Supporting Information

Table S1. RGB values of captured images for standard calibration curve (above) and real samples (below).

F^- (mg/L)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
R	169.0	169.3	172.7	174.7	167.7	174.7	173.0	173.3	170.7	176.3	174.7
G	169.0	159.0	156.0	152.7	141.0	144.7	138.3	135.7	126.7	128.0	122.3
R/G	1.00	1.06	1.11	1.14	1.19	1.21	1.25	1.28	1.35	1.38	1.43

Real samples	groundwater	snow	rain	lake	tap water	fine drinking water	purified water	mineral water	toothpaste solution
R	173.0	175.7	171.7	181.0	174.7	177.7	172.0	175.0	173.0
G	128.3	141.7	154.7	138.3	138.0	144.0	163.0	133.3	153.7
R/G	1.35	1.24	1.11	1.31	1.27	1.23	1.06	1.31	1.13

Table S2. Comparison of F^- detection by smartphone-based colorimetry with other coumarin containing receptors.

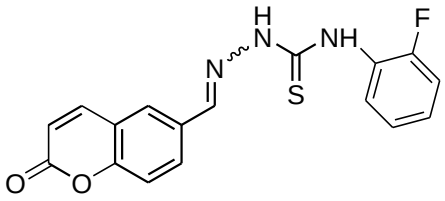
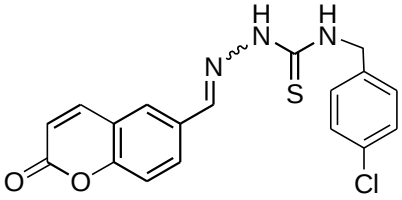
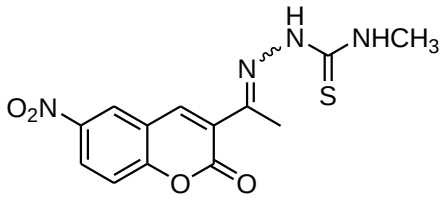
Coumarin containing receptors	Detection method	Detection limit	Ref.
	Colorimetric & Fluorescence	9.42 μM	10
	Colorimetric & Fluorescence	22.5 μM	10
	Smartphone-based colorimetry	1.52 μM (0.088 mg/L)	This work

Table S3. Spiked and recovery test of F^- in drinking water from smartphone colorimetry. Values were means ± standard deviation (n = 3).

Water sample	Added (mg/L)	Found (mg/L)	Recovery (%)	RSD (%)
tap water	0	0.61	-	-
	0.2	0.82	105.0	5.0
	0.4	0.99	95.0	4.5
	0.6	1.23	103.3	4.8

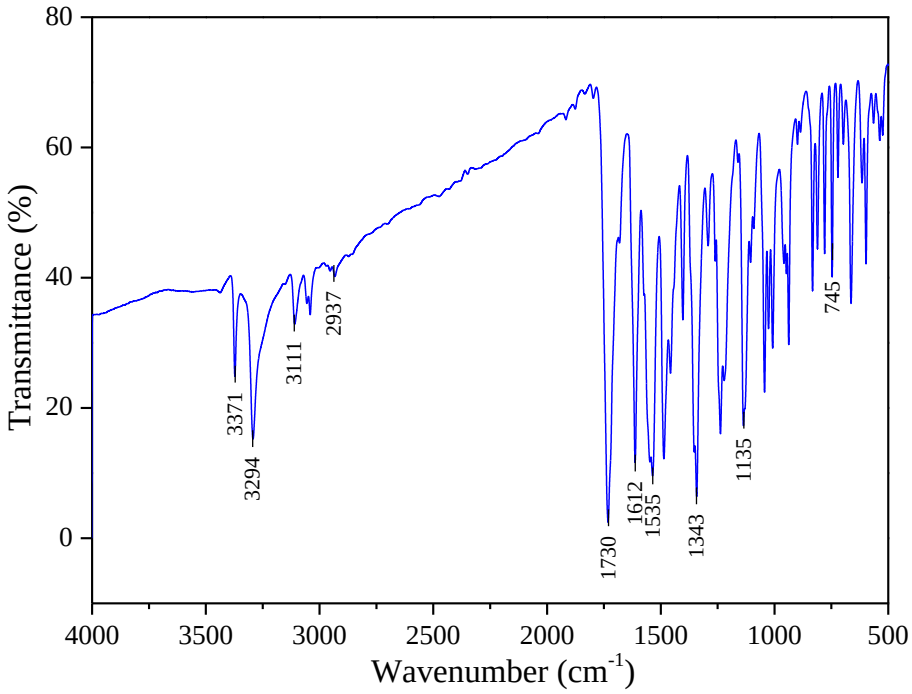


Fig. S1. FTIR of receptor R.

