

Supplementary Material

Facile Synthesis to Porous TiO_2 Nanostructures at Low Temperature for Efficient Visible-light Degradation of Tetracycline

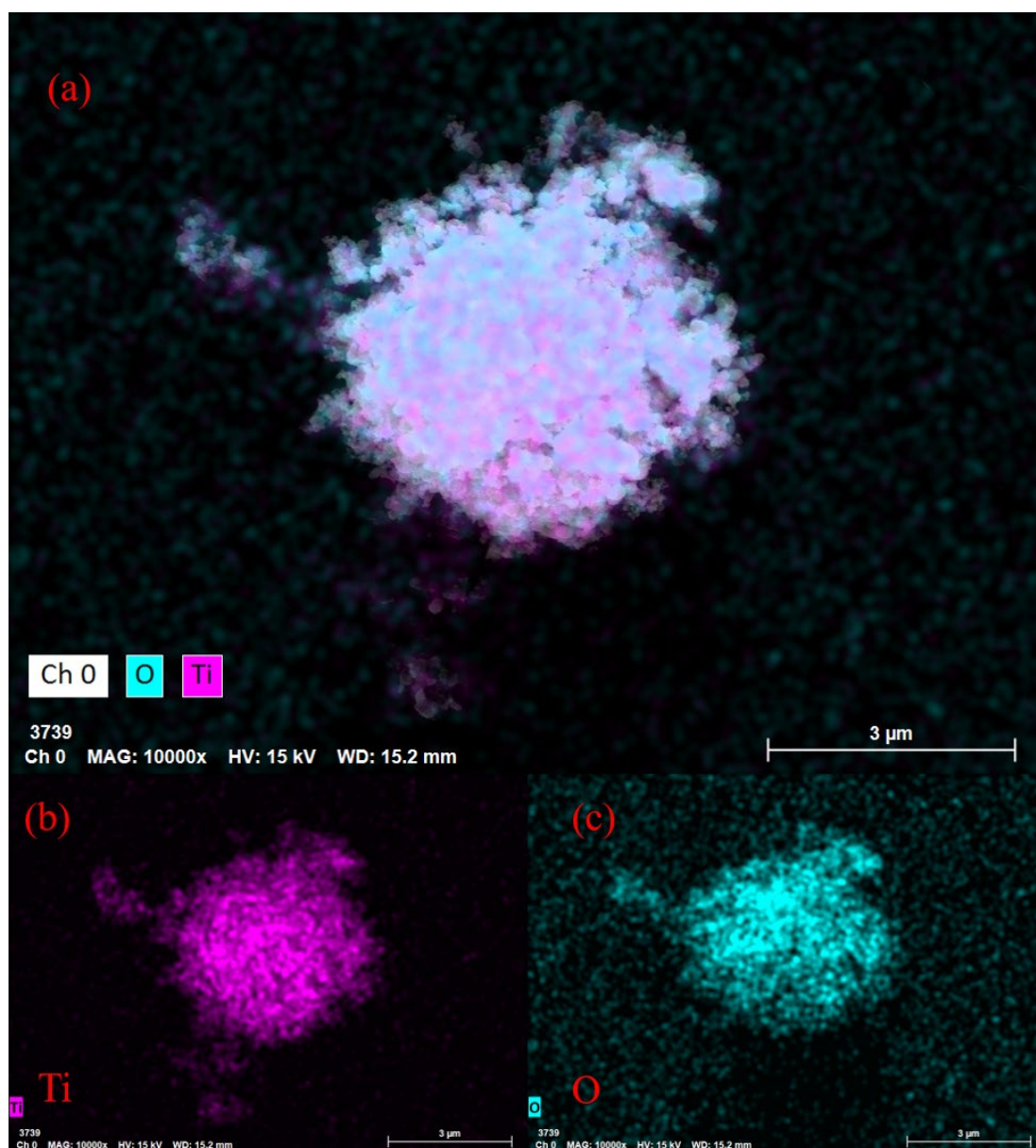


Fig. S1 Elements mapping of TiO_2 -100

Table S1 Specific surface areas, pore volume, and pore diameter of these samples.

