Electronic Supplementary Material (ESI) for RSC Advances.

Five Co(II) coordination polymers with different counter anions based on [3,5-di(4H-1,2,4-triazol-4-yl) benzoato]$^-$ ligand: Directed synthesis, structures and magnetic properties

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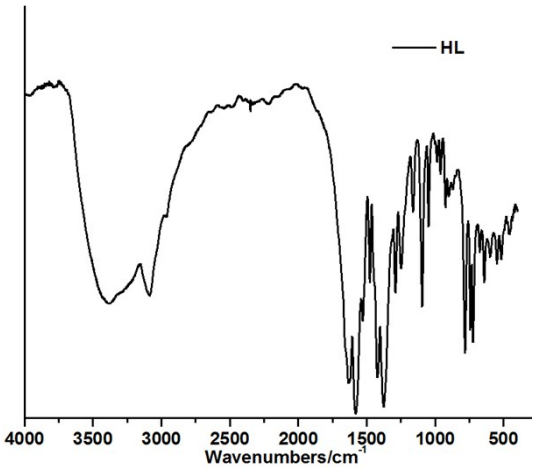

Fig. S1 IR of ligand HL

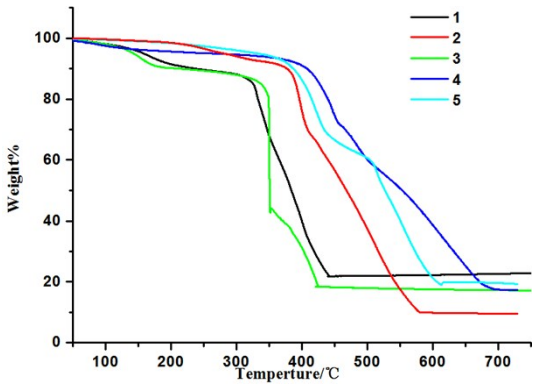

Fig. S2 TGA of complexes **1**−**5**.