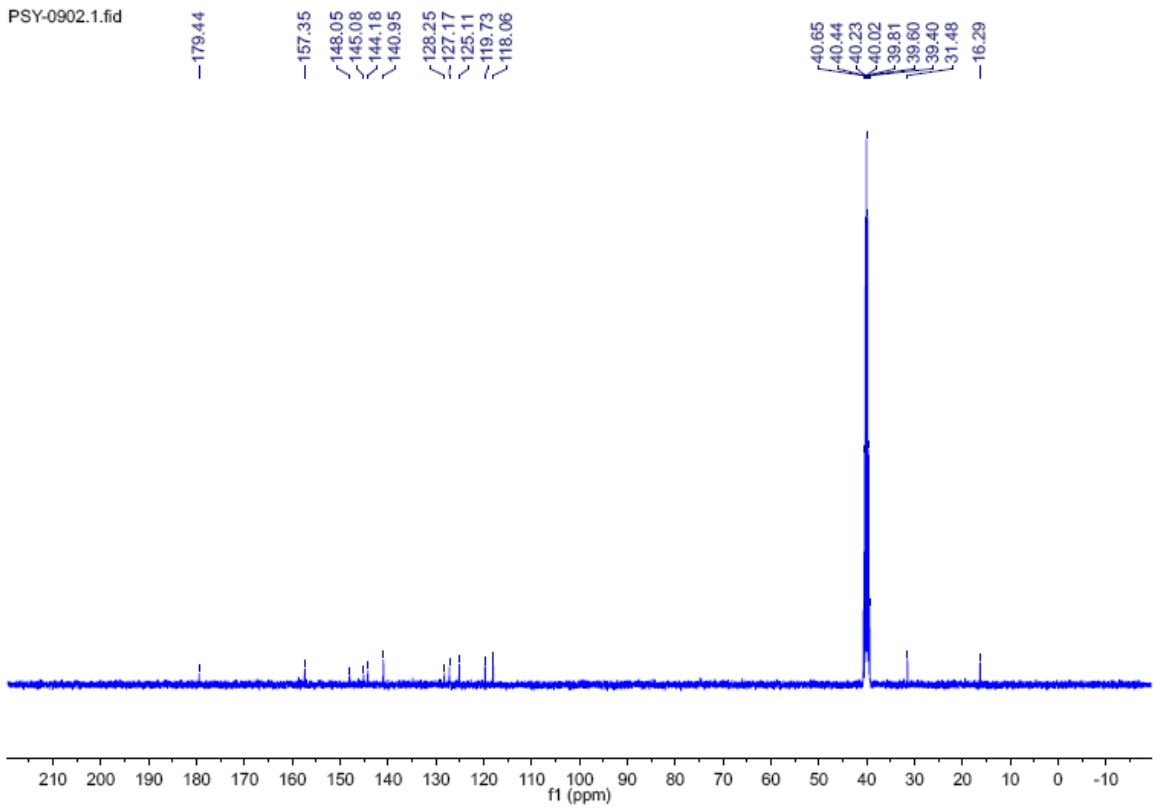


Fig. S2. ^{13}C NMR spectra of receptor R.

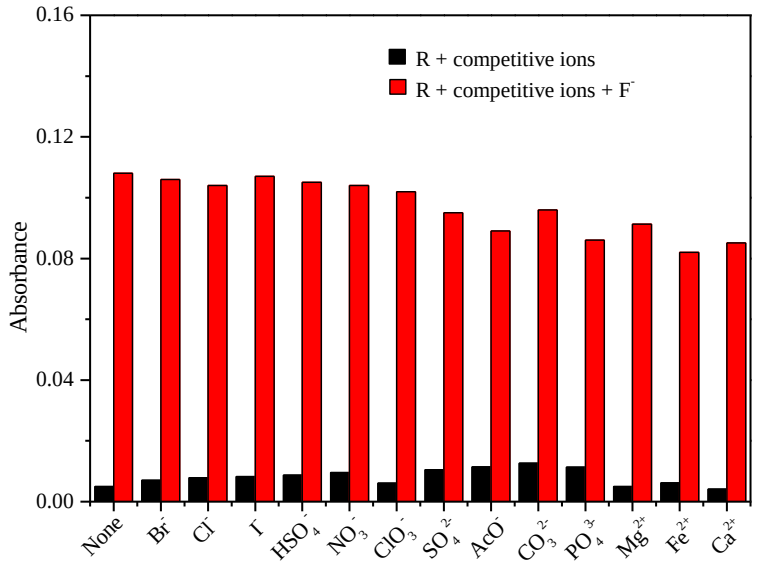


Fig. S3. Change in absorbance of receptor R (100 μM) towards F^- in presence of other ions (10 μM) at 546 nm.

