



Supplementary Materials

1. The Spectra of Structural Characterization of NPA

^1H NMR (400 MHz, $\text{DMSO}-d_6$) δ 11.48 (s, 1H), 10.23 (s, 1H), 8.82 (d, $J = 5.9$ Hz, 1H), 8.49 (d, $J = 7.3$ Hz, 1H), 8.39 (d, $J = 8.5$ Hz, 1H), 7.85 (d, $J = 7.8$ Hz, 1H), 7.82 – 7.77 (m, 1H), 7.66 (d, $J = 8.5$ Hz, 1H), 7.26 (t, $J = 7.7$ Hz, 1H), 6.96 – 6.90 (m, 2H), 4.06 – 4.01 (m, 2H), 1.65 – 1.57 (m, 2H), 1.35 (m, $J = 7.4$ Hz, 2H), 0.93 (t, $J = 7.4$ Hz, 3H). ^{13}C NMR (100 MHz, $\text{DMSO}-d_6$) δ 164.02, 163.36, 149.94, 148.27, 146.53, 140.92, 134.01, 133.69, 131.31, 131.22, 129.45, 128.61, 125.50, 124.62, 122.46, 119.13, 112.00, 107.65, 40.02, 30.23, 20.31, 14.19. HRMS (ESI): calculated for $\text{C}_{22}\text{H}_{20}\text{N}_4\text{O}_2$ $[\text{M} + \text{H}]^+$ 373.1658, found 373.1659.

