

Fig. S1 ^1H NMR spectrum of compound **HAM** in DMSO.

Fig. S2 ^{13}C NMR spectrum of compound **HAM** in DMSO.

Fig. S3 ESI-HRMS spectrum of compound **HAM**.

Fig. S4. Fluorescence responses of **HBA** with Al^{3+} in different solvents.

Fig. S5. The effect of pH on the fluorescence intensity of **HAM** ($10\ \mu\text{M}$) with in the presence of Al^{3+} ($100\ \mu\text{M}$).

Fig. S6. Fluorescence response time for **HAM** ($10\ \mu\text{M}$) with the addition of Al^{3+} ($100\ \mu\text{M}$) in DMF/PBS (1/1, v/v, pH=7, 10 mM).

Fig. S7. Job's plot of probe **HAM** with Al^{3+} .

Fig. S8. Fluorescence intensity of **HAM** ($10\ \mu\text{M}$) with Al^{3+} in the presence of various competitive anions ($100\ \mu\text{M}$). (1. CH_3COO^- , 2. I^- , 3. H_2PO_4^- , 4. $\text{P}_2\text{O}_7^{4-}$, 5. SO_3^{2-} , 6. PO_4^{3-} , 7. SO_4^{2-} , 8. HSO_3^- , 9. SO_4^{2-} , 10. F^- , 11. SCN^- , 12. Cl^- , 13. Br^- , 14. ClO^- , 15. HCO_3^- , 16. S^{2-})

Fig. S9. MS spectrum of probe **HAM- Al^{3+}** .

Fig. S10. MTT assay for the survival rate HeLa cells treated with various concentrations of **probe HAM** (0-100 μM).

