Supporting Information for the Manuscript:

Copper(II) Coordination Polymers: Tunable Structures and Different Activation Effect of Hydrogen Peroxide for the Degradation of Methyl Orange under Visible Light Irradiation

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Table S1. Crystal data and structure refinement details for polymers **1**, **2** and **3**.

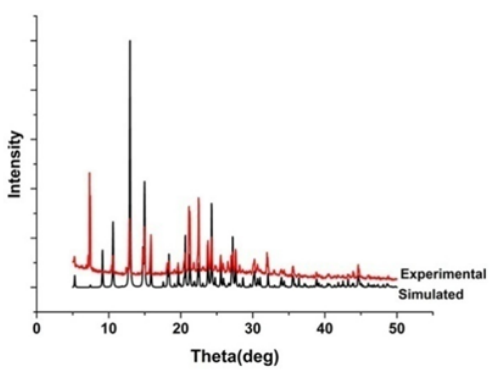
Complex	**1**	**2**	**3**
Formula	$C_{32}H_{42}N_{14}O_7Cu$	$C_{32}H_{50}N_{12}O_5Cl_2Cu$	$C_{16}H_{20}N_6Cl_2Cu$
Fw	798.34	817.28	430.82
Temp(K)	293(2)	293(2)	293(2)
Wavelength(Å	0.71073	0.71073	0.71073
Crystal system	Orthorhombic	Triclinic	Monoclinic
Space group	*Ibam*	*P-1*	*P2(1)/c*
a (Å)	23.711(5)	7.9002(16)	13.329(3)
b (Å)	8.9025(18)	10.020(2)	14.147(3)
c (Å)	33.427(7)	13.153(3)	9.6681(19)
α(deg)	90	101.72(3)	90
β(deg)	90	93.69(3)	101.46(3)
γ(deg)	90	91.54(3)	90
V (Å^3)	7056(3)	1016.5(4)	1786.7(6)
Z	8	1	4
D_c (g·cm^{-3})	1.503	1.335	1.602
μ (mm^{-1})	0.689	0.721	1.534
F(000)	3336	429	884
GOF on F^2	1.070	1.055	1.011
$R_1[I>2\sigma(I)]^a$	0.0741	0.0664	0.0772
wR_2 (all data)^b	0.1620	0.1679	0.1502

$^aR_1 = [|F_0|-|F_c|]/|F_0|$. $^bwR_2 = [w(F_0^2-F_c^2)^2]/[w(F_0^2)^2]^{1/2}$.

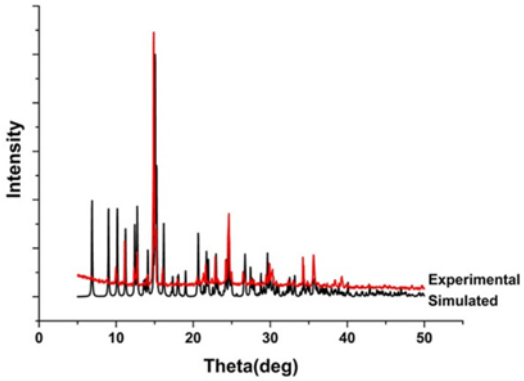
Table S2. Selected bond lengths / Å and angles /° for 1 and 2[a].

Complex **1**					
Cu(1)-N(4)	2.047(4)	Cu(1)-O(1)	2.249(5)	Cu(1)-N(4)#1	2.047(4)
Cu(1)-N(1)	2.032(3)	Cu(1)-N(1)#1	2.032(3)	N(1)#1-Cu(1)-N(1)	173.3(2)
N(4)#1-Cu(1)-N(1)	91.05(14)	N(4)-Cu(1)-O(1)	103.49(11)	N(4)-Cu(1)-N(1)	90.51(14)
N(4)#1-Cu(1)-O(1)	103.50(11)	N(4)-Cu(1)-N(4)#1	153.0(2)	N(1)#1-Cu(1)-O(1)	86.67(10)
N(4)-Cu(1)-N(1)#1	91.05(14)	N(1)-Cu(1)-O(1)	86.67(10)	N(4)#1-Cu(1)-N(1)#1	90.51(14)
Complex **2**					
Cu(1)-N(4)	2.021(2)	Cu(1)-N(1)#1	2.009(2)	Cu(1)-N(4)#1	2.021(2)
Cu(1)-N(1)	2.009(2)	N(4)-Cu(1)-N(1)#1	89.22(9)	N(4)-Cu(1)-N(1)	90.78(9)
N(4)#1-Cu(1)-N(1)#1	90.78(9)	N(4)#1-Cu(1)-N(1)	89.22(9)	N(4)-Cu(1)-N(4)#1	180.00(10)
N(1)#1-Cu(1)-N(1)	180.00(12)				
Complex **3**					
Cu(1)-N(6)#1	2.023(5)	Cu(1)-N(3)	2.013(5)	Cu(1)-Cl(1)	2.3207(17)
Cu(1)-Cl(2)	2.2550(18)	N(6)#1-Cu(1)-Cl(1)	90.63(15)	N(3)-Cu(1)-Cl(1)	91.37(15)
N(6)#1-Cu(1)-Cl(2)	89.05(16)	N(3)-Cu(1)-Cl(2)	89.14(15)	N(6)-Cu(1)-N(3)	166.3(3)
Cl(1)-Cu(1)-Cl(2)	179.09(7)				