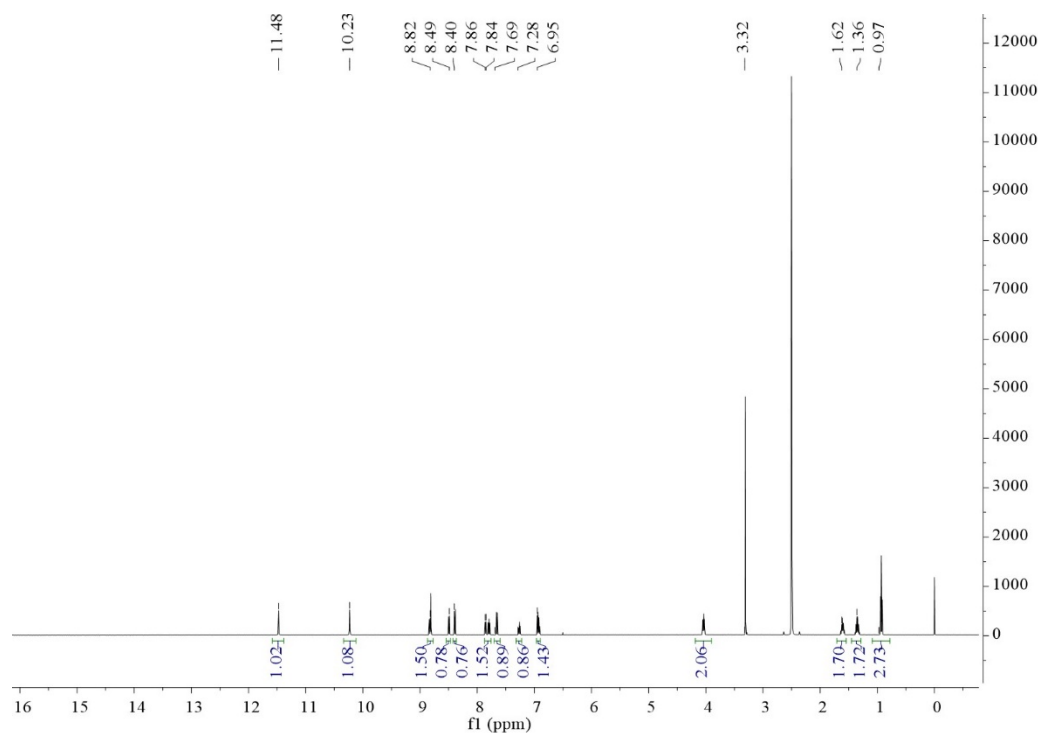
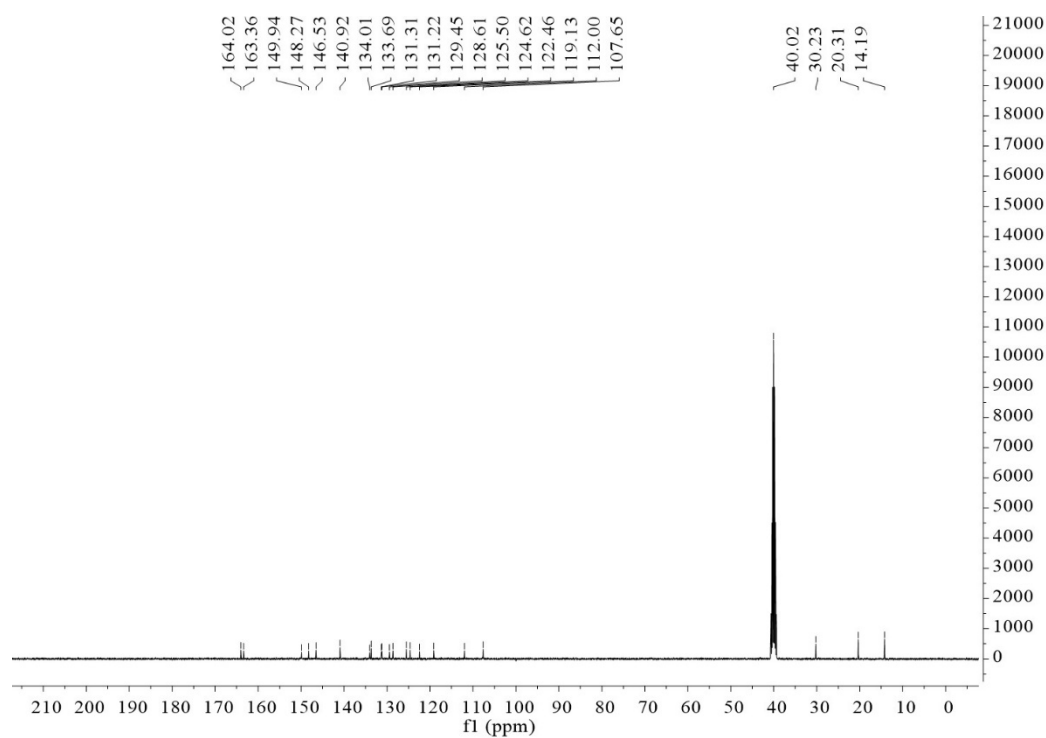
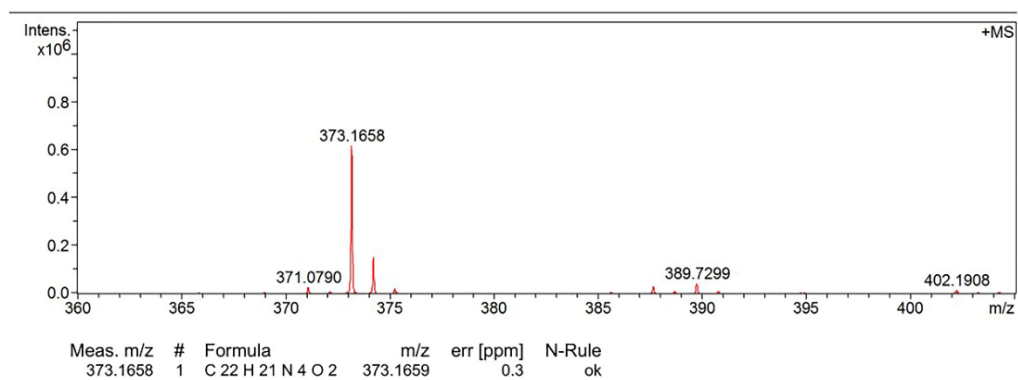


Figure S1. ^1H NMR spectrum of compound NPA.

Figure S2. ^{13}C NMR spectrum of compound *NPA*.Figure S3. Mass Spectrum ($\text{M}+\text{H}^+$) of compound *NPA*.

