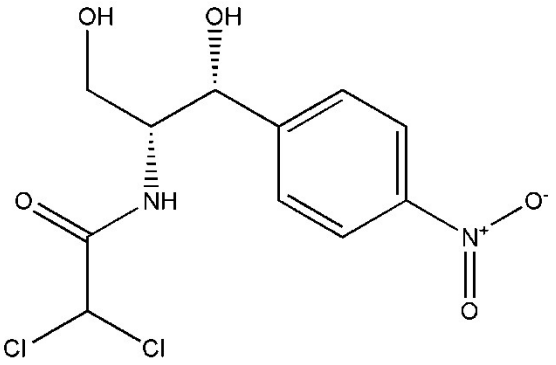
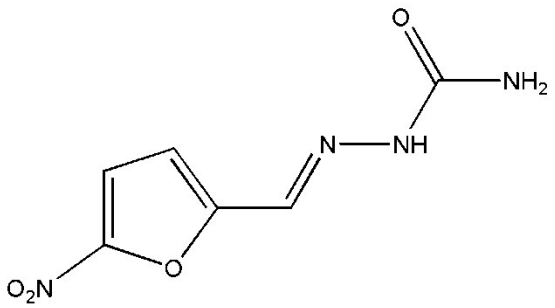
Electronic Supporting Information

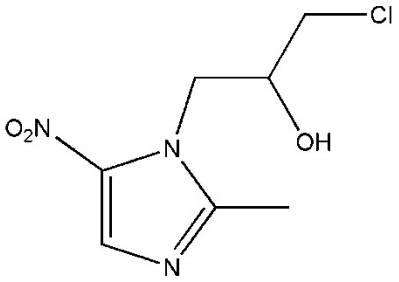
New 3,5-bis(3,4-dicarboxyphenoxy)benzoic acid appended Mn(II) coordination polymers: Synthesis, Characterization and Antibiotic Photodegradation properties



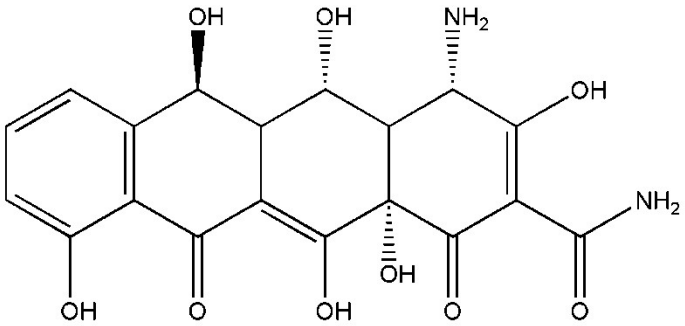
chloramphenicol



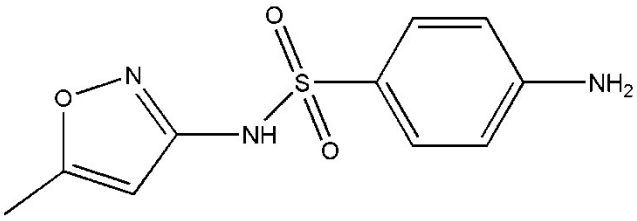
nitrofurazone



ornidazole



oxytetracycline



sulfamethoxazole

Scheme S1 the backbone of the antibiotics pollutants of chloramphenicol (CAP), nitrofurazone (NFZ), ornidazole (ODZ), oxytetracycline (OXY), and sulfamethoxazole (SMT).

