

Electronic Supplementary Material (ESI) for New Journal of Chemistry.

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UltraSensitive Fe³⁺ ion detection based on pH-insensitive fluorescent graphene nanosensors in strong acid and neutral media

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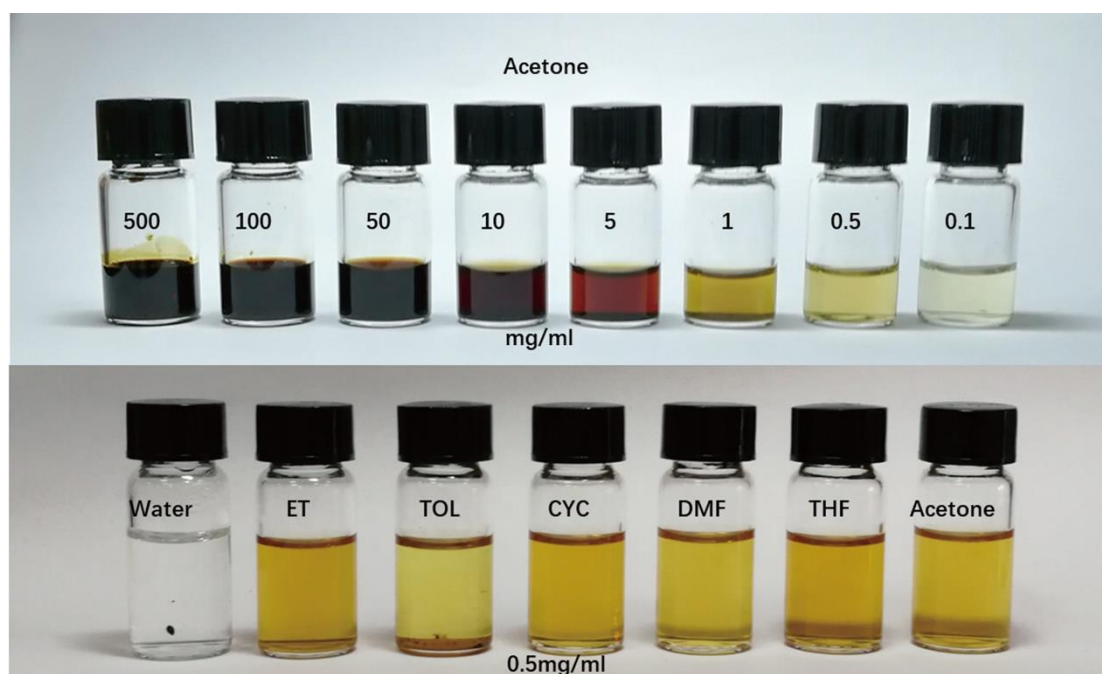


Figure S1: The dispersion pattern of FRGO in acetone from 0.1 to 500 mg/ml and the dispersion pattern of FRGO in different solvents at 0.5 mg/ml

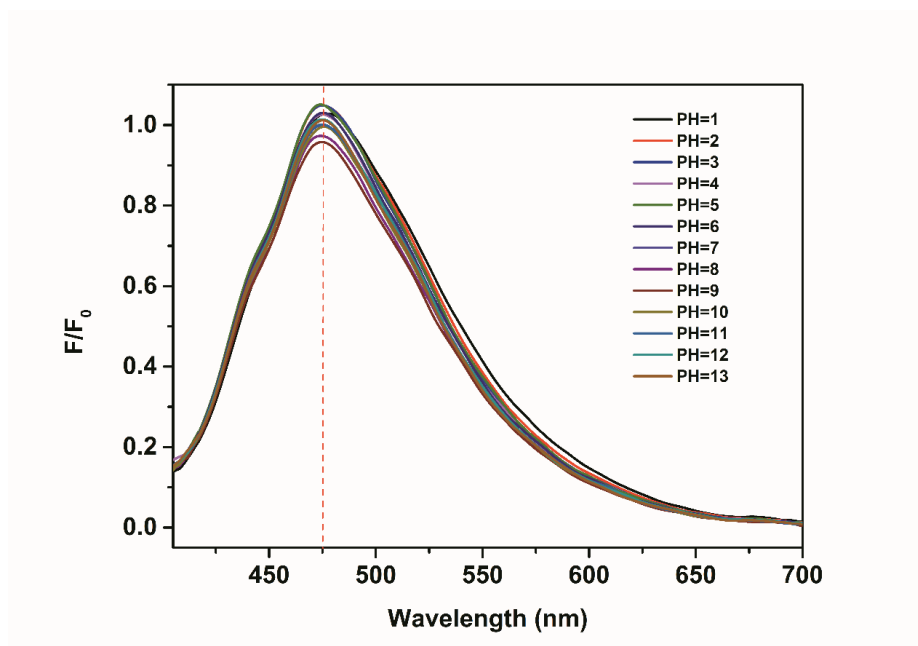


Figure S2: Fluorescence intensity at 475 nm upon excitation at 375 nm as a function of pH.