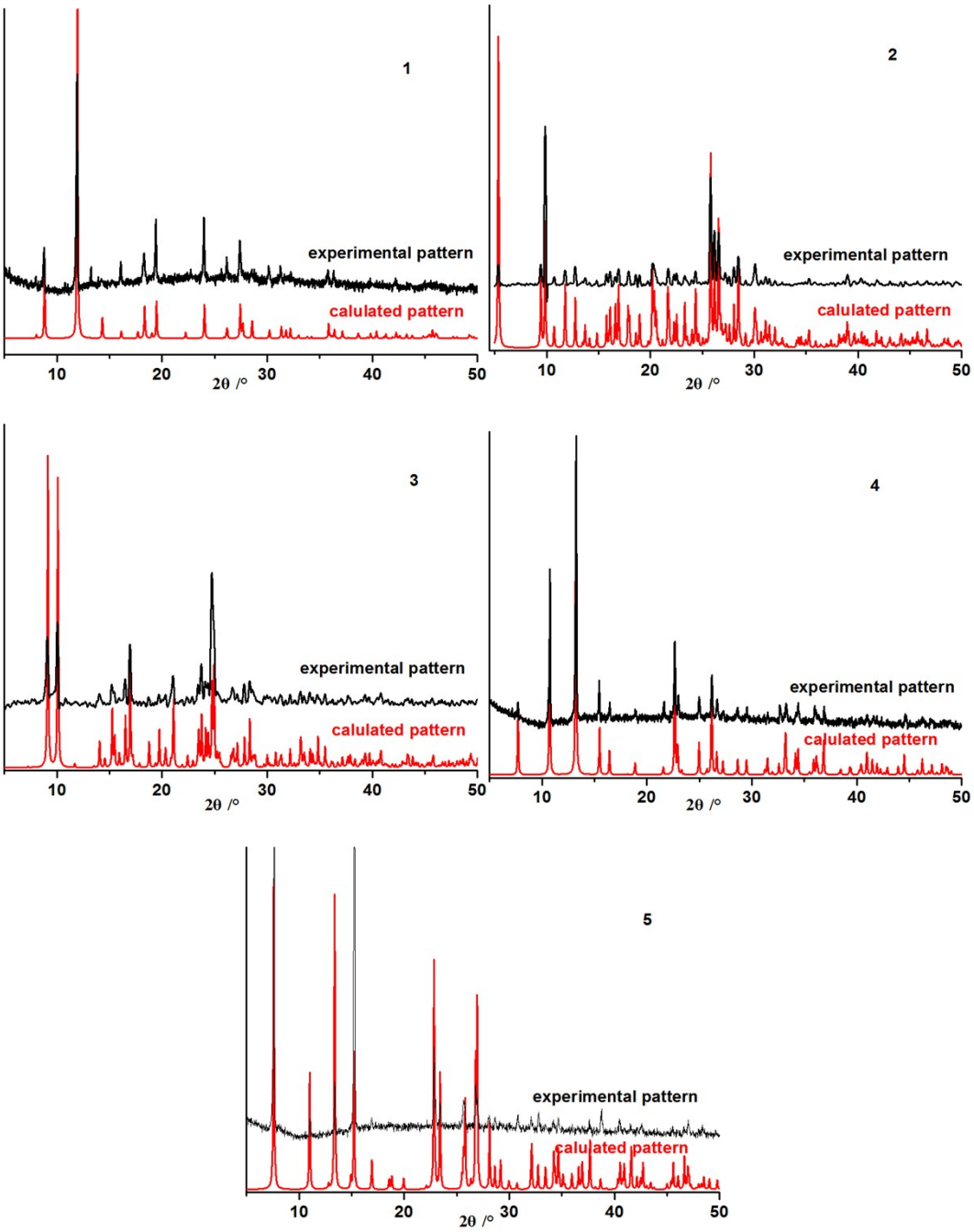

Fig. S3 PXRD compare chart of complexes **1**−**5**.

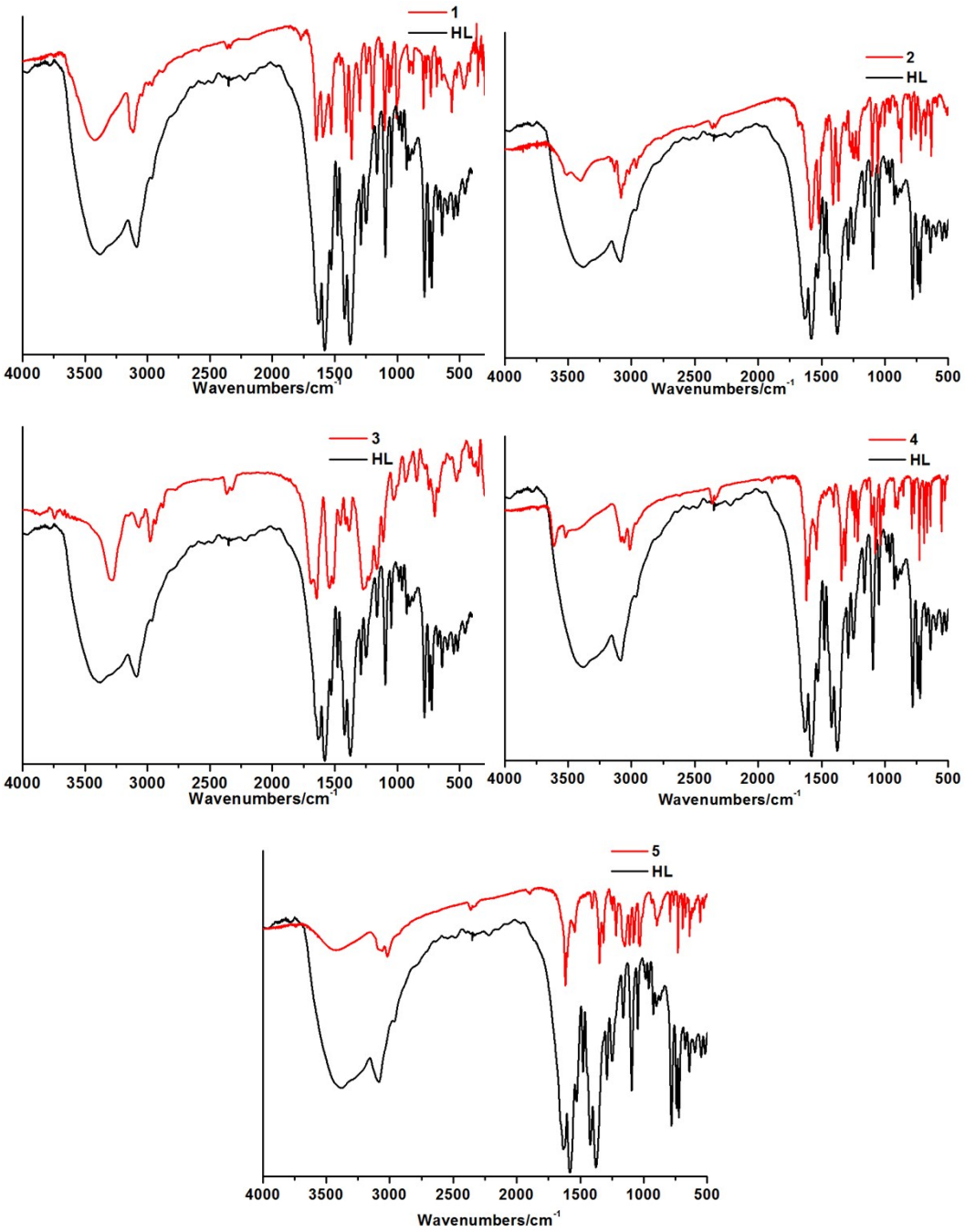

Fig. S4 The IR of complexes **1**–**5**.

