Electronic Supplementary Material (ESI) for RSC Advances.

Degradation of organic pollutants by $NiFe_2O_4$/peroxymonosulfate: Efficiency, influential factors and catalytic mechanism

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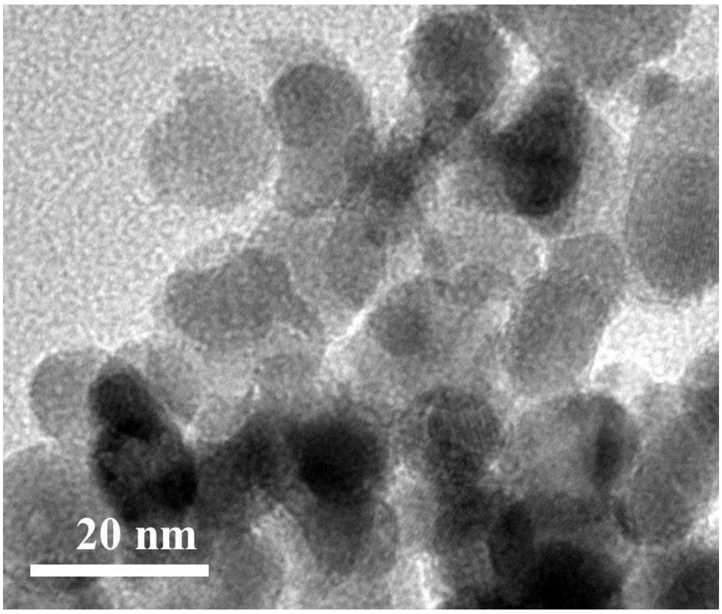

Figure S1 HR-TEM image of $NiFe_2O_4$ spinel.

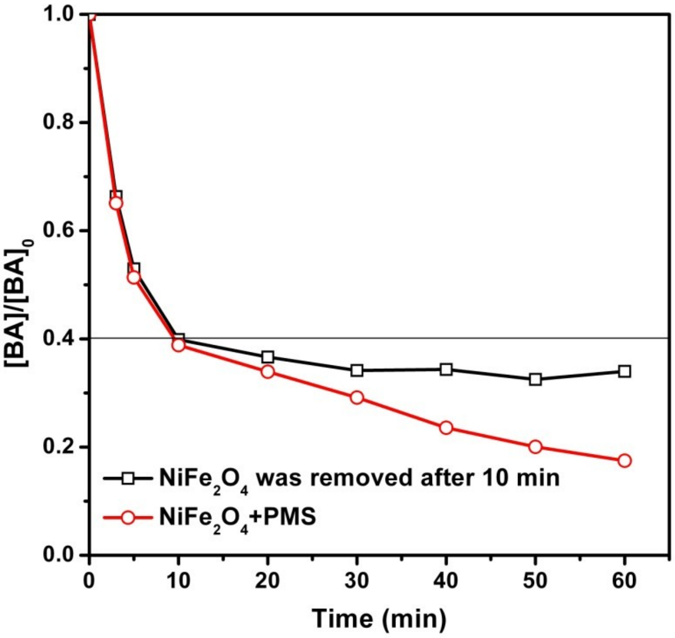

Figure S2 BA degradation by NiFe2O4 catalyzed PMS system. Conditions: [PMS]=1.0 mM, [BA]=10 μM, [Oxides]=100 mg/L, initial pH=7.0±0.1, T=25±1°C.

