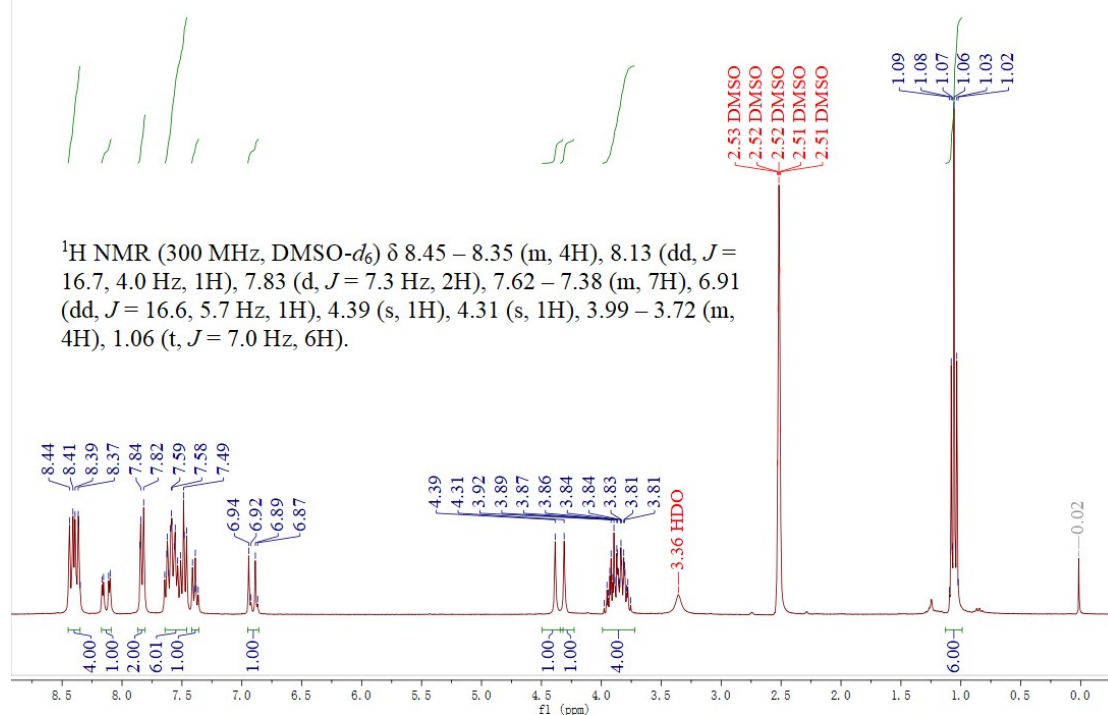


Figure S1. $^1\text{H NMR}$ spectra of SSAP in $\text{DMSO-}d_6$.