2. Spectral Characteristics of Probe NPA upon Coordination with Cu^{2+}

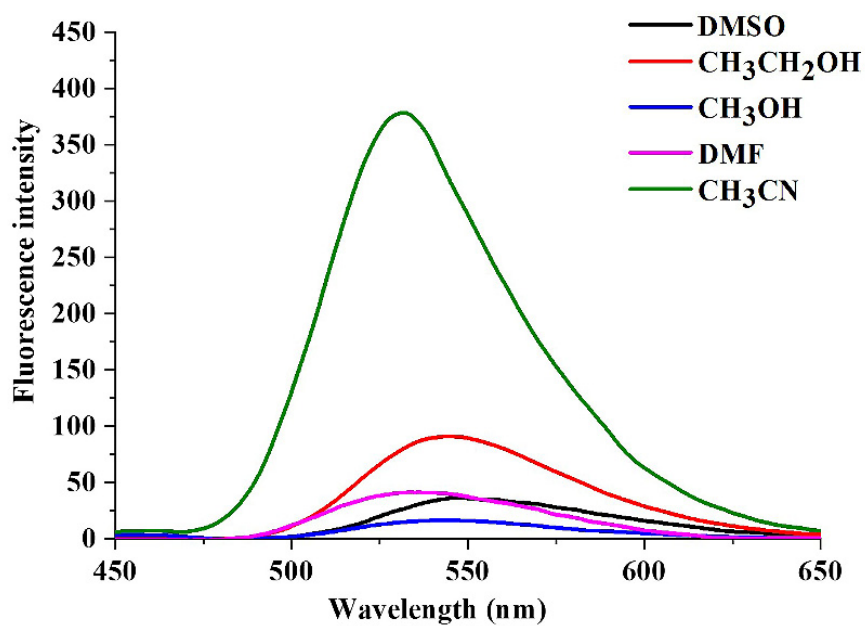


Figure S4. Fluorescence spectra of NPA in different solvents.

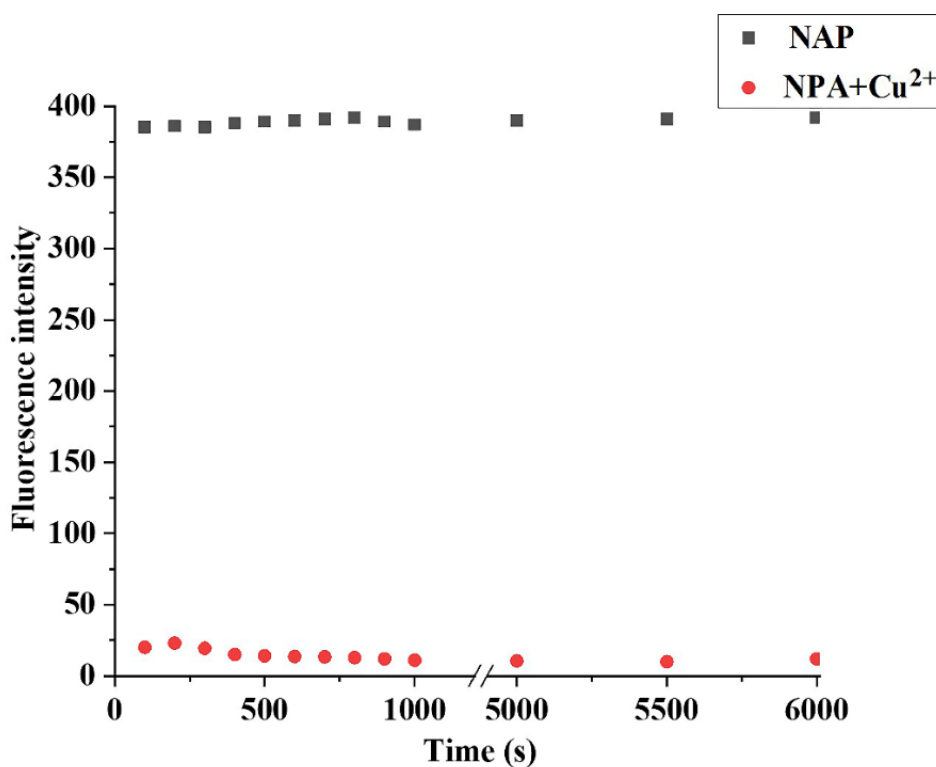


Figure S5. Stability of time on fluorescence intensity of NPA.

