Syntheses, Crystal Structures and Photocatalytic Properties of Four Hybrid Iodoargentates with Zero and Two-Dimensional Structures

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Supporting Information

Table S1. Selected bond lengths (Å) for compounds **1** and **2**.

		1	
Mn(1)-N(2)	1.976(4)	Mn(1)-N(1)#1	1.983(4)
Mn(1)-N(2)#1	1.976(4)	Mn(1)-N(1)#2	1.983(4)
Mn(1)-N(2)#2	1.976(4)	Mn(1)-N(1)	1.983(4)
Ag(1)-I(1)	2.8755(9)	Ag(1)-I(2)#5	2.7266(7)
Ag(1)-I(2)	2.7267(7)		
		2	
Fe(1)-N(2)	1.980(3)	Fe(1)-N(1)	1.983(3)
Fe(1)-N(2)#1	1.980(3)	Fe(1)-N(1)#1	1.983(3)
Fe(1)-N(2)#2	1.980(3)	Fe(1)-N(1)#2	1.983(3)
I(1)-Ag(1)	2.8750(8)	Ag(1)-I(2)#3	2.7285(6)
I(2)-Ag(1)	2.7287(6)		

Symmetry transformations used to generate equivalent atoms: **1**) #1 -x+y, -x+1, z; #2 -y+1, x-y+1, z; #3 x-y+1/3, -y+2/3, -z+1/6; **2**) #1 -x+y+1, -x+1, z; #2 -y+1, x-y, z; #3 -x+8/3, -x+y+4/3, -z-1/6.

Table S2. Selected bond lengths (Å) for compound **3**.

I(2)-Ag(1)#3	2.9058(16)	I(2)-Ag(6)	2.9582(14)
I(1)-Ag(1)#3	2.7868(16)	I(5)-Ag(6)	2.7687(13)
I(7)-Ag(1)	2.8422(14)	I(7)-Ag(6)#2	2.8746(13)
I(12)-Ag(1)	2.9980(15)	I(14)-Ag(6)	2.9683(13)
I(3)-Ag(2)#1	2.9611(15)	I(8)-Ag(7)	2.9158(12)
I(4)-Ag(2)	2.9013(14)	I(9)-Ag(7)	2.8328(13)
I(10)-Ag(2)#1	2.8625(14)	I(12)-Ag(7)	2.8512(13)
I(11)-Ag(2)	2.7967(14)	I(13)-Ag(7)	2.9397(13)
I(5)-Ag(3)	2.7930(14)	I(6)-Ag(8)	2.8965(13)
I(6)-Ag(3)	2.9069(14)	I(9)-Ag(8)	2.8939(13)
I(8)-Ag(3)	2.9746(15)	I(11)-Ag(8)	2.7687(12)
I(9)-Ag(3)	2.8405(13)	I(14)-Ag(8)	2.9214(13)
I(1)-Ag(4)	2.7604(14)	I(3)-Ag(9)	2.9038(14)
I(4)-Ag(4)	2.9412(15)	I(8)-Ag(9)	2.8431(13)
I(10)-Ag(4)#1	2.8451(13)	I(10)-Ag(9)	2.8296(13)
I(14)-Ag(4)	2.9684(13)	I(13)-Ag(9)	2.9547(13)
I(2)-Ag(5)	2.8379(14)	I(3)-Ag(10)	2.8443(13)
I(4)-Ag(5)	2.8426(14)	I(7)-Ag(10)	2.8318(13)
I(6)-Ag(5)	2.8721(14)	I(12)-Ag(10)	2.9483(13)
I(14)-Ag(5)	2.9143(12)	I(13)-Ag(10)	2.9769(13)
Ag(10)-Ag(9)	3.0879(14)	Ag(6)-Ag(5)	3.0642(15)
Ag(10)-Ag(7)	3.1264(15)	Ag(5)-Ag(4)	3.0462(15)
Ag(10)-Ag(1)	3.3516(17)	Ag(4)-I(10)#4	2.8451(13)
Ag(9)-Ag(7)	3.1536(14)	Ag(2)-I(10)#4	2.8625(14)
Ag(8)-Ag(5)	3.3224(15)	Ag(2)-I(3)#4	2.9612(15)
Ag(7)-Ag(3)	3.3560(16)	Ag(1)-I(1)#2	2.7868(16)
Ag(6)-I(7)#3	2.8746(13)	Ag(1)-I(2)#2	2.9059(16)

Symmetry transformations used to generate equivalent atoms: #1 x-1, y, z; #2 x-1, y+1, z; #3 x+1, y-1, z; #4 x+1, y, z.