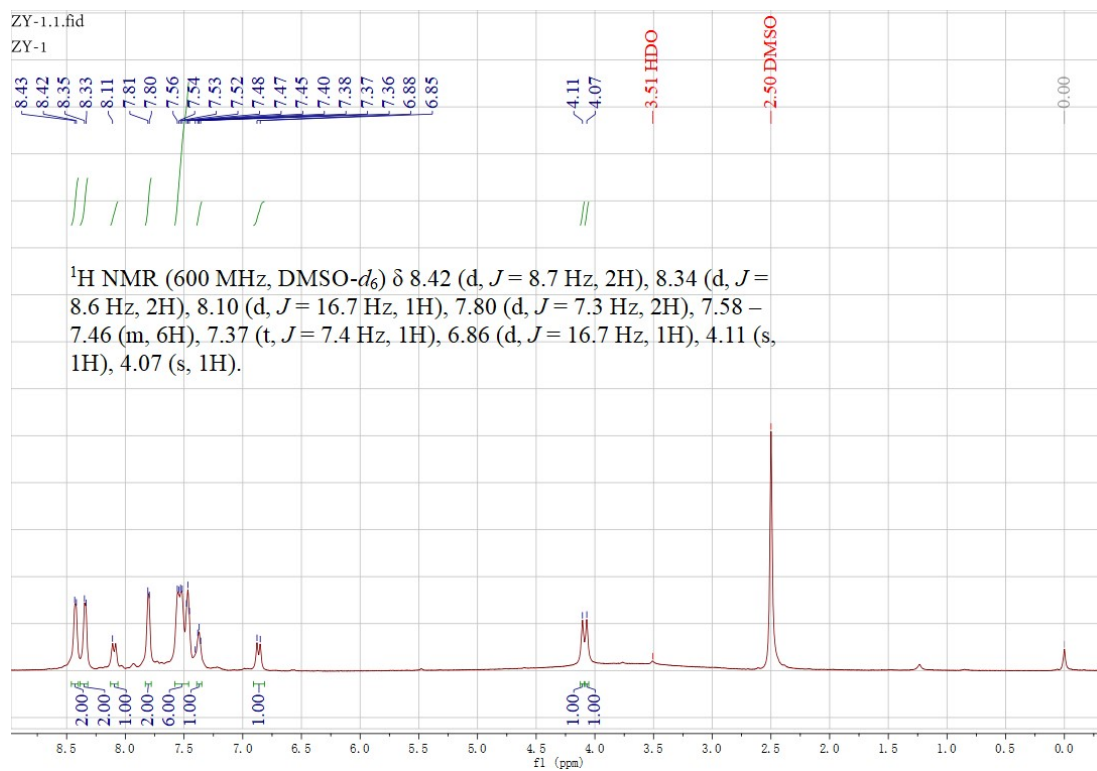


Figure S2. ^1H NMR spectra of SSAPA in DMSO-d_6 .

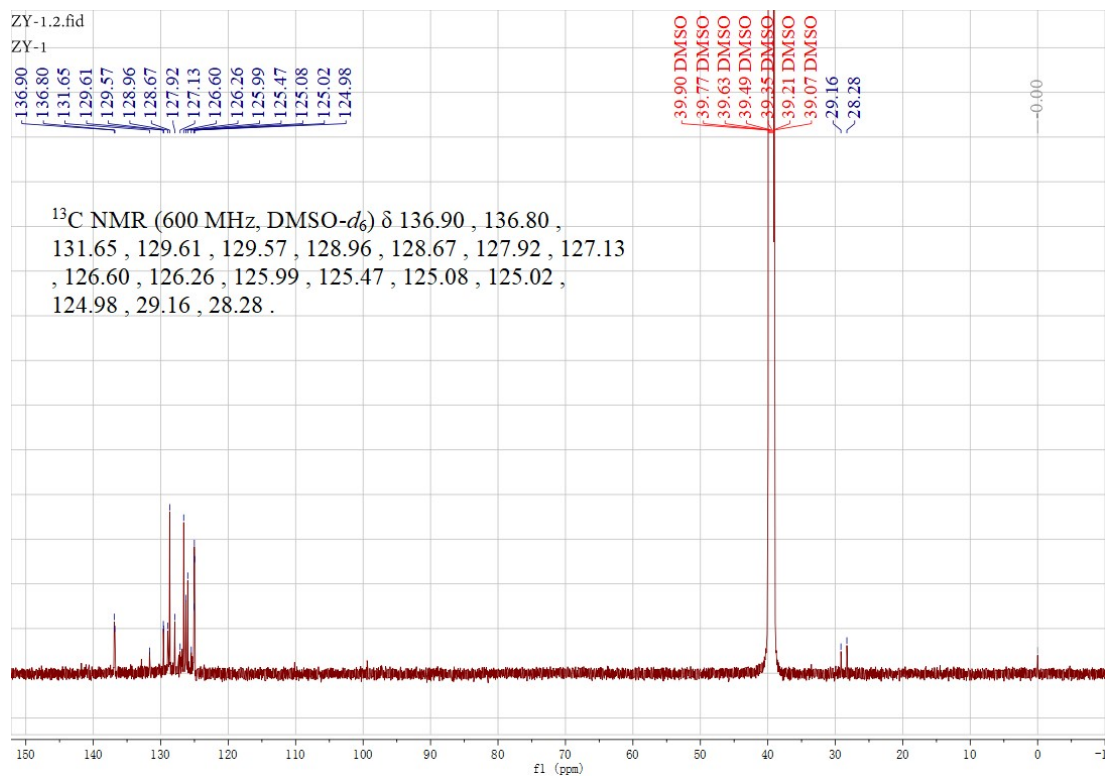
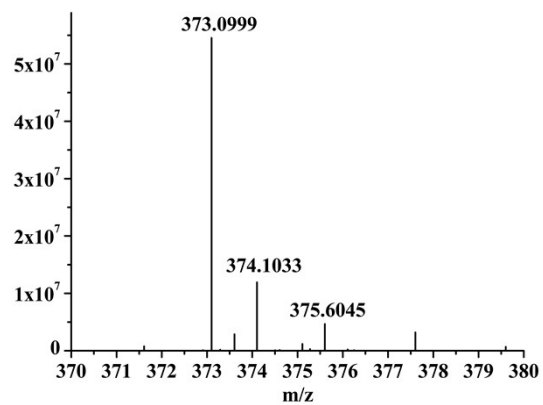