Samples	Surface Area(m ² /g)	BJH Pore Volume(cm ³ /g)	BJH Average Pore Size(nm)
TiO ₂ -90	33	0.13	7.96
TiO ₂ -100	57	0.18	9.07
TiO ₂ -110	40	0.16	9.32
P25	9.2	0.031	5.98

Table S2 The pseudo-first-order kinetic rate constants of different samples

Samples	UV Light		Visible Light	
	Kinetic rate constants (k, min ⁻¹)	Correlation coefficients (R ²)	Kinetic rate constants (k, min ⁻¹)	Correlation coefficients (R ²)
TiO ₂ -90	0.09047	0.95691	0.01684	0.98666
TiO ₂ -100	0.18515	0.98452	0.02167	0.97614
TiO ₂ -110	0.10482	0.98241	0.01836	0.95829
P25	0.00967	0.97868	0.00505	0.98623

Table S3 Comparison of removal efficiency of various photocatalysts toward TC

Photocatalyst	light type	Light time (min)	Degradation rate (%)	References
TiO ₂ -GC	visible light	120	94.6	[1]
TiO ₂ /Ag	visible light	90	90	[2]
P25	UV/visible	120	94.8/76.6	[3]
black anatase-TiO ₂	light	270	66.2	[4]
TiO ₂ @MoS ₂ /BiVO ₄	visible light	90	72.3%	[5]
hollow TiO ₂	visible light	120	90	[6]

PG/TiO ₂	UV/visible light	90	95.5/88.6	[7]
TiO ₂ /RM	visible light	120	60	[8]
BiVO ₄ /TiO ₂ /RGO	visible light	120	96.2	[9]
TiO ₂	UV/ visible light	60	Nearly100/79	This work

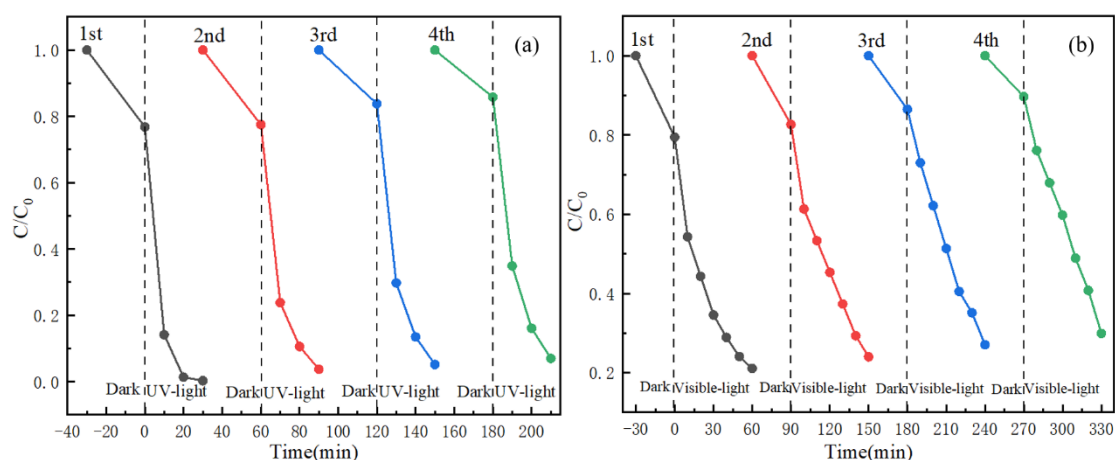


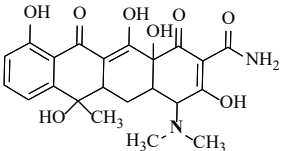
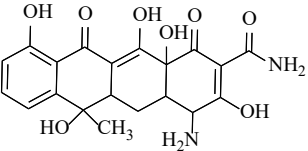
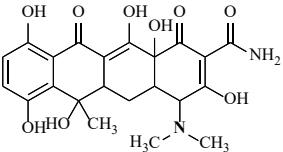
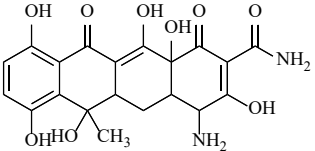
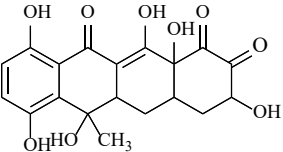
Fig. S2 Recycled testing of TiO₂-100 for TC(a) UV-light;(b) visible light.