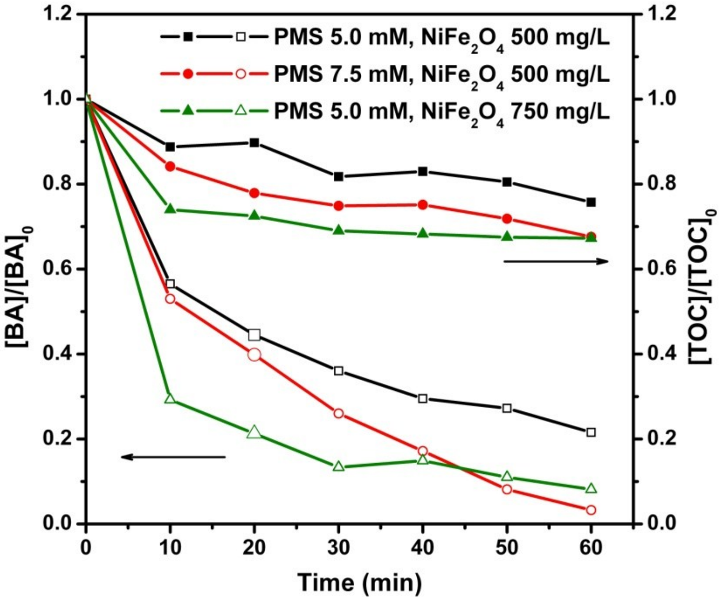

Figure S3 BA degradation and TOC removal by NiFe2O4/PMS system.

Conditions: [BA]=50 μM, initial pH=7.0±0.1, T=25±1°C.

The capacity of mineralization of $NiFe_2O_4$/PMS system was investigated. 78.4% of BA was removed when the initial concentration of PMS, BA and $NiFe_2O_4$ were 5.0 mM, 0.05 mM and 500 mg/L, respectively (Figure S3). At the same time, 24.3% of TOC was decomposed via catalysis, and the residual products still remained in the solution as organic compounds, which could also be found in the sequential EEM images (Figure S4). Increasing the initial concentration of PMS or $NiFe_2O_4$ could accelerate the degradation rates of BA and improve TOC removal. The capacity of mineralization of $NiFe_2O_4$/PMS system was comparable with homogeneous Co/PMS system (Anipsitakis, G.P.; Dionysiou, D.D. Environ. Sci. Technol. 2003, 37, 4790-4797).

