Supporting Information

Construction of colorimetric sensor array based on coupling reaction to identify phenols

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Preparation of Nanoenzymes

Preparation of Fe-N-C nanozymes. First, DICY (5 g), Glucose (1 g), and $FeCl_2 \cdot 4H_2O$ (5 mL, 10 mM) were dissolved in water to obtain a homogenous solution and stirred 12 h. Then, the water was removed by freeze-drying to obtain the powder. Finally, the powder was pyrolyzed at 900 °C for 2 h with a rate of 3 °C/min in N_2 to obtain the Fe−N−C nanozymes.[1]

Preparation of Cu-N-C nanozymes. First, $Cu(NO_3)_2$ (0.7275 g) in 30 mL of anhydrous methanol was used as solution 1. Then, KCl (500 g) as the template was stirred with the solution 1 and dried at 80 °C. Next, 2-MeIm (0.821 g) in 30 mL of methanol as solution 2 was added for immobilization of the 2-MeIm onto the KCl template, the solution was dried at 80 °C to obtain Cu(2-MeIm)/KCl. The powder was pyrolyzed at 750 °C for 2 h with a rate of 5 °C/min in Ar. Finally, the bulk sample was washed several times with a large amount of H_2SO_4 and H_2O to obtain Cu-N-C nanozymes.[2]

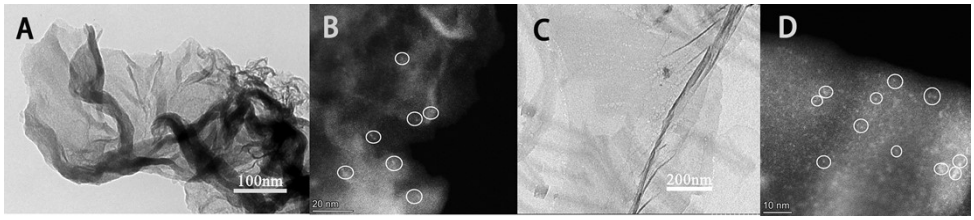


Figure S1. TEM images of Fe-N-C nanozymes and Cu-N-C nanozymes (A and C), Magnifiied HAADF-STEM images of Fe-N-C nanozymes and Cu-N-C nanozymes (B and D).

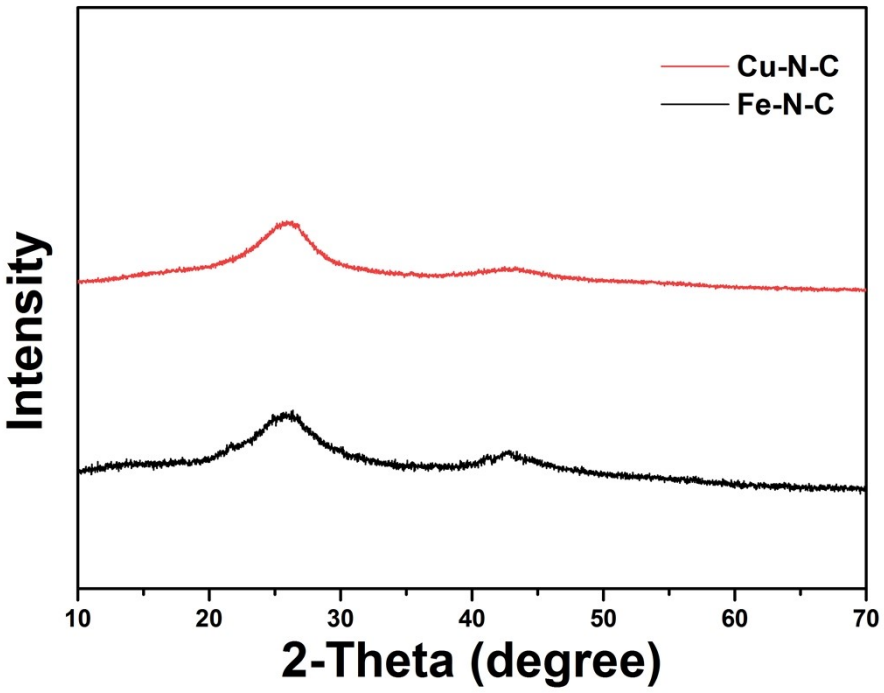


Figure S2. XRD patterns of Fe−N−C nanozymes and Cu−N−C nanozymes.