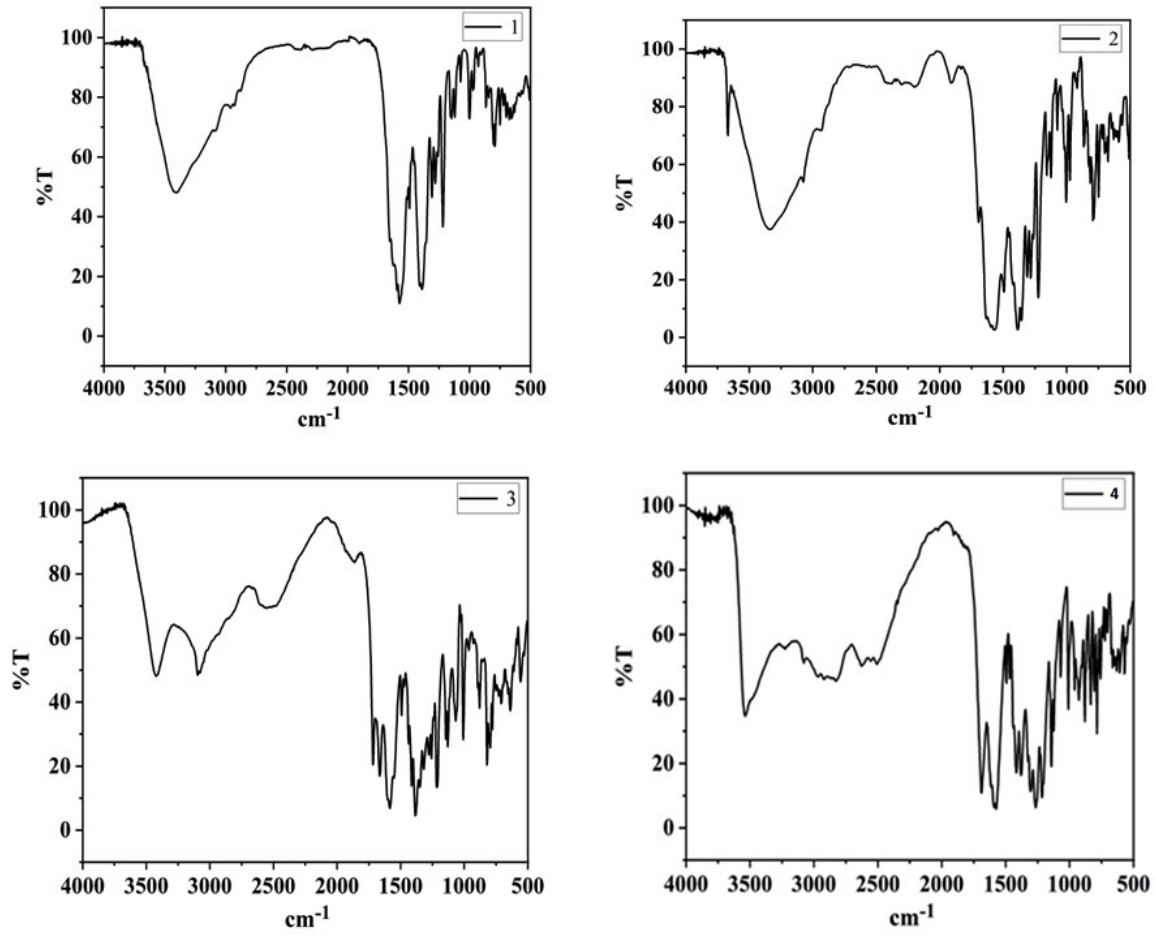


Figure S1 FT-IR spectra of CPs **1-4**

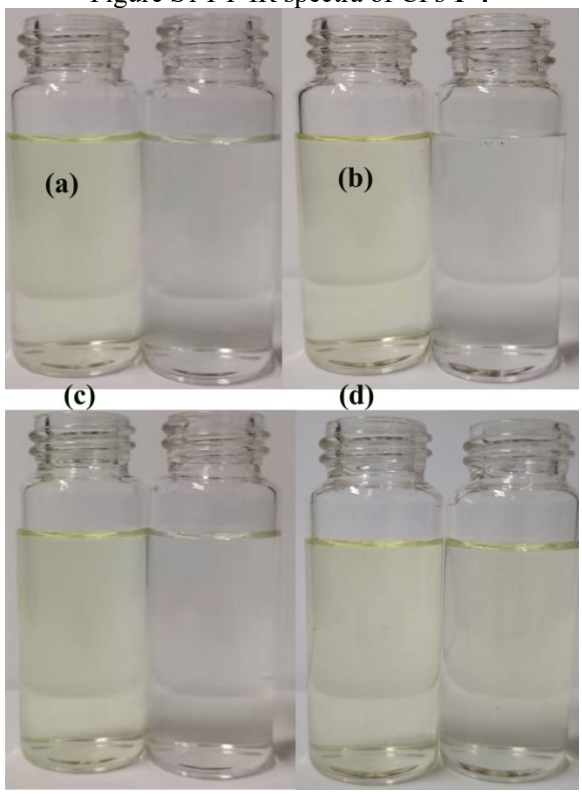


Fig. S2 The photographs of the compound before and after exposed to the analytes under UV light