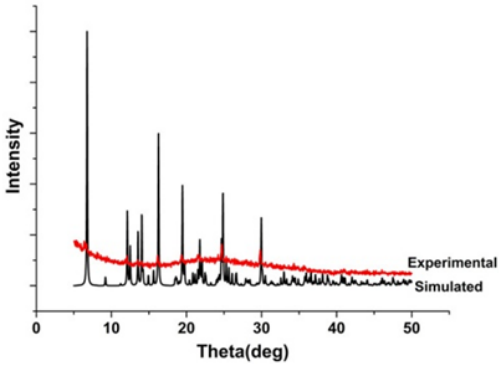
[a] Symmetry transformations used to generate equivalent atoms in Complex **1**：#1 1-x,1-y,z; Complex **2**: #1 -x,-y+1,-z; Complex **3**: #1 x+1,y,z+1.



(a) Complex **1**

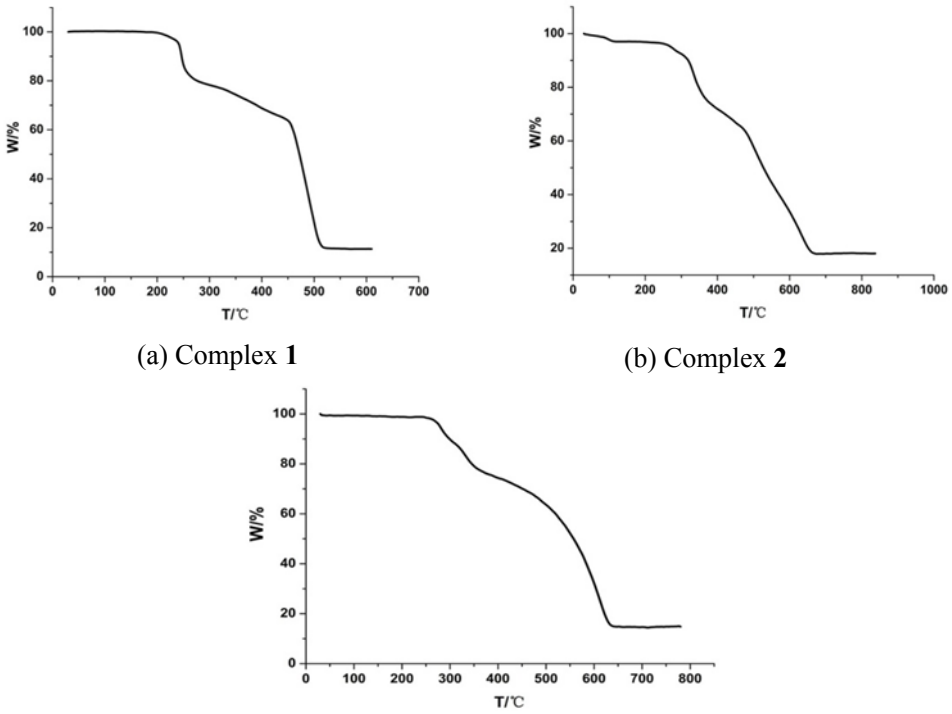


(b) Complex **2**



(c) Complex **3**

Fig. S1. Experimental (red) and simulated (black) PXRD patterns of complexes.