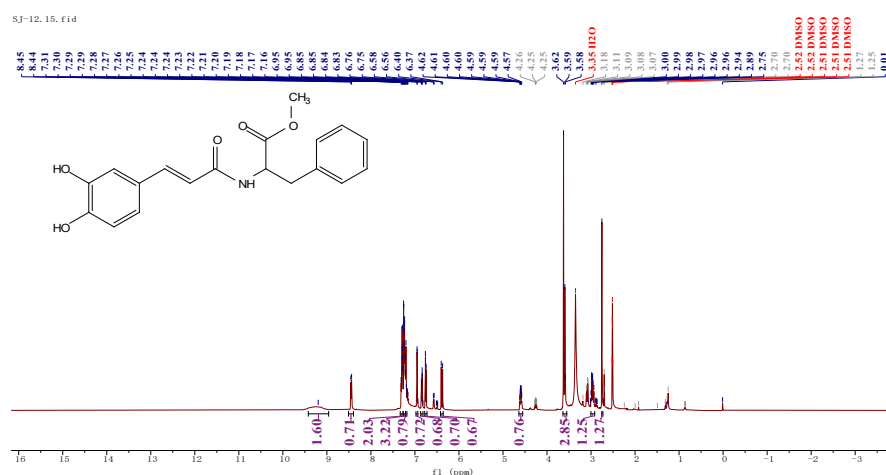


Fig. S1

D3-1,2, F1d

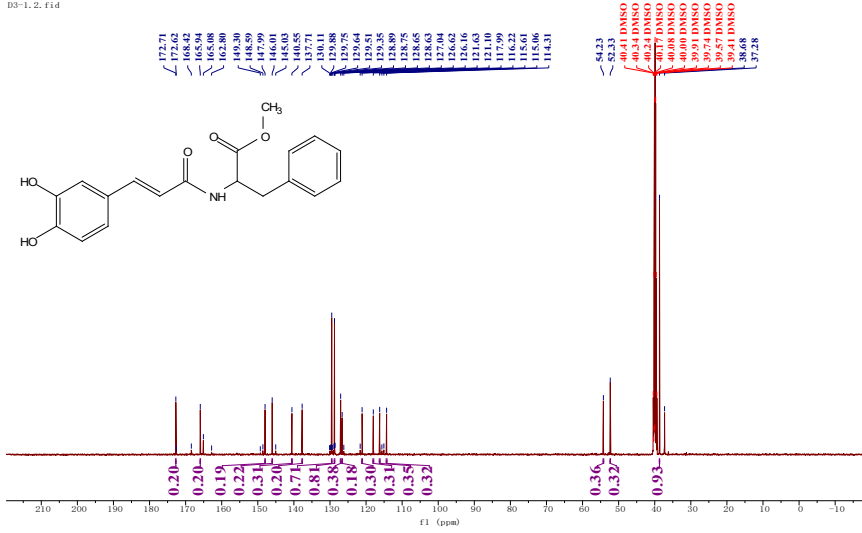


Fig. S2

MS 缩放的质谱图

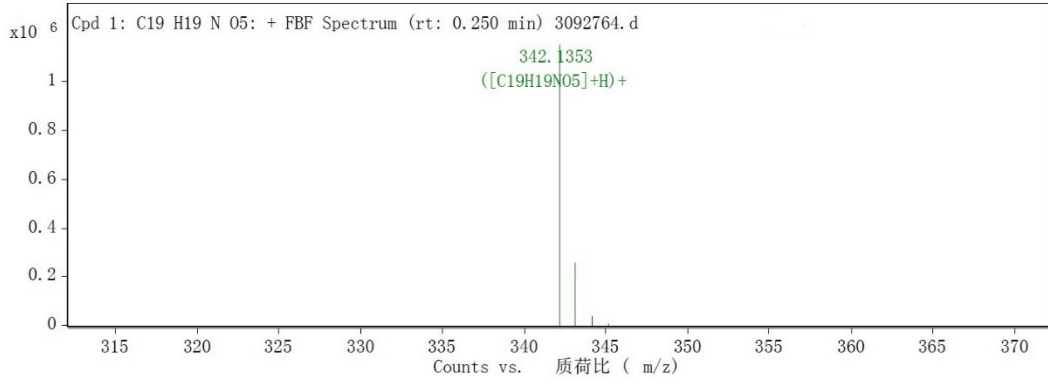


Fig. S3

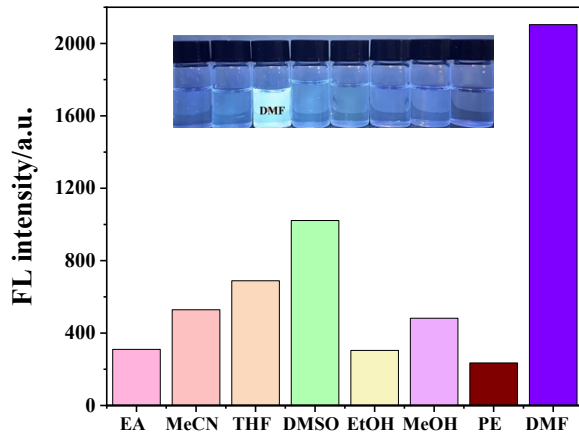


Fig. S4

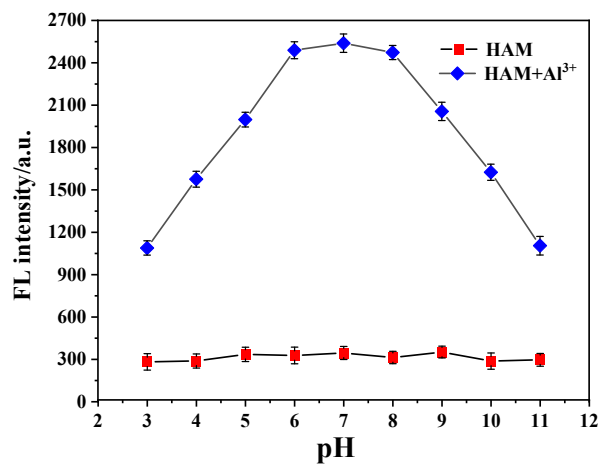


Fig. S5

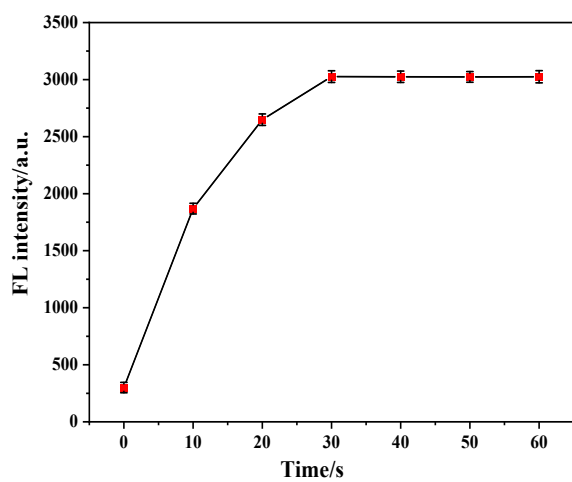


Fig. S6

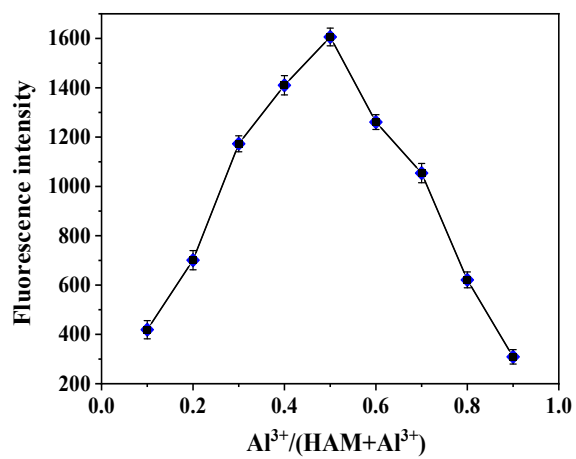


Fig. S7

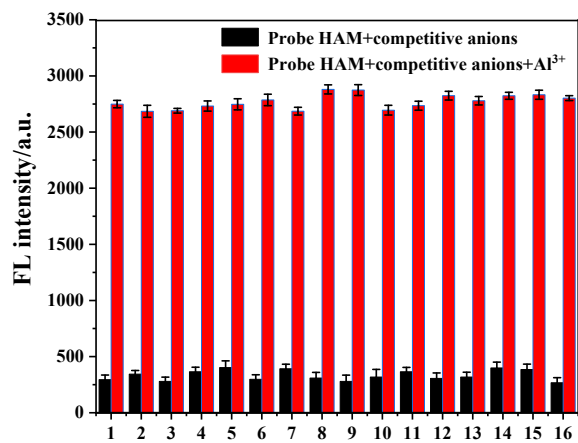


Fig. S8

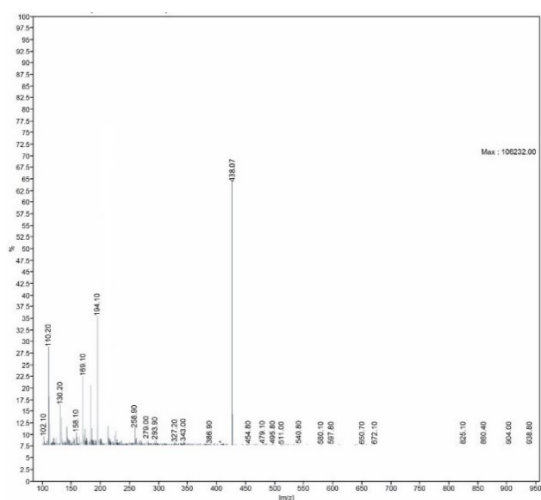


Fig. S9

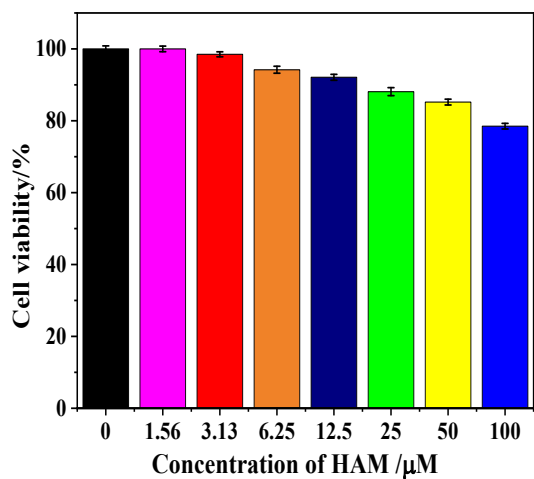
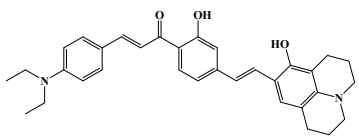
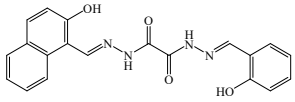
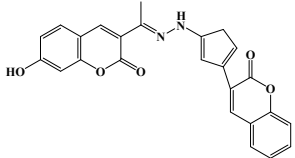
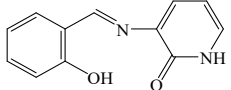