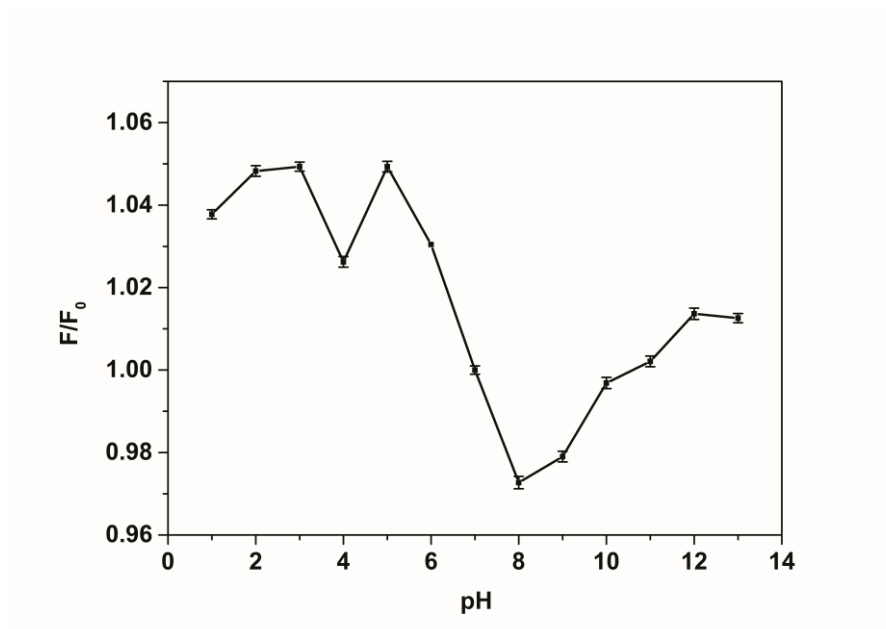


Figure S3: Fluorescence intensity at 475 nm upon excitation at 375 nm as a function of pH.

