Supporting Information

Degradation of Methylene blue by singlet oxygen in the photo-Fenton system with WO_3/modified CN catalyst

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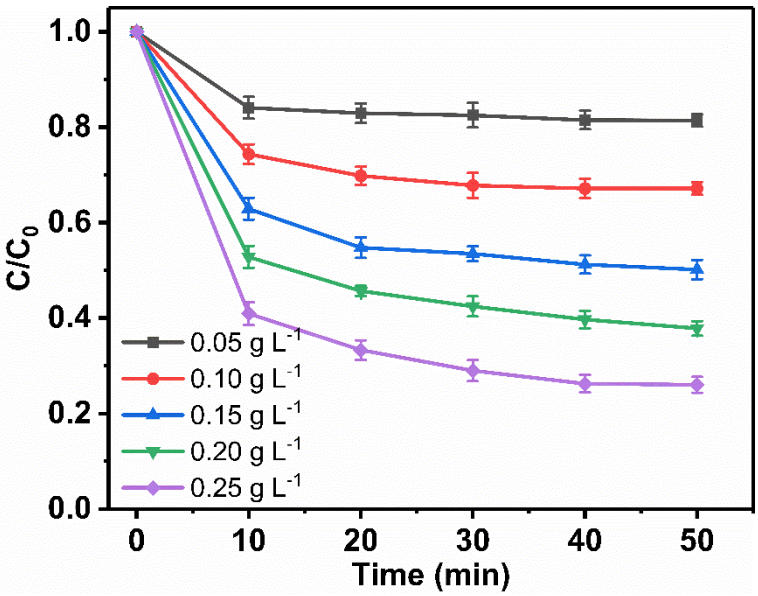


Figure. S1 Removal rate of MB by absorption.

