Supporting information

Text S1

Experiment materials

The NH_4VO_3 used in the experiments was obtained from Shanghai McLean Co., Ltd. The $FeCl_3 \cdot 6H_2O$ used in the experiments was obtained from Shanghai Aladdin Biochemical Technology Co., Ltd. *L*-histidine, methanol, anhydrous ethanol, NaCl, anhydrous $NaHCO_3$, NaOH, NaH_2PO_4, and anhydrous Na_2SO_4 were obtained from Shanghai Sinopharm Group Chemical Reagent Co., Ltd. Tert-butanol, benzoquinone, sulfuric acid and $NaNO_3$ were bought from Sichuan Xilong Chemical Co., Ltd. Sepiolite was obtained from Zhangjiakou, China. Deionized water was used throughout the experiments and the reagents used were analytically pure and did not require further purification.

Characterization

Rigaku Ultima IV X-ray diffractometer was used to determine the crystal structure of the samples. Scanning electron microscope (SEM) images were collected to analyze the surface morphology and microstructure of the samples. HRTEM (FEI TalosF200S) was used to study the microstructure and internal crystallization of the samples. A fully automated specific surface area and porosity analyzer (Micromeritics ASAP 2460) was used to measure the specific surface area and pore size distribution of the samples. The surface compositions and chemical states of the catalysts were investigated by X-ray photoelectron spectroscopy (XPS, ESCALAB XI+). Electron paramagnetic resonance (EPR) spectra were measured on Bruker A300-10/12.

Degradation experiment

The experiments were conducted to determine the removal effect of TC in the $FeVO_4$/Sep/PMS system by measuring the absorbance of the reaction solution at a fixed time point. The degradation experiments were performed as follows: the catalyst and PMS were dispersed into a conical flask (150 mL), which was subsequently shaken to obtain homogeneous solution. Then 50 mL of TC solution (40 mg/L) was quickly added to the flask and then started shaking (180 r/min). At the pre-determined time points, 2 mL reaction solution was sampled and filtered via a 0.45-μm syringe filter, and the absorbance of filtered solution was measured by UV at 357 nm.

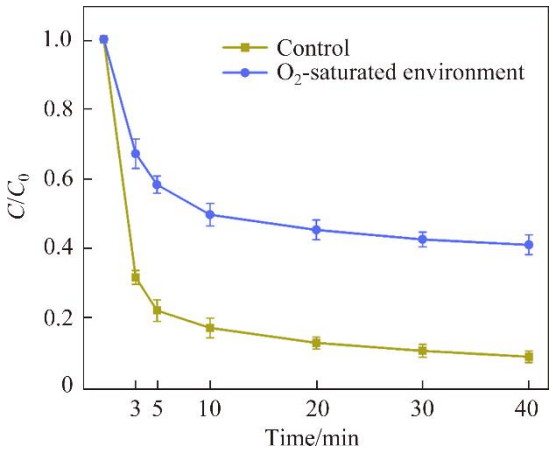


Figure S1 Effect of O_2-saturated environment on TC degradation in $FeVO_4$/Sep-30%/PMS system

