Supplementary Information (SI) for RSC Advances.
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Supplementary Information

MnFe Aminoclay as a Novel Catalyst: Structural Characterization and Potential for Catechol Detection

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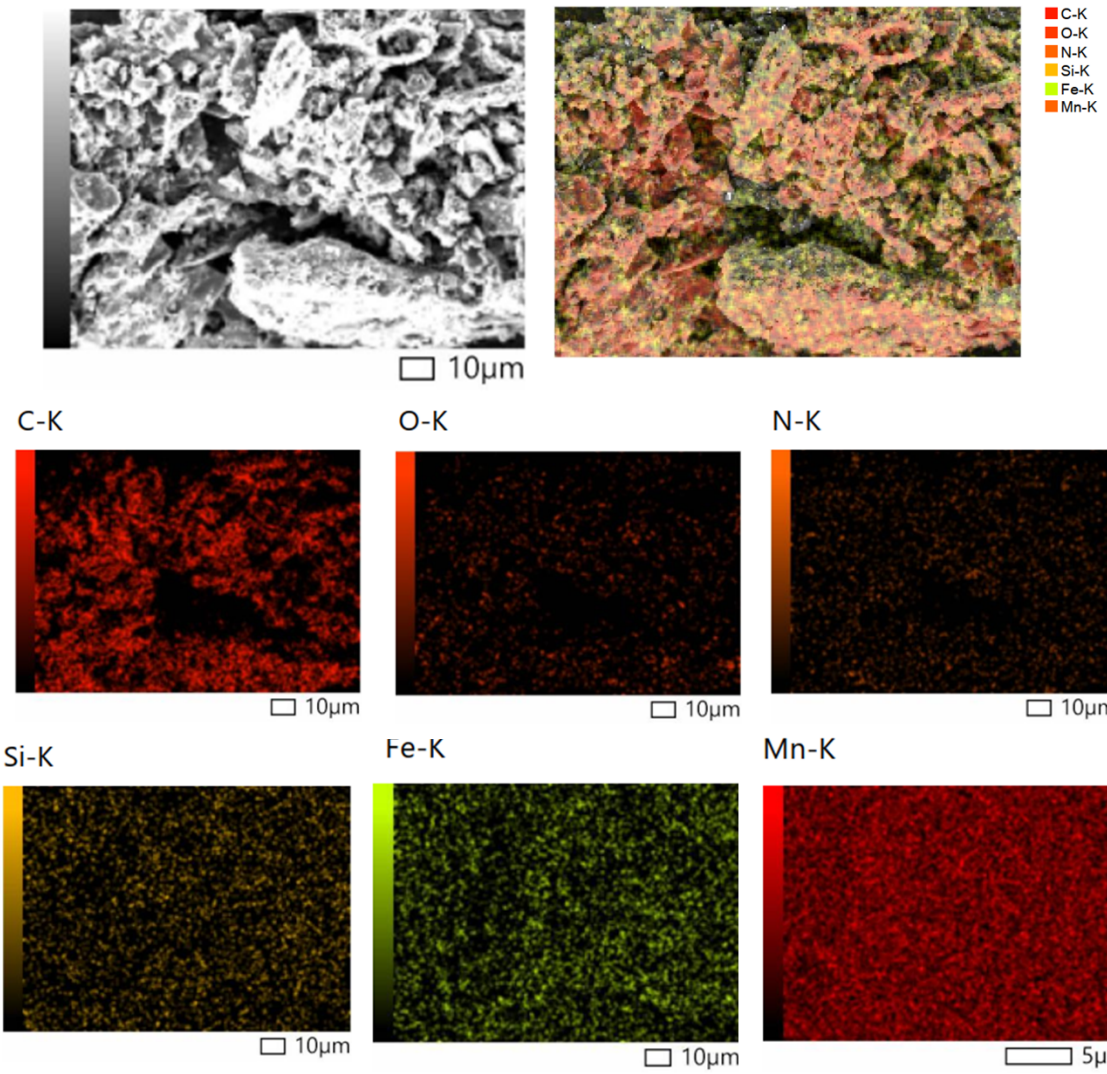

Fig. S1 SEM-EDS elemental mapping images of MnFeAC (5:1)