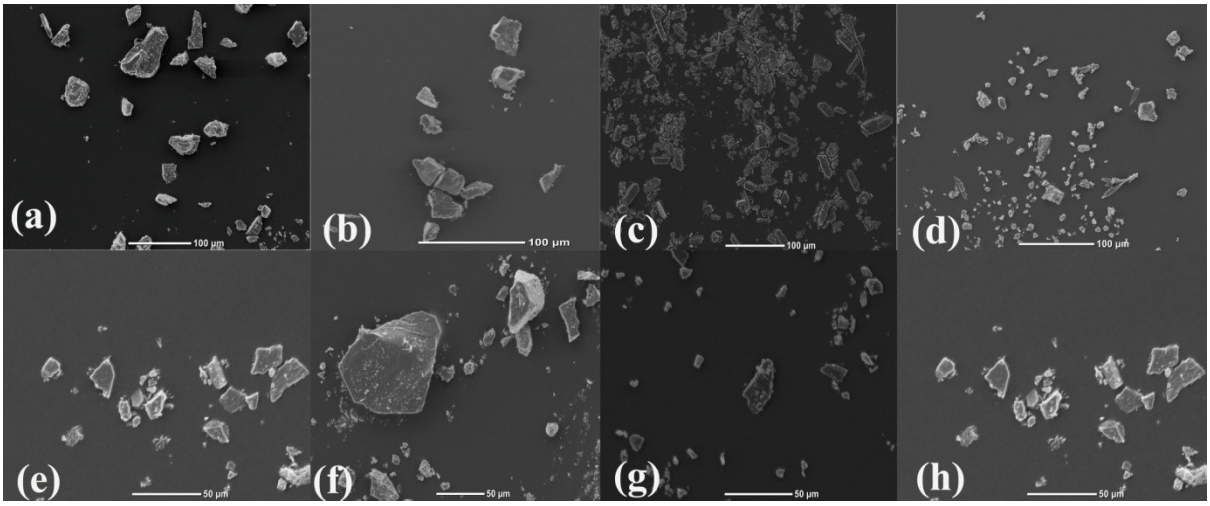


Fig. S3 the SEM images of each coordination polymer before and after photodegradation of NFZ for CPs **1-4**