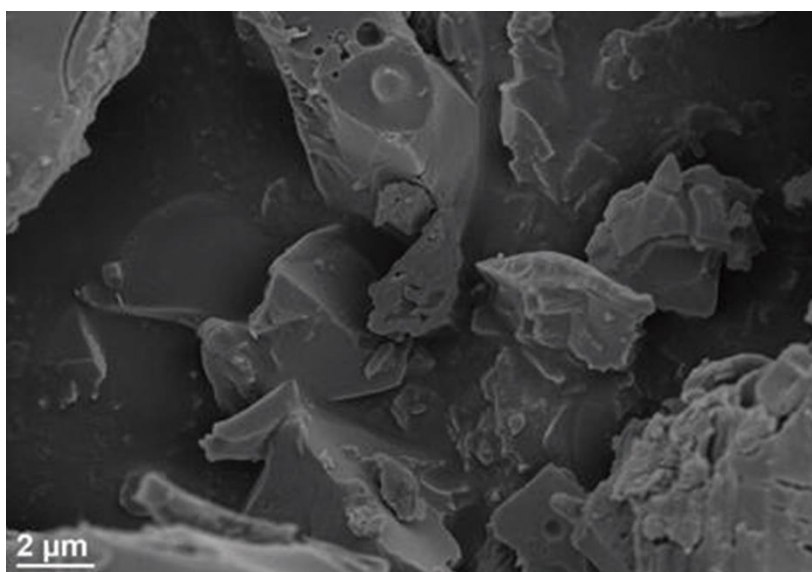


Figure S4: SEM image of FRGO

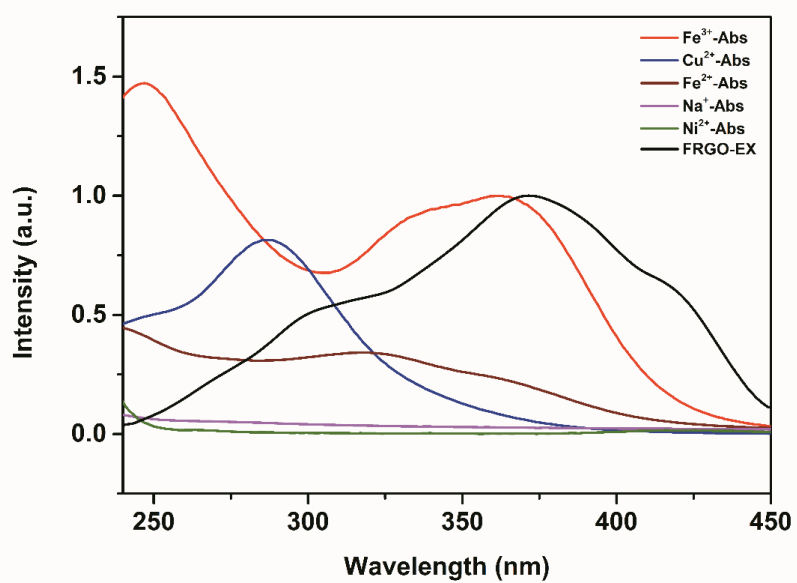


Figure S5: The excitation spectrum of FRGO and the UV-vis absorption spectra of Fe³⁺, Cu²⁺, Fe²⁺, Na⁺, Ni²⁺.

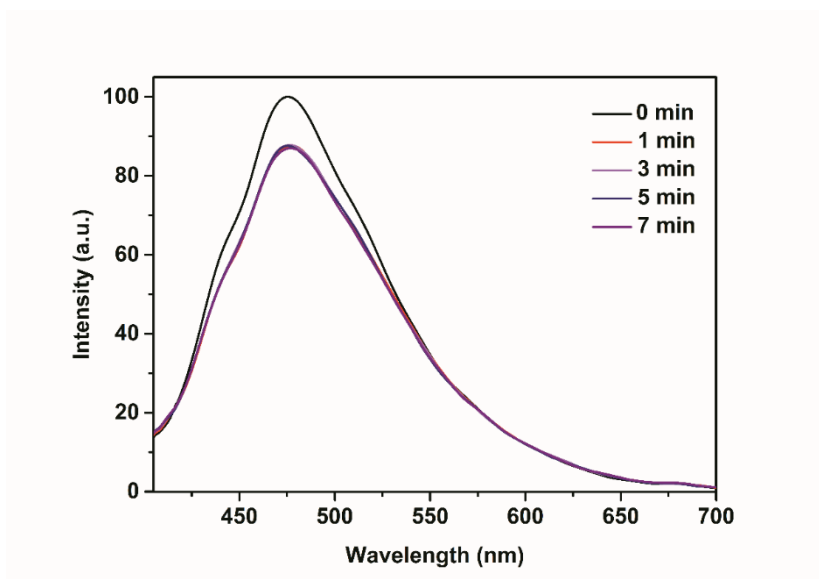


Figure S6: Time-dependent fluorescence change of the FRGO in the presence of Fe^{3+} $20\mu\text{M}$.

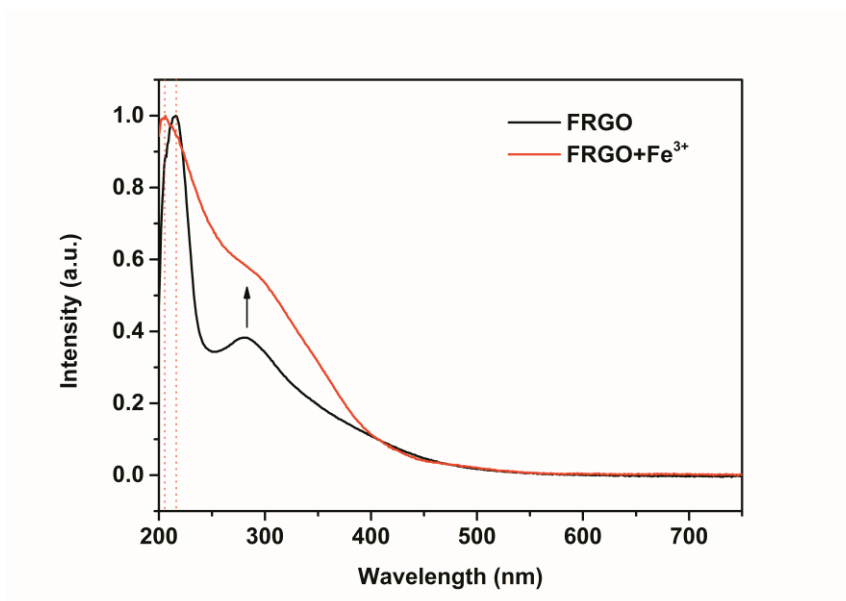


Figure S7: UV-Vis changes of the FRGO (0.03mg/ml) and that after adding of Fe^{3+} (2mM).

