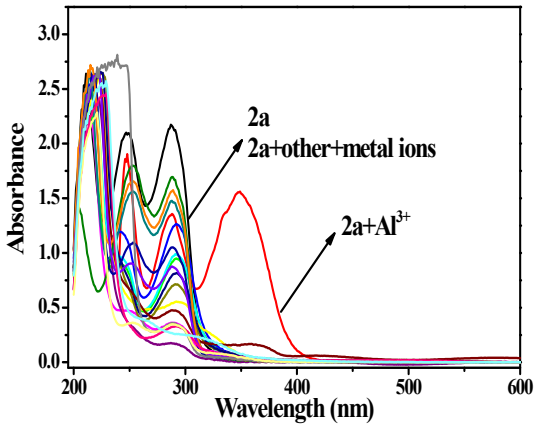


Fig. S1. Absorbance spectra of probe **2a** (5.0×10^{-6} M) in the presence of 10 equiv of different metal ions in C_2H_5OH solution.

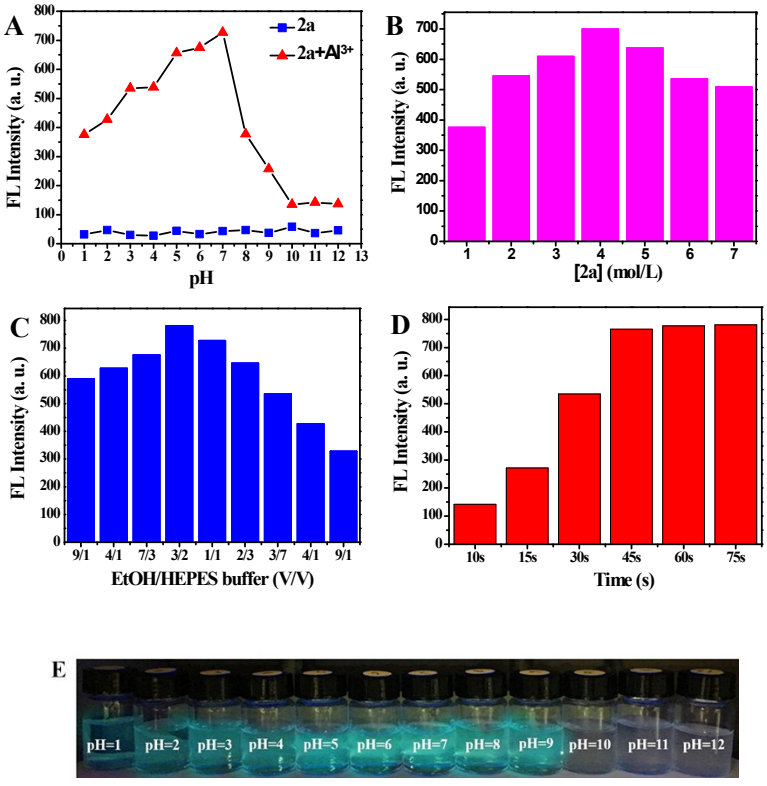


Fig. S2 The fluorescence intensity of probe **2a** (5.0×10^{-6} M) in the absence or presence of Al^{3+} in EtOH solution at different pH values (1–12) (λ_{ex} = 330 nm) (A). The fluorescence intensity of different concentration of probe **2a** in the presence of Al^{3+} (5.0×10^{-5} M) (B). The fluorescence intensity of probe **2a** (5.0×10^{-6} M) with Al^{3+} in the presence of Al^{3+} at different EtOH/HEPES buffer (C), in EtOH solution at different response time (D). Fluorescence photograph of **2a** (5.0×10^{-6} M) in the absence or presence of Al^{3+} under a UV lamp at 365 nm (E).