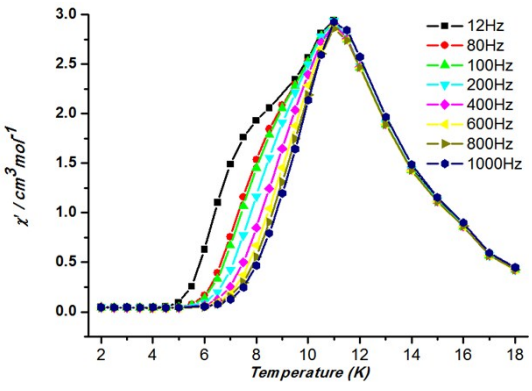

Fig. S5 Temperature dependence of the in-phase ac susceptibility (χ′) between 12 and 1000 Hz at H_{dc} = 0 Oe for **1.**

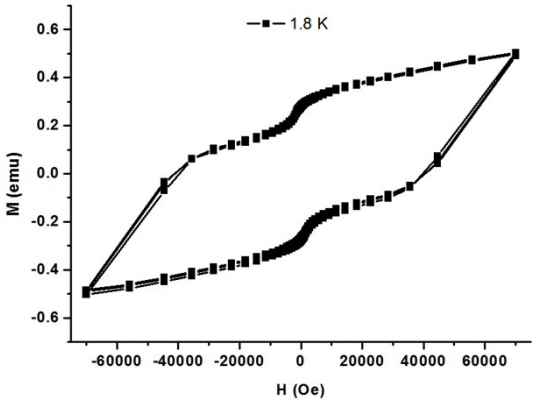

Fig. S6 The hysteresis loop for **1** at 1.8k.

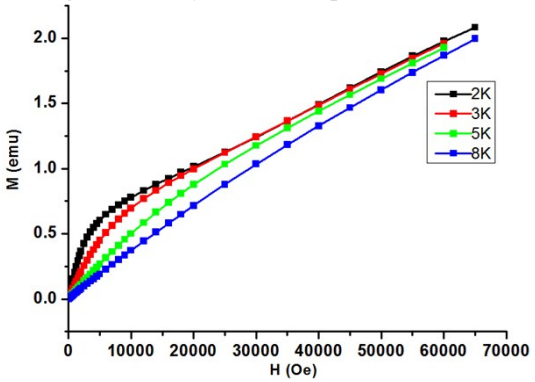

Fig. S7 Magnetization M versus the magnetic field H for **3** at different low temperatures.

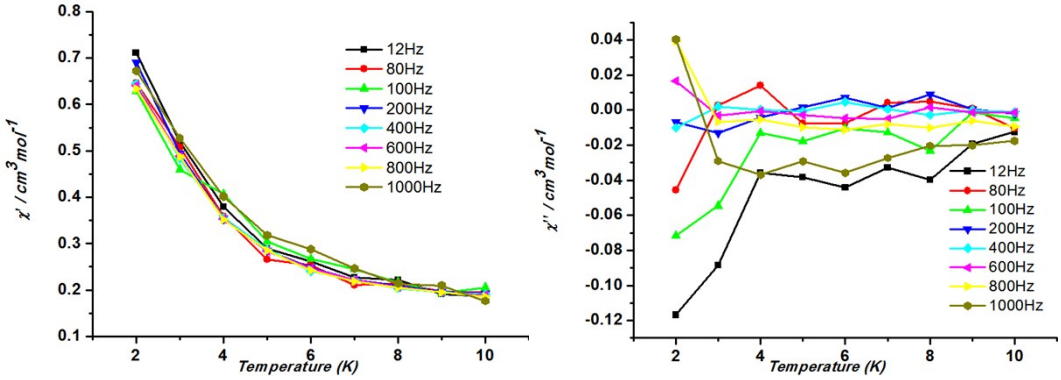

Fig. S8 Temperature dependence of the in-phase ac susceptibility (χ′) and the out-of-phase ac susceptibility (χ″) between 12 and 1000 Hz at H_{dc} = 0 Oe for **3**.