(a) Complex **1**

(b) Complex **2**

(c) Complex **3**

Fig. S2. TGA curves of complexes **1**, **2**, **3**.

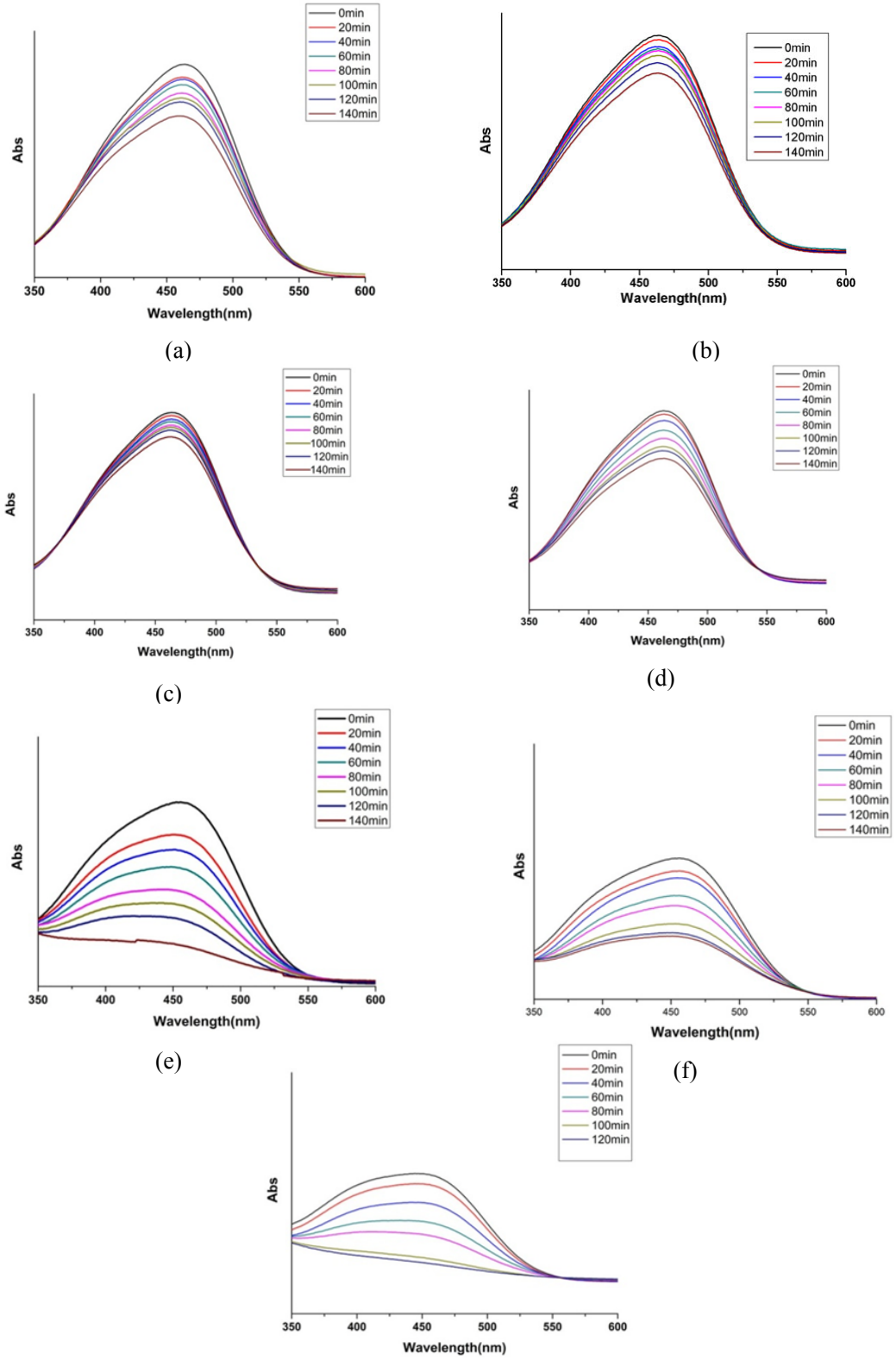
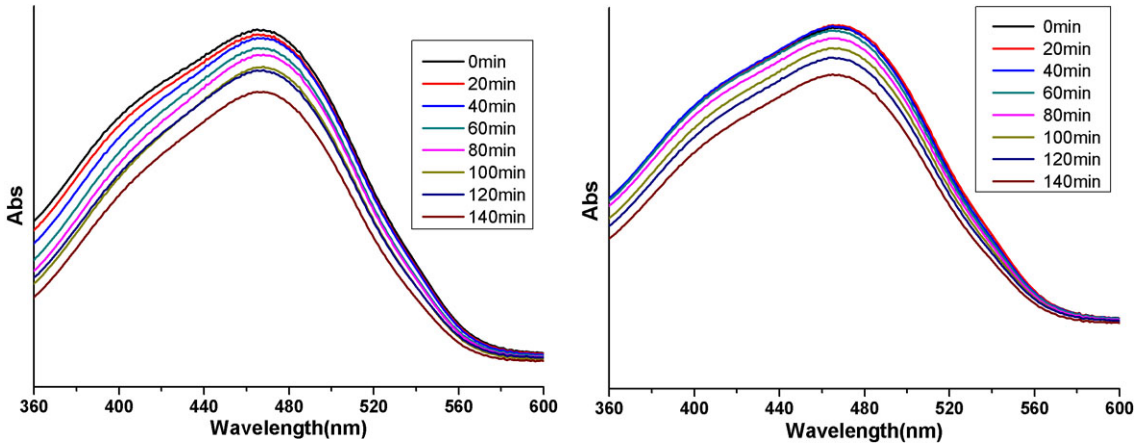
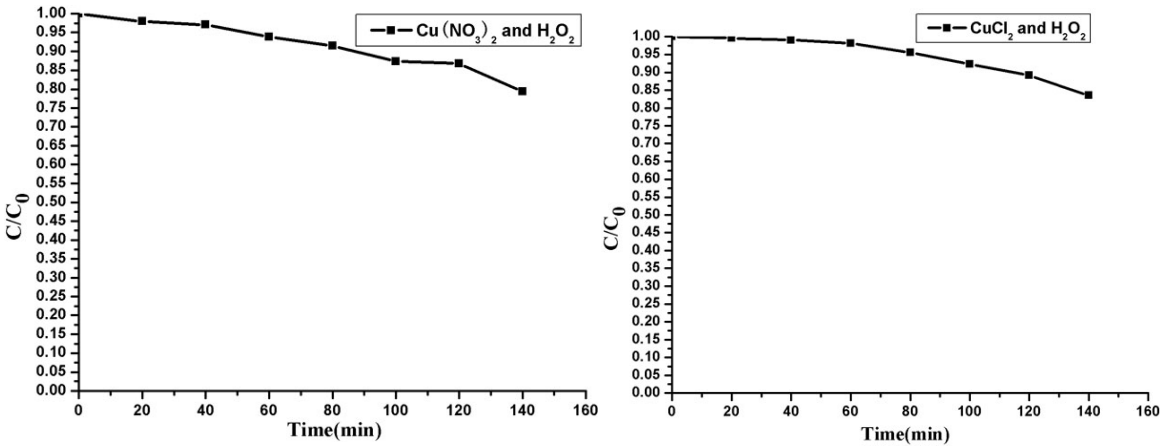


