Electronic Supplementary Material (ESI) for RSC Advances.

Table S1 XPS data of 5P-TiO_2

Name	Peak BE	Height CPS	FWHM eV	Area (P) CPS.eV	Area (N) TPP-2M	Atomic %
N1s	400.27	419.23	0.24	1621.32	0.01	1.64
C1s	284.53	3152.37	1.88	8569.31	0.11	13.98
O1s	529.91	44563.58	1.55	93055.98	0.44	57.31
P2p	133.45	1740.06	1.76	3934.73	0.04	4.55
Ti2p	458.63	40064.72	1.1	84380.35	0.17	22.52

Table S2 six factors experimental design and experimented and predicted values for the central composite design

Run	levels of variables						Response(% removal of TC)	
	A	B	C	D	E	F	$Y_{(experimented)}$	$Y_{(predicted)}$
1	10	180	20	4	13.6	4	99.91	100.15
2	20	40	20	1	19.4	10	100.00	99.85
3	20	40	20	4	8.5	10	99.34	99.76
4	20.89	110	12.5	2.5	16.2	7	100.00	99.98
5	15	110	12.5	2.5	5.5	7	100.00	96.93
6	10	40	20	1	10.4	10	100.00	98.75
7	15	110	0.76	2.5	17.0	7	100.00	99.93
8	10	180	5	1	9.6	10	100.00	99.58
9	20	180	5	4	9.4	10	100.00	88.86
10	15	0.44	12.5	2.5	16.1	7	86.44	99.81
11	7.17	110	12.5	2.5	15.8	7	100.00	100.20
12	15	110	12.5	2.5	16.6	7	98.24	97.16
13	20	40	5	1	21.4	4	97.00	96.47
14	10	40	5	4	31.0	4	96.76	100.24
15	10	180	20	1	8.3	4	100.00	99.26
16	20	180	20	1	23.6	4	100.00	99.52
17	15	110	12.5	2.5	16.3	7	96.67	100.69
18	10	180	5	4	17.9	10	97.14	100.71
19	20	180	20	4	3.9	4	99.95	86.85
20	10	40	20	4	22.4	10	100.00	100.25
21	10	70	5	1	7.0	4	100.00	100.61
22	15	110	12.5	2.5	24.8	7	93.00	100.48
23	15	110	12.5	2.5	14.4	11.7	100.00	100.13
24	15	110	12.5	2.5	15.3	7	100.00	85.78
25	15	110	24.24	2.5	10.2	7	100.00	100.68
26	15	219.56	12.5	2.5	15.8	7	99.70	93.35
27	20	180	5	1	19.8	10	100.00	99.92
28	15	110	12.5	0.15	13.0	7	99.82	100.48
29	15	110	12.5	2.5	19.6	2.3	99.31	97.28
30	20	40	5.00	4	10.0	4	89.03	96.76
31	15	110	12.5	4.85	14.6	7	85.00	96.88

