Electronic Supplementary Information

A highly selective and sensitive fluorescence "turn-on" fluoride ion sensor

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Materials and instruments and General procedures

Materials and instruments

All reagents and starting materials were obtained from commercial suppliers and used as received unless otherwise noted. F^-, Cl^-, Br^-, I^-, AcO^-, $H_2PO_4^-$, HSO_4^-, ClO_4^-, were used as the thetetrabutylammonium (TBA) salts and the SCN^- and CN^- ions were used as the sodium salts. Nuclear magnetic resonance (NMR) spectra were recorded on Varian Mercury 400. Mass spectra were recorded on a Bruker Esquire 6000 MS instrument. Fluorescence spectra were recorded on a Shimadzu RF-5301PC spectrofluorophotometer. Ultraviolet-visible (UV-vis) spectra were recorded on a Shimadzu UV-2550 spectrometer.

General procedure

1. General procedure for UV-vis experiments

All the UV-vis experiments were carried out on a Shimadzu UV-2550 spectrometer. Any changes in the UV-vis spectra of the synthesized sensors were recorded on the addition of F^- (measured 0.5 mL 0.1mol/L diluted to 0.01 mol/L). The host concentration was kept constant in all experiments.

2. General procedure for fluorescence experiments

All the fluorescence experiments were carried out on a Shimadzu RF-5301PC spectrofluorophotometer. Any changes in the fluorescence spectra of the synthesized sensors were recorded on the addition of F^- (measured 0.5 mL 0.1mol/L diluted to 0.01 mol/L). The host concentration was kept constant in all experiments.

3. General procedure for ^{1}H NMR titration

For ^{1}H NMR titrations, two stock solutions were prepared in DMSO-*d*$_6$: one of them contained the host only, the second one contained a certain concentration of F^- (measured 0.5 mL 0.1mol/L diluted to 0.01 mol/L). Aliquots of the solutions were mixed directly in NMR tubes.