Table S3. Selected bond lengths (Å) for compound **4**.

Ag(1A)-I(12)	2.8603(13)	Ag(8)-I(12)	2.8426(10)
Ag(1A)-I(13)#5	2.7136(12)	Ag(8)-I(17)	2.7965(9)
Ag(1A)-I(16)	2.8927(12)	Ag(8)-I(20)	2.8689(10)
Ag(1A)-I(20)	2.8876(16)	Ag(8)-I(20)#2	2.9022(10)
Ag(2A)-I(4)#5	2.7697(12)	Ag(9)-I(9)	2.8568(10)
Ag(2A)-I(8)	2.9002(13)	Ag(9)-I(11)	2.8902(10)
Ag(2A)-I(12)	2.9126(15)	Ag(9)-I(14)#4	2.8010(10)
Ag(2A)-I(16)	2.9059(12)	Ag(9)-I(21)	2.8757(10)
Ag(3)-I(1)#6	2.8057(11)	Ag(10)-I(3)	2.8507(10)
Ag(3)-I(4)	2.8832(11)	Ag(10)-I(6)	2.7779(10)
Ag(3)-I(5)	2.8929(12)	Ag(10)-I(8)	2.8471(10)
Ag(3)-I(13)	2.8311(11)	Ag(10)-I(10)	2.9500(11)
Ag(4)-I(6)	2.8873(13)	Ag(11)-I(7)	2.8093(10)
Ag(4)-I(7)	2.7482(11)	Ag(11)-I(15)	2.8282(10)
Ag(4)-I(21)#1	2.9569(11)	Ag(11)-I(19)	2.8598(10)
Ag(4)-I(22)	2.8530(11)	Ag(11)-I(19)#3	3.0205(11)
Ag(5)-I(5)	2.7800(10)	Ag(12)-I(1)	2.7734(11)
Ag(5)-I(9)	3.1116(12)	Ag(12)-I(3)	2.8471(11)
Ag(5)-I(11)	2.9198(11)	Ag(12)-I(10)	2.8576(10)
Ag(5)-I(18)	2.8126(11)	Ag(12)-I(16)	2.9601(10)
Ag(6A)-I(11)#1	2.8963(11)	Ag(13)-I(2)	2.7999(10)
Ag(6A)-I(15)	2.7956(11)	Ag(13)-I(6)	2.8967(10)
Ag(6A)-I(21)#1	2.9190(11)	Ag(13)-I(14)	2.8433(9)
Ag(6A)-I(22)	2.9200(12)	I Ag(13)-(22)	2.8413(9)
Ag(7)-I(8)	2.9067(11)	Ag(14)-I(2)	2.8051(10)
Ag(7)-I(10)	2.8850(11)	Ag(14)-I(9)	2.8631(10)
Ag(7)-I(17)	2.8030(11)	Ag(14)-I(18)	2.7990(10)
Ag(7)-I(16)	2.8576(11)	Ag(14)-I(21)	2.9507(9)
Ag(5)-Ag(14)	3.2235(13)	Ag(8)-Ag(1A)	3.0320(14)
Ag(9)-Ag(14)	3.2368(12)	Ag(8)-Ag(8)#2	3.1155(16)
Ag(12)-Ag(10)	2.9913(12)	Ag(7)-Ag(2A)	3.1471(13)
Ag(11)-Ag(11)#3	2.9658(17)	Ag(6A)-Ag(9)#4	3.0624(12)
Ag(9)-Ag(6A)#1	3.0624(12)	Ag(6A)-Ag(4)	3.3323(14)

Symmetry transformations used to generate equivalent atoms: #1 x-1, y, z; #2 -x+1, -y+2, -z+1; #3 -x+2, -y+1, -z+1; #4 x+1, y, z; #5 x, y-1, z.