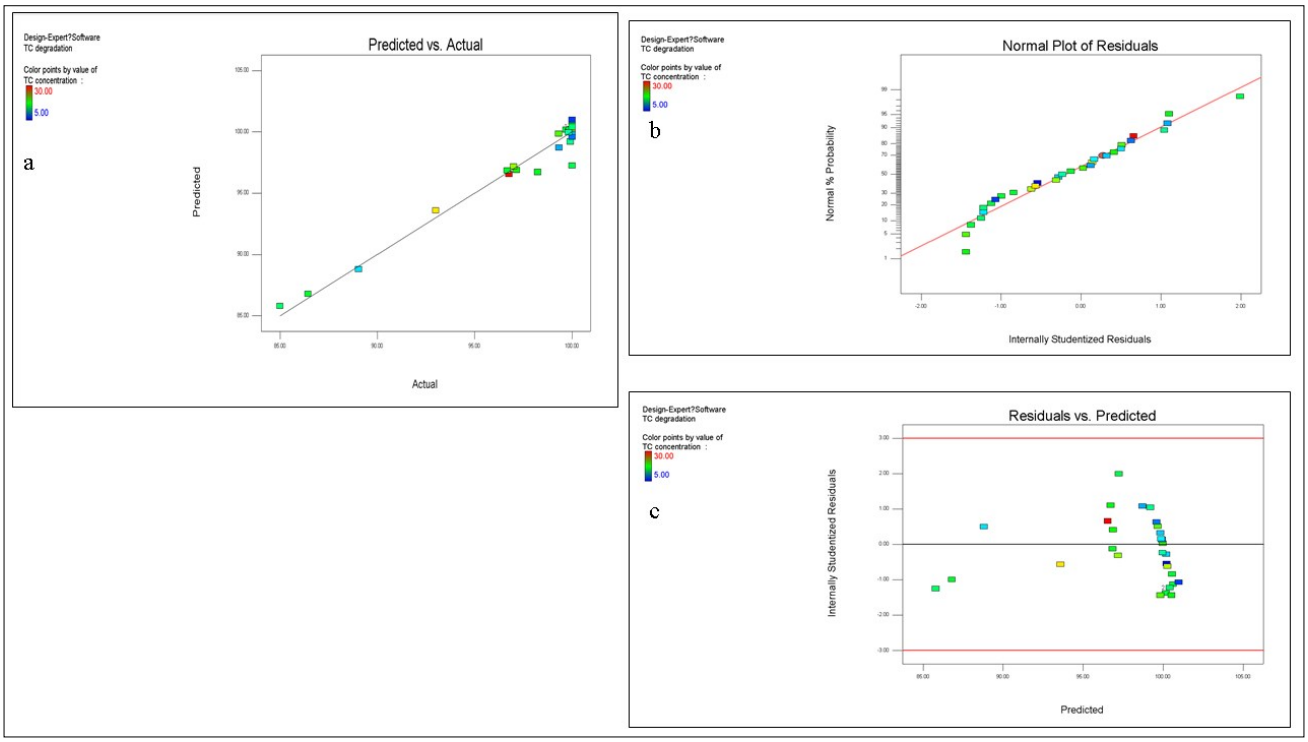


Fig.S1. Analyze of accuracy of obtained formula

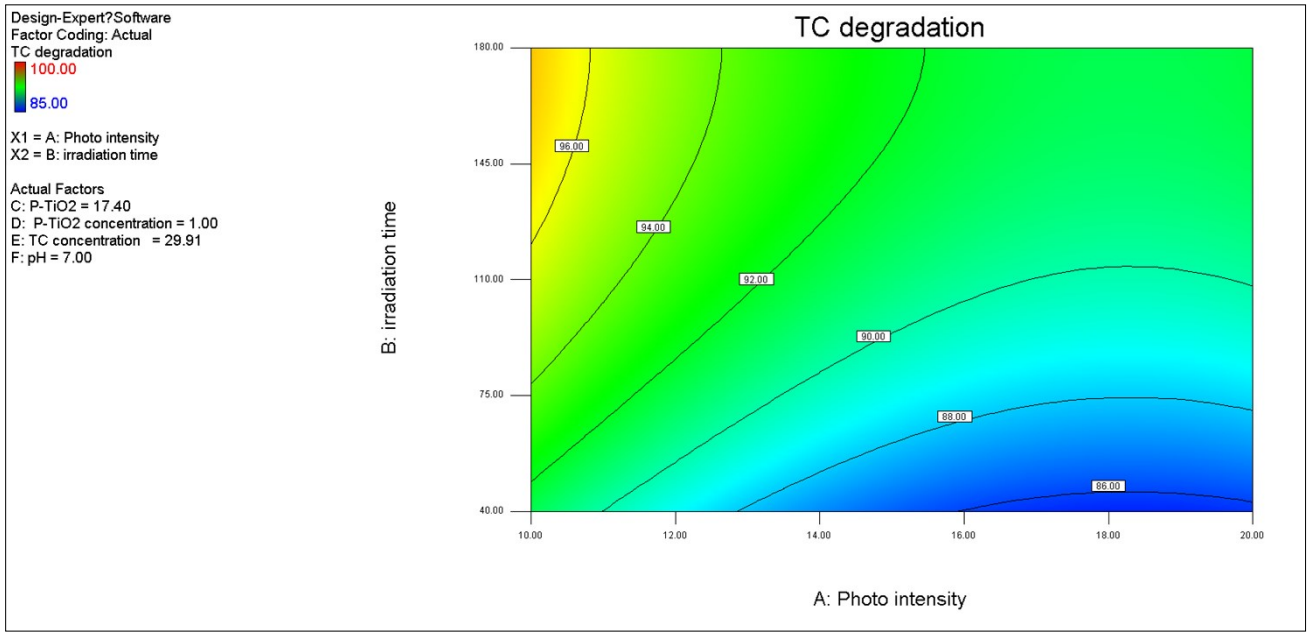


Fig.S2. Optional experimental conditions for photodegradation of TC

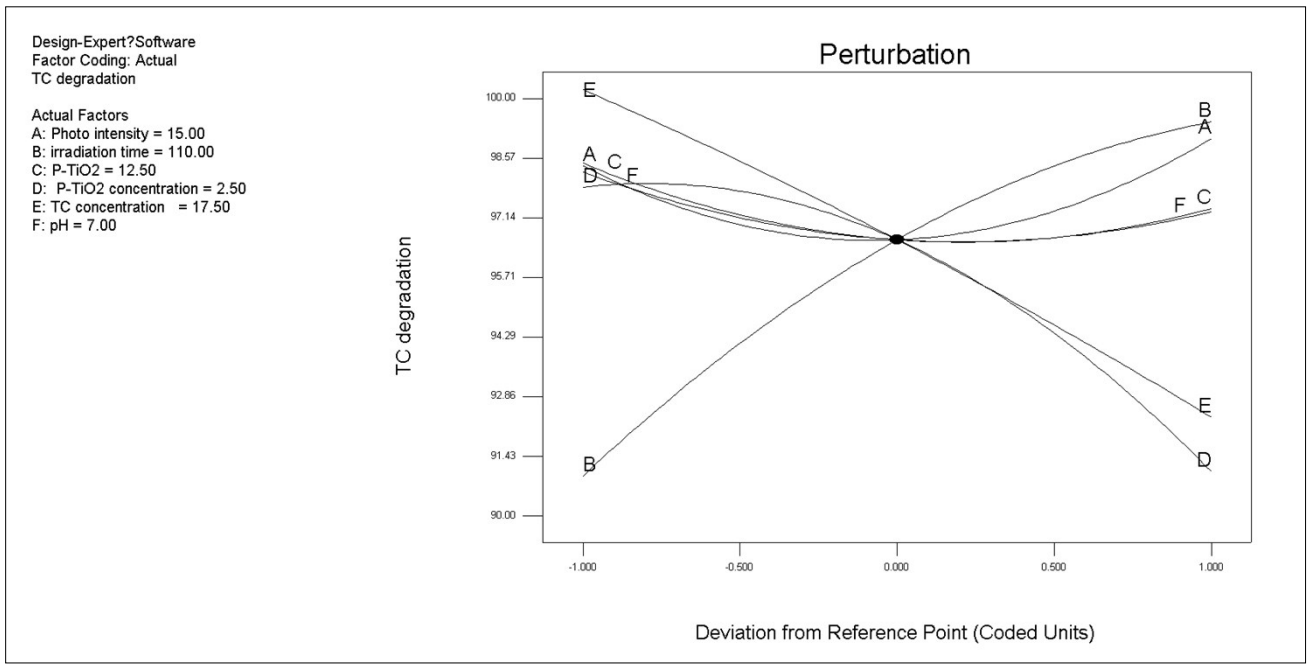


Fig S3 the perturbation plot for the TC degradation

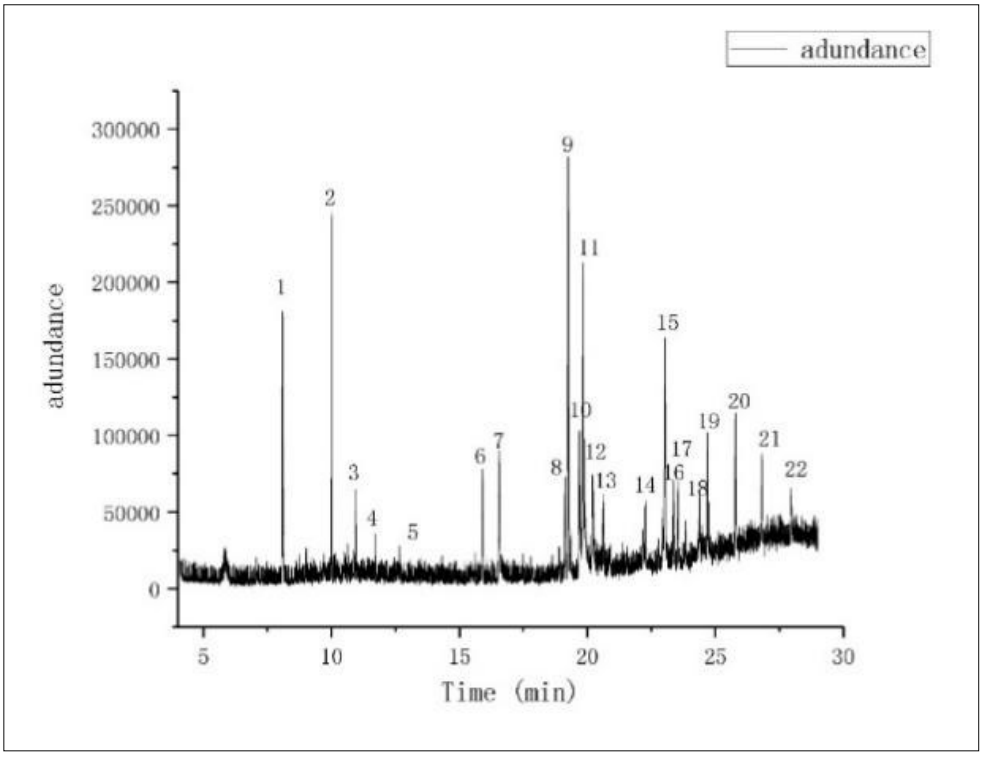


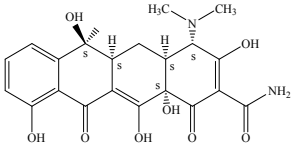
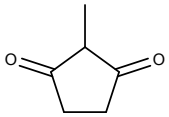
