Electronic Supplementary Information

Multicolorful Ratiometric-Fluorescent Test Paper for Determination of Fluoride Ions in Environmental Water

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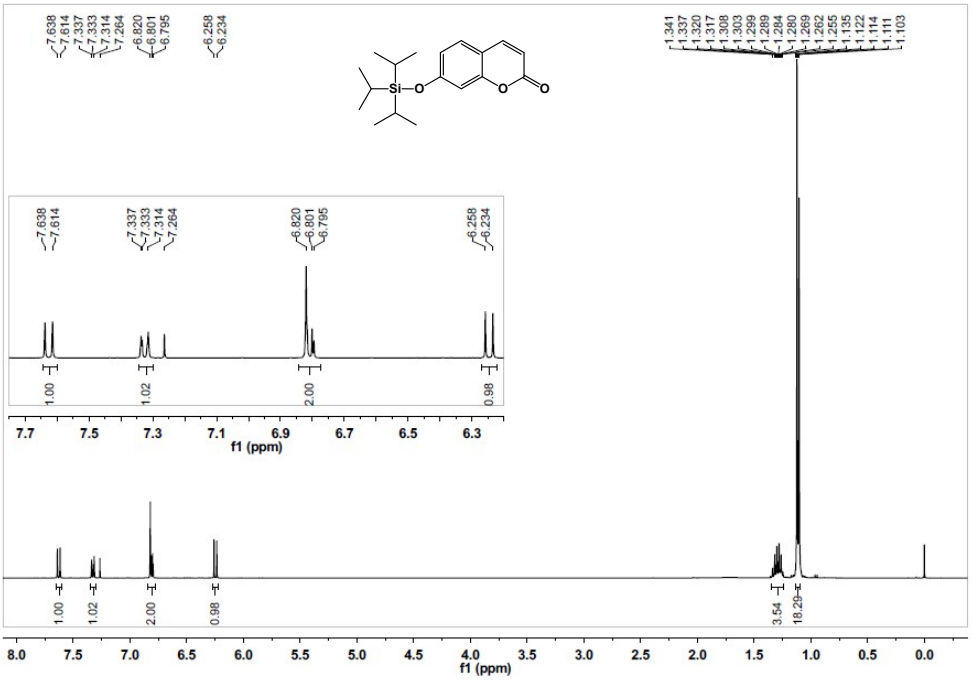

Fig. S1 ^{1}H NMR spectrum of C-TIPS.

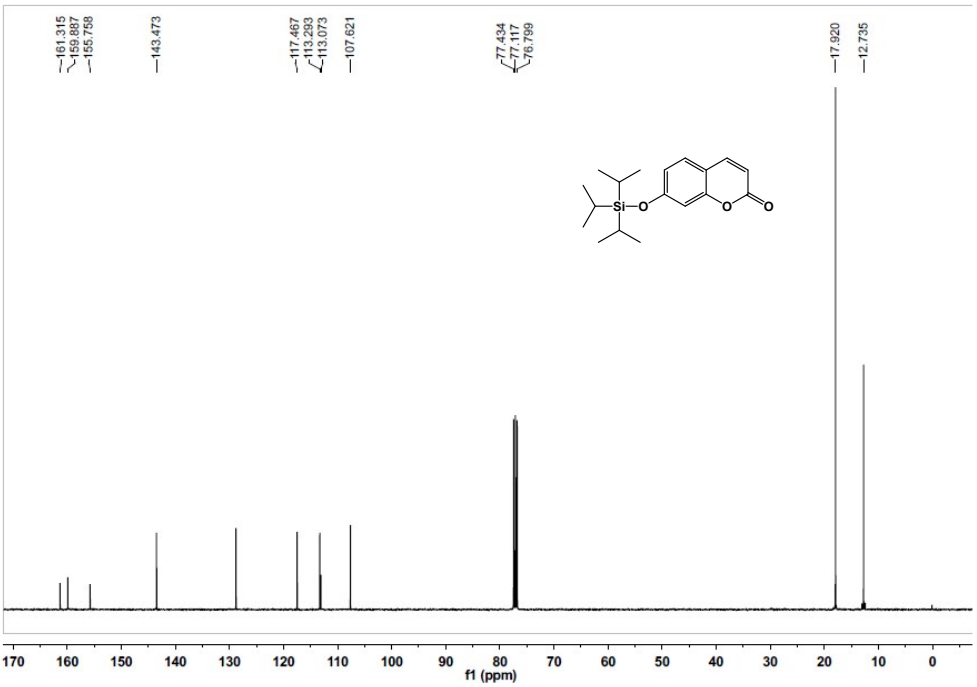

Fig. S2 ^{13}C NMR spectrum of probe C-TIPS.