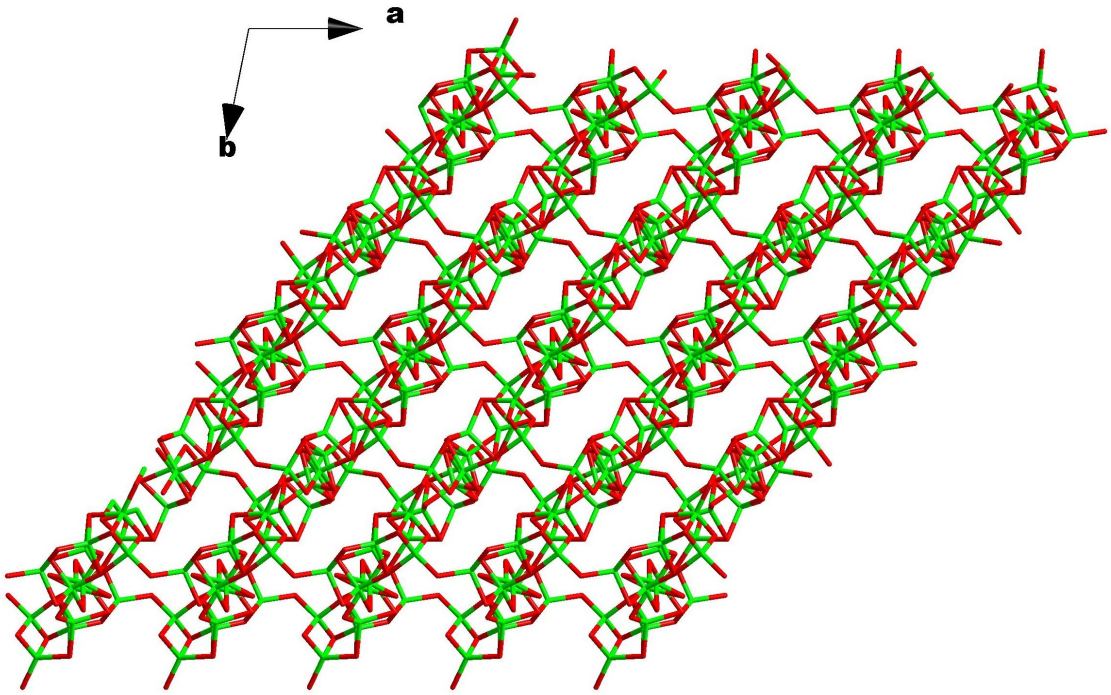


Fig. **S1** View of the 2D $[Ag_7I_{11}]^{4-}$ layer in compound **4** along the *c*-axis.