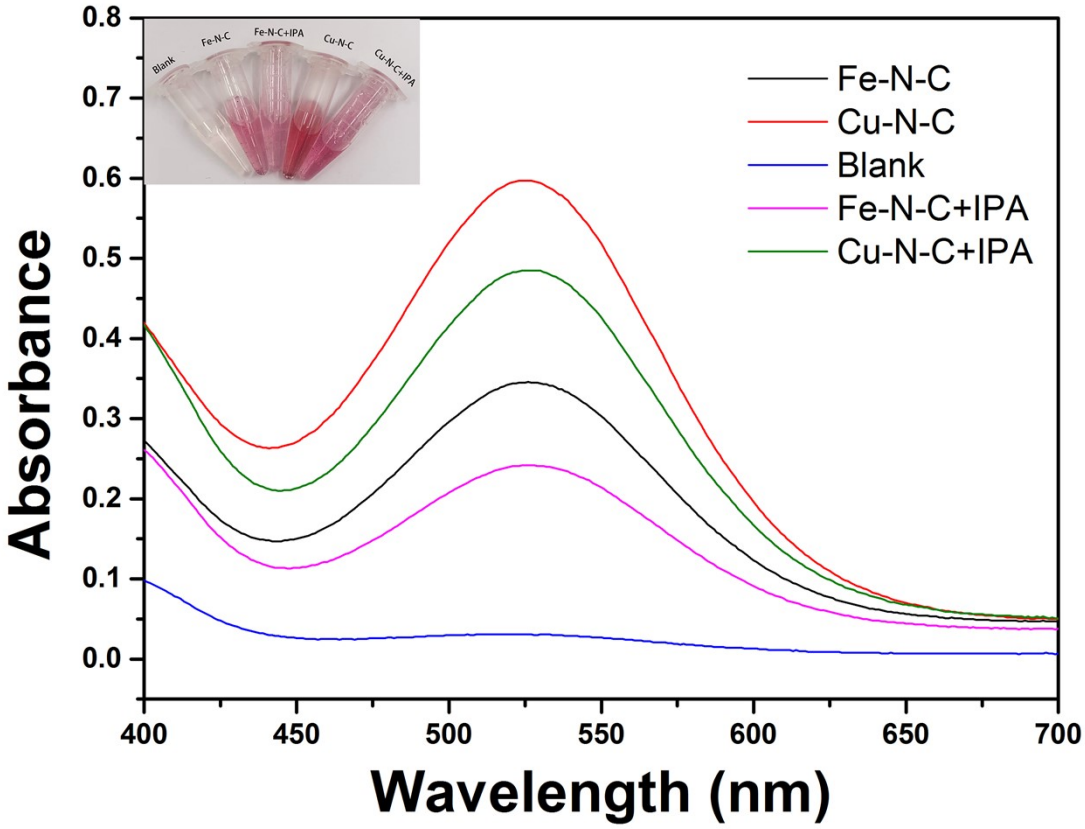


Figure S3. The effect of adding isopropanol on absorbance.