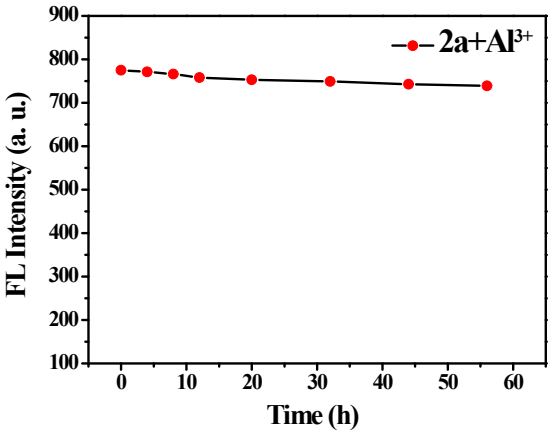


Fig. S3. The fluorescence intensity of probe **2a** (5.0×10^{-6} M) with Al^{3+} in solution (EtOH/HEPES buffer, v/v = 6/4, 10 mM HEPES, pH = 7.4) at different time, λ_{ex} = 330 nm

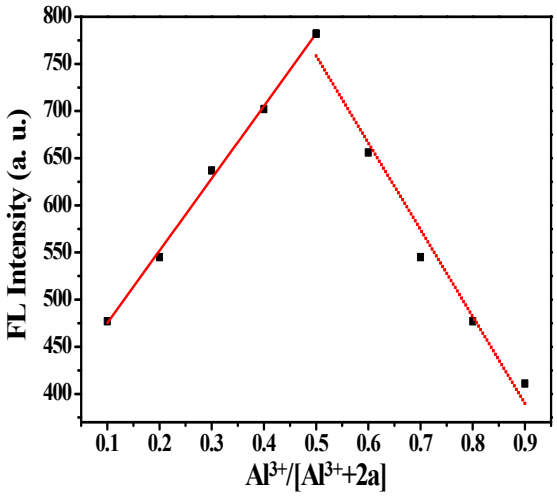


Fig. S4. Job's plots for determining the stoichiometry of **2a** and Al^{3+} in solution (EtOH/HEPES buffer, v/v = 6/4, 10 mM HEPES, pH = 7.4), λ_{ex} = 330 nm.

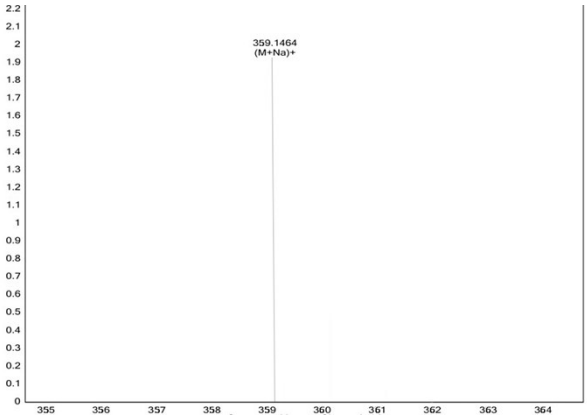


Fig. S5. The HRMS spectra of **2a**-Al^{3+} complex.

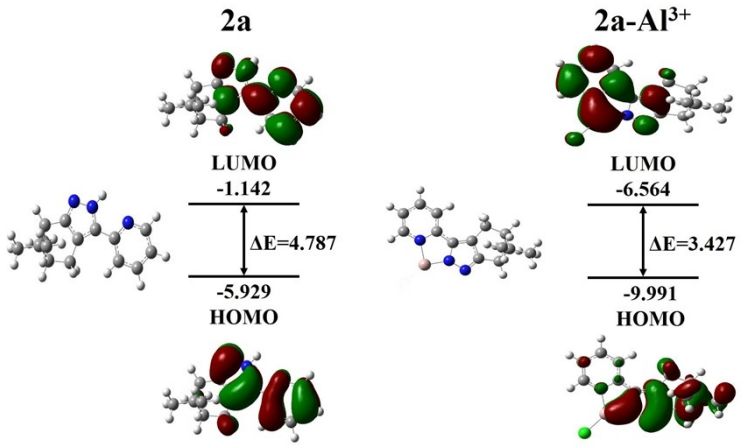


Fig. S6. Molecular orbitals (LUMO and HOMO) of compounds **2a** and **2a**-Al^{3+} complex.