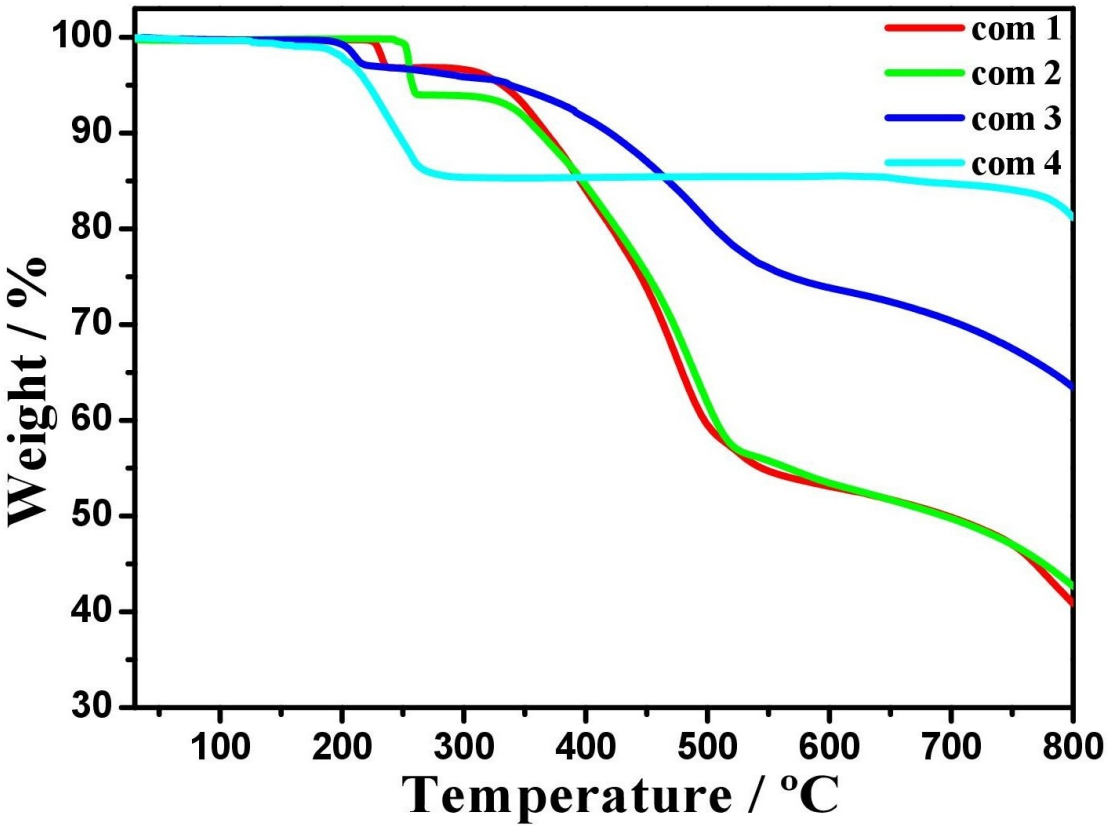
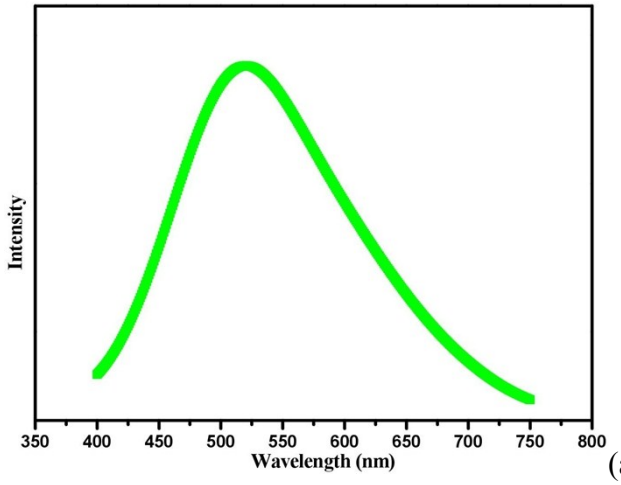
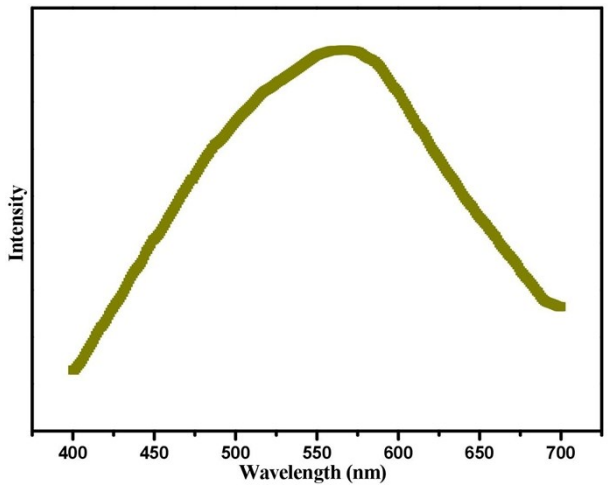


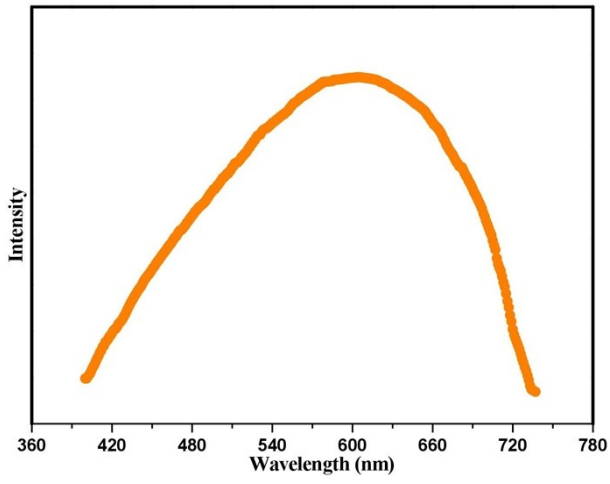
Fig. **S2** Thermogravimetric curves for compounds **1**-**4**.