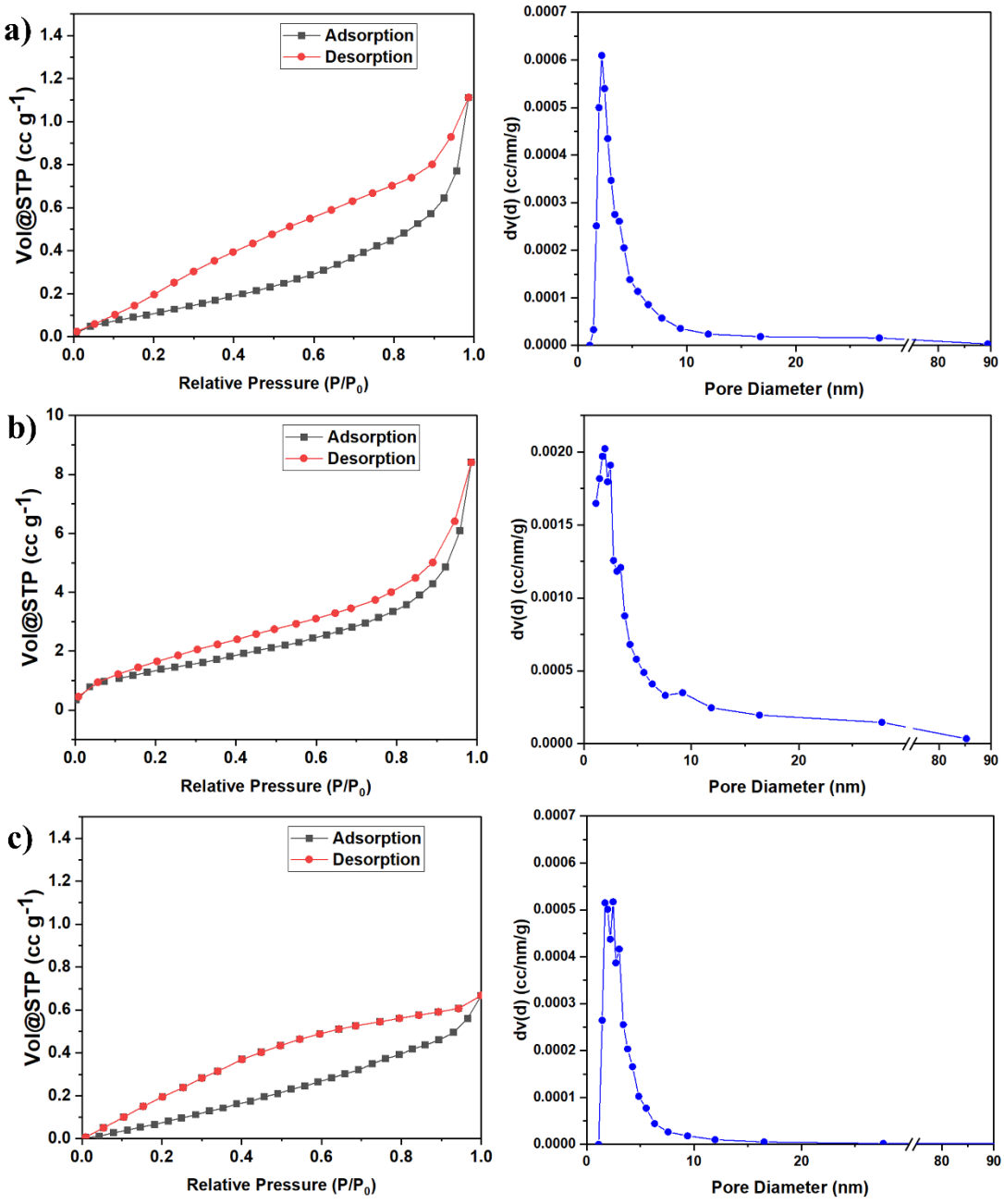

Fig. S2 N_2 desorption isotherm (left) and BJH pore structure analysis of MnAC (a), FeAC (b), and MnFeAC (5:1) (c).