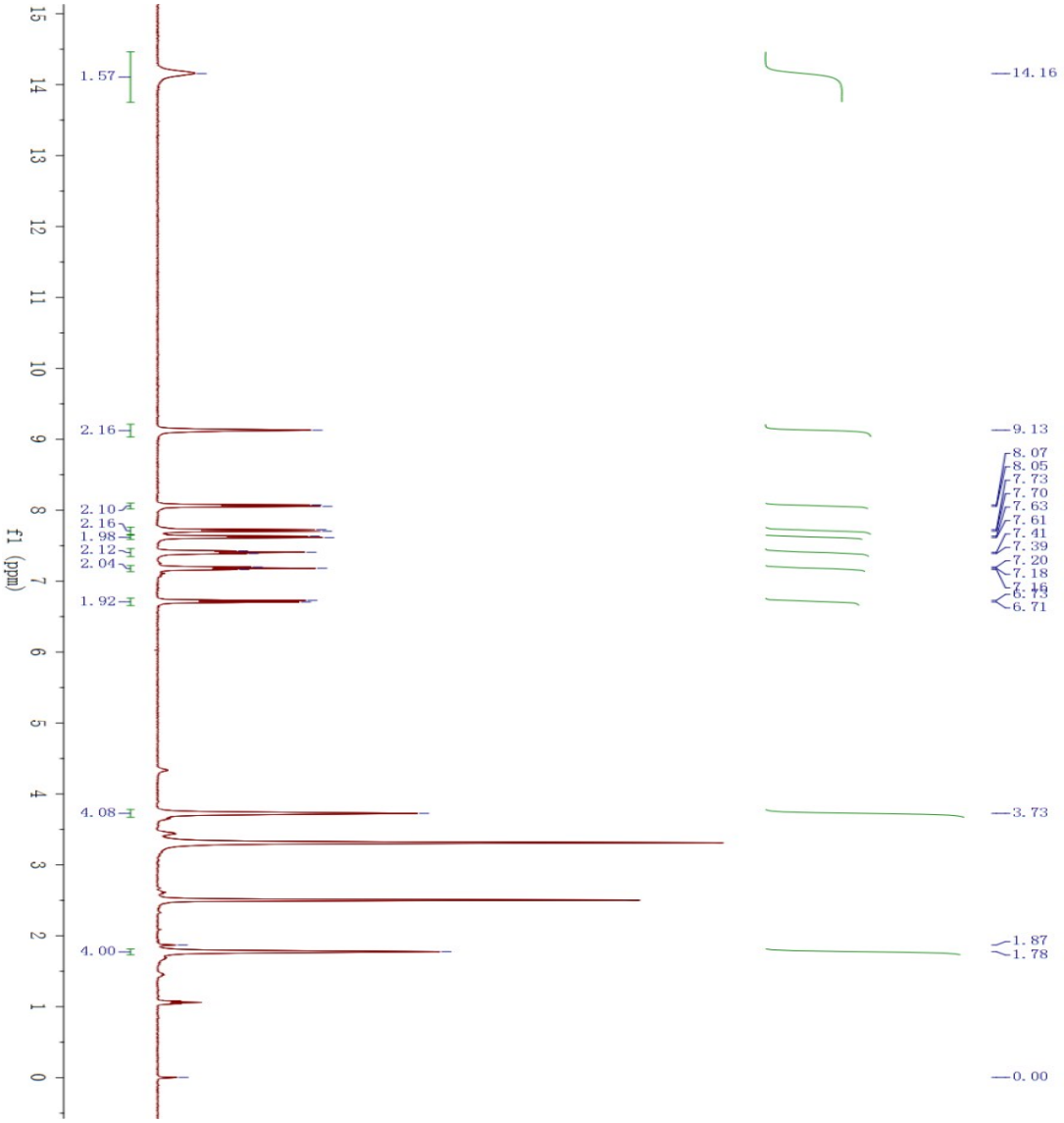

Fig. S1. ^{1}H NMR spectra of sensor **S** in DMSO-d_6.