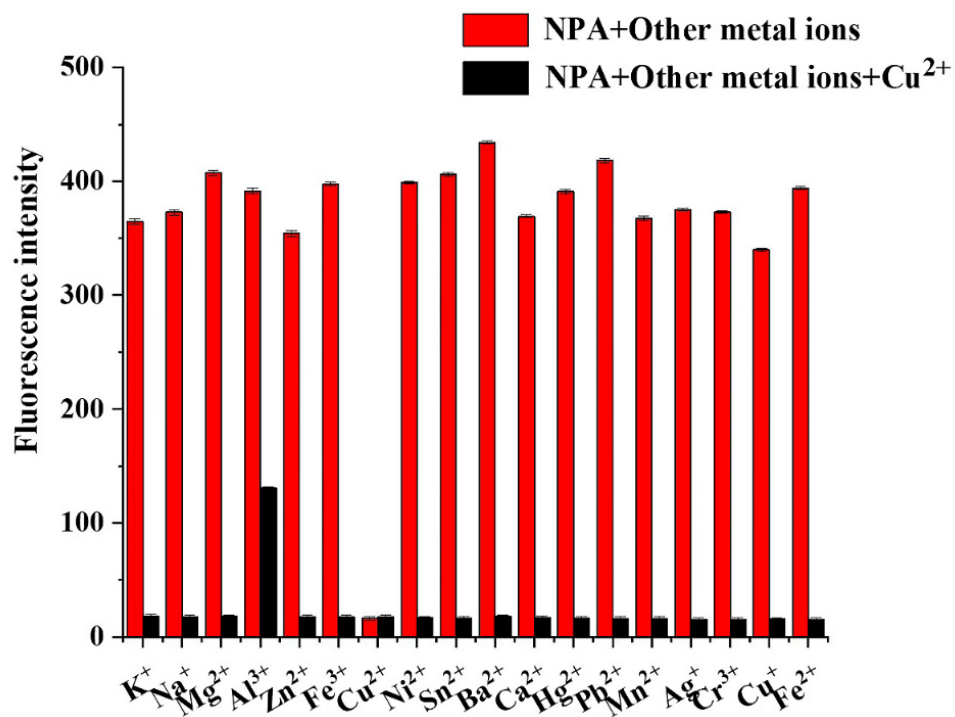


Figure S6. Fluorescence response of NPA–Cu²⁺ by adding various metal ions.

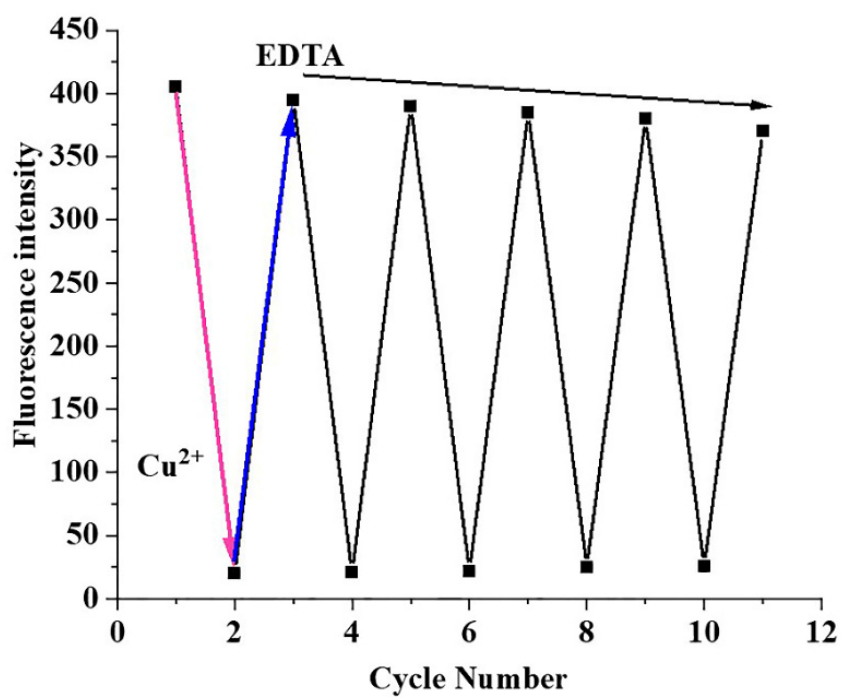


Figure S7. Reversible changes in the fluorescence intensity upon the sequential introduction of Cu²⁺ and EDTA in CH₃CN.