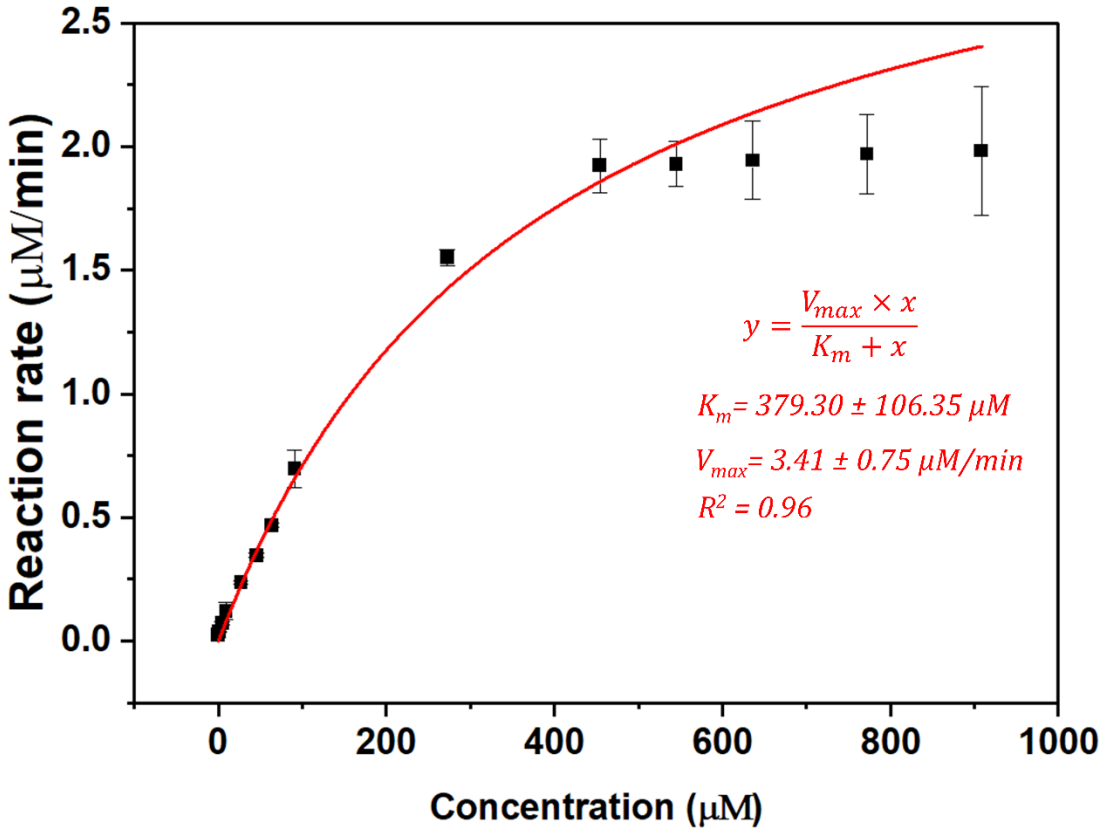

Fig. S3 Michaelis-Menten kinetic analysis of catechol oxidation catalyzed by MnFeAC (5:1). Experiments were performed in triplicate (n = 3). Error bars indicate SD.