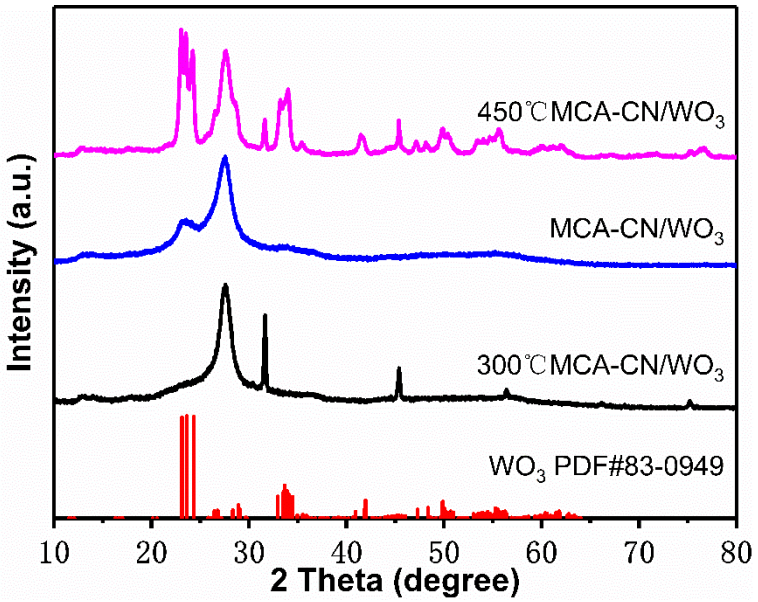
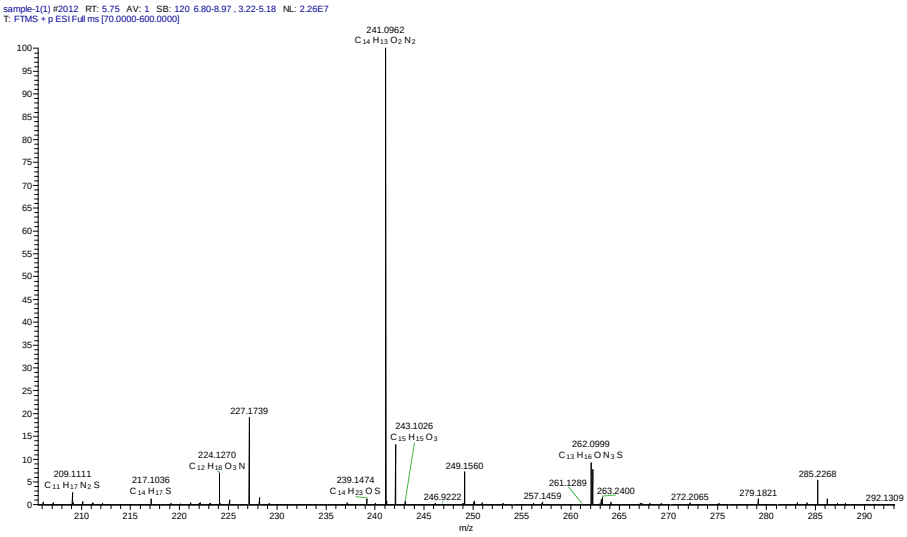
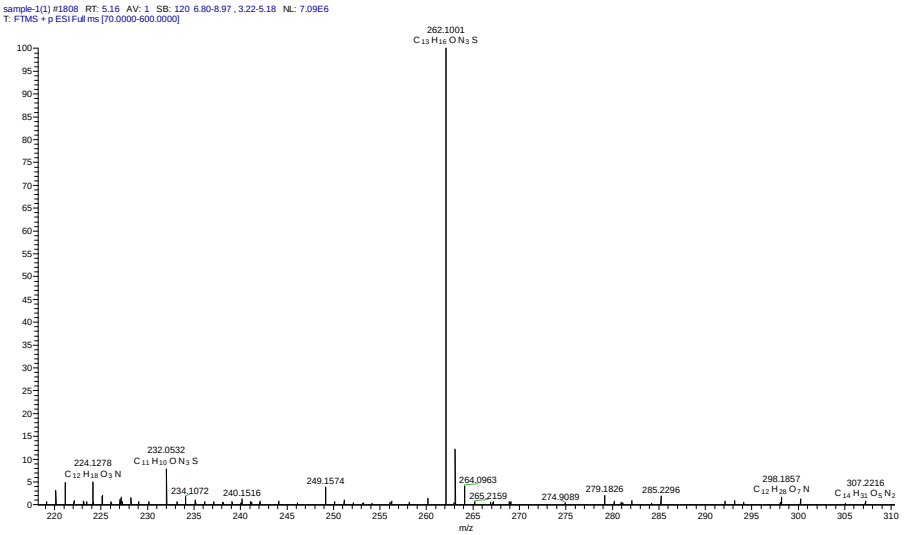


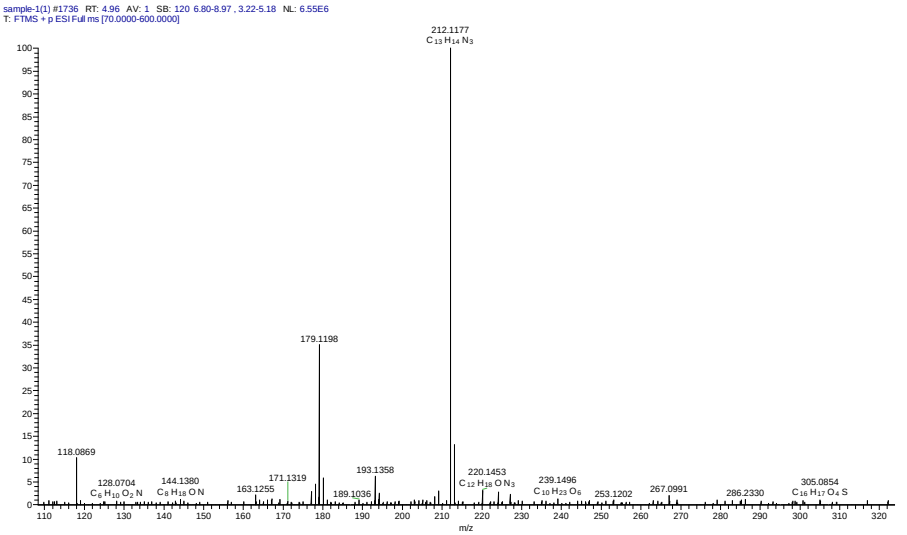
Figure. S2 XRD patterns of MCA-CN/WO_3, 300℃MCA-CN/WO_3 and 450℃MCA-CN/WO_3.