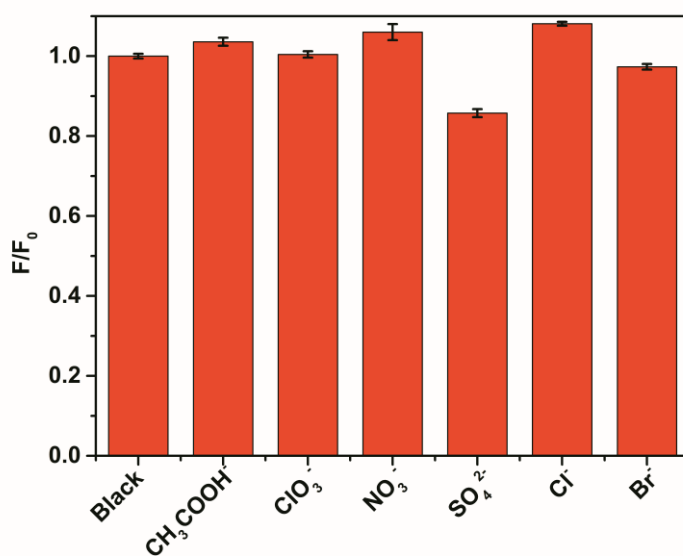


Figure S8: The relative FL ratio of FRGO in the absence and presence of various anion ions at a concentration of 0.2 mM.

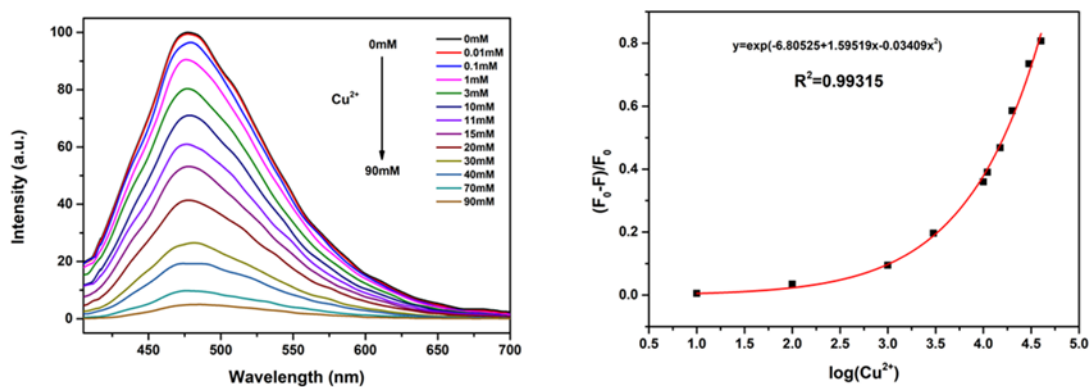


Figure S9: (A) Fluorescence spectra of FRGO solution with different concentrations of Cu²⁺ at pH = 7; (B) The comparison of the obtained (F₀-F)/F₀ for the detection of Cu²⁺ at pH = 7

Table S1 RGO and FRGO, with C, N, and O contents (%) obtained from XPS analysis.

Sample	C 1s	N 1s	O 1s
RGO	84.16	0	15.84
FRGO	81.98	5.77	12.25

Table S2 C 1s XPS deconvolution fitting results. All values are in percent

Sample	C=C	C-O(C-N)	C-C	C=O
RGO	67.45	8.58	21.34	2.64
FRGO	44.75	27.8	22.01	6.42

Table S3 The value of residual weight (%) at 800°C and loss of 5% of the value of decomposition temperature (°C).

Sample	The weight residual of 800 °C (%)	The decomposition temperature of 5 % (°C)
RGO	69.8	--
FRGO	38.6	168

Table S4 Detection of Fe³⁺ ions in river water samples.

Sample	Concentration(nM)					
	Added	Found by ICP-MS	Recovery ^a by MS(%)	Found by FRGO	Recovery ^a by FRGO(%)	
1	0	35.45	--	33.80	--	
2	10	45.27	98.2	44.00	102.0	

^aRecovery = (determined C_{metal ion} of spiked sample - determined C_{metal ion} of non-spiked sample)/added value × 100%.