Fig.S3. UV−vis absorption of MO at different time intervals under Xe lamp irradiation: (a) with H_2O_2; (b) with complex **1**; (c) with complex **2**; (d) with complex **3**; (e) with complex **1** and H_2O_2; (f) with complex **2** and H_2O_2; (g) with complex **3** and H_2O_2.



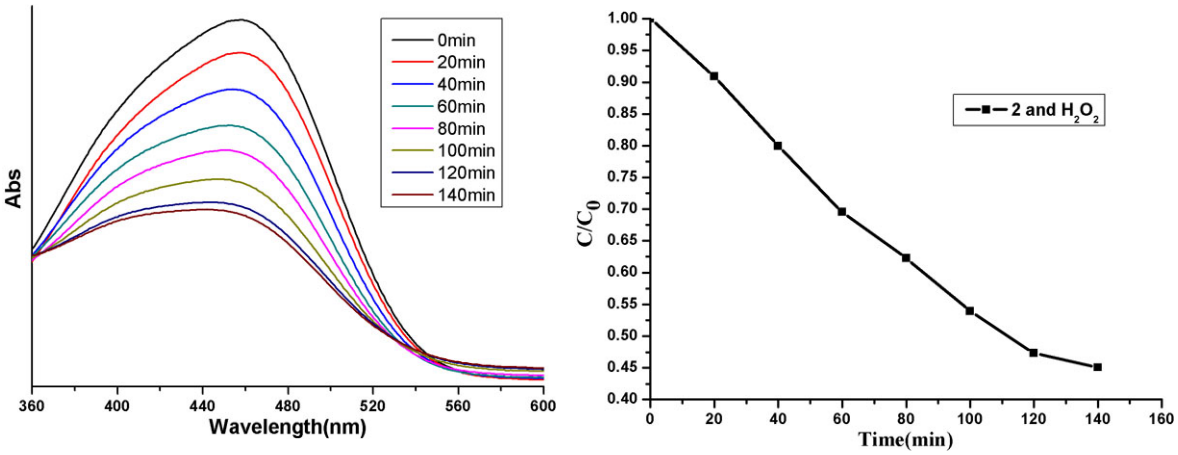
(a) (b)