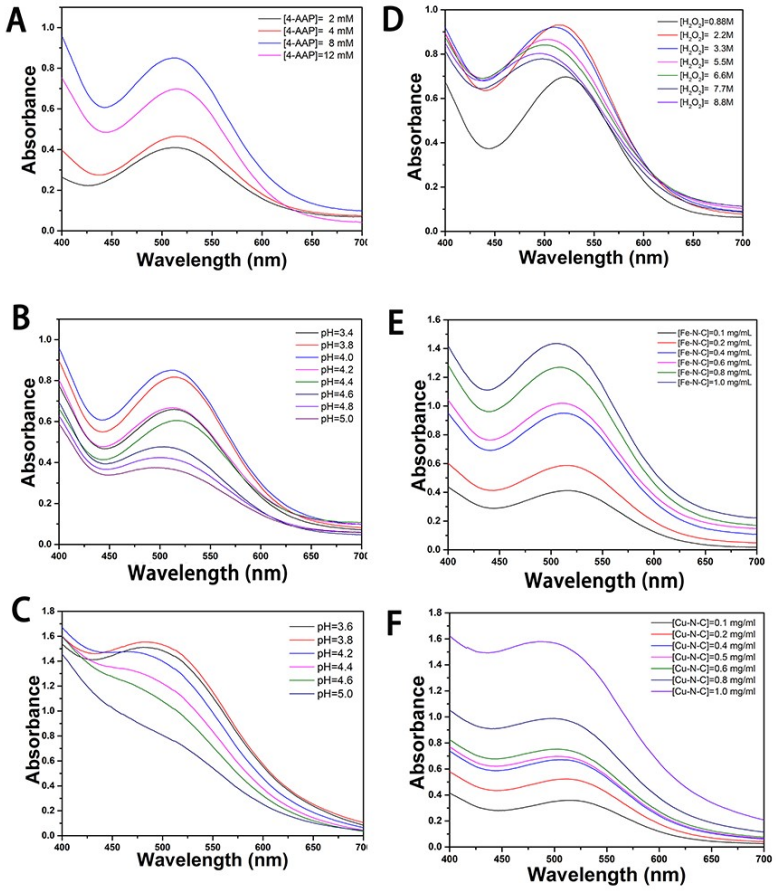


Figure S4. (A) The effect of the 4-AAP concentration on the absorbance. **(B-C)** The effect of the pH values on the absorbance for Fe-N-C nanozymes and Cu-N-C nanozymes. **(D)**The effect of the H_2O_2 concentration on the absorbance. **(E-F)**The effect of the concentrations of nanozymes on the absorbance.

Table S0. The structures of the six phenols.

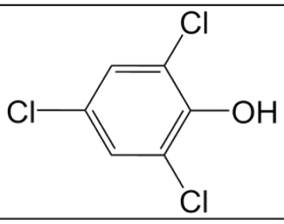
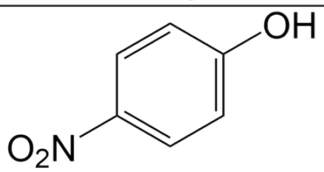
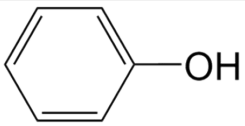
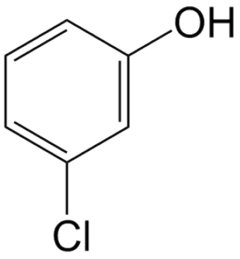
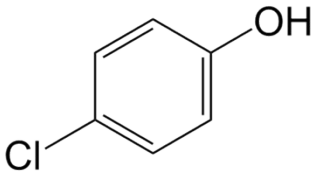
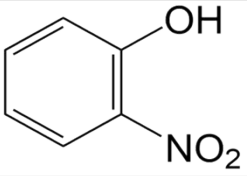
Phenolic pollutants	Structural formula
2,4,6-Trichlorophenol	
4-Nitrophenol	
phenol	
3-Chlorophenol	
4-Chlorophenol	
o-Nitrophenol	

Table S1 The training matrix of the colorimetric response patterns against six phenolic pollutants at the concentration of 50 nM using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	0.046	-0.068
Phe	0.038	-0.065
Phe	0.036	-0.073
Phe	0.041	-0.072
Phe	0.039	-0.078
Tri	-0.007	-0.093
Tri	-0.005	-0.089
Tri	0.004	-0.09
Tri	-0.001	-0.092
Tri	0.004	-0.101
P-np	0.043	-0.272
P-np	0.036	-0.266
P-np	0.035	-0.276
P-np	0.042	-0.259
P-np	0.043	-0.269
3-CP	0.079	0.032
3-CP	0.077	0.033
3-CP	0.085	0.037
3-CP	0.08	0.032
3-CP	0.082	0.032
4-CP	0.112	0.038
4-CP	0.113	0.036
4-CP	0.113	0.032
4-CP	0.111	0.034
4-CP	0.113	0.038
0-np	0.026	0.028
0-np	0.026	0.027
0-np	0.027	0.021
0-np	0.027	0.034
0-np	0.025	0.03