Table S1. Selected bond distances (Å) and angles (°) for **1**−**5**

Complex **1**			
Co(1)-O(2)	1.990(4)	Co(1)-O(2)#VI	1.995(4)
Co(1)-N(3)#IV	2.190(3)	Co(1)-N(3)#III	2.190(3)

Co(1)-N(2)	2.196(3)	Co(1)-O(2)-Co(1)#III	117.2(2)
O(2)-Co(1)-O(2)#VI	179.75(13)	O(2)-Co(1)-N(3)#IV	85.32(13)
O(2)#VI-Co(1)-N(3)#IV	94.49(14)	O(2)-Co(1)-N(3)#III	85.32(13)
O(2)#VI-Co(1)-N(3)#III	94.49(14)	N(3)#IV-Co(1)-N(3)#III	81.75(18)
O(2)-Co(1)-N(2)#II	94.73(13)	O(2)#VI-Co(1)-N(2)#II	85.46(13)
N(3)#IV-Co(1)-N(2)#II	98.39(13)	N(3)#III-Co(1)-N(2)#II	179.86(13)
O(2)-Co(1)-N(2)	94.73(13)	O(2)#VI-Co(1)-N(2)	85.46(13)
N(3)#IV-Co(1)-N(2)	179.86(13)	N(3)#III-Co(1)-N(2)	98.39(13)
N(2)#II-Co(1)-N(2)	81.47(18)		
Symmetry Code: #I -x+2,y,z #II x,y,-z+3/2 #III -x+3/2,y+1/2,z #IV -x+3/2,y+1/2,-z+3/2 #V 3/2–x, –1/2+y, 3/2–z #VI -x+3/2,y-1/2,z			
Complex **2**			
Co(1)-O(1)	2.074(2)	Co(1)-O(4)#I	2.092(2)
Co(1)-O(5)	2.1121(19)	Co(1)-N(8)#III	2.135(2)
Co(1)-O(3)	2.1363(18)	Co(1)-N(6)#II	2.174(2)
O(3)-Co(1)-N(6)#II	175.72(8)	O(1)-Co(1)-O(4)#1	176.88(8)
O(1)-Co(1)-O(5)	92.96(8)	O(4)#I-Co(1)-O(5)	84.61(8)
O(1)-Co(1)-N(8)#III	92.75(9)	O(4)#I-Co(1)-N(8)#III	89.57(9)
O(5)-Co(1)-N(8)#III	173.51(9)	O(1)-Co(1)-O(3)	91.16(8)
O(4)#I-Co(1)-O(3)	87.00(8)	O(5)-Co(1)-O(3)	92.80(7)
N(8)#III-Co(1)-O(3)	84.02(8)	O(1)-Co(1)-N(6)#II	89.61(9)
O(4)#I-Co(1)-N(6)#II	92.04(8)	O(5)-Co(1)-N(6)#II	82.95(8)
N(8)#III-Co(1)-N(6)#II	100.16(9)		
Symmetry Code: #I -x+1,y+1/2,-z+1/2 #II x,-y+3/2,z+1/2 #III -x+1,-y+2,-z #IV x,-y+3/2,z-1/2 #V -x+1,y-1/2,-z+1/2			
Complex **3**			
Co(1)-O(3)#III	2.021(4)	Co(1)-O(1)	2.049(3)
Co(1)-N(9)#II	2.133(4)	Co(1)-N(6)#I	2.150(4)
Co(1)-N(1)	2.150(4)	Co(1)-O(9)	2.278(3)

Co(2)-N(8)	2.114(4)	Co(2)-N(8)#V	2.114(4)
Co(2)-N(5)#IV	2.119(4)	Co(2)-N(5)#VI	2.119(4)
Co(2)-N(2)#VII	2.137(4)	Co(2)-N(2)#II	2.137(4)
O(3)#III-Co(1)-O(1)	95.54(15)	O(3)#III-Co(1)-N(9)#II	94.28(16)
O(1)-Co(1)-N(9)#II	86.22(16)	O(3)#III-Co(1)-N(6)#I	87.92(16)
O(1)-Co(1)-N(6)#I	176.16(16)	N(9)#II-Co(1)-N(6)#I	91.86(16)
O(3)#III-Co(1)-N(1)	172.72(16)	O(1)-Co(1)-N(1)	90.21(16)
N(9)#II-Co(1)-N(1)	90.54(16)	N(6)#I-Co(1)-N(1)	86.47(17)
O(3)#III-Co(1)-O(9)	81.09(12)	O(1)-Co(1)-O(9)	91.05(15)
N(9)#II-Co(1)-O(9)	174.40(12)	N(6)#I-Co(1)-O(9)	91.14(16)
N(1)-Co(1)-O(9)	94.37(12)	N(8)-Co(2)-N(8)#V	180.0(2)
N(8)-Co(2)-N(5)#IV	89.64(17)	N(8)#V-Co(2)-N(5)#IV	90.36(17)
N(8)-Co(2)-N(5)#VI	90.36(17)	N(8)#V-Co(2)-N(5)#VI	89.64(17)
N(5)#IV-Co(2)-N(5)#VI	180.0(2)	N(8)-Co(2)-N(2)#VII	89.28(16)
N(8)#V-Co(2)-N(2)#VII	90.72(16)	N(5)#IV-Co(2)-N(2)#VII	88.58(17)
N(5)#VI-Co(2)-N(2)#VII	91.42(17)	N(8)-Co(2)-N(2)#II	90.72(16)
N(8)#V-Co(2)-N(2)#II	89.28(16)	N(5)#IV-Co(2)-N(2)#II	91.42(17)
N(5)#VI-Co(2)-N(2)#II	88.58(17)	N(2)#VII-Co(2)-N(2)#II	180.0
Co(1)-O(9)-Co(1)#IV	119.4(2)		