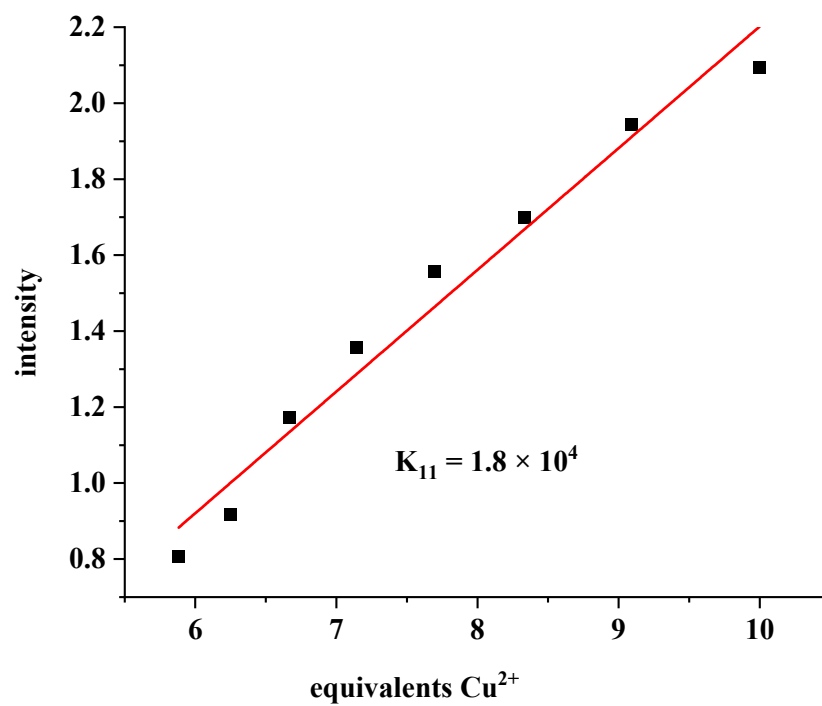


Figure S8. Host-Guest interaction BindFit of NPA and Cu²⁺.

3. Sensing Assay for Glyphosate by NPA-Cu²⁺

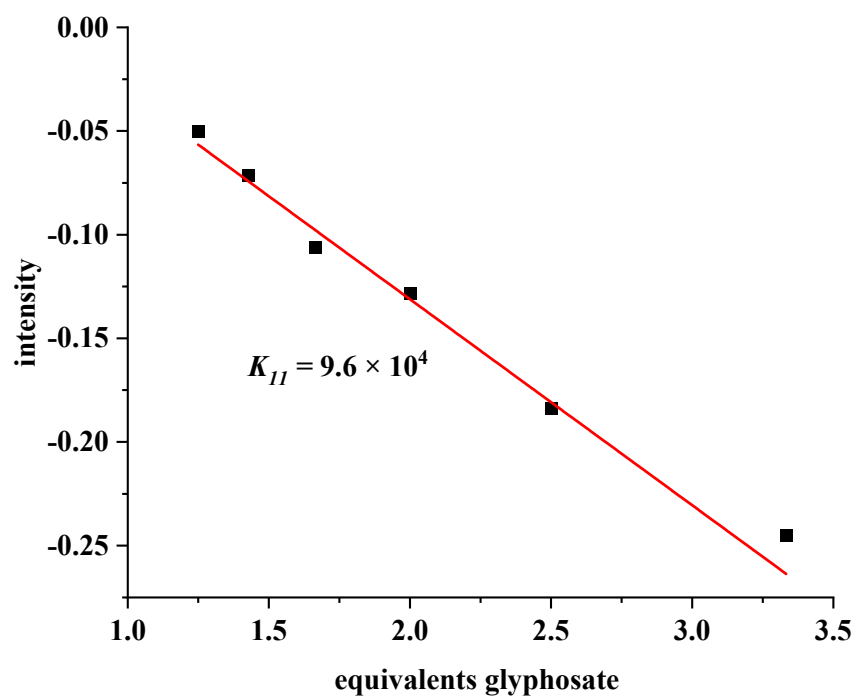


Figure S9 Host-Guest interaction BindFit of NPA-Cu²⁺ and glyphosate.