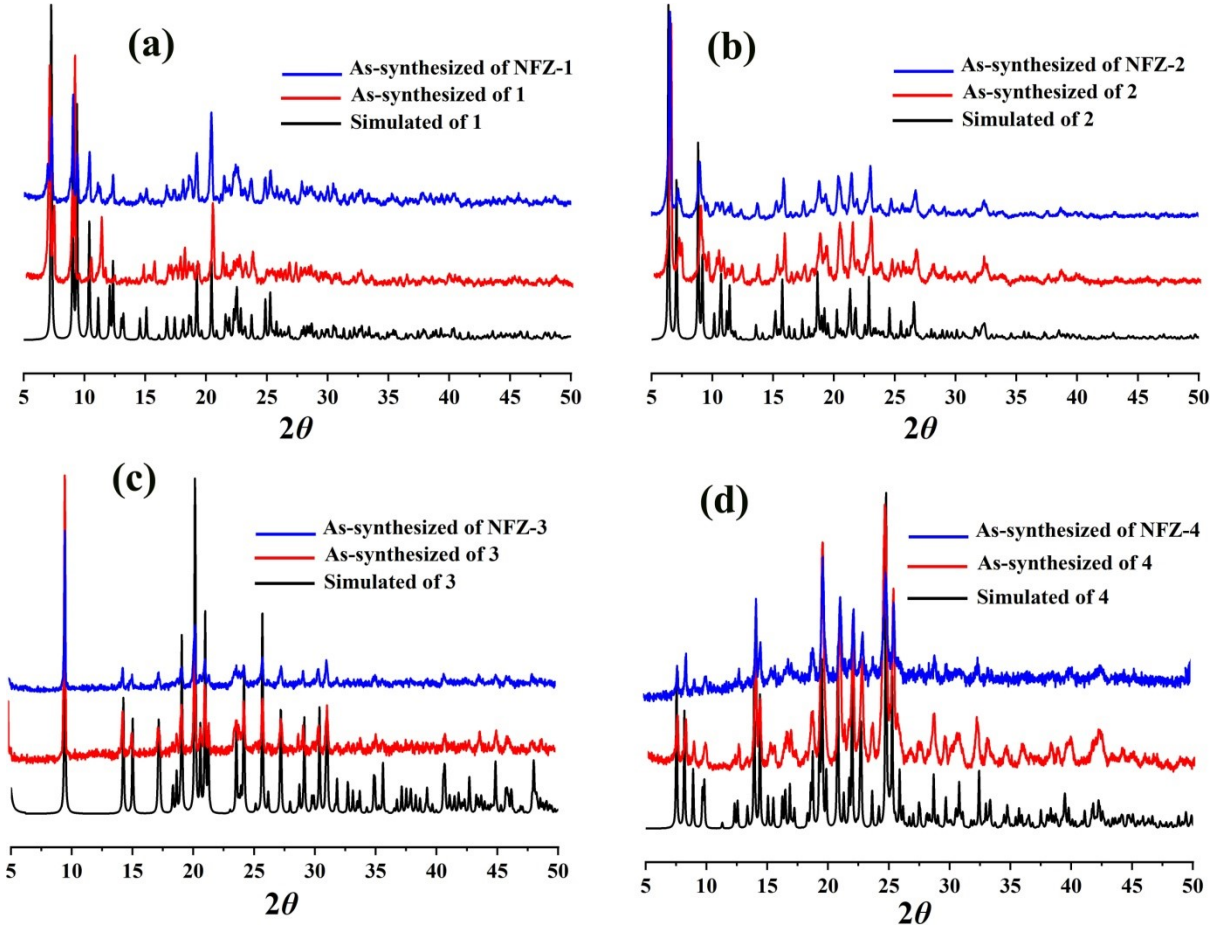


Fig. S4 the PXRD of each coordination polymer before and after photodegradation of NFZ for CPs **1-4**

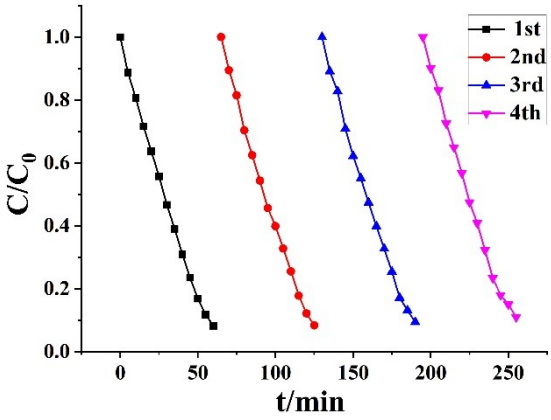


Fig. S5 Results of the photocatalytic recycles for CP **2** against the photodegradation of NFZ antibiotic.

Table S1. Crystallographic data and structure refinement details for CPs 1 and 2

Parameter	**1**	**2**
Formula	$C_{28}H_{23}Mn_2NO_{15}$	$C_{31}H_{30}Mn_2N_2O_{15}$
Formula weight	723. 35	954.69
Crystal system	Monoclinic	Monoclinic
Space group	*P21/c*	*P21/c*
Crystal Color	Colourless	Colourless
a, Å	10.1417(2)	14.081(4)
b, Å	18.8610(3)	19.265(5)
c, Å	16.4838(2)	16.785(5)
α, °	90	90
β, °	105.408(2)	100.610(6)
γ, °	90	90
V, Å ^{3}	3039.74(9)	4475(2)
Z	4	4
ρ_{calAg}, g/cm^3	1.581	1.417
μ, mm^{-1}	7.430	0.639
F(000)	1472	1984
θ Range, deg	3.6-76.1	1.5-27.8
Reflection Collected	19316	25375
Independent reflections (R_{int})	0.047	0.073