sample-1(1) #2012 RT: 5.75 AV: 1 SB: 120 6.80-8.97 , 3.22-5.18 NL: 2.26E7
T: FTMS + p ESI Full ms [70.0000-600.0000]
241.0962
C 14 H 13 O 2 N 2
227.1739
243.1026
C 15 H 15 O 3
224.1270
C 12 H 18 O 3 N
262.0999
C 13 H 16 O N 3 S
209.1111
C 11 H 17 N 2 S
217.1036
C 14 H 17 S
249.1560
239.1474
C 14 H 23 O S
246.9222
261.1289
257.1459
263.2400
272.2065
279.1821
285.2268
292.1309
m/z

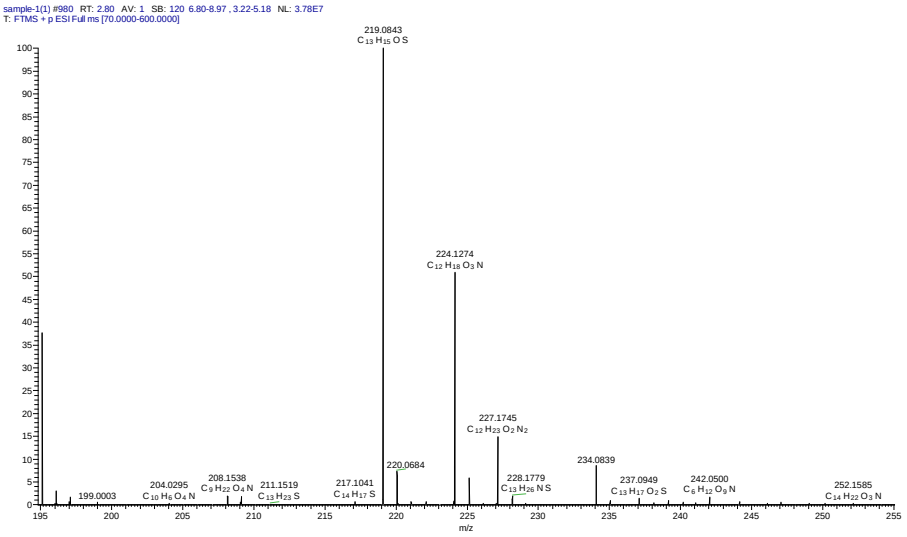
(b)


sample-1(1) #1808 RT: 5.16 AV: 1 SB: 120 6.80-8.97 , 3.22-5.18 NL: 7.09E6
T: FTMS + p ESI Full ms [70.0000-600.0000]
262.1001
C 13 H 16 O N 3 S
232.0532
C 11 H 10 O N 3 S
224.1278
C 12 H 18 O 3 N
234.1072
240.1516
249.1574
264.0963
265.2159
274.9089
279.1826
285.2296
298.1857
C 12 H 28 O 7 N
307.2216
C 14 H 31 O 5 N 2
m/z

(c)


sample-1(1) #1736 RT: 4.96 AV: 1 SB: 120 6.80-8.97 , 3.22-5.18 NL: 6.55E6
T: FTMS + p ESI Full ms [70.0000-600.0000]
212.1177
C 13 H 14 N 3
179.1198
118.0869
128.0704
C 6 H 10 O 2 N
144.1380
C 8 H 18 O N
163.1255
171.1319
189.1036
193.1358
220.1453
C 12 H 18 O N 3
239.1496
C 10 H 23 O 6
253.1202
267.0991
286.2330
305.0854
C 16 H 17 O 4 S
m/z

(d)



(e)