Symmetry Code: #I -x+3/2,y+1/2,-z+3/2 #II -x+2,-y,-z+1 #III x+1/2,-y+1/2,z-1/2 #IV -x+2,y,-z+3/2 #V -x+5/2,-y-1/2,-z+1 #VI x+1/2,-y-1/2,z-1/2 #VII x+1/2,y-1/2,z #VIII x-1/2,y+1/2,z #IX -x+3/2,y-1/2,-z+3/2 #X -x+1,y,-z+3/2 #XI x-1/2,-y+1/2,z+1/2

Complex **4**

Co(1)-N(2)	2.0996(18)	Co(1)-N(2)#VI	2.0996(18)
Co(1)-N(2)#VII	2.0996(18)	Co(1)-N(2)#IV	2.0996(18)
Co(1)-Cl(1)	2.4854(9)	N(2)-Co(1)-N(2)#VI	180.0
N(2)-Co(1)-N(2)#VII	91.84(10)	N(2)#VI-Co(1)-N(2)#VII	88.16(10)
N(2)-Co(1)-N(2)#IV	88.16(10)	N(2)#VI-Co(1)-N(2)#IV	91.84(10)

N(2)#VII-Co(1)-N(2)#IV	180.0	N(2)-Co(1)-Cl(1)#VI	92.87(5)
N(2)#VI-Co(1)-Cl(1)#VI	87.13(5)	N(2)#VII-Co(1)-Cl(1)#VI	92.87(5)
N(2)#IV-Co(1)-Cl(1)#VI	87.13(5)	N(2)-Co(1)-Cl(1)	87.13(5)
N(2)#VI-Co(1)-Cl(1)	92.87(5)	N(2)#VII-Co(1)-Cl(1)	87.13(5)
N(2)#IV-Co(1)-Cl(1)	92.87(5)	Cl(1)#VI-Co(1)-Cl(1)	180.0
Co(1)#VIII-Cl(1)-Co(1)	91.64(4)		
Symmetry Code: #I -x+1/2,-y+1,z #II x, 1–y, z #III -x+1/2,y,z #IV -x+1,y,-z+1 #V 1/2+x, 2–y, 1–z #VI -x+1,-y+2,-z+1 #VII x,-y+2,z #VIII -x+1/2,-y+2,z			
Complex **5**			
Co(1)-N(1)	2.080(4)	Co(1)-N(1)#I	2.080(4)
Co(1)-N(3)	2.118(4)	Co(1)-N(3)#I	2.118(4)
Co(1)-O(3)	2.155(3)	Co(1)-O(1W)	2.252(4)
N(1)-Co(1)-N(1)#I	96.0(2)	N(1)-Co(1)-N(3)	174.8(2)
N(1)#I-Co(1)-N(3)	85.92(12)	N(1)-Co(1)-N(3)#I	85.92(12)
N(1)#I-Co(1)-N(3)#I	174.8(2)	N(3)-Co(1)-N(3)#I	91.8(2)
N(1)-Co(1)-O(3)	97.65(14)	N(1)#I-Co(1)-O(3)	97.65(14)
N(3)-Co(1)-O(3)	86.82(14)	N(3)#I-Co(1)-O(3)	86.82(14)
N(1)-Co(1)-O(1W)	82.37(14)	N(1)#I-Co(1)-O(1W)	82.37(14)
N(3)-Co(1)-O(1W)	93.15(15)	N(3)#I-Co(1)-O(1W)	93.15(15)
O(3)-Co(1)-O(1W)	180.0(2)		
Symmetry Code: #I x,-y+1,z #II -x+1,-y,z #III -x+2,-y+2,z #IV -x+2,-y+1,z #V -x+2,y,z #VI -x+1,y,z #VII -x+1,-y+1,z			

Table S2. Selected Hydrogen Bond Interactions in Complexes **1**–**5**.