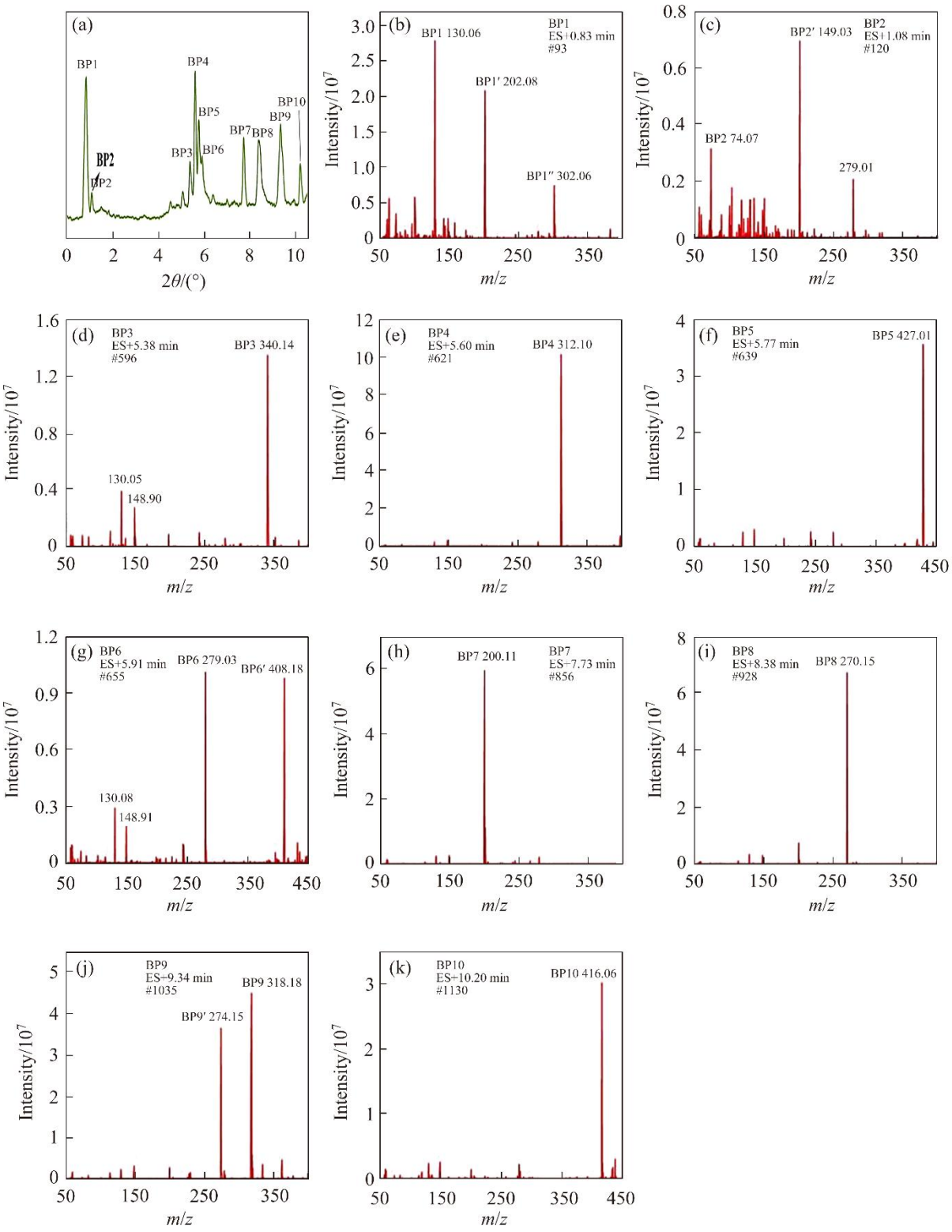


Figure S2 The HPLC-MS (ESI+) result of TC degradation products after reaction for 40 min in $FeVO_4$/Sep-30%/PMS system

Table S1 Main chemical compositions of sepiolite wt%

Sample	SiO_2	MgO	Al_2O_3	Fe_2O_3	CaO	TiO_2	L.O.I.[a]
Sepiolite	58.78	21.98	8.62	2.80	0.65	0.13	7.04

[a] Loss on ignition.

Table S2 Specific loading amounts of $FeVO_4$ in composites from ICP-MS analysis results wt%

Composite	V content[a]	Real loading amounts of $FeVO_4$[b]
$FeVO_4$/Sep-10%	2.9	9.7
$FeVO_4$/Sep-30%	8.6	28.8
$FeVO_4$/Sep-50%	14.3	47.9
$FeVO_4$/Sep-70%	20.1	67.4

[a]Measured via the ICP-MS; [b]Calculated by the ICP-MS results.