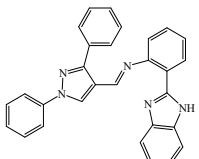
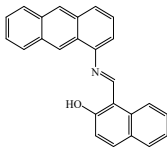
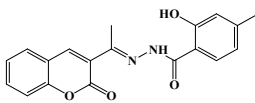
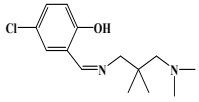
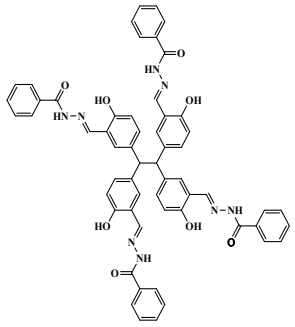


Fig. S10.

Table S1. Comparison of reported fluorescent probes for Al³⁺ with **HAM**

probe	LOD	Reference
	0.93 μM	Spectrochim Acta A 2022 [26]
	0.36 μM	Spectrochim Acta A 2020 [27]
	82.9 μM	Inorg Chim Acta 2022 [28]
	2.4 μM	Sensor Actuat B-Chim 2015 [29]
	0.212 μM	Spectrochim Acta A 2020 [30]
	1.48 μM	J Photoch Photobio A 2020 [31]
	6.7 μM	Sensor Actuat B-Chim 2017 [32]
	0.804 μM	Sensor Actuat B-Chim 2019 [33]
	0.5 μM	J. Lumin 2019 [34]
This work	0.168 μM	