Table S2 The training matrix of the colorimetric response patterns against six phenolic pollutants at the concentration of 100 nM using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	0.115	0.149
Phe	0.122	0.149
Phe	0.106	0.139
Phe	0.118	0.141
Phe	0.117	0.144
Tri	0.095	0.111
Tri	0.101	0.093
Tri	0.081	0.094
Tri	0.094	0.096
Tri	0.093	0.098
P-np	0.133	0.261
P-np	0.136	0.254
P-np	0.131	0.248
P-np	0.135	0.257
P-np	0.127	0.255
3-CP	0.08	0.141
3-CP	0.081	0.148
3-CP	0.08	0.138
3-CP	0.075	0.137
3-CP	0.074	0.143
4-CP	0.121	0.113
4-CP	0.123	0.109
4-CP	0.111	0.103
4-CP	0.122	0.102
4-CP	0.119	0.112
0-np	0.169	0.166
0-np	0.167	0.14
0-np	0.154	0.14
0-np	0.164	0.146
0-np	0.162	0.137

Table S3 The training matrix of the colorimetric response patterns against six phenolic pollutants at the concentration of 200 nM using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	0.03	0.026
Phe	0.036	0.024
Phe	0.035	0.025
Phe	0.032	0.029
Phe	0.037	0.025
Tri	-0.01	-0.038
Tri	0.002	-0.027
Tri	-0.004	-0.033
Tri	-0.002	-0.029
Tri	0.002	-0.037
P-np	0.048	0.009
P-np	0.046	0.004
P-np	0.047	0.016
P-np	0.047	0.012
P-np	0.043	0.019
3-CP	0.073	-0.124
3-CP	0.077	-0.093
3-CP	0.072	-0.112
3-CP	0.069	-0.098
3-CP	0.073	-0.119
4-CP	0.101	-0.004
4-CP	0.101	0.013
4-CP	0.098	0.01
4-CP	0.102	0.01
4-CP	0.103	0.007
0-np	0.081	-0.073
0-np	0.088	-0.074
0-np	0.088	-0.073
0-np	0.087	-0.063
0-np	0.084	-0.072

Table S4 The training matrix of the colorimetric response patterns against six phenolic pollutants at the concentration of 1000 nM using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	0.022	-0.033
Phe	0.023	-0.038
Phe	0.02	-0.04
Phe	0.024	-0.038
Phe	0.025	-0.038
Tri	0.01	-0.115
Tri	0.01	-0.13
Tri	0.014	-0.098
Tri	0.002	-0.102
Tri	0.005	-0.11
P-np	0.012	-0.076
P-np	0.017	-0.073
P-np	0.023	-0.075
P-np	0.011	-0.062
P-np	0.013	-0.07
3-CP	-0.003	-0.013
3-CP	-0.007	-0.013
3-CP	-0.001	-0.01
3-CP	-0.011	-0.002
3-CP	-0.014	-0.011
4-CP	0.018	0.007
4-CP	0.02	0.046
4-CP	0.029	0.01
4-CP	0.009	0.056
4-CP	0.007	0.006
0-np	0.026	-0.052
0-np	0.026	-0.053
0-np	0.037	-0.053
0-np	0.022	-0.056
0-np	0.022	-0.051

Table S5 The training matrix of the colorimetric response patterns against six phenolic pollutants at the concentration of 2000 nM using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	-0.047	-0.044
Phe	-0.046	-0.04
Phe	-0.049	-0.04
Phe	-0.044	-0.04
Phe	-0.048	-0.051
Tri	-0.07	-0.036
Tri	-0.092	-0.036
Tri	-0.097	-0.036
Tri	-0.099	-0.053
Tri	-0.069	-0.039
P-np	-0.034	-0.136
P-np	-0.032	-0.143
P-np	-0.036	-0.138
P-np	-0.027	-0.137
P-np	-0.033	-0.149
3-CP	-0.027	-0.195
3-CP	-0.02	-0.194
3-CP	-0.03	-0.192
3-CP	-0.018	-0.193
3-CP	-0.027	-0.194
4-CP	0.053	-0.243
4-CP	0.054	-0.253
4-CP	0.052	-0.245
4-CP	0.056	-0.249
4-CP	0.056	-0.251
0-np	0.011	-0.122
0-np	0.008	-0.116
0-np	0.009	-0.121
0-np	0.011	-0.135
0-np	0.017	-0.127