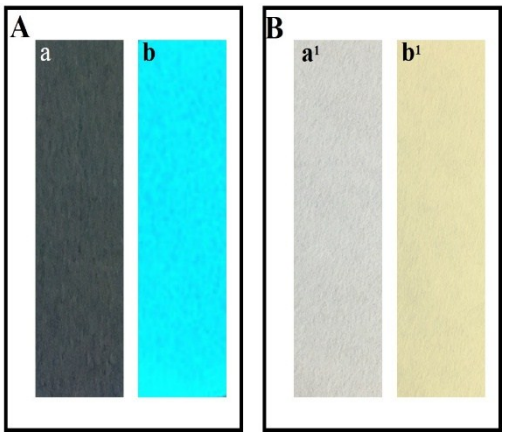


Fig. S7. Images of **2a**-based test strips tested with Al^{3+} 365 nm under UV lamp (A, a: **2a**; b: **2a**+Al^{3+}) and under sunlight (B, a1: **2a**; b1: **2a**+Al^{3+}).

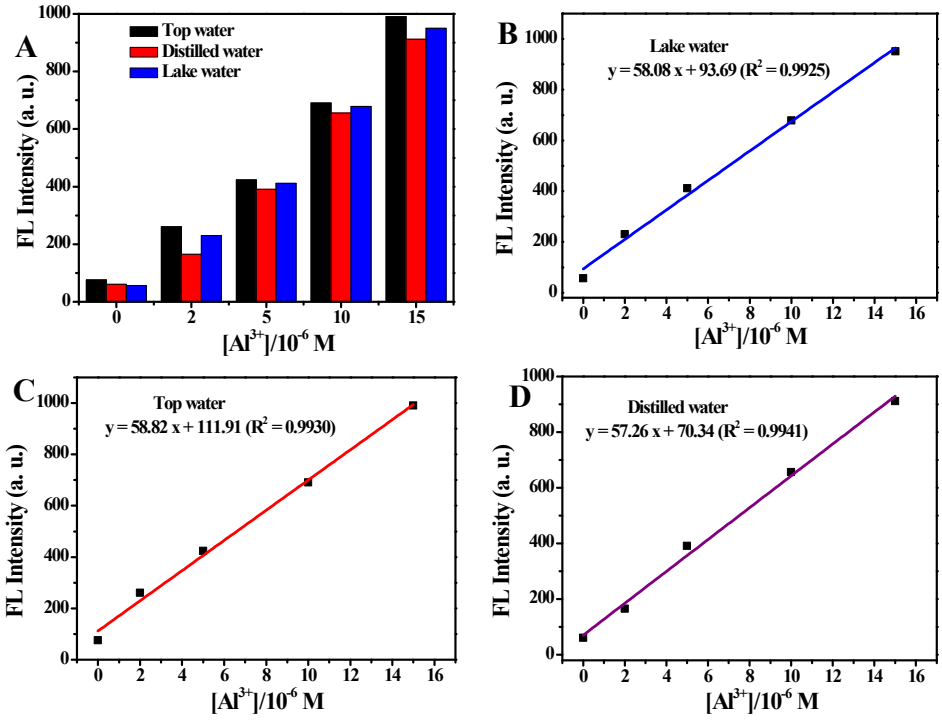


Fig. S8. Fluorescence intensity of probe **2a** treatment with Al^{3+} (0, 2, 5, 10, 15 μM) in three water samples. The linear relationship between the fluorescence intensity and Al^{3+} concentration (0, 2, 5, 10, 15 μM) in (b) lake water and (c) tap water and (d) distilled water samples.