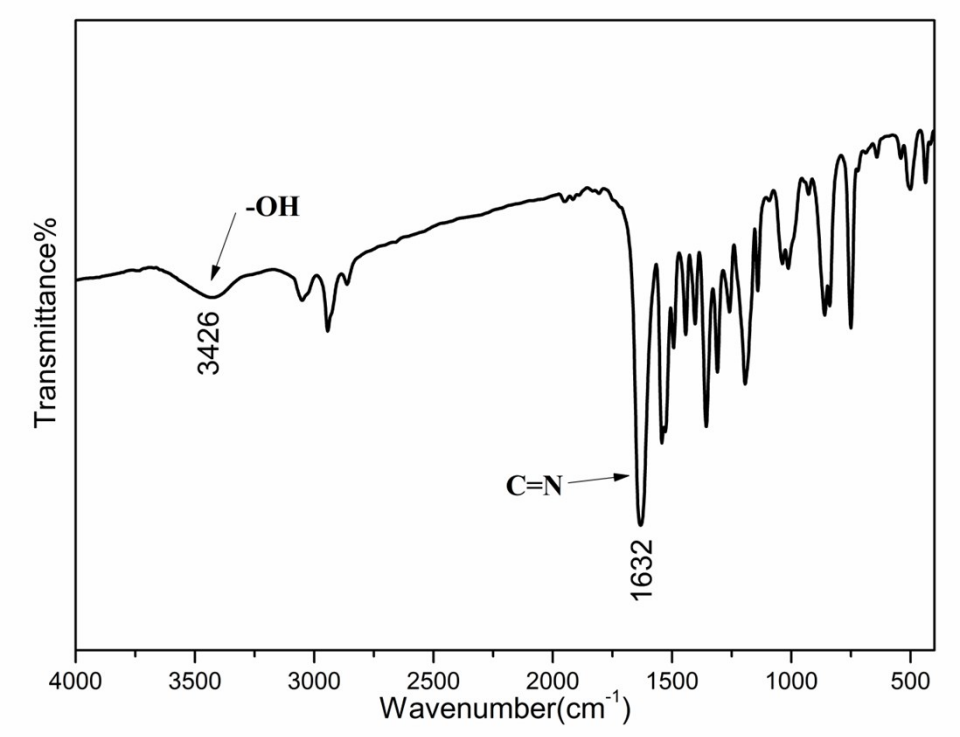

Fig. S2. IR spectra of sensor **S.**

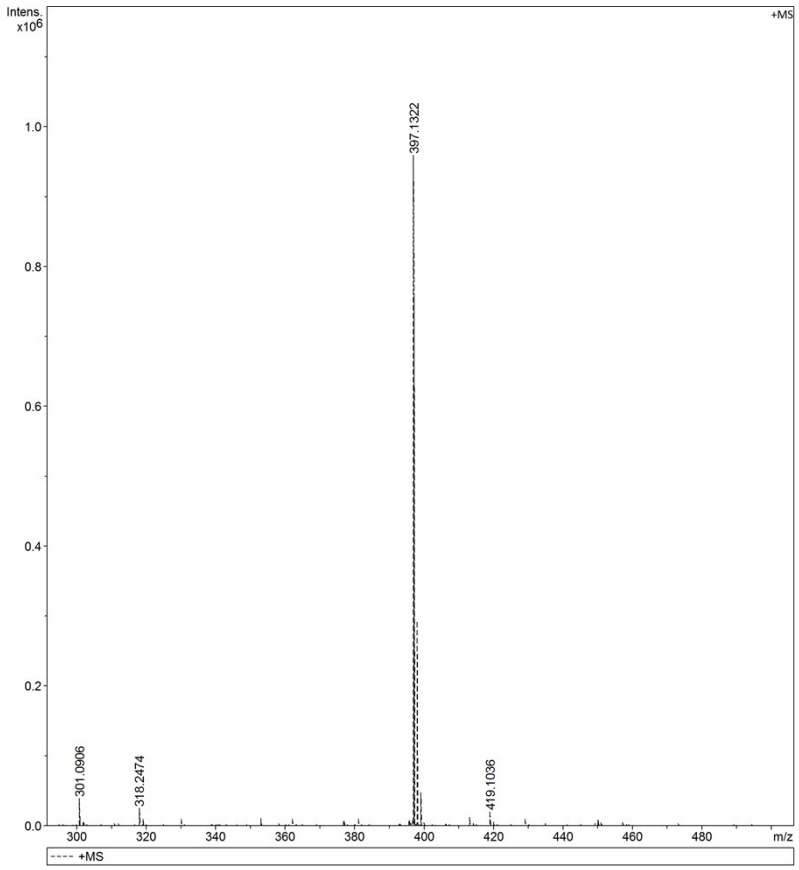

Figure S3. MS spectra of sensor **S.**

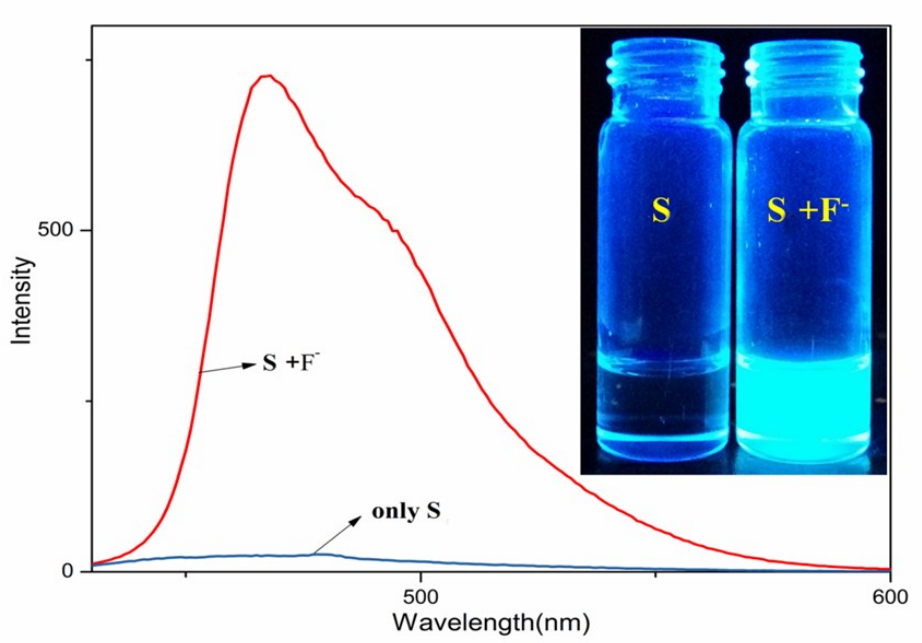

Fig. S4. Fluorescence spectra of sensor **S** (2.0×10^{-5} mol/L) recorded before and after reaction with