(a)



(b)



(c)

Fig. **S3** The solid emission spectra of compounds **1** (a), **3** (b) and **4** (c).

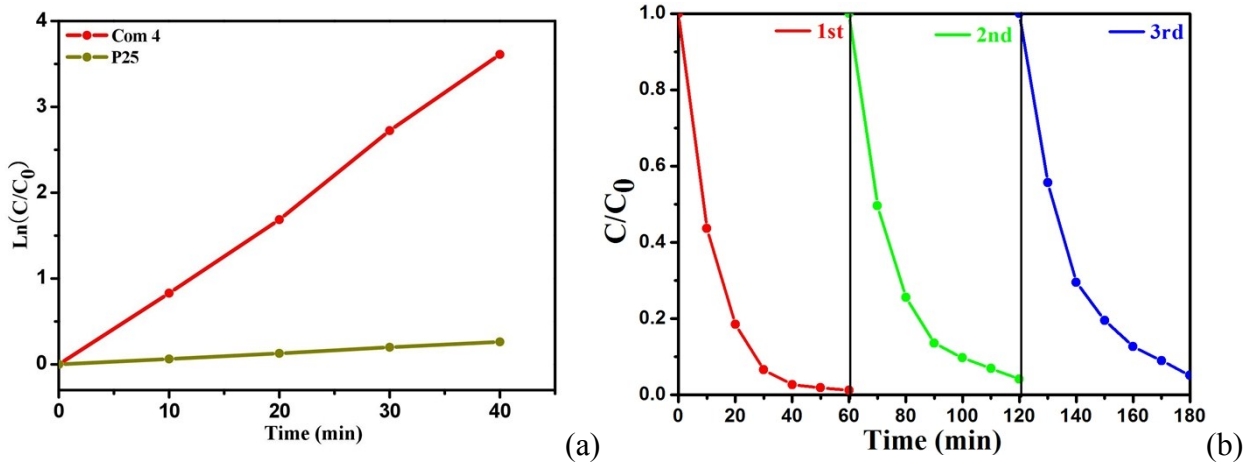


Fig. **S4** The linear relationship of Ln(C_0/C) over reaction time for CV (a) and irradiation-time dependences of the relative concentration C/C_0 of the CV (b) dye over **4** during cycling photocatalytic experiments under visible light.

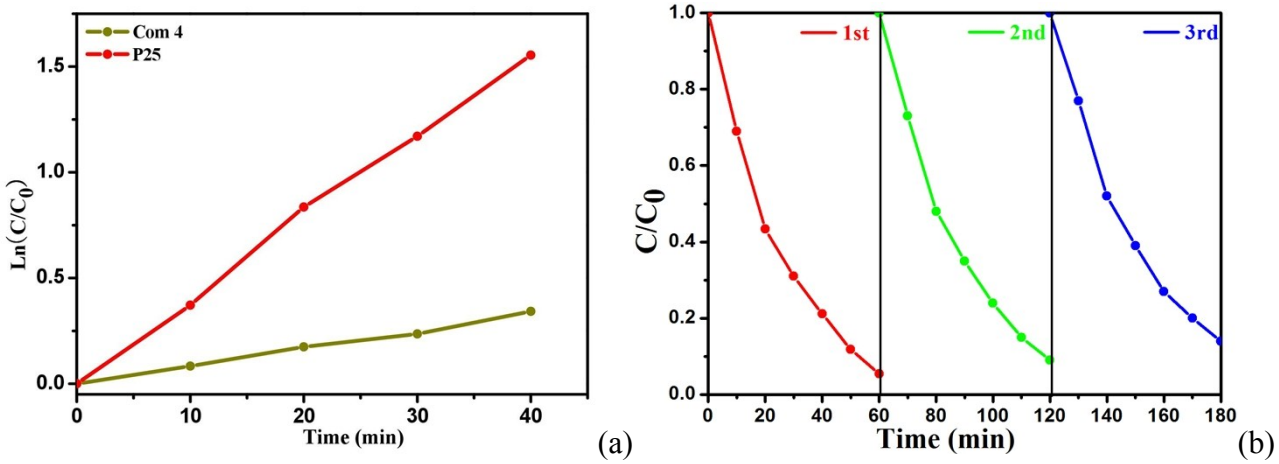


Fig. **S5** The linear relationship of Ln(C_0/C) over reaction time for RhB (a) and irradiation-time dependences of the relative concentration C/C_0 of the RhB (b) dye over **4** during cycling photocatalytic experiments under visible light.