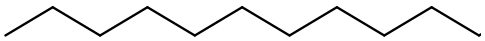
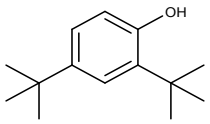
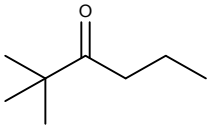
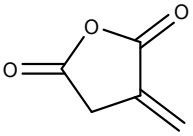
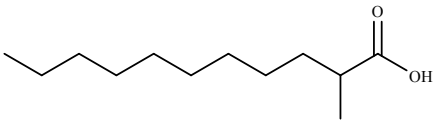
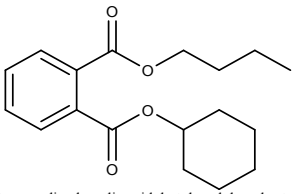
Fig .S4 Information of the total ion chromatograms (5 and 22 are the same intermediate).

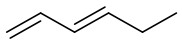
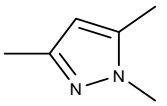
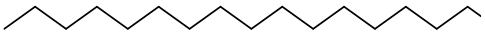
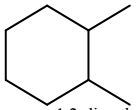
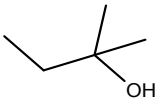
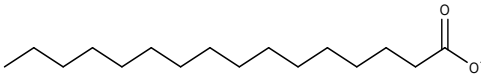
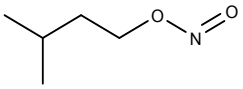
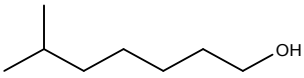
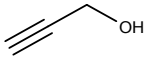
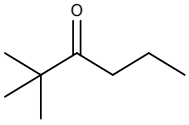
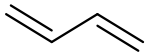
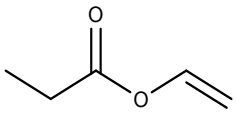
Table S3 ANOVA for response function Y (degradation efficiency of TC)