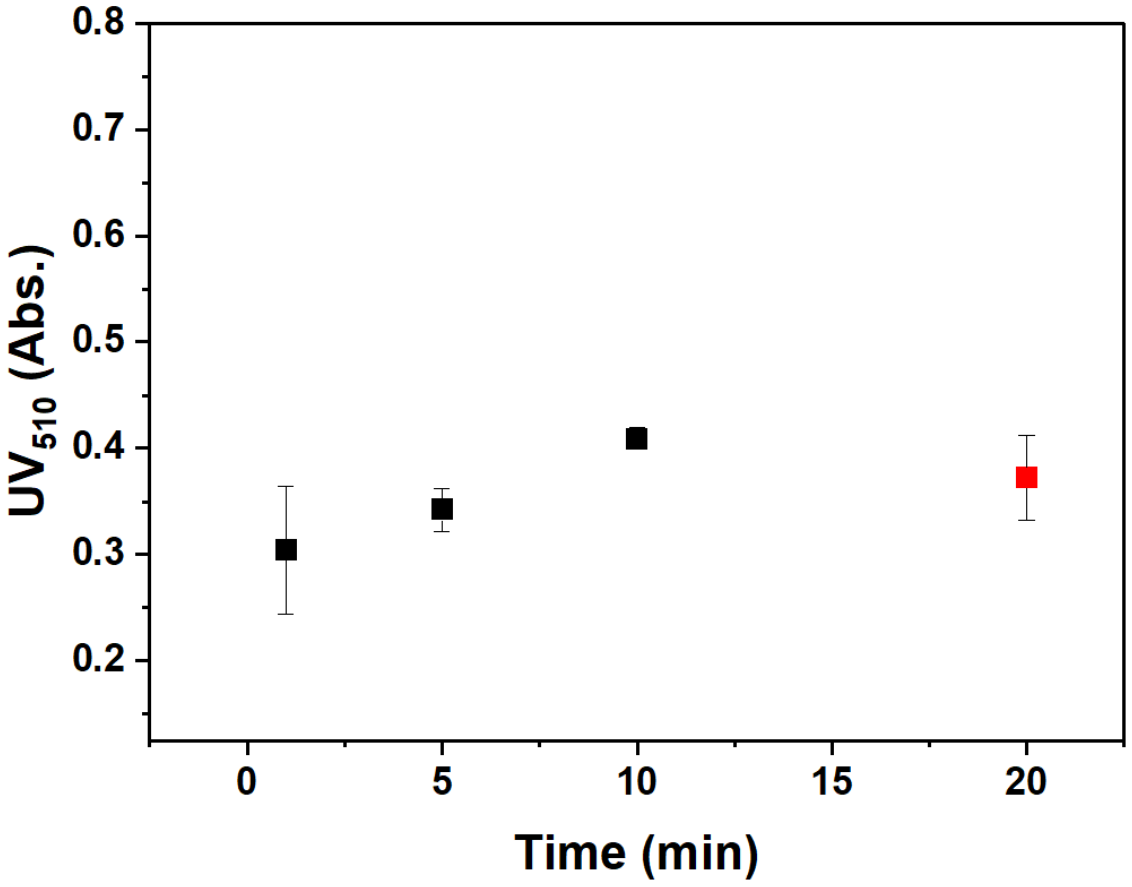

Fig. S4 Effect of H_2O_2 on the reaction time of the colorimetric detection system with MnFeAC (5:1) as catalyst. The red points represent reactions conducted without added H_2O_2. Reaction conditions: [Catechol] = 100 μM; pH = 7.4; T^o = 45°C; [4-AAP] = 0.1 mg mL^{-1}. Experiments were performed in triplicate (n = 3). Error bars indicate SD.