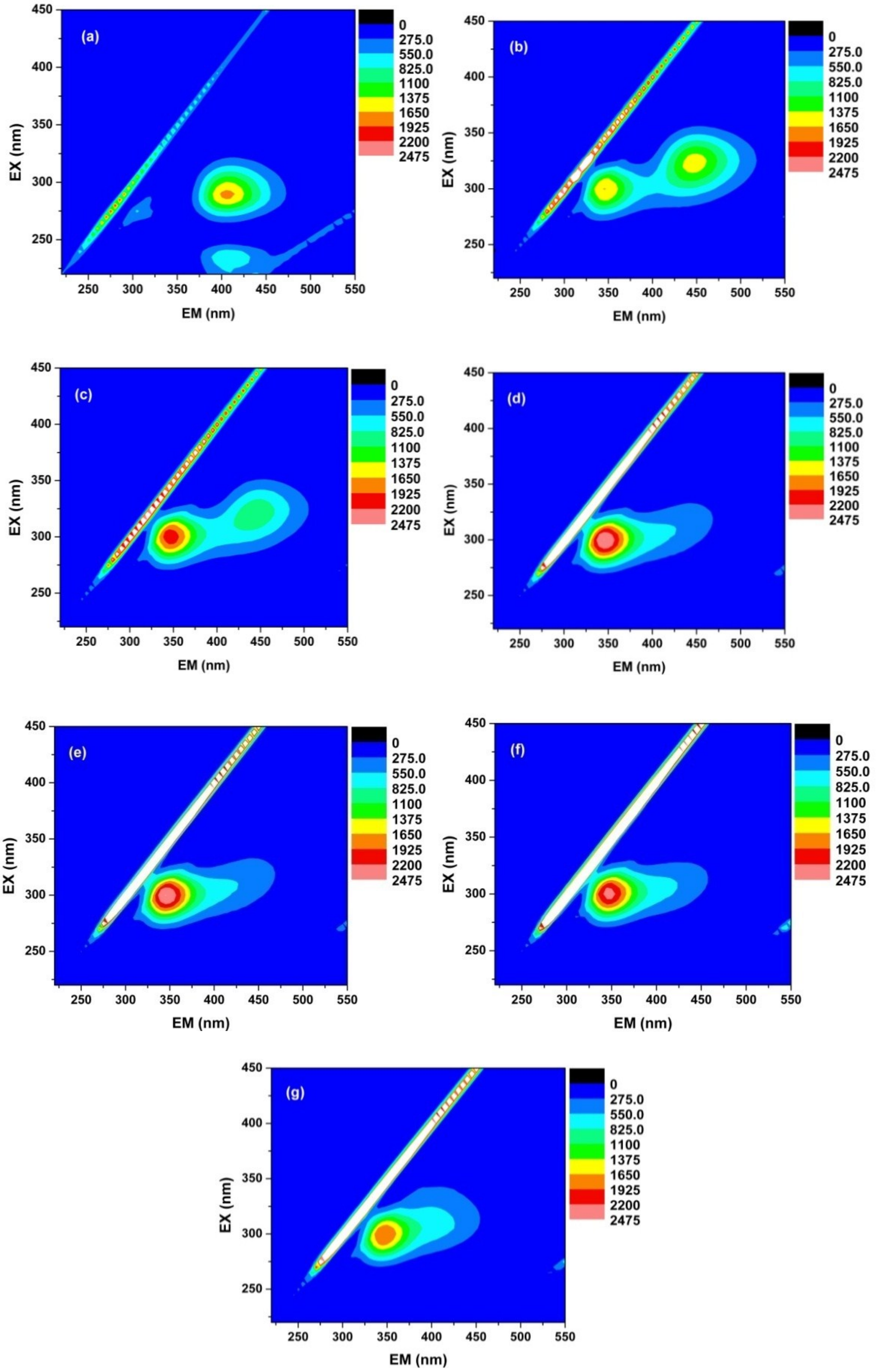

Figure S4 EEM images of BA degradation by $NiFe_2O_4$/PMS system.

(Figure (a)-(g) EEM images after 0, 10, 20, 30, 40, 50 and 60 min reaction)

Conditions: [PMS]=5.0 mM, [BA]=50 μM, [$NiFe_2O_4$]=500 mg/L, initial pH=7.0±0.1, T=25±1°C.

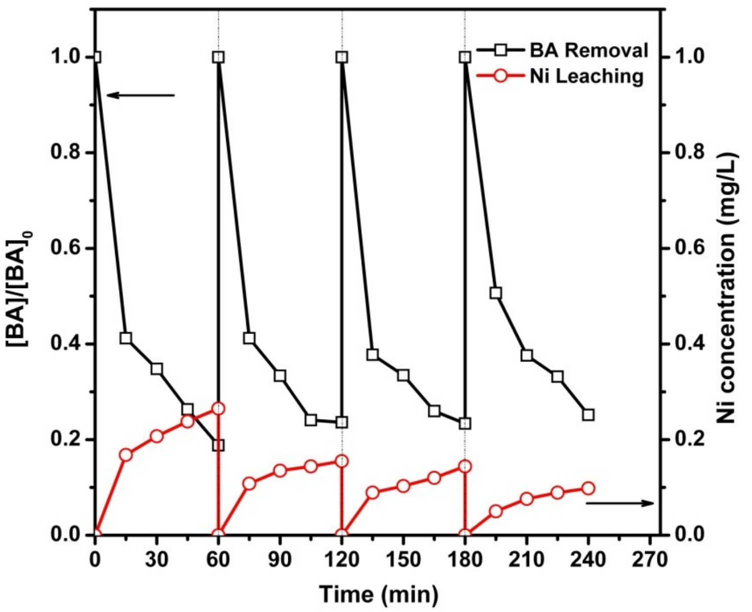

Figure S5 BA degradation and nickel leaching in $NiFe_2O_4$/PMS system for catalyst recycling experiment. Conditions: [PMS]=1.0 mM, [BA]=10 μM, [$NiFe_2O_4$]=100 mg/L, initial pH=7.0±0.1, T=25±1°C.