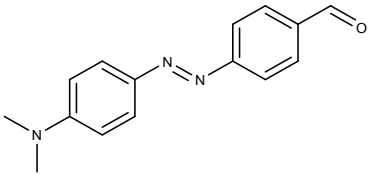
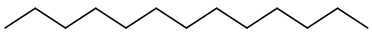
Source	Sum of Squares	Degree of freedom	Mean Square	F-Value	P-value
Model	479.13	24	19.96	7.87	0.0082
A	0.38	1	0.38	0.15	0.7129
B	88.62	1	88.62	34.95	0.0010
C	1.16	1	1.16	0.46	0.5248
D	52.17	1	52.17	20.57	0.0040
E	31.07	1	31.07	12.25	0.0128
F	1.04	1	1.04	0.41	0.5451
AC	2.70	1	2.70	1.06	0.3423
AD	28.41	1	28.41	11.20	0.0155
AE	50.81	1	50.81	20.04	0.0042
BC	2.19	1	2.19	0.86	0.3889
BD	6.46	1	6.46	2.55	0.1615
BF	24.44	1	24.44	9.64	0.0210
CD	9.78	1	9.78	3.86	0.0972
CE	4.04	1	4.04	1.59	0.2536
CF	17.75	1	17.75	7.00	0.0382
DE	13.19	1	13.19	5.20	0.0628
DF	6.71	1	6.71	2.65	0.1549
EF	20.53	1	20.53	8.10	0.0294
A^2	35.60	1	35.60	14.04	0.0095
B^2	25.63	1	25.63	10.11	0.0191
C^2	18.03	1	18.03	7.11	0.0372
D^2	55.40	1	55.40	21.85	0.0034
E^2	0.28	1	0.28	0.11	0.7507
F^2	16.08	1	16.08	6.34	0.0454
CorTotal	494.35	30			

R^2=0.9692, Adjusted R^2=0.8461, Adep precision=10.441.

Table S4 Products identified by GC-MS analysis during photocatalytic degradation of TC

Abbreviation	CAS #	Chemical formula	Chemical structure	m/z	Retention time(min)
TC	64-75-5	$C_{22}H_{25}ClN_2O_8$	 •HCl Tetracycline hydrochloride Rotation (-).,Absolute stereochemistry.	480.9	-
DP 1	765-69-5	$C_6H_8O_2$	 1,3-Cyclopentanedione, 2-methyl-	112	8.0863
DP 2	629-59-4	$C_{14}H_{30}$	 Tetradecane	198	10.0073
DP 3	96-76-4	$C_{14}H_{22}O$	 Phenol, 2,4-bis(1,1-dimethylethyl)-	206	10.9493
DP 4	5405-79-8	$C_8H_{16}O$	 3-Hexanone, 2,2-dimethyl-	128	11.7144
DP 5	2170-03-8	$C_5H_4O_3$	 2,5-Furandione, dihydro-3-methylene-	112	13.3941
DP 6	24323-25-9	$C_{12}H_{24}O_2$	 Undecanoic acid, 2-methyl-	200	15.8950
DP 7	84-64-0	$C_{18}H_{24}O_4$	 1,2-Benzenedicarboxylic acid, butyl cyclohexyl ester	304	16.5566

DP 8	592-48-3	C_6H_{10}	 1,3-HEXADIENE	82	19.1302
DP 9	1072-91-9	$C_6H_{10}N_2$	 1H-Pyrazole, 1,3,5-trimethyl-	110	19.2422
DP 10	112-61-8	$C_{19}H_{38}O_2$	 Octadecanoic acid, methyl ester	298	19.6815
DP 11	583-57-3	C_8H_{16}	 Cyclohexane, 1,2-dimethyl-	112	19.8395
DP 12	75-85-4	$C_5H_{12}O$	 2-methyl-2-butano	88	20.1991
DP 13	111-06-8	$C_{20}H_{40}O_2$	 Hexadecanoic acid, butyl ester	312	20.6278
DP 14	110-46-3	$C_5H_{11}NO_2$	 Amyl Nitrite	117	22.2585
DP 15	26952-21-6	$C_8H_{18}O$	 Isooctanol	130	23.0202
DP 16	107-19-7	C_3H_4O	 2-Propyn-1-ol	56	23.3521
DP 17	5405-79-8	$C_8H_{16}O$	 3-Hexanone, 2,2-dimethyl-	128	23.5428
DP 18	106-99-0	C_4H_6	 1,3-Butadiene	54	24.3868
DP 19	105-38-4	$C_5H_8O_2$	 Propanoic acid, ethenyl ester	100	24.7054

DP 20	39208-00-9	$C_{15}H_{15}N_3O$	 Benzaldehyde, 4-((4-(dimethylamino)phenyl)azo)-	253	25.7916
DP 21	629-50-5	$C_{13}H_{28}$	 Tridecane	184	26.8187