Figure S3. ^{13}C NMR spectra of SSAPA in DMSO-d_6 .



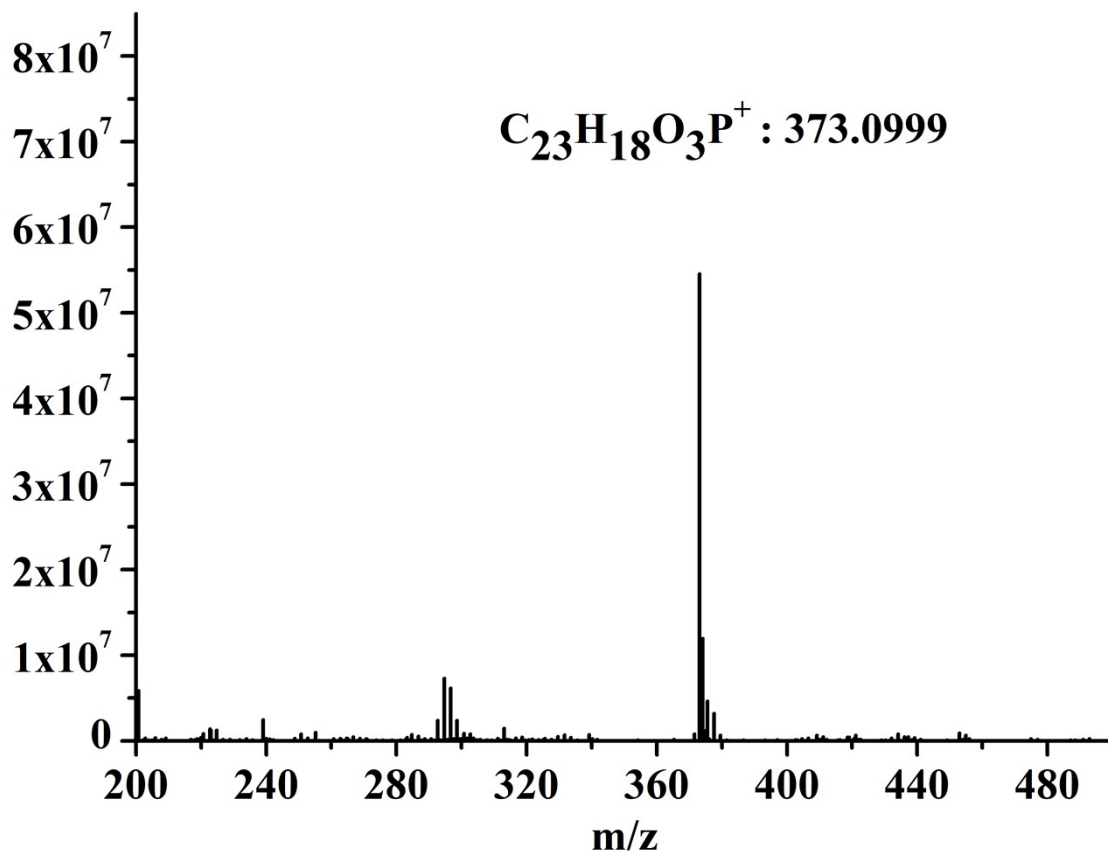


Figure S4. The HRMS spectra of SSAPA.