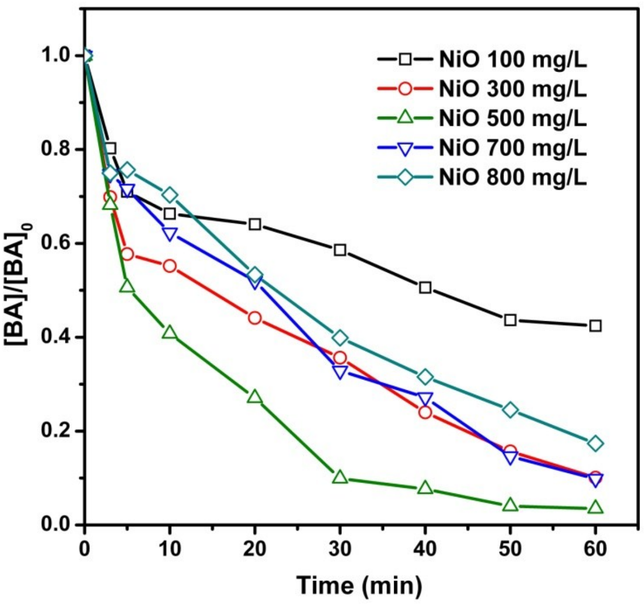

Figure S6 Effect of NiO dosage on BA degradation by NiO/PMS.
Conditions: [PMS]=1.0 mM, [BA]=10 μM, initial pH=7.0±0.1, T=25±1°C.

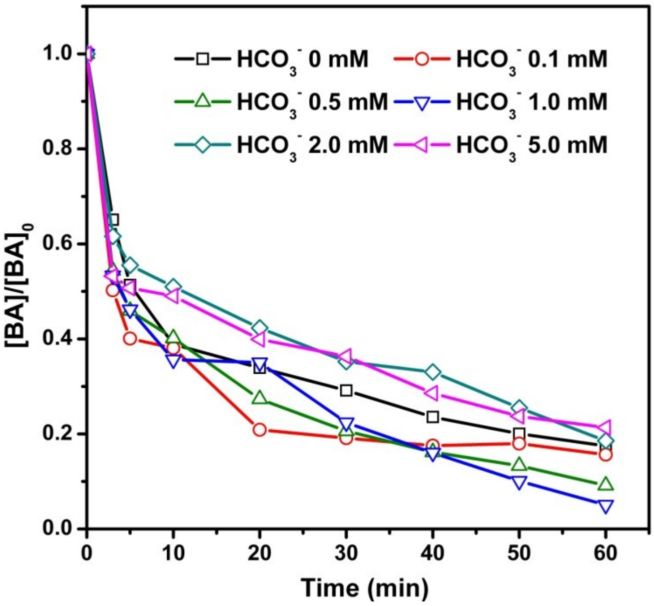

Figure S7 Effect of bicarbonate on BA degradation by $NiFe_2O_4$/PMS system.

Conditions: [PMS]=1.0 mM, [BA]=10 μM, [$NiFe_2O_4$]=100 mg/L, initial pH=7.0±0.1, T=25±1°C.