D−H···A	D−H/ Å	H···A/ Å	D···A/ Å	∠D − H···A/deg
Complex **2**				
O(5)-H(51)...O(3)#V	0.85	2.04	2.872(3)	166.1
O(5)-H(51)...O(4)	0.85	2.37	2.797(3)	111.3

O(5)-H(52)...O(2)#I	0.85	1.88	2.698(3)	161.5
O(6)-H(61)...O(2)#VI	0.85	2.28	3.000(6)	142.9
O(6)-H(61)...O(6)#VI	0.85	2.50	3.025(12)	120.5
O(6)-H(62)...O(2)	0.85	2.14	2.914(5)	150.7
O(6)-H(62)...O(5)#V	0.85	2.54	3.136(5)	127.9
Symmetry Code: #I -x+1,y+1/2,-z+1/2 #II x,-y+3/2,z+1/2 #III -x+1,-y+2,-z #IV x,-y+3/2,z-1/2 #V -x+1,y-1/2,-z+1/2 #VI -x+1,-y+1,-z				
Complex **5**				
O(1W)-H(1W)...O(2W)	0.84	1.89	2.654(7)	151.2
O(2W)-H(2W)...O(5)#VIII	0.84	1.96	2.792(6)	170.0
O(2W)-H(2W)...O(6)#IX	0.84	2.14	2.919(11)	153.0
Symmetry Code: #I x,-y+1,z #II -x+1,-y,z #III -x+2,-y+2,z #IV -x+2,-y+1,z #V -x+2,y,z #VI -x+1,y,z #VII -x+1,-y+1,z #VIII x,y,z+1 #IX -x+1,-y+1,z+1				

Experimental conditions for the synthesis of complexes

It was found that the temperature between 120 °C to 160 °C basically result in similar products with similar crystal morphology. Therefore, the experimental results under different temperatures were omitted. All the following experiments were carried out in a 16 mL Teflon lined stainless steel container and heated at 160 °C for 3 days.

Table S3. Experimental results.

	metal salt	ligand	Templates	Solvent system	pH value	Experimental results
1	0.4 mmol $Co(NO_3)_2$	0.4 mmol	—	8 mL H_2O	6	Red-brown twin crystals
2	0.4 mmol $Co(NO_3)_2$	0.4 mmol	—	8 mL EtOH	6	Brown-black powder
3	0.4 mmol $Co(NO_3)_2$	0.4 mmol	—	8 mL DMF	6	Red-brown Block crystals

						including single crystal (small)
4	0.4 mmol $Co(NO_3)_2$	0.4 mmol	—	8 mL CH_3CN	6	Brown-gray powder
5	0.1 mmol $Co(NO_3)_2$	0.1 mmol	—	8 mL H_2O	2	Brown powder
6	0.1 mmol $Co(NO_3)_2$	0.1 mmol	—	8 mL H_2O	4	Pink solution and red block crystals including single crystal (small)
7	0.1 mmol $Co(NO_3)_2$	0.1 mmol	—	8 mL H_2O	7	Brown-yellow block crystals including single crystal (small) and black powder
8	0.25 mmol $Co(NO_3)_2$	0.2 mmol	—	4 mL EtOH and 4 mL H_2O	—	Red block crystals including single crystal (small) and brown yellow block single crystal
9	0.25 mmol $Co(NO_3)_2$	0.2 mmol	0.2 mmol H_2*o*-bdc	4 mL EtOH and 4 mL H_2O	—	Red needle single crystal and brown-yellow block single

						crystal (small)
10	0.25 mmol $Co(NO_3)_2$	0.2 mmol	0.2 mmol H_2*o*-bdc	6 mL H_2O	2	Brown block single crystal (opaque)
11	0.25 mmol $Co(NO_3)_2$	0.2 mmol	0.2 mmol H_2*o*-bdc	6 mL H_2O	4	Brown twinning (opaque)
12	0.25 mmol $Co(NO_3)_2$	0.2 mmol	0.2 mmol H_2*o*-bdc	3 mL EtOH and 3 mL H_2O	—	Brown-red powder
13	0.25 mmol $Co(NO_3)_2$	0.2 mmol	0.2 mmol H_2*o*-bdc	6 mL H_2O	—	Brown block single crystal (opaque) and brown-gray powder
14	0.25 mmol $Co(NO_3)_2$	0.2 mmol	0.2 mmol H_2*p*-bdc	6 mL H_2O	—	Brown twin crystals and brown-gray powder
15	0.25 mmol $Co(NO_3)_2$	0.2 mmol	0.2 mmol 1,3,5-H_3btc	3 mL EtOH and 3 mL H_2O	—	Brown-red powder
16	0.25 mmol $Co(NO_3)_2$	0.2 mmol	0.2 mmol 1,3,5-H_3btc	6 mL H_2O	—	Brown-red powder
17	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,4,5-H_4btec	8 mL H_2O	—	Brown-gray powder
18	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol Succinic acid	8 mL H_2O	—	Brown powder
19	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 4,4'Bipyridinyl	8 mL H_2O	—	Brown powder and red-brown