Fig.S4. UV−vis absorption of MO at different time intervals under Xe lamp irradiation: (a) with $Cu(NO_3)_2$ and H_2O_2; (b) with $CuCl_2$ and H_2O_2.



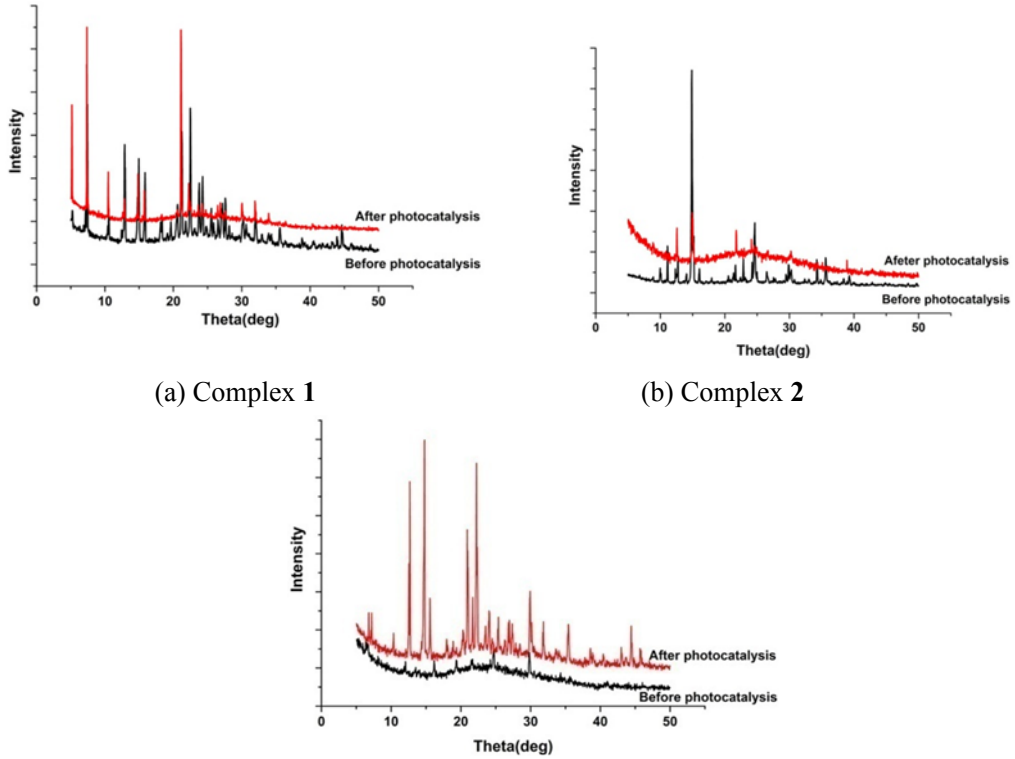
(a) (b)

Fig.S5. Concentration changes of MO at different time intervals under Xe lamp irradiation: (a) For $Cu(NO_3)_2$ and H_2O_2; (b) For $CuCl_2$ and H_2O_2.



(a) (b)

Fig.S6. (a) UV−vis absorption of MO at different time intervals under Xe lamp irradiation with complex **2**; (b) Concentration changes of MO at different time intervals under Xe lamp irradiation for **2** and H_2O_2.



(a) Complex **1** (b) Complex **2**

(c) Complex **3**

Fig. S7. PXRD patterns of complexes before and after catalysis.