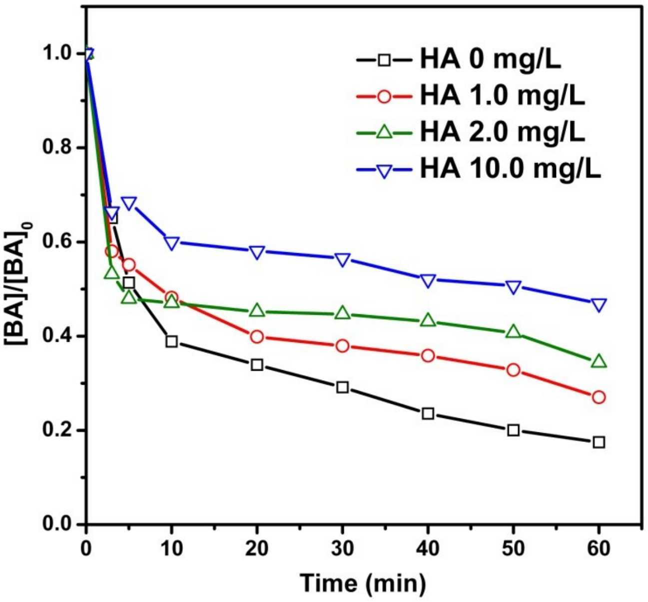

Figure S8 Effect of NOM on BA degradation by $NiFe_2O_4$/PMS system.

Conditions: [PMS]=1.0 mM, [BA]=10 μM, [$NiFe_2O_4$]=100 mg/L, initial pH=7.0±0.1, T=25±1°C.

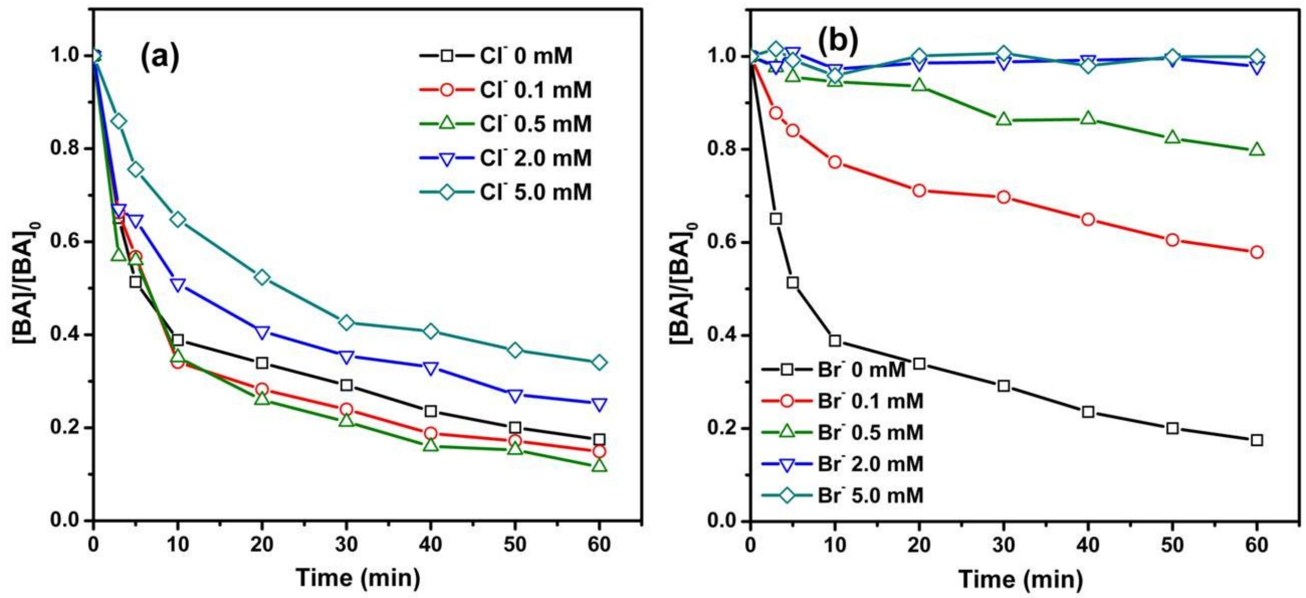

Figure S9 Effect of (a) chloride and (b) bromide on BA degradation by $NiFe_2O_4$/PMS system. Conditions: [PMS]=1.0 mM, [BA]=10 μM, [$NiFe_2O_4$]=100 mg/L, initial pH=7.0±0.1, T=25±1°C.