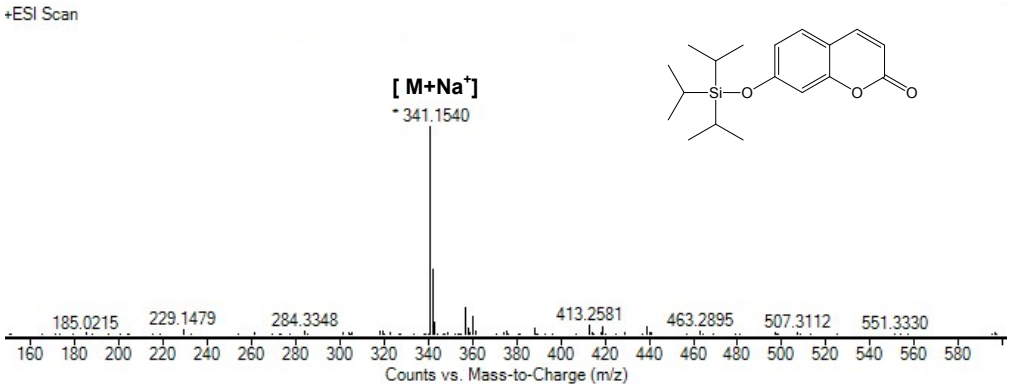

Fig. S3 HR-MS spectrum of C-TIPS.

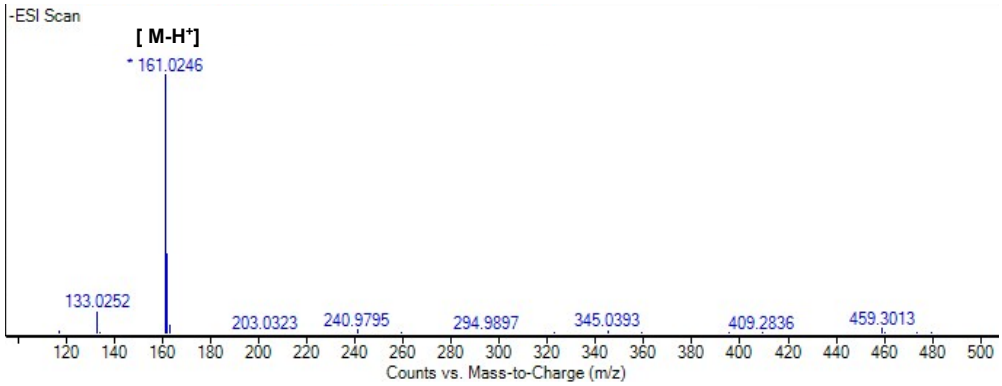

Fig. S4 HR-MS spectrum of C-TIPS after the addition of F^- for 30 min.

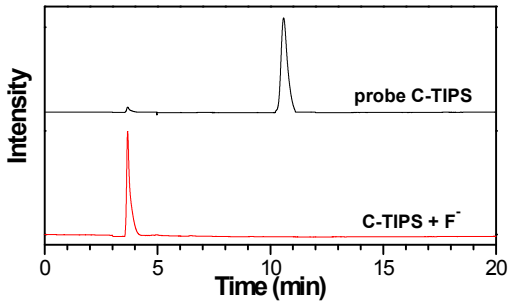

Fig. S5 HPLC profiles of C-TIPS before and after the addition of F^-.

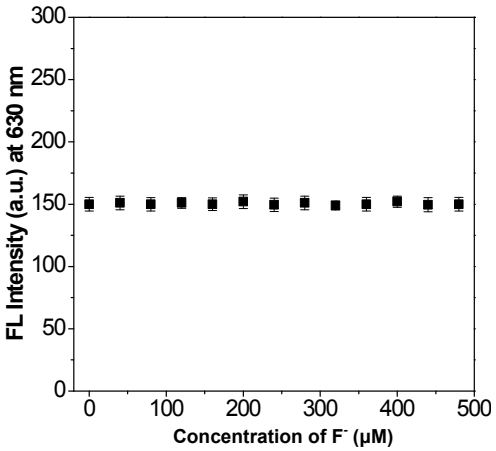

Fig. S6 The fluorescence spectra of the red QDs with the addition of F^- at the excitation of 375 nm.