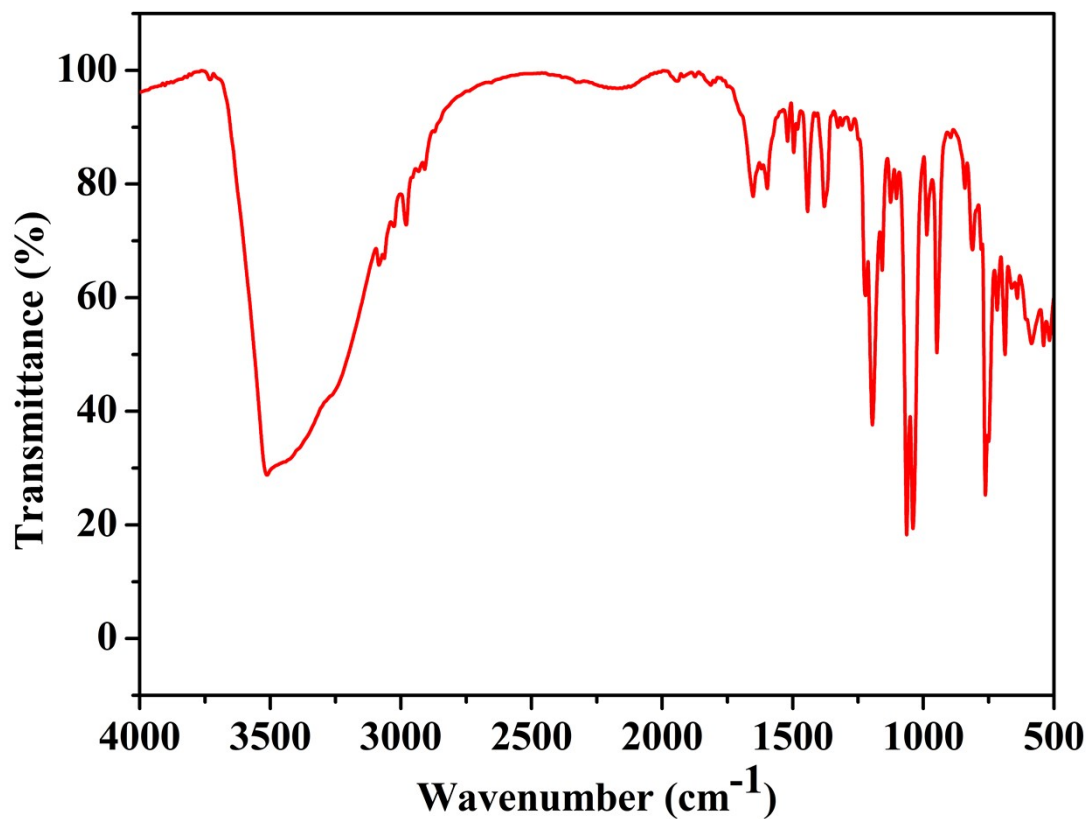


Figure S5. The Infrared spectra of SSSAPA.

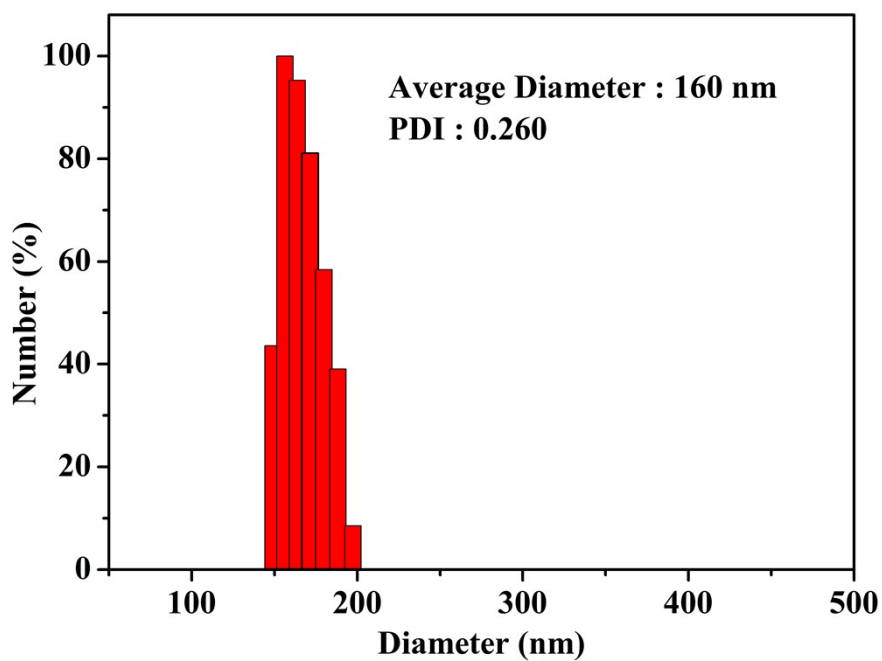


Figure S6. DLS data showing particle sizes of SSAPA in water.