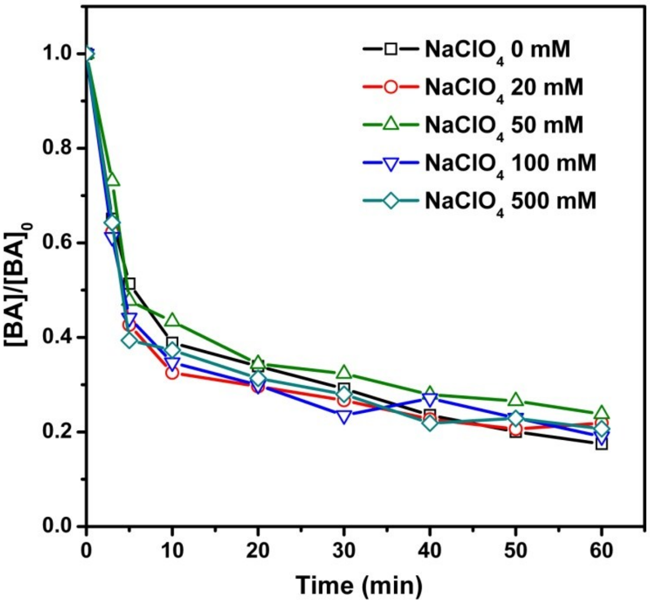

Figure S10 Effect of ion strength on BA degradation by $NiFe_2O_4$/PMS system.

Conditions: [PMS]=1.0 mM, [BA]=10 μM, [$NiFe_2O_4$]=100 mg/L, initial pH=7.0±0.1, T=25±1°C.