Table S6 The training matrix of the colorimetric response patterns against six phenolic pollutants at the concentration of 0.02 mM using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	-0.011	0.207
Phe	-0.016	0.219
Phe	-0.02	0.216
Phe	-0.031	0.211
Phe	-0.013	0.211
Tri	0.004	0.195
Tri	0.004	0.195
Tri	0.006	0.204
Tri	-0.002	0.202
Tri	-0.002	0.195
P-np	0.023	0.125
P-np	0.027	0.128
P-np	0.023	0.12
P-np	0.027	0.12
P-np	0.022	0.137
3-CP	0.034	0.165
3-CP	0.037	0.162
3-CP	0.031	0.186
3-CP	0.035	0.191
3-CP	0.035	0.169
4-CP	0.017	0.241
4-CP	0.019	0.261
4-CP	0.017	0.25
4-CP	0.018	0.246
4-CP	0.015	0.251
0-np	0.039	0.24
0-np	0.051	0.243
0-np	0.046	0.244
0-np	0.043	0.24
0-np	0.037	0.243

Table S7 The training matrix of the colorimetric response patterns against six phenolic pollutants at the concentration of 0.2 mM using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	0.518	-0.057
Phe	0.457	-0.041
Phe	0.508	-0.057
Phe	0.522	-0.065
Phe	0.501	-0.014
Tri	0.005	-0.053
Tri	0.012	-0.254
Tri	0.012	-0.075
Tri	0.01	-0.066
Tri	0.008	-0.047
P-np	0.038	0.219
P-np	0.03	0.147
P-np	0.039	0.179
P-np	0.005	0.192
P-np	0.052	0.259
3-CP	0.106	0.109
3-CP	0.145	0.095
3-CP	0.117	0.141
3-CP	0.11	0.106
3-CP	0.114	0.12
4-CP	0.002	0.032
4-CP	0.03	0.033
4-CP	0.014	0.013
4-CP	0.007	0.017
4-CP	0.019	0.023
0-np	-0.042	0.08
0-np	-0.023	0.073
0-np	-0.028	0.09
0-np	-0.035	0.097
0-np	-0.043	0.075

Table S8 The training matrix of the colorimetric response patterns against six phenolic pollutants at the concentration of 2 mM using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	-0.012	-0.509
Phe	-0.02	-0.509
Phe	-0.024	-0.509
Phe	-0.011	-0.506
Phe	-0.009	-0.504
Tri	-0.094	-0.726
Tri	-0.104	-0.72
Tri	-0.092	-0.729
Tri	-0.09	-0.727
Tri	-0.09	-0.725
P-np	0.342	0.518
P-np	0.334	0.5
P-np	0.345	0.462
P-np	0.344	0.549
P-np	0.346	0.536
3-CP	0.326	0.024
3-CP	0.303	0.022
3-CP	0.326	0.022
3-CP	0.314	0.029
3-CP	0.32	0.027
4-CP	0.25	-0.047
4-CP	0.24	-0.05
4-CP	0.254	-0.058
4-CP	0.247	-0.05
4-CP	0.26	-0.046
0-np	0.385	0.515
0-np	0.389	0.512
0-np	0.376	0.512
0-np	0.375	0.514
0-np	0.383	0.515

Table S9 The training matrix of the colorimetric response patterns against Phe at different concentrations using this sensor assay.

Phe concentration	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
1nM	0.152	0.013
1nM	0.152	0.014
1nM	0.15	0.017
1nM	0.148	0.016
1nM	0.148	0.012
100nM	0.143	-0.014
100nM	0.143	-0.016
100nM	0.135	-0.015
100nM	0.14	-0.012
100nM	0.14	-0.014
200nM	0.121	-0.045
200nM	0.121	-0.046
200nM	0.12	-0.046
200nM	0.121	-0.041
200nM	0.122	-0.043
300nM	0.112	-0.064
300nM	0.112	-0.066
300nM	0.107	-0.064
300nM	0.112	-0.062
300nM	0.11	-0.066
400nM	0.1	-0.087
400nM	0.1	-0.085
400nM	0.099	-0.084
400nM	0.101	-0.085
400nM	0.098	-0.085
500nM	0.091	-0.106
500nM	0.091	-0.109
500nM	0.083	-0.107
500nM	0.089	-0.104
500nM	0.087	-0.107
600nM	0.081	-0.125
600nM	0.076	-0.123
600nM	0.076	-0.124
600nM	0.076	-0.123
600nM	0.079	-0.128
700nM	0.073	-0.146
700nM	0.069	-0.148
700nM	0.067	-0.143