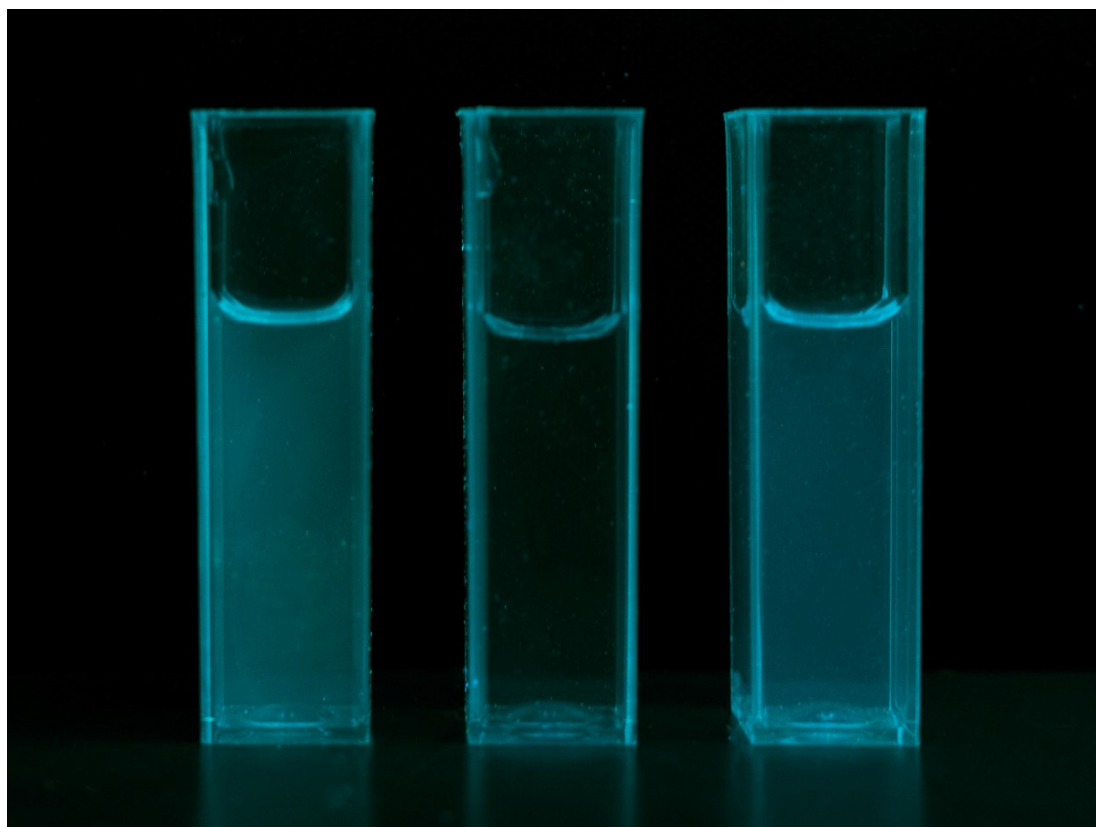


Figure S7. Fluorescence images of SSAPA (left), SSAPA/Tb³⁺ complex (middle), and SSAPA/Tb³⁺/ATP complex (right).