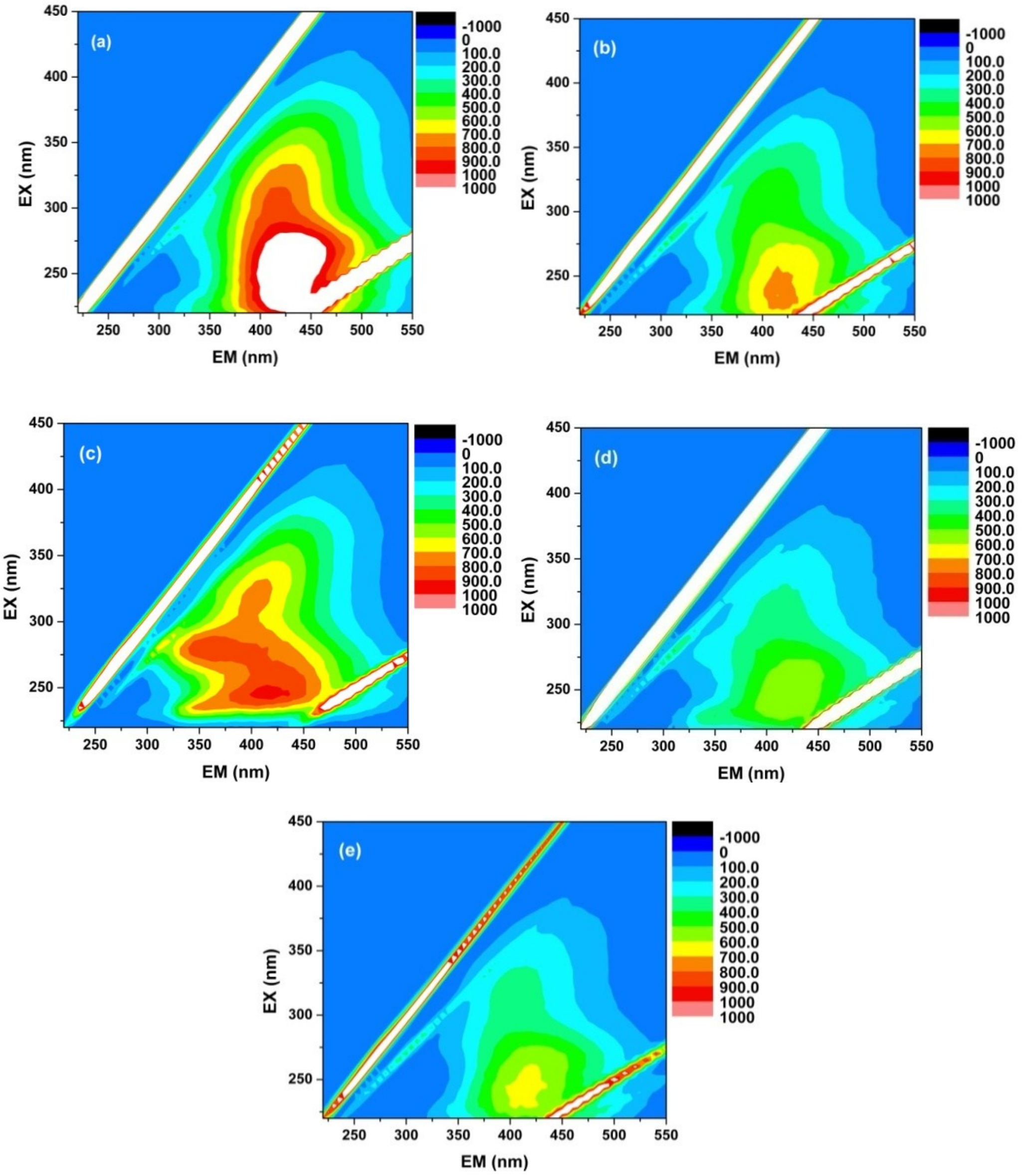

Figure S11 EEM images of actual water bodies: (a) I-DWTP, (b) FW-DWTP, (c) I-WWTP, (d) surface water and (e) ground water

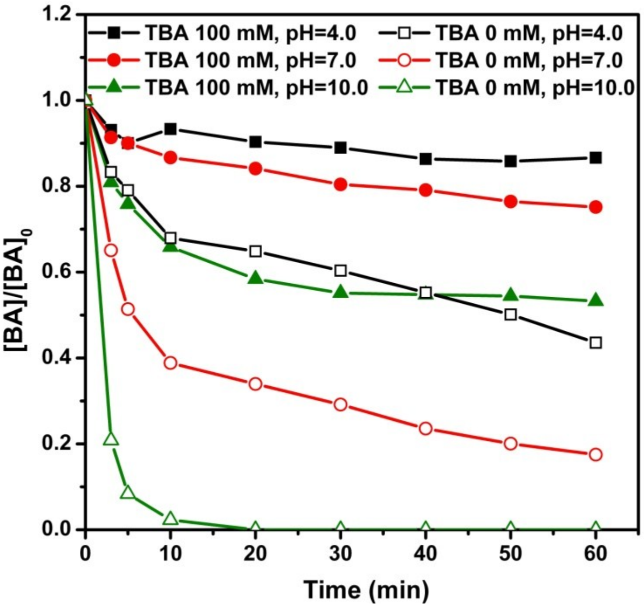

Figure S12 Inhibition of TBA on BA degradation by $NiFe_2O_4$/PMS system at different pH.

Conditions: [PMS]=1.0 mM, [BA]=10 μM, [$NiFe_2O_4$]=100 mg/L,T=25±1°C.