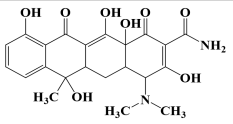
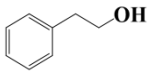
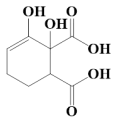
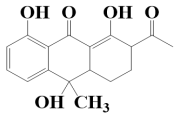
Table S3 Comparison of catalytic properties of different samples

Catalyst	Pollutant	Reactant conditions	Time/min	Degradation efficiency/%	Ref.
$FeVO_4$/Sep-30%	Tetracycline (40 mg/L)	[catalyst]=1.0 g/L [PMS]=1.0 mmol/L	40	91.2	This work
FeOCl	Tetracycline (20 mg/L)	[catalyst]=0.5 g/L [PMS]=100.0 mg/L	60	81.0	[1]
Fe_3O_4/2D-MoS_2	Tetracycline (50 mg/L)	[catalyst]=0.2 g/L [PMS]=2.5 mmol/L	90	89.0	[2]
FN-CM	Tetracycline (20 mg/L)	[catalyst]=10.0 g/L [PMS]=2.0 mmol/L	90	80.3	[3]
Fe_3O_4@PANI-p	Tetracycline (20 mg/L)	[catalyst]=0.4 g/L [PMS]=4.0 mmol/L	90	89.8	[4]
H_2O_2/Ag NPs	Tetracycline (15 mg/L)	[catalyst]=4.0 g/L [PMS]=50.0 mmol/L	90	85.0	[5]

Table S4 Specific loading of $FeVO_4$ in the composites before and after use based on ICP-MS analysis results wt%

Catalyst	Fresh $FeVO_4$/Sep-30%	Used $FeVO_4$/Sep-30%
Real loading amounts of $FeVO_4$	29.3	28.7

Table S5 Detected *m/z*, ESI+, molecular mass, proposed molecular formulas, and structural formula of NF and its degradation byproducts after reaction for 5 min

Retention time/min	By-products	*m/z*	Molecular formula	Structural formula
	TC	444.45	$C_{22}H_{24}N_2O_8$	
0.83	BP1	130.06	$C_8H_{10}O$	
0.83	BP1′	202.08	$C_8H_{10}O_6$	
0.83	BP1″	302.06	$C_{17}H_{18}O_5$	

to be continued

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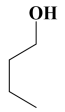
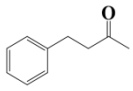
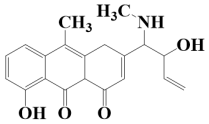
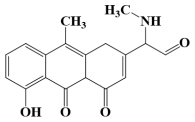
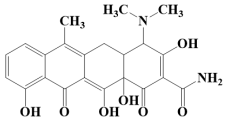
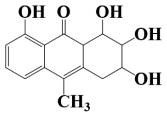
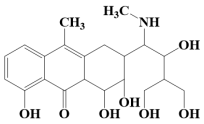
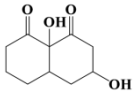
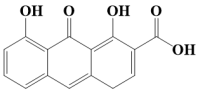
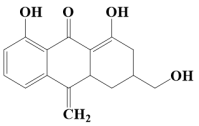
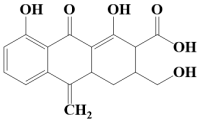
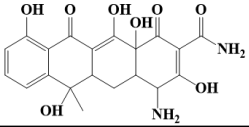
Retention time/min	By-products	*m/z*	Molecular formula	Structural formula
1.08	BP2	74.07	$C_4H_{10}O$	
1.08	BP2′	149.03	$C_{10}H_{12}O$	
5.38	BP3	340.14	$C_{20}H_{21}NO_4$	
5.60	BP4	312.10	$C_{18}H_{17}NO_4$	
5.77	BP5	427.01	$C_{22}H_{22}N_2O_7$	
5.91	BP6	279.03	$C_{15}H_{16}O_5$	
5.91	BP6'	408.18	$C_{21}H_{29}NO_7$	
7.73	BP7	200.11	$C_{10}H_{14}O_4$	
8.38	BP8	270.15	$C_{15}H_{10}O_5$	
9.34	BP9	274.15	$C_{16}H_{16}O_4$	
9.34	BP9′	318.18	$C_{17}H_{16}O_6$	
10.20	BP10	416.06	$C_{20}H_{20}N_2O_8$	

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