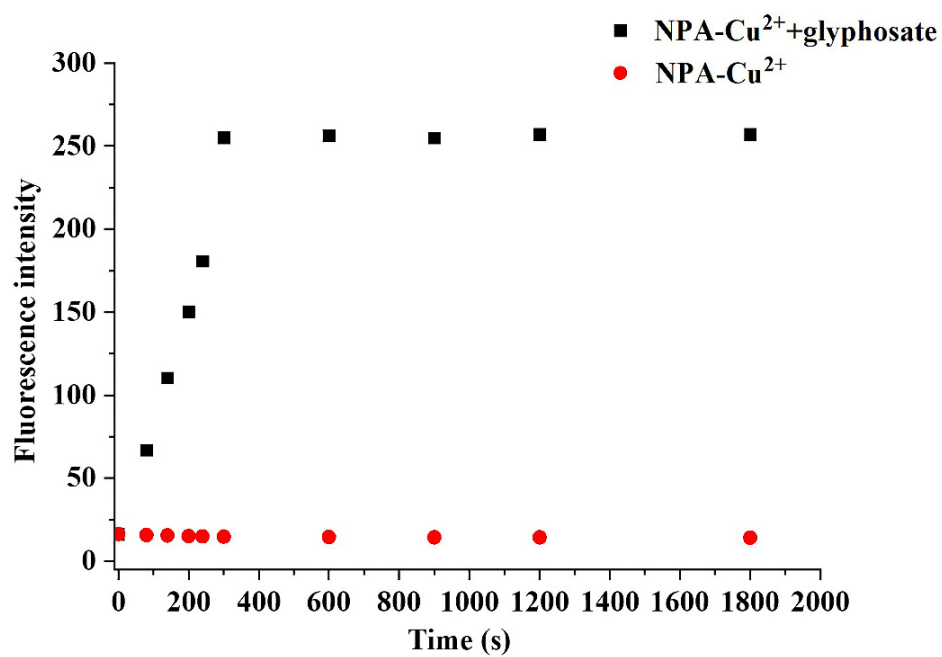
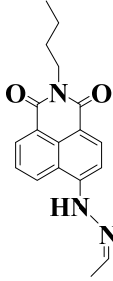
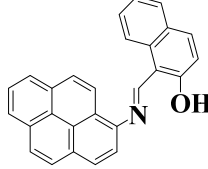
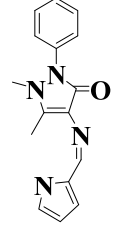
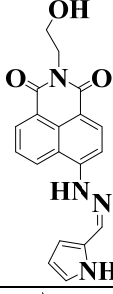
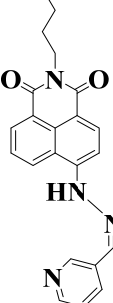


Figure S10. Stability of time on fluorescence intensity of NPA-Cu²⁺.

4. Comparison of NPA with Previously Published Probes for Cu²⁺ Ions

Table S1. Comparison of NPA with previously published probes for Cu²⁺ ions.

Sensing Mechanism	Probes	Working Media	LOD (μM)	References
Hydrolysis		CH ₃ CN-HEPES (4:1, v/v, pH = 7.4)	0.32	[35]
ICT		DMSO/H ₂ O (v/v ,8/2)	0.22	[36]
ICT		CH ₃ CN-H ₂ O (v/v = 2:8, pH = 5)	0.22	[37]
PET		CH ₃ CN-H ₂ O (v/v = 3:7, pH = 7.0)	0.71	[43]
PET		CH ₃ CN	0.21	This work

References

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