700nM	0.067	-0.147
700nM	0.066	-0.146
800nM	0.062	-0.166
800nM	0.06	-0.168
800nM	0.056	-0.165
800nM	0.061	-0.164
800nM	0.056	-0.167
900nM	0.053	-0.187
900nM	0.047	-0.186
900nM	0.046	-0.187
900nM	0.047	-0.186
900nM	0.046	-0.187
1000nM	0.04	-0.209
1000nM	0.037	-0.211
1000nM	0.035	-0.206
1000nM	0.038	-0.204
1000nM	0.033	-0.208

Table S10 The training matrix of the colorimetric response patterns against the mixture of Phe and Tri at 50 nM using this sensor assay.

Phe:Tri	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe:Tri=0:10	-0.173	-0.089
Phe:Tri=0:10	-0.175	-0.088
Phe:Tri=0:10	-0.178	-0.091
Phe:Tri=0:10	-0.174	-0.095
Phe:Tri=0:10	-0.171	-0.093
Phe:Tri=1:9	-0.075	-0.167
Phe:Tri=1:9	-0.076	-0.169
Phe:Tri=1:9	-0.082	-0.163
Phe:Tri=1:9	-0.079	-0.167
Phe:Tri=1:9	-0.08	-0.164
Phe:Tri=2:8	-0.181	-0.212
Phe:Tri=2:8	-0.177	-0.212
Phe:Tri=2:8	-0.182	-0.214
Phe:Tri=2:8	-0.178	-0.215
Phe:Tri=2:8	-0.179	-0.217
Phe:Tri=3:7	-0.092	-0.246
Phe:Tri=3:7	-0.088	-0.251
Phe:Tri=3:7	-0.095	-0.246
Phe:Tri=3:7	-0.091	-0.249
Phe:Tri=3:7	-0.088	-0.254
Phe:Tri=4:6	-0.067	-0.235
Phe:Tri=4:6	-0.066	-0.234
Phe:Tri=4:6	-0.061	-0.242
Phe:Tri=4:6	-0.06	-0.237
Phe:Tri=4:6	-0.062	-0.238
Phe:Tri=5:5	-0.128	-0.284
Phe:Tri=5:5	-0.125	-0.288
Phe:Tri=5:5	-0.128	-0.287
Phe:Tri=5:5	-0.124	-0.287
Phe:Tri=5:5	-0.125	-0.287
Phe:Tri=6:4	-0.161	-0.273
Phe:Tri=6:4	-0.16	-0.272
Phe:Tri=6:4	-0.16	-0.272
Phe:Tri=6:4	-0.158	-0.275
Phe:Tri=6:4	-0.157	-0.273
Phe:Tri=7:3	-0.016	-0.176
Phe:Tri=7:3	-0.009	-0.176

Phe:Tri=7:3	-0.01	-0.174
Phe:Tri=7:3	-0.006	-0.174
Phe:Tri=7:3	-0.006	-0.178
Phe:Tri=8:2	-0.055	-0.241
Phe:Tri=8:2	-0.055	-0.241
Phe:Tri=8:2	-0.057	-0.238
Phe:Tri=8:2	-0.058	-0.242
Phe:Tri=8:2	-0.056	-0.244
Phe:Tri=9:1	-0.004	-0.337
Phe:Tri=9:1	-0.005	-0.335
Phe:Tri=9:1	-0.004	-0.334
Phe:Tri=9:1	0.004	-0.339
Phe:Tri=9:1	0.004	-0.34
Phe:Tri=10:0	0.018	-0.247
Phe:Tri=10:0	0.023	-0.246
Phe:Tri=10:0	0.018	-0.249
Phe:Tri=10:0	0.018	-0.247
Phe:Tri=10:0	0.018	-0.25

Table S11 The training matrix of the colorimetric response patterns against the mixture of Phe,3-CP and O-np at 50 nM using this sensor assay.