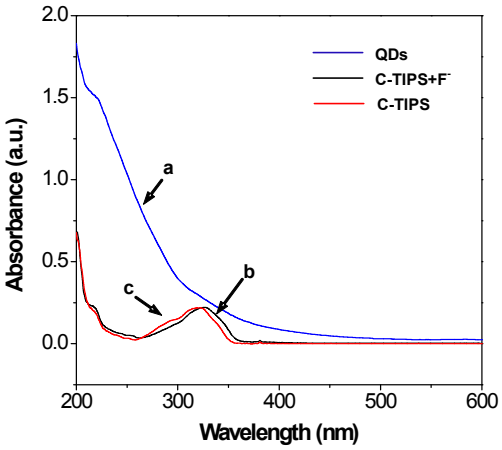

Fig. S7 UV-vis spectra of (a) QDs, (b) C-TIPS after the treatment of 1 mM F^- for 20 min, (c) C-TIPS in EtOH/H_2O (7:3, v/v)

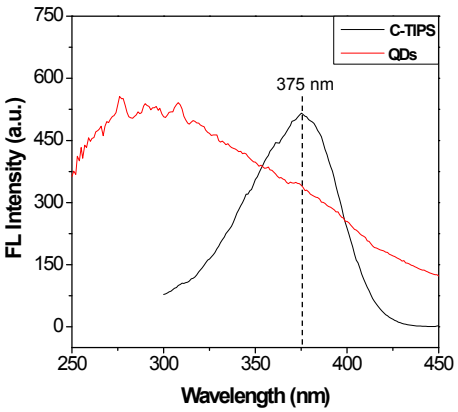

Fig. S8 The excitation spectra of C-TIPS after treatment of 150 equiv of F^- (λ_{em} = 455 nm) and CdTe QDs (λ_{em} = 630 nm).