						twin crystals
20	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol H_2o-bdc	8 mL H_2O	—	Brown powder
21	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol NaOH	10 mL H_2O	—	Brown block single crystal (fragile)
22	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.4 mmol NaOH	8 mL H_2O	—	Brown-gray powder
23	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.3 mmol NaOH and 0.1 mmol H_2o-bdc	8 mL H_2O	—	Brown twin crystals
24	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.3 mmol NaOH and 0.1 mmol H_2o-bdc	5 mL EtOH and 5 mL H_2O	—	Brown-gray powder
25	0.15 mmol $Co(NO_3)_2$	0.1 mmol	0.3 mmol NaOH	2 mL EtOH and 8 mL H_2O	—	Brown-gray powder and brown-yellow powder
26	0.15 mmol $Co(NO_3)_2$	0.1 mmol	0.3 mmol NaOH and 0.1 mmol H_2o-bdc	2 mL EtOH and 8 mL H_2O	—	Brown twin crystals
27	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.3 mmol NaOH	8 mL EtOH and 2 mL H_2O	—	Brown-gray powder
28	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.3 mmol NaOH	5 mL EtOH and 5 mL H_2O	—	Brown-gray powder
29	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.3 mmol NaOH	10 mL H_2O	—	Brown-gray powder

30	0.1 mmol $Co(NO_3)_2$	0.1 mmol	—	10 mL H_2O	—	Brown-gray powder
31	0.1 mmol $Co(NO_3)_2$	0.1 mmol	—	8 mL EtOH and 2 mL H_2O	—	Red needle single crystal (small) and brown block single crystal (opaque)
32	0.1 mmol $Co(NO_3)_2$	0.1 mmol	—	5 mL EtOH and 5 mL H_2O	—	Brown-yellow block single crystal, red needle single crystal and red twin crystals
33	0.1 mmol $Co(NO_3)_2$	0.1 mmol	—	2 mL EtOH and 8 mL H_2O	—	Brown-red powder
34	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol H_2*o*-bdc	5 mL EtOH and 5 mL H_2O	—	red-brown twin crystals
35	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol NaOH	5 mL EtOH and 5 mL H_2O		Brown block single crystal (small)
36	0.2 mmol $Co(NO_3)_2$	0.1 mmol	—	5 mL EtOH and 5 mL H_2O	—	Red needle single crystal
37	0.2 mmol $Co(NO_3)_2$	0.1 mmol	—	5 mL EtOH and 5 mL H_2O	—	Red needle single crystal and red twin

						crystals
38	0.4 mmol $Co(NO_3)_2$	0.1 mmol	—	5 mL EtOH and 5 mL H_2O	—	Red needle single crystal and red twin crystals
39	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 4,4'Bipyridinyl	5 mL EtOH and 5 mL H_2O	—	Brown-yellow block single crystal and red needle single crystal (small)
40	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol Imidazole	5 mL EtOH and 5 mL H_2O	—	Brown-yellow block single crystal and red needle single crystal
41	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,3,5-H_3btc	5 mL EtOH and 5 mL H_2O	—	Red block crystals including single crystal
42	0.1 mmol $Co(NO_3)_2$	0.05 mmol	0.05 mmol 1,3,5-H_3btc	5 mL EtOH and 5 mL H_2O	—	Purple twin crystals
43	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,3,5-H_3btc	5 mL EtOH and 5 mL H_2O	—	Brown-red powder
44	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,4,5-H_4btec	2 mL EtOH and 8 mL H_2O	—	Brown-red powder
45	0.1 mmol	0.1	0.1 mmol	5 mL EtOH	—	Brown-red

	$Co(NO_3)_2$	mmol	Succinic acid	and 5 mL H_2O		powder and red block crystals including single crystal (small)
46	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol Propanedioic acid	5 mL EtOH and 5 mL H_2O	—	Brown-yellow block single crystal, red needle single crystal and red twin crystals
47	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol Fumaric acid	5 mL EtOH and 5 mL H_2O	—	Red twin crystals
48	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,4-btc	5 mL EtOH and 5 mL H_2O	—	Brown-red powder and red block crystals including single crystal (small)
49	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,3-btc	5 mL EtOH and 5 mL H_2O		Brown-red powder
50	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol H_2*p*-bdc	5 mL EtOH and 5 mL H_2O	4.5	Red twin crystals
51	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol H_2*o*-bdc	5 mL EtOH and 5 mL H_2O	4.5	Red twin crystals
52	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,3,5-H_3btc	5 mL EtOH and 5 mL	4.5	Purple twin crystals

				H_2O		
53	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	5 mL EtOH and 5 mL H_2O	4.5	Purple twin crystals and red powder
54	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,4-H_3btc	5 mL EtOH and 5 mL H_2O	4.5	Red block crystals including single crystal (small)
55	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,4,5- H_4btec	5 mL EtOH and 5 mL H_2O	4.5	Purple twin crystals and red powder
56	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	5 mL EtOH and 5 mL H_2O	2	Purple twin crystals and red powder
57	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	5 mL EtOH and 5 mL H_2O	3	red twin crystals and red powder
58	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	5 mL EtOH and 5 mL H_2O	4	Red twin crystals
59	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	5 mL EtOH and 5 mL H_2O	5	Brown-yellow crystal (small) and red twin crystals
60	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	5 mL EtOH and 5 mL H_2O	6	Gray powder
61	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,3,5-H_3btc	5 mL CH_3CN and	—	Purple twin crystals