Phe:3-CP:O-np	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
1:1:1	0.045	0.707
1:1:1	0.05	0.712
1:1:1	0.044	0.713
1:1:1	0.042	0.712
1:1:1	0.046	0.711
1:2:1	0.024	0.005
1:2:1	0.03	0.016
1:2:1	0.024	0.003
1:2:1	0.021	0.011
1:2:1	0.022	0.008
1:1:2	0.097	−0.018
1:1:2	0.098	−0.012
1:1:2	0.1	−0.012
1:1:2	0.096	−0.013
1:1:2	0.099	−0.014
2:1:1	0.058	0.065
2:1:1	0.056	0.066
2:1:1	0.059	0.056
2:1:1	0.055	0.062
2:1:1	0.061	0.061
1:2:3	0.015	0.031
1:2:3	0.018	0.04
1:2:3	0.014	0.032
1:2:3	0.016	0.031
1:2:3	0.016	0.031
1:3:1	0.047	0.095
1:3:1	0.057	0.1
1:3:1	0.054	0.098
1:3:1	0.05	0.09
1:3:1	0.054	0.095
2:1:3	0.051	0.077
2:1:3	0.061	0.079
2:1:3	0.054	0.075
2:1:3	0.058	0.076
2:1:3	0.056	0.081
2:3:1	0.042	0.087
2:3:1	0.044	0.089
2:3:1	0.04	0.09

2:3:1	0.037	0.084
2:3:1	0.044	0.086
3:1:2	0.025	0.1
3:1:2	0.031	0.114
3:1:2	0.026	0.11
3:1:2	0.026	0.113
3:1:2	0.026	0.11
3:2:1	0.098	0.028
3:2:1	0.105	0.034
3:2:1	0.096	0.026
3:2:1	0.099	0.027
3:2:1	0.099	0.029

Table S12 The training matrix of the colorimetric response patterns against the mixture at 50 nM using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	0.046	-0.068
Phe	0.038	-0.065
Phe	0.036	-0.073
Phe	0.041	-0.072
Phe	0.039	-0.078
Tri	-0.007	-0.093
Tri	-0.005	-0.089
Tri	0.004	-0.09
Tri	-0.001	-0.092
Tri	0.004	-0.101
P-np	0.043	-0.272
P-np	0.036	-0.266
P-np	0.035	-0.276
P-np	0.042	-0.259
P-np	0.043	-0.269
Phe:Tri=1:9	-0.076	-0.169
Phe:Tri=1:9	-0.082	-0.163
Phe:Tri=1:9	-0.079	-0.167
Phe:Tri=1:9	-0.08	-0.164
Phe:Tri=2:8	-0.181	-0.212
Phe:Tri=2:8	-0.177	-0.212
Phe:Tri=2:8	-0.182	-0.214
Phe:Tri=2:8	-0.178	-0.215
Phe:Tri=2:8	-0.179	-0.217
Phe:Tri=3:7	-0.092	-0.246
Phe:Tri=3:7	-0.088	-0.251
Phe:Tri=3:7	-0.095	-0.246
Phe:Tri=3:7	-0.091	-0.249
Phe:Tri=3:7	-0.088	-0.254
Phe:Tri=4:6	-0.067	-0.235
Phe:Tri=4:6	-0.066	-0.234
Phe:Tri=4:6	-0.061	-0.242
Phe:Tri=4:6	-0.06	-0.237
Phe:Tri=4:6	-0.062	-0.238
Phe:Tri=1:9	-0.076	-0.169
Phe:3-CP:O-np=1:2:1	0.024	0.005
Phe:3-CP:O-np=1:2:1	0.03	0.016
Phe:3-CP:O-np=1:2:1	0.024	0.003

Phe:3-CP:O-np=1:2:1	0.021	0.011
Phe:3-CP:O-np=1:2:1	0.022	0.008
Phe:3-CP:O-np=1:1:2	0.097	-0.018
Phe:3-CP:O-np=1:1:2	0.098	-0.012
Phe:3-CP:O-np=1:1:2	0.1	-0.012
Phe:3-CP:O-np=1:1:2	0.096	-0.013
Phe:3-CP:O-np=1:1:2	0.099	-0.014
Phe:3-CP:O-np=2:1:1	0.058	0.065
Phe:3-CP:O-np=2:1:1	0.056	0.066
Phe:3-CP:O-np=2:1:1	0.059	0.056
Phe:3-CP:O-np=2:1:1	0.055	0.062
Phe:3-CP:O-np=2:1:1	0.061	0.061
Phe:3-CP:O-np=1:2:3	0.015	0.031
Phe:3-CP:O-np=1:2:3	0.018	0.04
Phe:3-CP:O-np=1:2:3	0.014	0.032
Phe:3-CP:O-np=1:2:3	0.016	0.031
Phe:3-CP:O-np=1:2:3	0.016	0.031