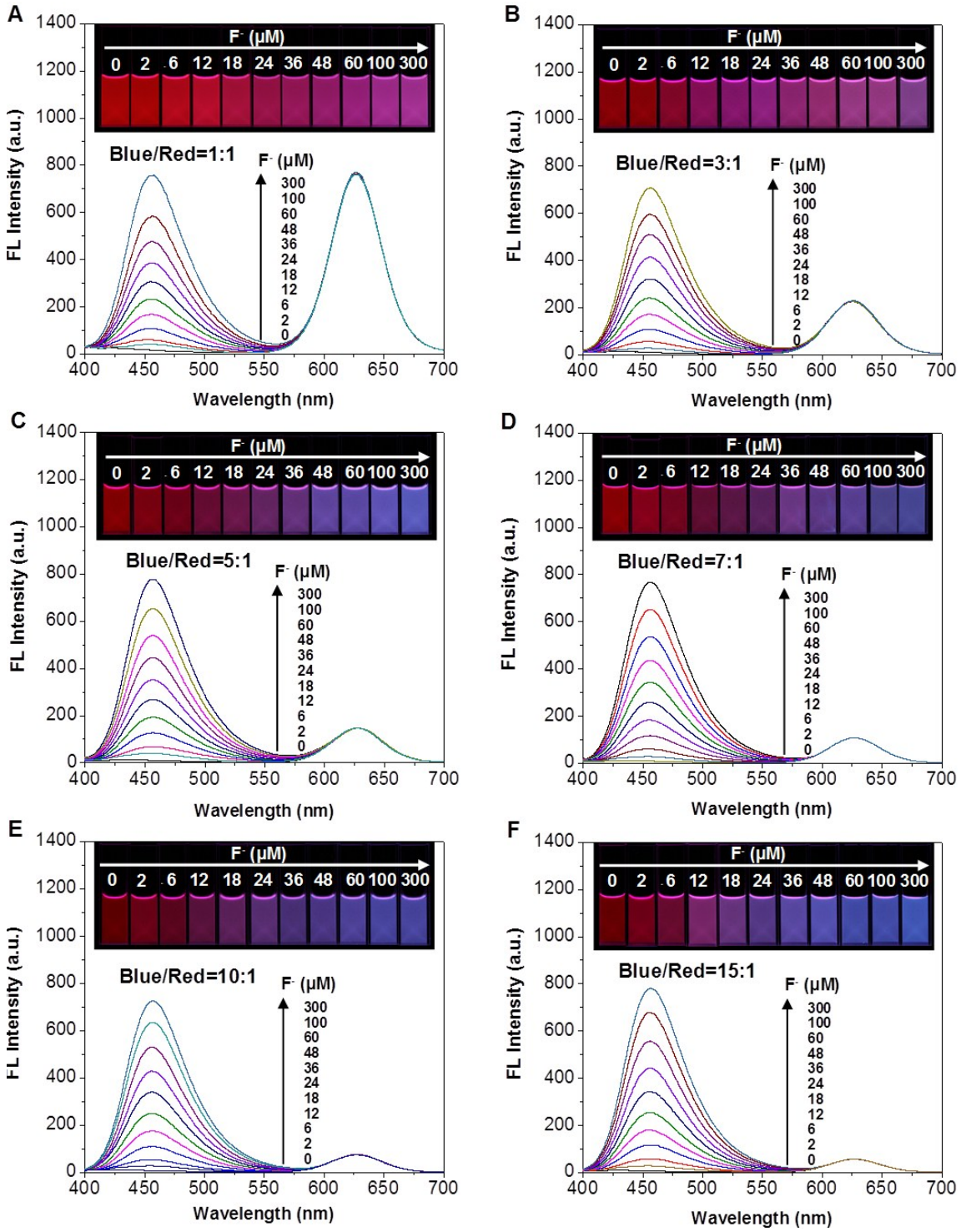

Fig. S9 The fluorescent spectra of mixture of C-TIPS and red QDs at different ratios with the addition of F^-. The ratios of fluorescent intensity (blue to red) were (A) 1:1, (B) 3:1, (C) 5:1, (D) 7:1, (E) 10:1 and (F) 15:1. The insets show the corresponding fluorescent photos under 365 nm UV.

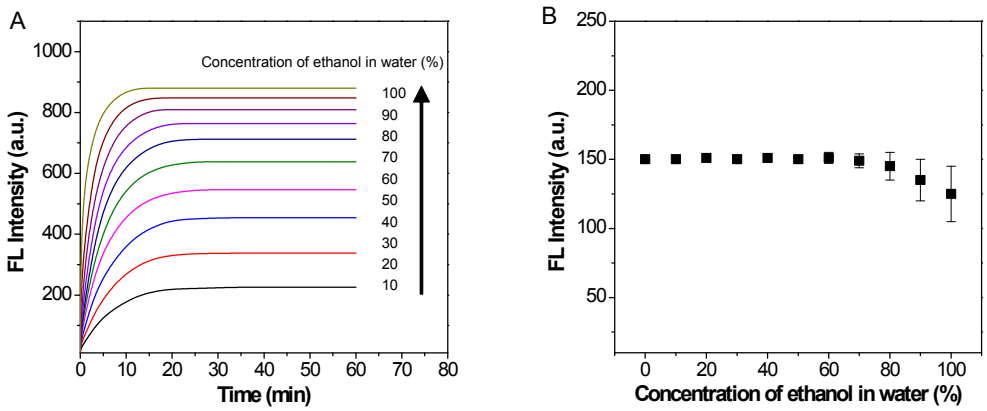

Fig. S10 (A) Time-dependent fluorescence intensity at 455 nm of C-TIPS after the addition of 150 equiv of F^- in different ratios of ethanol and water mixtures, λ_{ex} = 375 nm. (B) The fluorescence intensity at 630 nm of CdTe QDs in different ratios of ethanol and water mixture for 60 min.

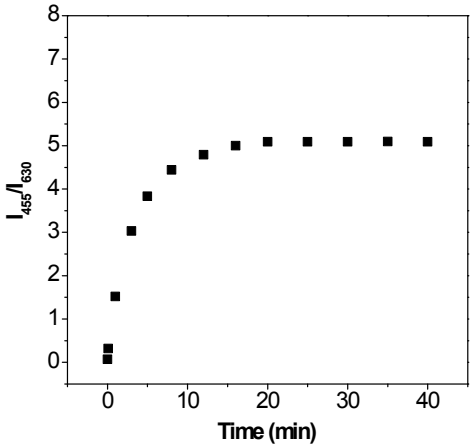

Fig. S11 Time-dependent fluorescence ratios I_{455}/I_{630} in the presence of 300 μM F^- at room temperature.

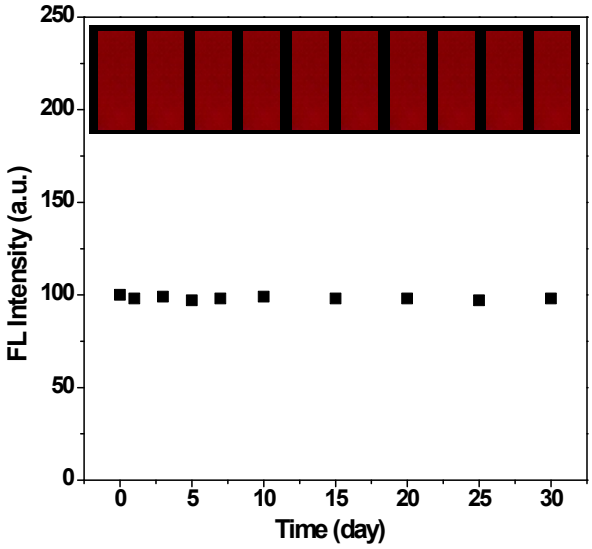

Fig. S12 The fluorescence stability of C-TIPS/CdTe QDs printed on paper (stored at 4 ^{o}C for different days). The photos were taken under a 365nm UV lamp.