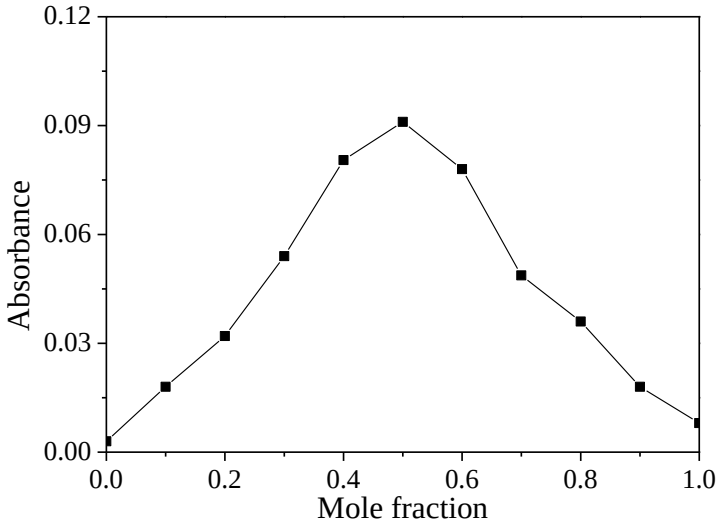


Fig. S4. Job's plot for the interaction between receptor R and F^-.

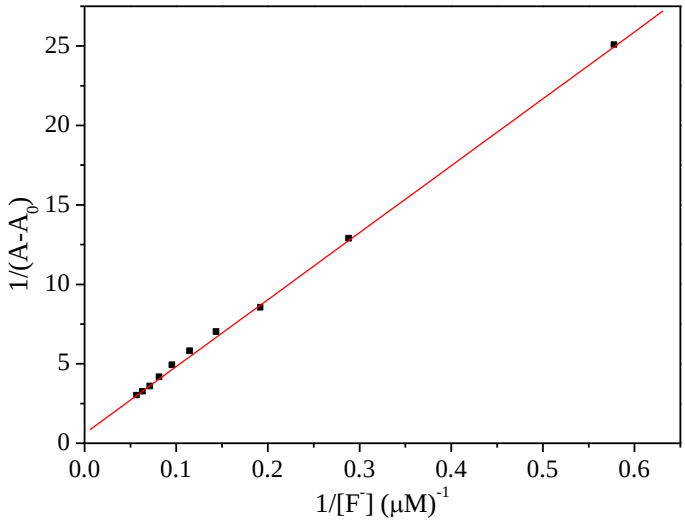


Fig. S5. Benesi-Hildebrand plot for receptor R with F^-. The binding constant of receptor with fluoride was evaluated by Benesi Hildbrand equation (Solanki et al., Sensor Actuat A: Phys. 2021, 328: 112776; Jain et al., Anal Chem Lett. 2017, 7(2): 170-87): $1/(A-A_0) = 1/\Delta A_{max} + 1/(K[F^-]\Delta A_{max})$. $\Delta A_{max} = A_{max}-A_0$, where A_0, A, and A_{max} were the receptor absorption with no fluoride, concentration at middle level, and at a maximum binding concentration for complete binding. K was the binding constant and $[F^-]$ was the fluoride concentration. The value of K was determined from the intercept/slope of a linear plot obtained by plotting $1/(A-A_0)$ *vs*. $1/[F^-]$.

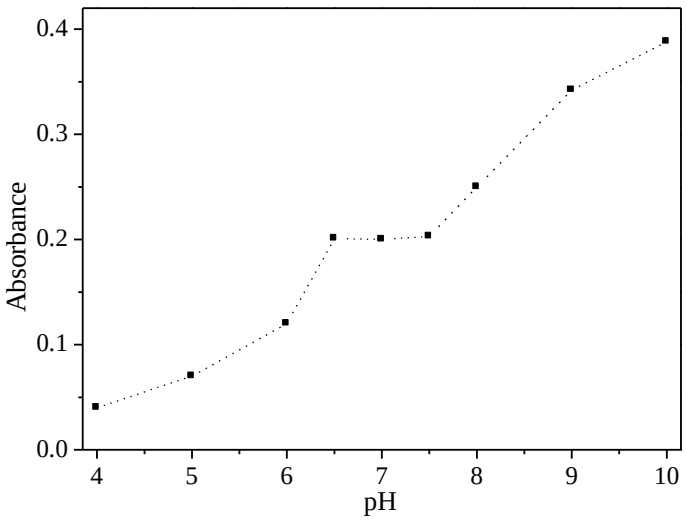


Fig. S6. Absorbance changes of receptor R at 546 nm with respect to various pH of solution containing F^-.