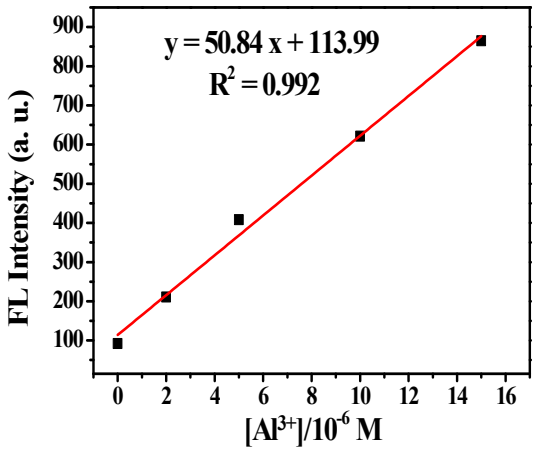


Fig. S9. The linear relationship between the fluorescence intensity and Al^{3+} concentration (0, 2, 5, 10, 15 μM) in 20% HCl (V/V) aqueous solution.

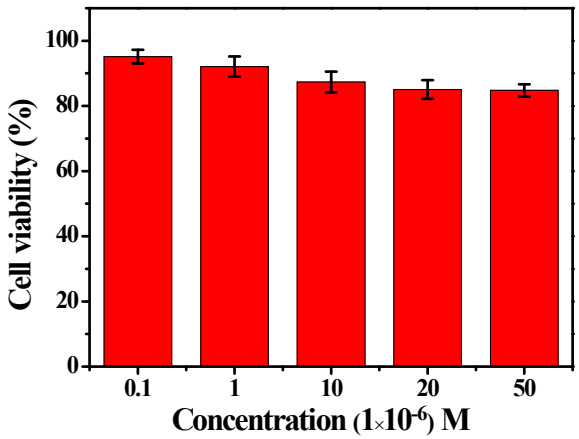
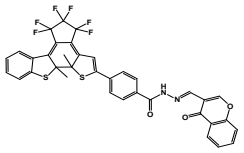
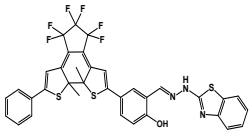
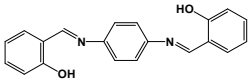
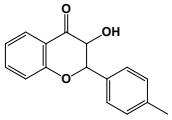
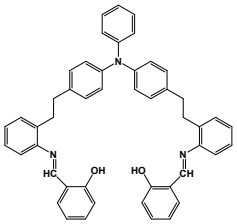
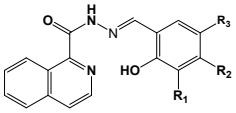
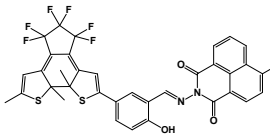
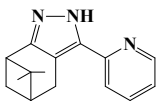


Fig. S10. MTT assay of Hela cells was incubated with 0.1, 1, 10, 20 and 50 × 10^{-6} M probe **2a** for 48 h.

Table S1 Comparison of different fluorescent probes for the determination of Al^{3+}.

Probe	In food samples test	Solution	Detection limit	Reference
	NO	CH_3CN	5.47×10^{-7}	Dyes and Pigments, 2018, [37]
	NO	Methanol	9.3×10^{-8}	Tetrahedron Letters, 2017, [38]
	NO	H_2O:DMF=1:5	7.5×10^{-7}	J. Photoch. Photobio. A, 2018, [39]
	NO	H_2O:CH_3CN = 3:1	7.5×10^{-7}	Sens. Actuators B: Chem, 2018, [40]
	NO	CH_3OH:H_2O = 4:1,	2.99×10^{-7}	Sens. Actuators B: Chem, 2017, [41]
	NO	Methanol	8.08×10^{-8}	Spectrochim. Acta A, 2018, [42]
	NO	Methanol	1.75×10^{-7}	J. Photoch. Photobio. A, 2017, [43]
	Yes	EtOH/HEPS buffer = 7/3	8.1×10^{-8}	