F^- (0.01mol/L) (50 equiv). (Inset) Fluorescence changes of the probe **S** (2.0×10^{-5} mol/L) in the presence of 50 equiv of F^-.

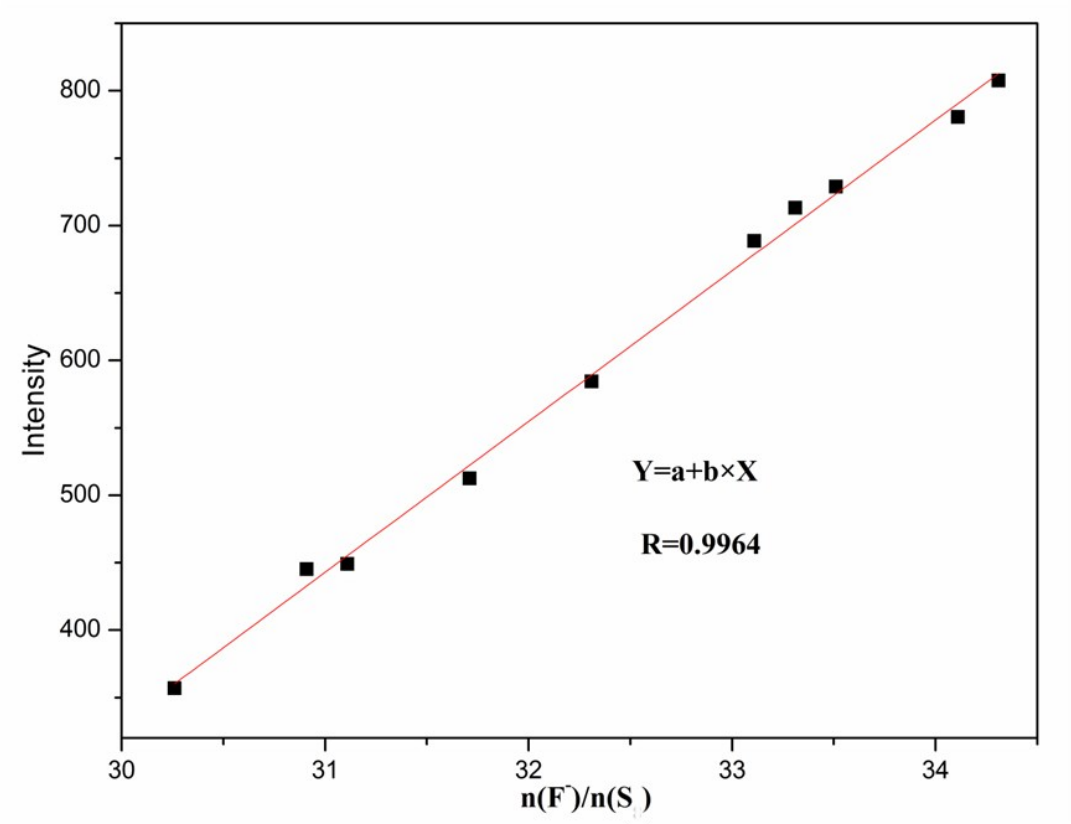

Fig. S5. Linear portion of the curve of fluorescence intensity at 467 nm of sensor **S** (2.0×10^{-5} mol/L) DMSO in the presence of F^-.