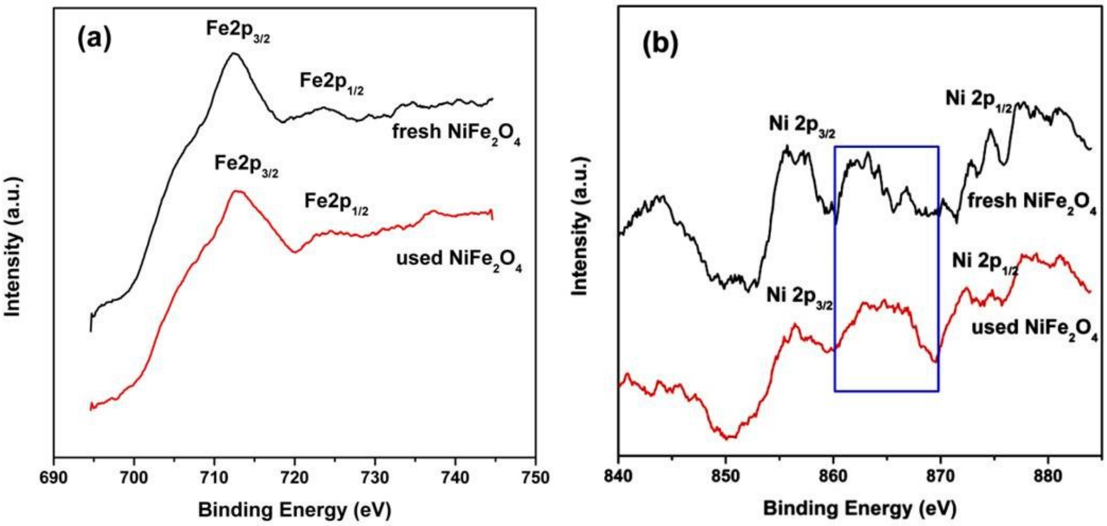

Figure S13 XPS of Fe 2p (a) and Ni 2p (b) in fresh and used $NiFe_2O_4$.

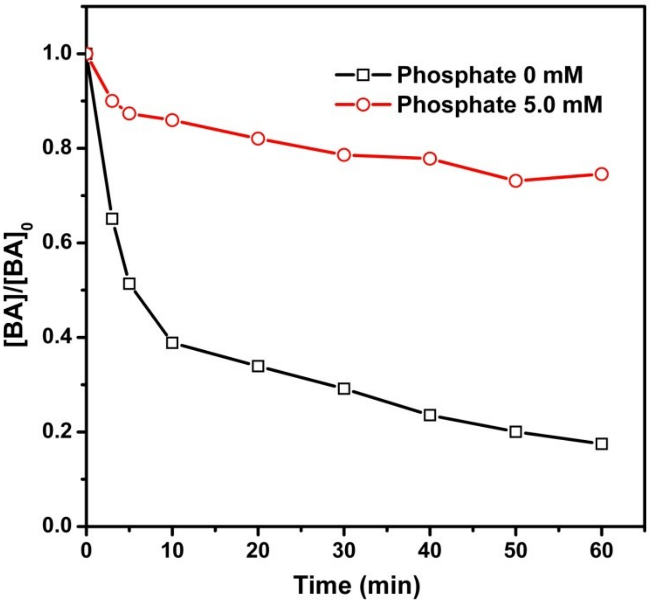

Figure S14 Inhibition of phosphate on BA degradation by $NiFe_2O_4$/PMS system.

Conditions: [PMS]=1.0 mM, [BA]=10 μM, [$NiFe_2O_4$]=100 mg/L, initial pH=7.0±0.1, T=25±1°C.

Tables

Table S1 Parameters of actual water bodies

	I-DWTP	FW-DWTP	E-WWTP	Surface water	Groundwater
Turbidity（NTU）	18.10	1.55	0.85	2.74	1.32
UV_{254}（cm^{-1}）	0.588	0.135	0.150	0.138	0.038
COD_{Mn}（mg O_2/L）	11.16	5.28	12.89	4.46	0.98
TIC（mg/L）	8.64	7.44	54.84	11.27	68.98
TOC（mg/L）	11.52	5.25	12.46	4.51	4.03
Ca（mg/L）	18.536	19.313	22.446	26.522	78.496
Mg（mg/L）	3.617	3.507	3.381	5.385	15.479
Fe（mg/L）	1.987	0.048	0.061	0.201	0.029
Mn（mg/L）	0.024	0.019	0.006	0.004	0.019
Ni（mg/L）	0.007	0.005	0.005	0.005	0.010
Cl（mg/L）	2.79	13.37	75.17	11.24	6.58
Br（mg/L）			N/A*		

* Bromate was not detectable in the actualwater bodies.