Reflections with $I > 2\sigma(I)$	5215	5183
Number of parameters	437	573
R_1, wR_2 ($I > 2\sigma(I)$)*	0.0805, 0.2342	0.0653, 0.1522
R_1, wR_2 (all data)**	0.0892, 0.2419	0.1413, 0.1871

Table S2. Crystallographic data and structure refinement details for CPs 3 and 4

Parameter	**3**	**4**
Formula	$C_{23}H_{16}MnO_{14}$	$C_{33}H_{22}MnN_2O_{13}$
Formula weight	571. 30	709. 46
Crystal system	Monoclinic	Triclinic
Space group	*P2/c*	*P-1*
Crystal Color	Colorless	Yellow
a, Å	19.1708(8)	11.2767(4)
b, Å	6.2123(3)	11.9402(4)
c, Å	9.5258(5)	12.4311(4)
α, °	90	96.076(3)
β, °	102.172(4)	104.603(3)
γ, °	90	111.886(3)
V, Å ^{3}	1108.97(9)	1465.30(10)
Z	2	2
ρ_{calAg}, g/cm^3	1.711	1.608
μ, mm^{-1}	0.676	4.351
F(000)	582	726
θ Range, deg	3.3-30.3	4.1-76.2
Reflection Collected	11811	17701
Independent reflections (R_{int})	0.045	0.050
Reflections with $I > 2\sigma(I)$	2732	4994
Number of parameters	213	446
R_1, wR_2 ($I > 2\sigma(I)$)*	0.0389, 0.0987	0.0494, 0.1318
R_1, wR_2 (all data)**	0.0505, 0.1052	0.0559, 0.1363

* $R = \sum(F_o - F_c)/\sum(F_o)$, ** $wR_2 = \{\sum[w(F_o^2 - F_c^2)^2]/\sum(F_o^2)^2\}^{1/2}$.

Table S3. Selected bond distances (Å) and angles (deg) for **1-4**

		1	
Mn(1)-O(1)	2.112(4)	Mn(1)-O(13)	2.165(5)
Mn(1)-O(14)	2.219(4)	Mn(1)-O(6)#1	2.226(4)
Mn(1)-O(4)#2	2.204(4)	Mn(1)-O(9)#2	2.179(4)
Mn(2)-O(2)	2.108(4)	Mn(2)-O(15)	2.141(5)
Mn(2)-O(5)#1	2.160(4)	Mn(2)-O(10)#1	2.211(3)
Mn(2)-O(4)#2	2.196(3)	Mn(2)-O(6)#2	2.317(4)
		2	
Mn(1)-O(1)	2.101(3)	Mn(1)-O(13)	2.131(3)
Mn(1)-O(5)#1	2.182(3)	Mn(1)-O(10)#1	2.176(3)
Mn(1)-O(4)#2	2.215(3)	Mn(1)-O(6)#2	2.283(3)
Mn(2)-O(2)	2.128(3)	Mn(2)-O(14)	2.171(4)
Mn(2)-O(17)	2.174(3)	Mn(2)-O(6)#1	2.229(3)
Mn(2)-O(4)#2	2.200(3)	Mn(2)-O(9)#2	2.215(3)
		3	
Mn1-O(1)	2.1499(14)	Mn(1)-O(9)	2.2034(13)
Mn(1)-O(2)#1	2.1733(13)	Mn(1)-O(1)#2	2.1499(14)
Mn(1)-O(9)#2	2.2034(13)	Mn(1)-O(2)#3	2.1733(13)
		4	
Mn(1)-O(1)	2.109(2)	Mn(1)-O(13)	2.175(2)
Mn(1)-N(1)	2.253(2)	Mn(1)-O(12)#1	2.146(2)
Mn(1)-O(7)#2	2.363(2)	Mn(1)-O(11)#3	2.135(2)
		1	
O(1)-Mn(1)-O(13)	91.73(19)	O(1)-Mn(1)-O(14)	87.53(18)
O(1)-Mn(1)-O(6)#1	98.35(16)	O(1)-Mn(1)-O(4)#2	91.52(17)
O(1)-Mn(1)-O(9)#2	172.46(16)	O(13)-Mn(1)-O(14)	93.1(2)
O(6)#1-Mn(1)-O(13)	169.41(18)	O(4)#2-Mn(1)-O(13)	90.19(19)
O(9)#2-Mn(1)-O(13)	81.65(17)	O(6)#1-Mn(1)-O(14)	90.56(15)
O(4)#2-Mn(1)-O(14)	176.58(15)	O(9)#2-Mn(1)-O(14)	89.25(16)
O(4)#2-Mn(1)-O(6)#1	86.32(14)	O(6)#1-Mn(1)-O(9)#2	88.49(13)
O(4)#2-Mn(1)-O(9)#2	92.09(14)	O(2)-Mn(2)-O(15)	84.52(19)
O(2)-Mn(2)-O(5)#1	86.71(16)	O(2)-Mn(2)-O(10)#1	98.52(17)
O(2)-Mn(2)-O(4)#2	91.07(16)	O(2)-Mn(2)-O(6)#2	169.50(16)
O(5)#1-Mn(2)-O(15)	165.38(17)	O(10)#1-Mn(2)-O(15)	88.47(17)
O(4)#2-Mn(2)-O(15)	101.19(17)	O(6)#2-Mn(2)-O(15)	89.43(18)
O(5)#1-Mn(2)-O(10)#1	81.28(14)	O(4)#2-Mn(2)-O(5)#1	90.63(14)
O(5)#1-Mn(2)-O(6)#2	100.88(14)	O(4)#2-Mn(2)-O(10)#1	167.03(15)
O(6)#2-Mn(2)-O(10)#1	89.86(13)	O(4)#2-Mn(2)-O(6)#2	81.69(13)
		2	