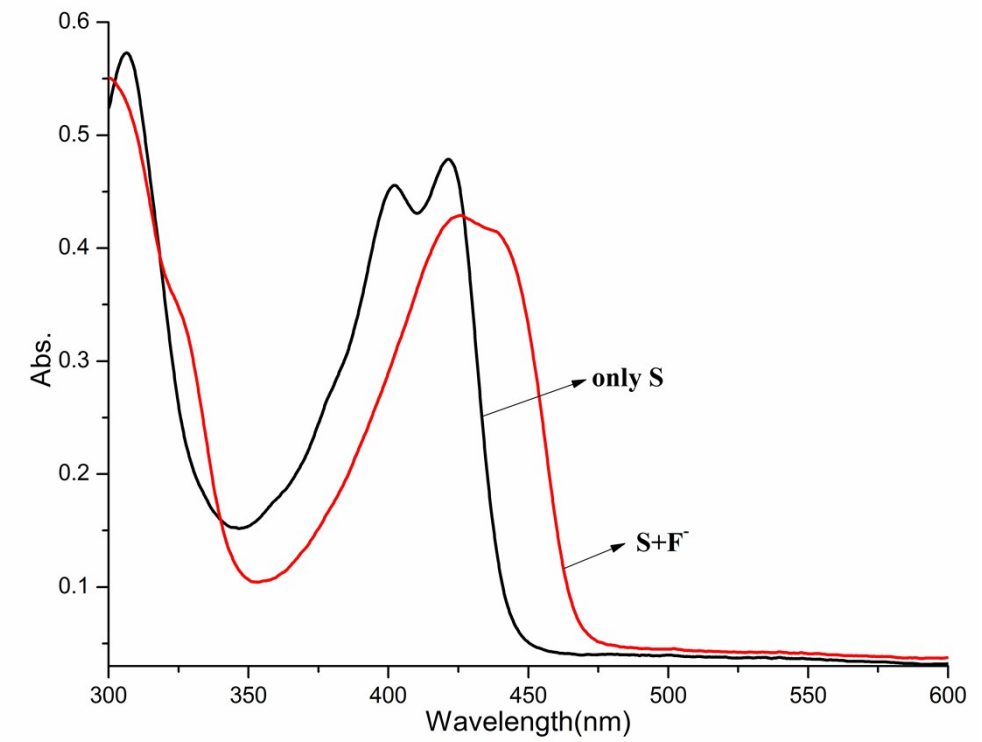

Fig. S6. UV/vis absorption spectra of sensor **S** (2.0×10^{-5} mol/L) in DMSO in the absence and presence of 50 equiv F^-.