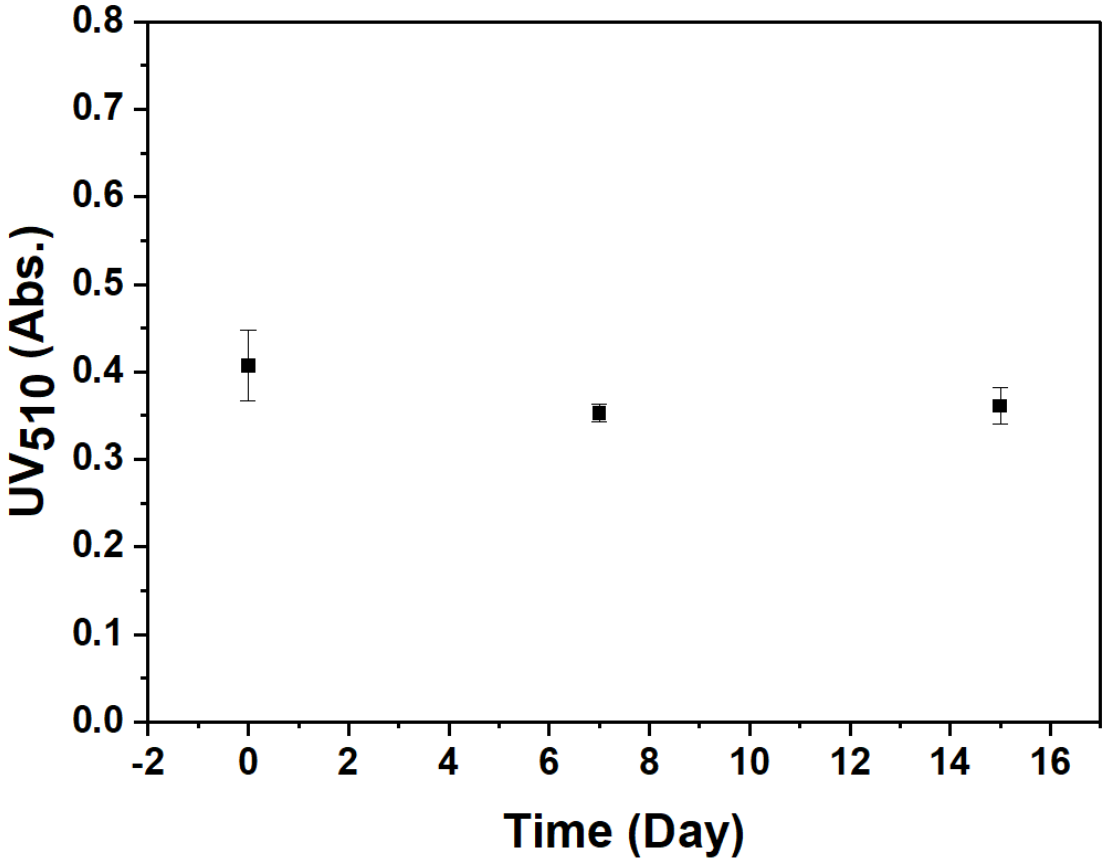

Fig. S5 Storage ability of detection system with MnFeAC (5:1) as catalyst. Reaction conditions: [Catechol] = 100 μM; pH = 7.4; T^{o} = 45^{o}C; [4-AAP] = 0.1 mg mL^{-1}. Experiments were performed in triplicate (n = 3). Error bars indicate SD.