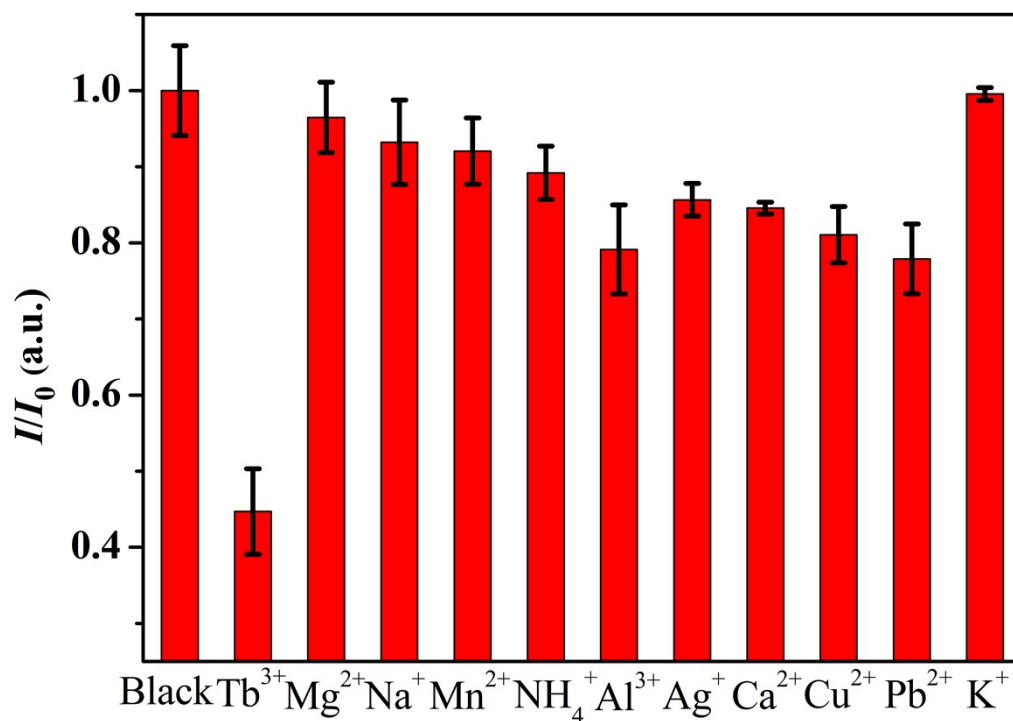


Figure S8. The quenching percentage of SSAPA (0.1 μ M) in the presence of the possible interfering species. The concentration was 10 μ M for interfering species and the concentration of Tb³⁺ is 1 μ M. The fluorescence intensities of SSAPA in the absence or presence of different interfering substances are denoted by I and I_0 .