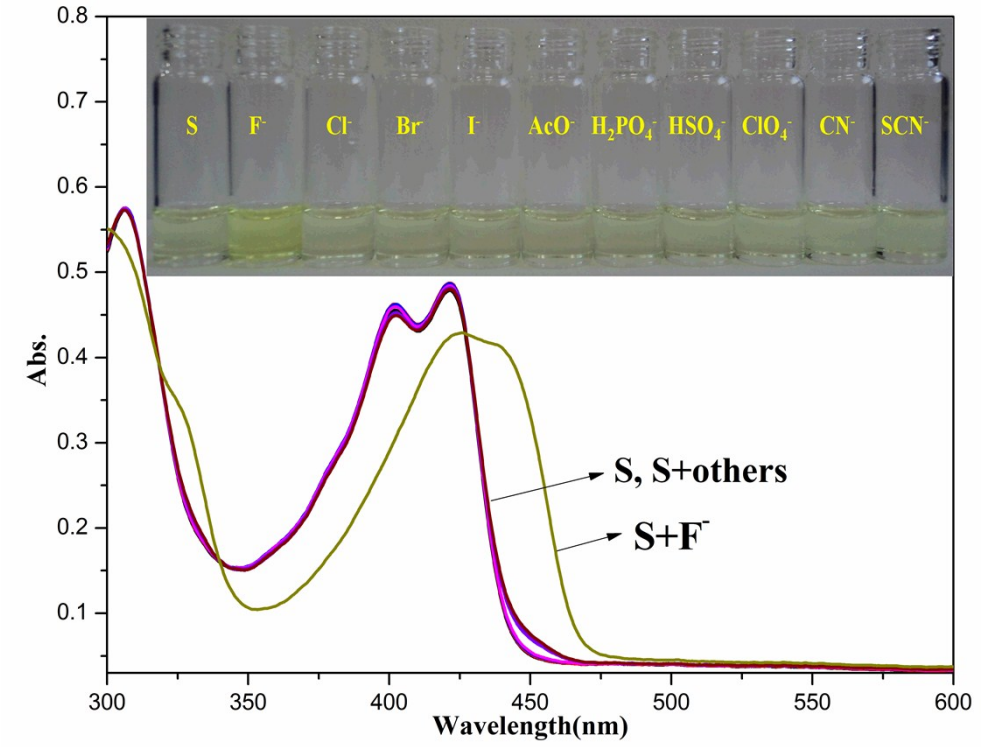

Fig. S7. Absorption spectra of sensor **S** (2.0×10^{-5} mol/L) in DMSO upon addition of various (F^-, Cl^-, Br^-, I^-, AcO^-, $H_2PO_4^-$, HSO_4^-, ClO_4^-, as the thetetrabutylammonium (TBA) salts CN^- and SCN^-; as the sodium salts, 50 equiv each) (0.01mol/L) in aqueous solution. (**Inset**) Color changes of the sensor **S** (2.0×10^{-5} mol/L) in the

presence of 50 equiv of (F^-, Cl^-, Br^-, I^-, AcO^-, $H_2PO_4^-$, HSO_4^-, ClO_4^-, CN^- and SCN^-).

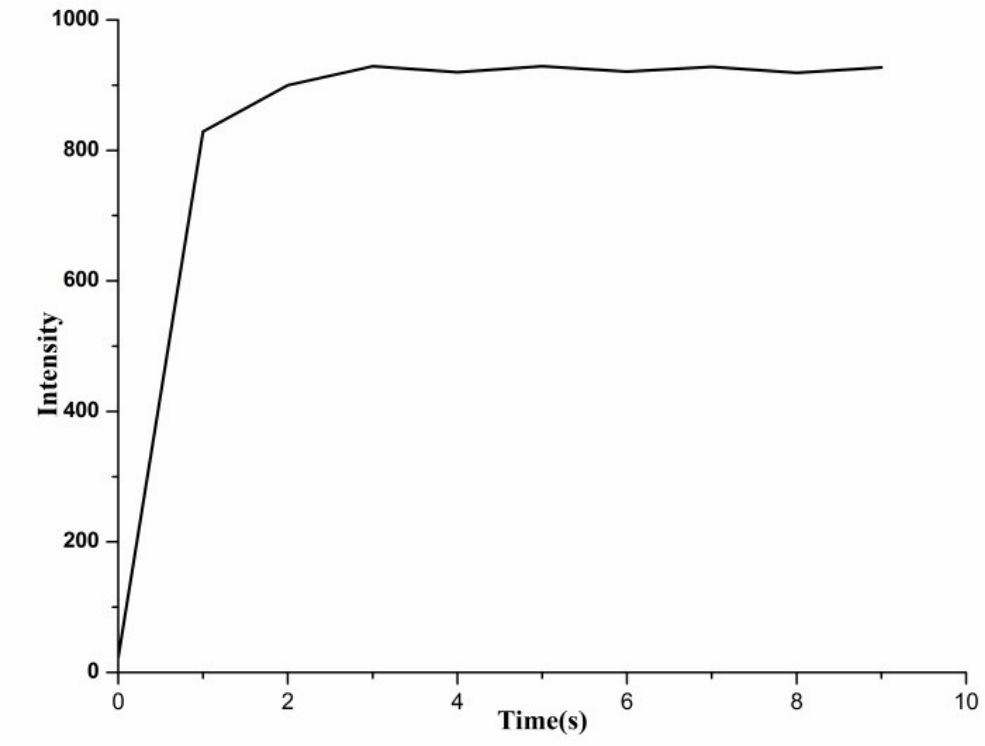

Fig. S8 Fluorescence intensity at 467 nm for **S** (2.0×10^{-5} mol/L) in DMSO after addition of F^- (0.01 M) in aqueous solution.