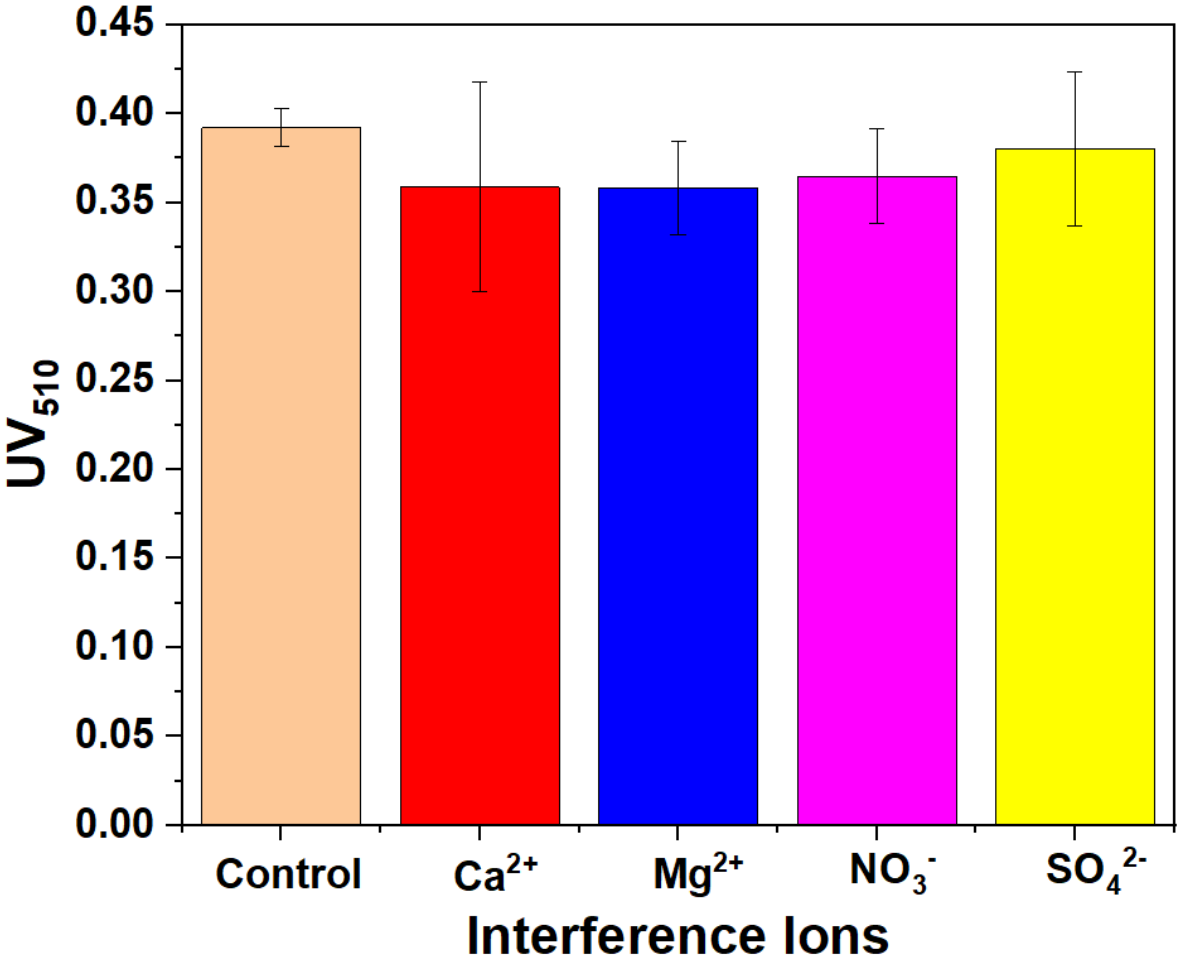

Fig. S6 Effect of common inorganic ions on UV_{510}. The concentration of each ions is 5 times higher than catechol (500 µM). Reaction conditions: [Catechol] = 100 µM; pH = 7.4; T^o = 45^{o}C; [4-AAP] = 0.1 mg mL^{-1}. Experiments were performed in triplicate (n = 3). Error bars indicate SD.

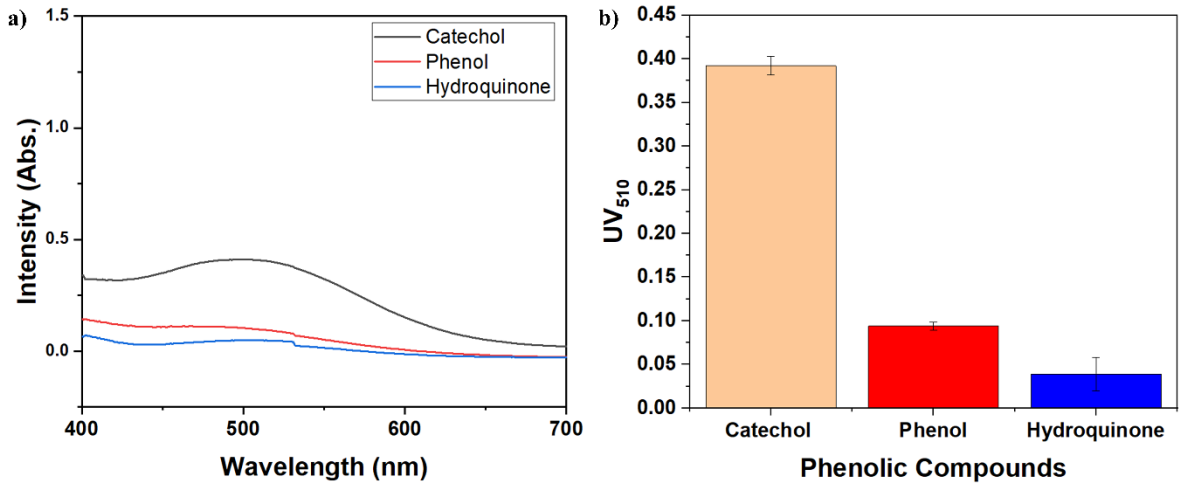

Fig. S7 a) UV-vis absorption spectra of catechol, phenol, and hydroquinone recorded in the wavelength range of 400-700 nm. b) Corresponding colorimetric responses quantified as UV_{510} for the three phenolic compounds. Reaction conditions: [Phenolic compounds] = 100 µM; pH = 7.4; T^o = 45^{o}C; [4-AAP] = 0.1 mg mL^{-1}. Experiments were performed in triplicate (n = 3). Error bars indicate SD.