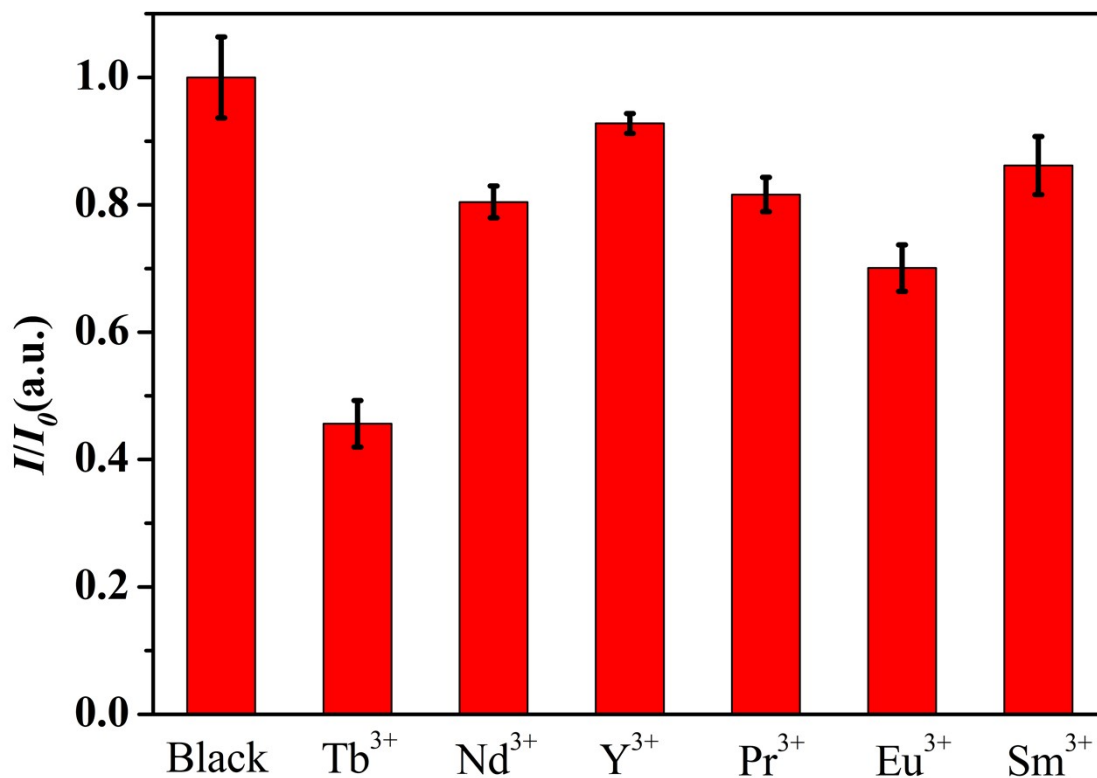


Figure S9. The quenching percentage of SSAPA (0.1 μ M) in the presence of the possible interfering other lanthanide ions. The concentration was 1 μ M for interfering species and the concentration of Tb^{3+} is 1 μ M. The fluorescence intensities of SSAPA in the absence or presence of different interfering substances are denoted by I and I_0 .

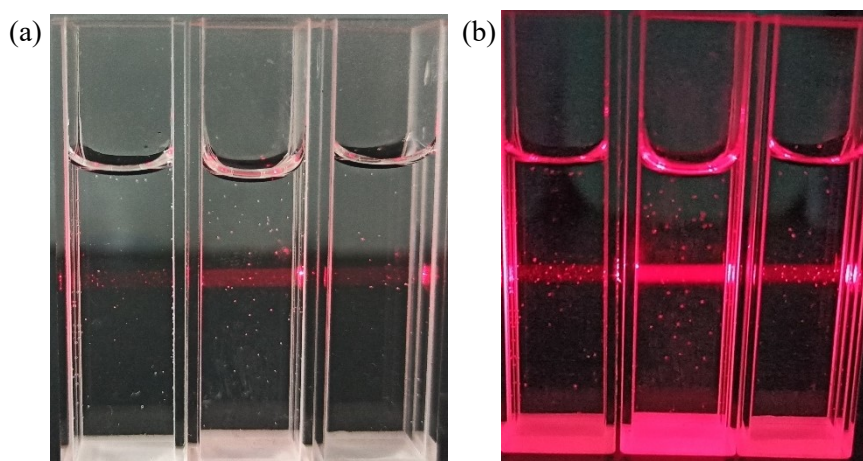


Figure S10. Tyndall Effect images of SSAPA (left), SSAPA/Tb³⁺ complex (middle), and

Probe	LOD	Ref.
SSAPA	2.8 nM	This work
Schiff's base	0.63 μM	1
Rare Earths with Xylenol Orange	0.3 μM	2

SSAPA/Tb³⁺/ATP complex (right) , under day light (a) and Under the dark (b).

Table S1. Comparison of the sensing performance of some reported probes for Tb³⁺.

Table S2. Comparison of the sensing performance of some reported probes for ATP.

Probe	LOD	Ref.
SSAPA/Tb ³⁺	4.5 nM	This work

MoS ₂ QDs/Fe ³⁺	5 μM	3
AuNPs /Tb-CDs	8.5 nM	4
norfloxacin–Tb ³⁺	41.3 nM	5
H ₂ dtoaCu (Metal-organic Frameworks)	8.19 nM	6
TPE-COOH/Cu ²⁺	4.5nM	7

Table S3. Analytical results in the serum sample containing 5% goat serum. (n=3).

Serum Samples	Spiked (μM)	Found (μM)	Recovery (%)	RSD (%)
Samble 1	0.2	0.212±0.12	107	5.64
Samble 2	0.3	0.314±0.08	105	4.22
Samble 3	0.4	0.409±0.05	102	2.54

Table S4. Analytical results in the serum sample containing 4% goat serum. (n=3).

Serum Samples	Spiked (μM)	Found (μM)	Recovery (%)	RSD (%)
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Samble 1	0.2	0.209±0.08	105	4.38
Samble 2	0.3	0.307±0.11	102	4.88
Samble 3	0.4	0.405±0.05	101	3.26

References

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