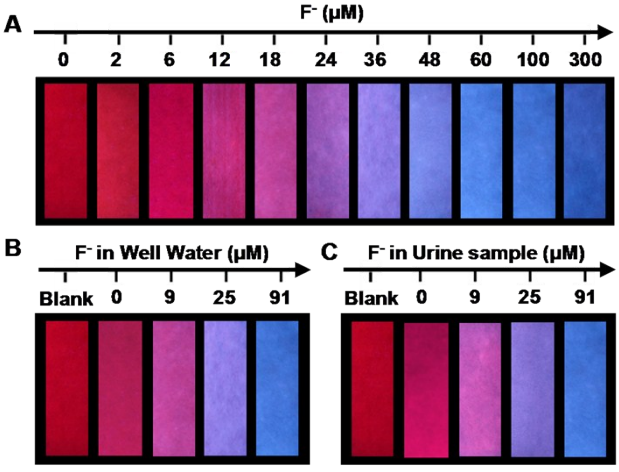

Fig. S13 (A) Visualization of F^- using the fluorescent test papers. (B, C) Visual detections of F^- in well water and urine sample, respectively. The photos were taken under 365 nm UV lamp.

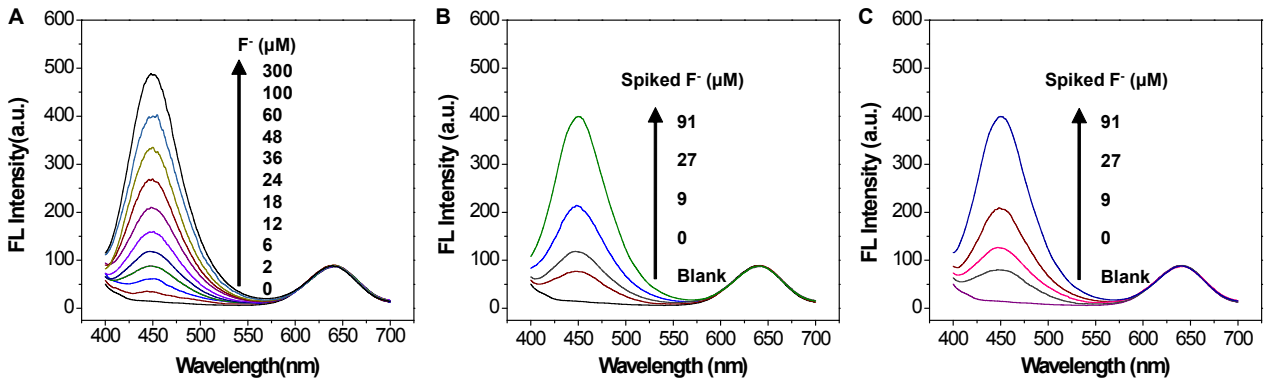

Fig. S14 Fluorescent spectra of test paper: (A) Visualization of F^- using the fluorescent test papers. (B, C) Visual detections of F^- in tap water and lake water, respectively.

Table S1 The detection limit previously reported Si-O bond breaking probe.

Materials	Methods	LOD	Ref.
Benzothiazolium hemicyanine derivative	Ratiometric fluorescence	80 μM	1
Quaternary ammonium functionalized fluorescent probes	Turn-on fluorescence	30 μM	2
Coumarin-based fluorescent probe	Fluorescence enhancement	0.67 μM	3
Rhodamine based molecules	Colorimetry and turn-on fluorescence	7.37μM	4
8-Silyloxyquinoline Scaffold	Colorimetry and turn-on fluorescence	3.8 μM	5
Coumarin-based probe/CdTe QDs	Ratiometric fluorescence	0.285 μM	This work

Table S2 The recoveries of F^- spiked in local lake water and tap water using the mixing system of C-TIPS/CdTe.

Spiked F^- (μM)	Well Water		Urine sample	
	Found (μM)	Recovery (%)	Found (μM)	Recovery (%)
0	9.1	101.1 ± 3.4	9	101.1 ± 4.1
12	20.9	99.5 ± 2.9	20.5	98.1 ± 3.8
36	45.3	100.7 ± 3.1	44.3	98.7 ± 3.5
100	110.7	101.6 ± 2.7	106.4	97.7 ± 3.7

References

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