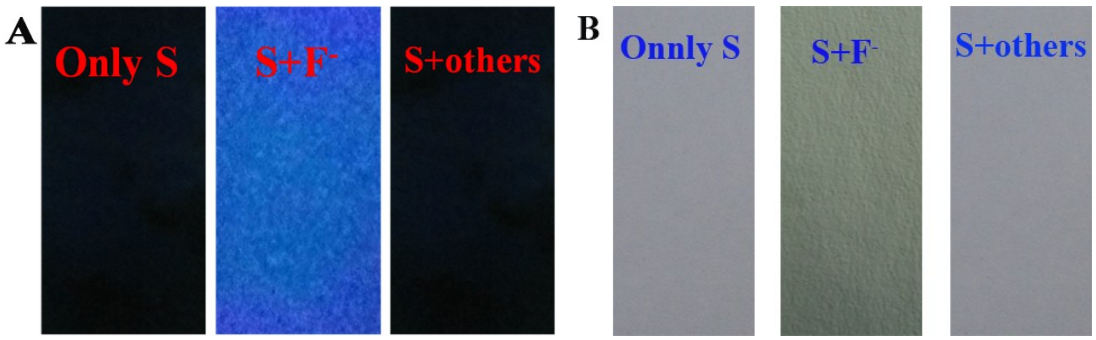

Fig.S9 Photographs of **S** on test papers (Left) only **S**, (Mid) after immersion into solution with F^-, (Right) after immersion into solutions with others in absence of F^- **(A)** under irradiation at 365 nm (B) under nature light.

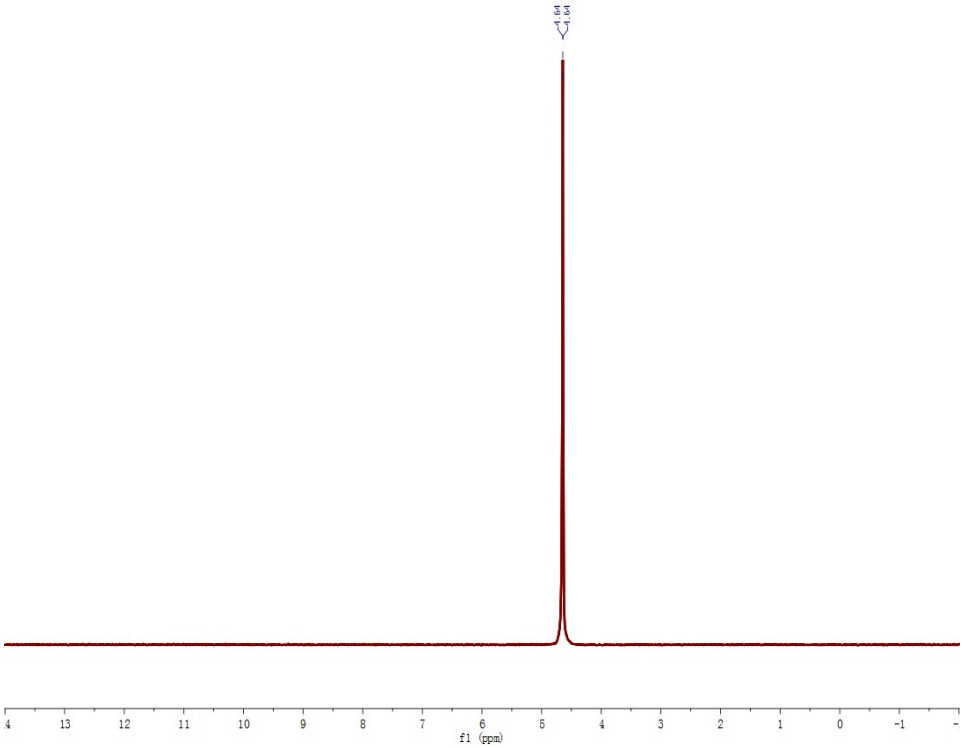

Fig. S10. ^{1}H NMR spectra of sensor **S** in D_2O.