O(1)-Mn(1)-O(13)	89.61(12)	O(1)-Mn(1)-O(5)#1	87.27(11)
O(1)-Mn(1)-O(10)#1	100.96(12)	O(1)-Mn(1)-O(4)#2	90.21(11)
O(1)-Mn(1)-O(6)#2	168.81(12)	O(5)#1-Mn(1)-O(13)	163.34(12)
O(10)#1-Mn(1)-O(13)	83.61(12)	O(4)#2-Mn(1)-O(13)	106.48(12)
O(6)#2-Mn(1)-O(13)	85.41(11)	O(5)#1-Mn(1)-O(10)#1	80.94(11)
O(4)#2-Mn(1)-O(5)#1	89.90(11)	O(5)#1-Mn(1)-O(6)#2	100.30(10)
O(4)#2-Mn(1)-O(10)#1	165.12(11)	O(6)#2-Mn(1)-O(10)#1	88.46(11)
O(4)#2-Mn(1)-O(6)#2	81.63(10)	O(2)-Mn(2)-O(14)	87.43(15)
O(2)-Mn(2)-O(17)	90.09(12)	O(2)-Mn(2)-O(6)#1	93.88(11)
O(2)-Mn(2)-O(4)#2	89.57(11)	O(2)-Mn(2)-O(9)#2	173.78(12)
O(14)-Mn(2)-O(17)	96.03(14)	O(6)#1-Mn(2)-O(14)	177.14(13)
O(4)#2-Mn(2)-O(14)	90.20(13)	O(9)#2-Mn(2)-O(14)	86.51(14)
O(6)#1-Mn(2)-O(17)	86.52(11)	O(4)#2-Mn(2)-O(17)	173.75(11)
O(9)#2-Mn(2)-O(17)	89.17(11)	O(4)#2-Mn(2)-O(6)#1	87.28(10)
O(6)#1-Mn(2)-O(9)#2	92.24(11)	O(4)#2-Mn(2)-O(9)#2	91.84(11)
		3	
O(1)-Mn(1)-O(9)	92.02(6)	O(1)-Mn(1)-O(2)#1	95.75(5)
O(1)-Mn(1)-O(1)#2	180.00	O(1)-Mn(1)-O(9)#2	87.98(6)
O(1)-Mn(1)-O(2)#3	84.25(5)	O(2)#1-Mn(1)-O(9)	90.02(5)
O(1)#2-Mn(1)-O(9)	87.98(6)	O(9)-Mn(1)-O(9)#2	180.00
O(2)#3-Mn(1)-O(9)	89.98(5)	O(1)#2-Mn(1)-O(2)#1	84.25(5)
O(2)#1-Mn(1)-O(9)#2	89.98(5)	O(2)#1-Mn(1)-O(2)#3	180.00
O(1)#2-Mn(1)-O(9)#2	92.02(6)	O(1)#2-Mn(1)-O(2)#3	95.75(5)
O(2)#3-Mn(1)-O(9)#2	90.02(5)		
		4	
O(1)-Mn(1)-O(13)	87.05(10)	O(1)-Mn(1)-N(1)	90.32(9)
O(1)-Mn(1)-O(12)#1	165.01(9)	O(1)-Mn(1)-O(7)#2	85.66(8)
O(1)-Mn(1)-O(11)#3	91.61(9)	O(13)-Mn(1)-N(1)	177.01(11)
O(12)#1-Mn(1)-O(13)	84.40(10)	O(7)#2-Mn(1)-O(13)	90.75(10)
O(11)#3-Mn(1)-O(13)	92.90(10)	O(12)_#1-Mn(1)-N(1)	97.86(9)
O(7)#2-Mn(1)-N(1)	87.63(8)	O(11)#3-Mn(1)-N(1)	88.60(9)
O(7)#2-Mn(1)-O(12)#1	82.16(8)	O(11)#3-Mn(1)-O(12)#1	101.09(9)
O(7)#2-Mn(1)-O(11)#3	175.33(9)		