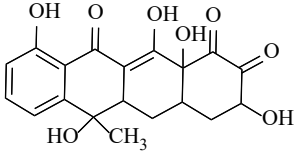
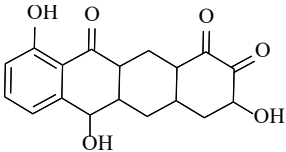
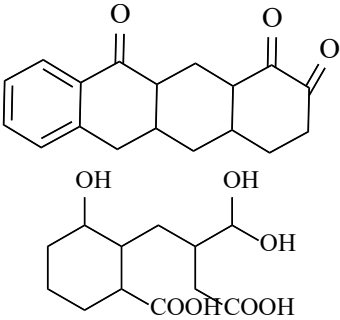
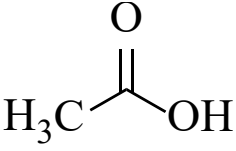
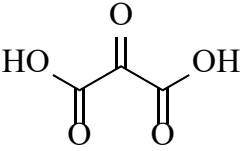
Table S4 Fukui Function indices of atoms in TC

Number	Atom	q_N	q_{N+1}	q_{N-1}	f^-	f^+	f^0
1	O	-0.2227	-0.2414	-0.194	0.0288	0.0187	0.0237
2	C	-0.1005	-0.107	-0.0961	0.0045	0.0065	0.0055
3	O	-0.2201	-0.2525	-0.1967	0.0235	0.0324	0.0279
4	O	-0.1658	-0.2179	-0.1026	0.0633	0.0521	0.0577
5	O	-0.1584	-0.1816	-0.1229	0.0356	0.0232	0.0294
6	O	-0.2228	-0.3048	-0.191	0.0319	0.082	0.0569
7	O	-0.32	-0.3385	-0.2111	0.1089	0.0186	0.0637
8	N	-0.1577	-0.1677	-0.1225	0.0352	0.01	0.0226
9	O	-0.1398	-0.1667	-0.1201	0.0197	0.0269	0.0233
10	O	-0.2085	-0.222	-0.1974	0.0111	0.0135	0.0123
11	C	-0.0363	-0.0405	-0.0321	0.0042	0.0041	0.0042
12	C	-0.0344	-0.0378	-0.0305	0.0039	0.0034	0.0037
13	C	0.136	0.1201	0.1395	0.0035	0.0159	0.0097
14	C	0.1522	0.149	0.1799	0.0277	0.0032	0.0154
15	C	0.1055	0.0509	0.1433	0.0378	0.0546	0.0462
16	C	0.0962	0.0647	0.1226	0.0263	0.0316	0.029
17	C	0.1286	0.05	0.1419	0.0133	0.0785	0.0459

18	C	0.0647	0.0583	0.0679	0.0033	0.0064	0.0048
19	C	-0.0735	-0.0815	-0.0628	0.0107	0.0081	0.0094
20	C	-0.0742	-0.0879	0.0055	0.0798	0.0137	0.0467
21	C	-0.0378	-0.0586	-0.0201	0.0178	0.0208	0.0193
22	C	-0.0732	-0.1101	-0.0493	0.0239	0.0369	0.0304
23	C	0.1254	0.1037	0.136	0.0106	0.0217	0.0161
24	C	-0.0283	-0.0305	-0.027	0.0013	0.0022	0.0017
25	C	-0.0228	-0.0255	-0.0132	0.0096	0.0027	0.0062
26	C	0.0052	-0.0296	0.0087	0.0035	0.0348	0.0191
27	C	-0.0269	-0.0961	0.0078	0.0347	0.0692	0.052
28	C	-0.0645	-0.092	-0.0325	0.0319	0.0275	0.0297
29	C	0.0205	0.0192	0.0233	0.0028	0.0013	0.002
30	C	-0.05	-0.0547	-0.0445	0.0055	0.0047	0.0051
31	C	0.0857	0.0831	0.0884	0.0027	0.0026	0.0026
32	N	-0.049	-0.0505	-0.0455	0.0035	0.0015	0.0025

Table S5 Possible major intermediates in the TC degradation process

Product ID	Chemical Formula	Proposed Structure	Measured (m/z)
TC	C ₂₂ H ₂₄ N ₂ O ₈		445
P1	C ₂₀ H ₂₀ N ₂ O ₈		417
P2	C ₂₂ H ₂₅ N ₂ O ₉		462
P3	C ₂₀ H ₂₁ N ₂ O ₉		434
P4	C ₂₀ H ₁₇ O ₈		402

P5	$C_{20}H_{17}O_8$		385
P6	$C_{20}H_{11}O_3$		340
P7	$C_{19}H_8O_3$		285
P8	$C_{12}H_{20}O_7$		277
P9	$C_2H_4O_2$		60
P10	$C_3H_2O_5$		118

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