Table S13 The training matrix of the colorimetric response patterns against six phenolic pollutants and other interfering species at the concentration of 50 nM using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	0.046	-0.068
Phe	0.038	-0.065
Phe	0.036	-0.073
Phe	0.041	-0.072
Phe	0.039	-0.078
Tri	-0.007	-0.093
Tri	-0.005	-0.089
Tri	0.004	-0.09
Tri	-0.001	-0.092
Tri	0.004	-0.101
P-np	0.043	-0.272
P-np	0.036	-0.266
P-np	0.035	-0.276
P-np	0.042	-0.259
P-np	0.043	-0.269
3-CP	0.079	0.032
3-CP	0.077	0.033
3-CP	0.085	0.037
3-CP	0.08	0.032
3-CP	0.082	0.032
4-CP	0.112	0.038
4-CP	0.113	0.036
4-CP	0.113	0.032
4-CP	0.111	0.034
4-CP	0.113	0.038
0-np	0.026	0.028
0-np	0.026	0.027
0-np	0.027	0.021
0-np	0.027	0.034
0-np	0.025	0.03
2,6-dph	0.09	-0.013
2,6-dph	0.093	-0.008
2,6-dph	0.1	-0.013
2,6-dph	0.095	-0.005
2,6-dph	0.097	-0.017
4-Chp	0.107	0.028

4-Chp	0.108	0.029
4-Chp	0.109	0.025
4-Chp	0.102	0.027
4-Chp	0.107	0.026
2,6-Dip	0.054	0.021
2,6-Dip	0.053	0.017
2,6-Dip	0.066	0.019
2,6-Dip	0.059	0.024
2,6-Dip	0.06	0.018

Table S14 The training matrix of the colorimetric response patterns against six phenolic pollutants at the concentration of 50 nM in tap water using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	0.045	0.013
Phe	0.042	0.017
Phe	0.043	0.015
Phe	0.043	0.016
Phe	0.043	0.013
Tri	-0.017	0.058
Tri	-0.018	0.059
Tri	-0.02	0.057
Tri	-0.024	0.06
Tri	-0.018	0.056
P-np	0.006	0.09
P-np	0.003	0.088
P-np	0.005	0.091
P-np	0	0.091
P-np	0.004	0.088
3-CP	0.056	0.064
3-CP	0.053	0.064
3-CP	0.054	0.063
3-CP	0.051	0.068
3-CP	0.055	0.066
4-CP	0.038	0.096
4-CP	0.034	0.092
4-CP	0.034	0.094
4-CP	0.03	0.091
4-CP	0.029	0.09
0-np	0.029	0.088
0-np	0.023	0.086
0-np	0.022	0.083
0-np	0.022	0.087
0-np	0.022	0.087

Table S15 The training matrix of the colorimetric response patterns against six phenolic pollutants at the concentration of 50 nM in lake water water using this sensor assay.

Phenolic pollutants	$A_{0,515}$-$A_{i,515}$ (Fe-N-C)	$A_{0,515}$-$A_{i,515}$ (Cu-N-C)
Phe	0.052	0.03
Phe	0.053	0.034
Phe	0.055	0.033
Phe	0.056	0.033
Phe	0.055	0.035
Tri	0.037	0.075
Tri	0.036	0.079
Tri	0.036	0.076
Tri	0.036	0.079
Tri	0.035	0.073
P-np	0.051	0.01
P-np	0.052	0.011
P-np	0.052	0
P-np	0.05	0.006
P-np	0.052	0.004
3-CP	0.052	0.101
3-CP	0.06	0.102
3-CP	0.056	0.098
3-CP	0.056	0.1
3-CP	0.055	0.098
4-CP	0.064	0.081
4-CP	0.063	0.083
4-CP	0.065	0.079
4-CP	0.066	0.082
4-CP	0.064	0.08
0-np	0.078	0.108
0-np	0.081	0.108
0-np	0.083	0.107
0-np	0.079	0.103
0-np	0.083	0.109

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