Symmetry Codes: **For 1**: #1=1-x, 1/2+y, 3/2-z; #2=x, 3/2-y, -1/2+z; **For 2**:#1=1-x, 1/2+y, 1/2-z; **For 3**: #-x,y,1/2-z; #2=-x,1-y,1-z; #3=x,1-y,1/2+z; **For 4**: #1=-1+x, y, 1+z; #2=x, y, 1+z; #3=1-x, 1-y, 1-z.

Table S4: Rate constant of the reactions

Material	k (min^{-1})	R^2
1+NFZ	0.01912	0.98604
2+NFZ	0.03224	0.98284
3+NFZ	0.01895	0.98506
4+NFZ	0.02121	0.98672
BQ+NFZ-1	0.01797	0.99484
AO+NFZ-1	0.02212	0.98343
TBA+NFZ-1	0.02598	0.96644
1+CAP	0.00211	0.98298
2+CAP	0.00212	0.97502
3+CAP	0.00303	0.98719
4+CAP	0.00968	0.98382
1+ODZ	0.02253	0.98763
2+ODZ	0.02401	0.98645
3+ODZ	0.01761	0.97908
4+ODZ	0.02530	0.98327
1+OXY	0.02075	0.99370
2+OXY	0.01533	0.98010
3+OXY	0.01381	0.99529
4+OXY	0.00557	0.98716

1+SMT	0.00655	0.98039
2+SMT	0.00698	0.99164
3+SMT	0.00465	0.99138
4+SMT	0.00706	0.99172

Table S5: The percentage photodegradation

	Blank	**1**	**2**	**3**	**4**
CAP	**18.48%**	**15.74%**	**17.63%**	**16.30%**	**24.88%**
NFZ	**24.82%**	**76.29%**	**91.93%**	**77.29%**	**78.61%**
ODZ	**24.67%**	**78.93%**	**78.04%**	**72.05%**	**80.93%**
OXY	**25.89%**	**64.97%**	**62.80%**	**32.18%**	**52.99%**
SMT	**49.01%**	**40.45%**	**40.25%**	**34.97%**	**43.21%**

Concentration (NFZ)	**20 mg/L**	**30 mg/L**	**40 mg/L**
	86.42%	**91.93%**	**81.23%**
Dosage (CP 2)	**10 mg/L**	**20 mg/L**	**30 mg/L**
	86.90%	**91.93%**	**81.79%**
pH	**pH=6**	**pH=7**	**pH=8**

	79.55%	**91.93%**	**81.88%**