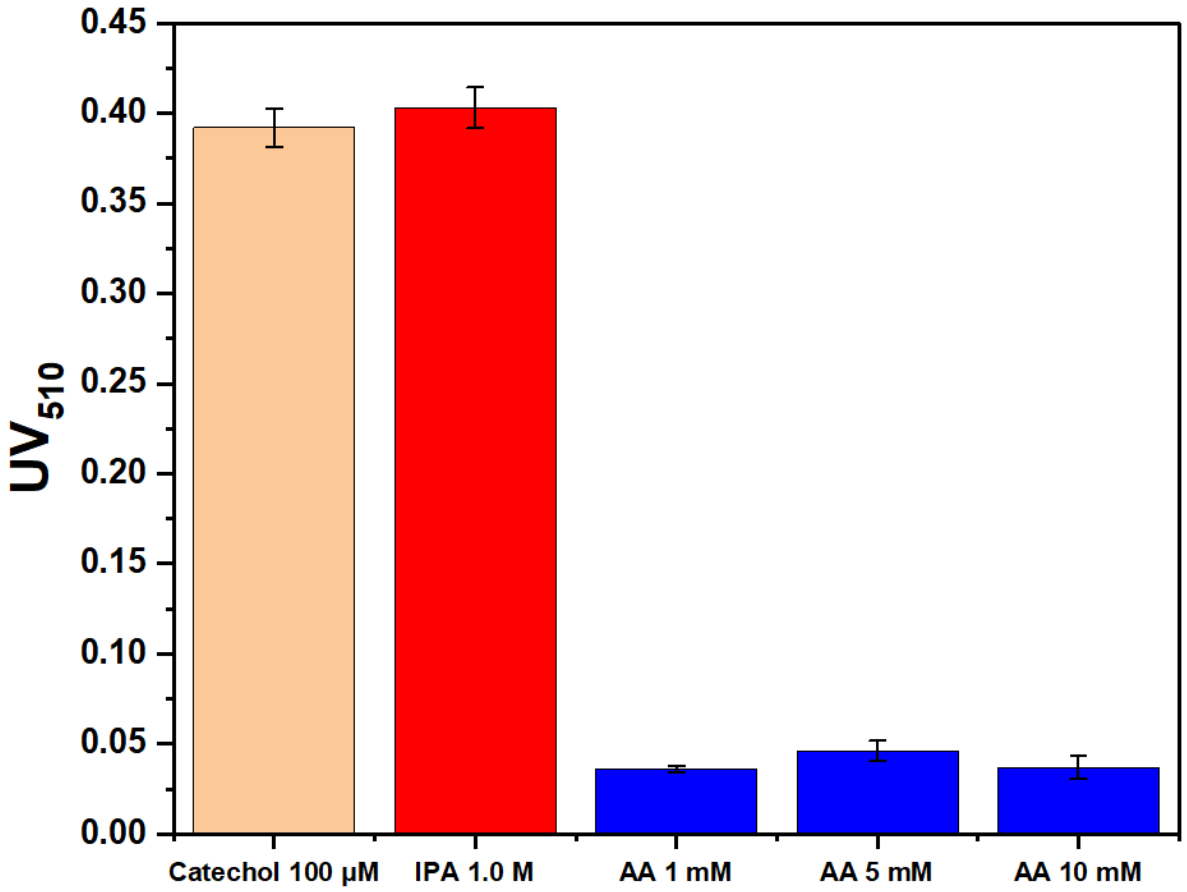

Fig. S8 UV_{510} response of detection system with 100 µM catechol in the presence of scavenging agents: isopropanol ($^{\bullet}OH$ scavenger) and ascorbic acid ($O_2^{\bullet-}$ scavenger). Reaction conditions: pH = 7.4; T^o = 45°C; [4-AAP] = 0.1 mg mL^{-1}. Experiments were performed in triplicate (n = 3). Error bars indicate SD.

Table S1. Specific surface area (BET), pore size, and pore volume of MnAC, FeAC, and MnFeAC (5:1)

Sample	**BET Surface Area ($m^2\ g^{-1}$)**	**BJH Pore size (nm)**	**BJH Pore Volume ($cm^3\ g^{-1}$)**
MnAC	0.60	2.196	0.002
FeAC	5.07	1.966	0.015
MnFeAC (5:1)	0.86	2.466	0.002

C_{spiked} (µM)	C_{found} (µM)	$C_{unspiked}$ (µM)	Recovery (%)
9.084	13.38		112.3%
45.42	54.73	3.18	113.5%
90.84	99.86		106.6%
		Mean (%)	110.8%
		Standard Deviation	3.79
		RSD (%)	3.4%

Table S2. Recovery analysis of catechol detection in tap water using MnFeAC (5:1)