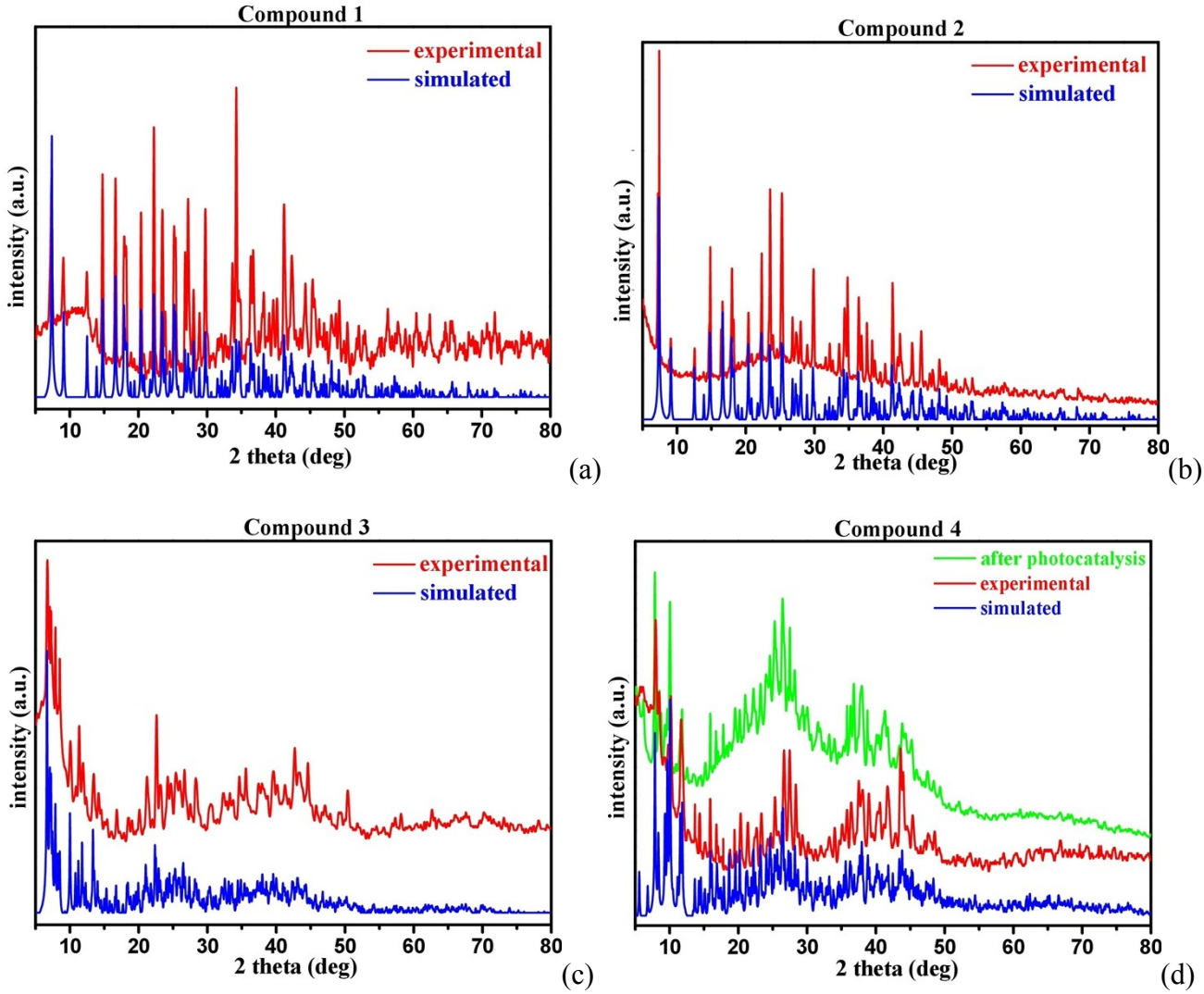


Fig. **S6** Experimental and simulated XRD powder patterns for compounds **1-4**.