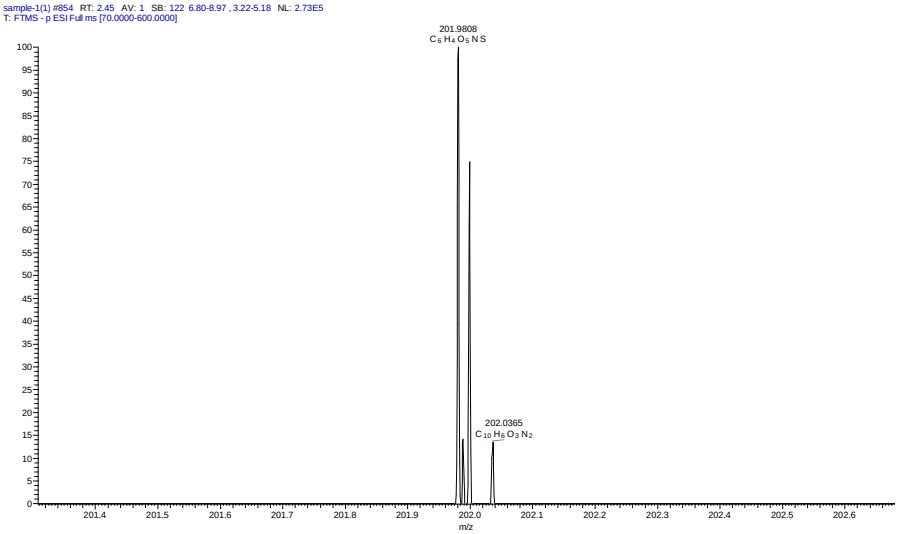
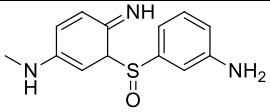
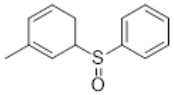
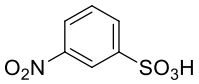
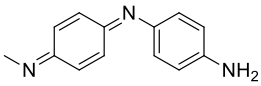
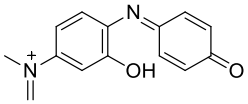


Figure. S3 Diffrent retention time of LC-MS spectrum (**a**) 5.75min, (**b**) 5.13 min, (**c**) 4.96min, (**d**) 2.77 min, (**e**) 2.45 min.

Table S1 Summary of the photo-Fenton degradation of pollutants over g-C_3N_4 based photocatalysts.

Catalysts	Pollutants	Mass (mg)	Removing capacities	Light source wavelength [nm]	pH	H_2O_2 solution	Degradation time/efficiency	Ref
Cu-C-CN	Methylene blue	20	10 mg L^{-1}/ (50 mL)	500 W tungsten lamp（ >410）	5.4-11	0.1 M	150 min/98 %	(Wang et al., 2019)
Fe_2O_3 /g-C_3N_4	Methylene blue	25	20 mg L^{-1}/ (50 mL)	300 W Xe lamp (≥ 420)	3-7	15 mM	16 min/100%	(Xi et al., 2019)
FeOCl/CDots	p-chlorophenol	100	5 mg L^{-1}/ (100 mL)	150 W Xe lamp (≥ 420)	2.9-8.7	/	180 min/90.7%	(Zhang et al., 2020)
CuS/g-C_3N_4	rhodamine B	40	30 mg L^{-1}/ (100 mL)	300 W Xe lamp (≥ 420)	/	0.16 M	60 min/97 %	(Ma et al., 2019)
FeNx/g-C_3N_4	Methylene blue	25	200 mg L^{-1}/ (50 mL)	300 W Xe lamp (≥ 420)	7	0.26 M	11 min/98.9%	(An et al., 2018)
NH_2-MIL-88B(Fe)/g-C_3N_4	Methylene blue	50	30 mg L^{-1}/ (50 mL)	500 W Xe lamp (≥ 420)	7	0.03 M	120 min/100%	(Li et al., 2017)
MCA-CN/WO_3	Methylene blue	15	20 mg L^{-1}/ (100 mL)	25 W LED lamp (≥ 400)	4.3-12.4	0.16 M	30 min/98 %	This work

Table S2 Retention time, mass spectra and chemical structure of main degradation intermediates of MB

Intermediate	t_R（min）	m/z	Molecular formula	Chemical structure
A	5.13	262	$C_{13}H_{15}N_3OS$	
B	2.77	219	$C_{13}H_{14}OS$	
C	2.45	202	$C_6H_5NO_5S$	
D	4.96	212	$C_{13}H_{13}N_3$	
E	5.75	241	$C_{14}H_{13}N_2O_2^+$	

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