				5 mL H_2O		
62	0.05 mmol $Co(NO_3)_2$	0.05 mmol	0.05 mmol 1,3,5-H_3btc	5 mL EtOH and 5 mL H_2O	—	Red twin crystals and needle twin crystals (little)
63	0.2 mmol $Co(NO_3)_2$	0.2mmol	0.1 mmol 1,3,5-H_3btc	5 mL EtOH and 5 mL H_2O	—	Purple twin crystals and colorless needle twin crystals
64	0.4 mmol $Co(NO_3)_2$	0.4mmol	0.1 mmol 1,3,5-H_3btc	5 mL EtOH and 5 mL H_2O	—	Red powder
65	0.1 mmol $Co(NO_3)_2$	0.1mmol	0.4 mmol 1,3,5-H_3btc	5 mL EtOH and 5 mL H_2O	—	Red twin crystals
66	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	4 mL EtOH and 6 mL H_2O	—	Red twin crystals
67	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	6 mL EtOH and 4 mL H_2O	—	Red twin crystals and needle twinning (little)
68	0.1 mmol $Co(NO_3)_2$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	7 mL EtOH and 3 mL H_2O	—	Red needle twin crystals and red powder
69	0.1 mmol $CoCO_3$	0.1 mmol	—	5 mL EtOH and 5 mL H_2O	—	Brown-yellow block single crystal (opaque)
70	0.2 mmol	0.1	—	5 mL EtOH	—	Brown-yellow

	$CoCO_3$	mmol		and 5 mL H_2O		block single crystal (small) and brown-gray powder
71	0.1 mmol $CoCO_3$	0.1 mmol	0.1 mmol Imidazole	5 mL EtOH and 5 mL H_2O	—	Brown-yellow block single crystal
72	0.1 mmol $CoCO_3$	0.1 mmol	0.1 mmol H_2*o*-bdc	5 mL EtOH and 5 mL H_2O	—	Brown twin crystals and brown-yellow powder
73	0.1 mmol $CoCO_3$	0.1 mmol	0.1 mmol H_2*p*-bdc	5 mL EtOH and 5 mL H_2O	—	Brown block single crystal (small) and red twin crystals
74	0.1 mmol $CoCO_3$	0.1 mmol	0.1 mmol 1,3,5-H_3btc	5 mL EtOH and 5 mL H_2O	—	Brown block single crystal (small), red twin crystal and purple powder
75	0.1 mmol $CoCO_3$	0.1 mmol	0.1 mmol H_4btec	5 mL EtOH and 5 mL H_2O	—	Purple powder
76	0.1 mmol $CoCO_3$	0.1 mmol	—	2 mL EtOH and 8 mL H_2O	—	Brown block single crystal (small) and brown-gray powder
77	0.1 mmol	0.1	—	2 mL EtOH	—	Brown-gray

	$CoCO_3$	mmol		and 8 mL H_2O		powder
78	0.1 mmol $CoCO_3$	0.1 mmol	—	10 mL EtOH	—	Brown-gray powder
79	0.1 mmol $CoCO_3$	0.1 mmol	—	10 mL H_2O	—	Brown block single crystal (small) and powder
80	0.1 mmol $CoCO_3$	0.1 mmol	0.1 mmol H_2*p*-bdc	5 mL EtOH and 5 mL H_2O	—	Brown block single crystal (small) and red powder
81	0.4 mmol $CoCl_2$	0.4 mmol	—	10 mL H_2O	3	Colorless needle single crystal (small) and brown powder
82	0.4 mmol $CoCl_2$	0.4 mmol	—	10 mL H_2O	7	Brown powder
83	0.1 mmol $CoCl_2$	0.1 mmol	—	5 mL EtOH and 5 mL H_2O	—	Red cubic single crystal
84	0.1 mmol $CoCl_2$	0.1 mmol	—	2 mL EtOH and 8 mL H_2O	—	Red cubic single crystal (small)
85	0.1 mmol $CoCl_2$	0.1 mmol	—	6 mL EtOH and 4 mL H_2O	—	Red cubic single crystal (small)
86	0.1 mmol	0.1	0.1 mmol	5 mL EtOH	—	Red cubic

	$CoCl_2$	mmol	H_2*o*-bdc	and 5 mL H_2O		single crystal (small)
87	0.1 mmol $CoCl_2$	0.1 mmol	0.1 mmol H_2*p*-bdc	5 mL EtOH and 5 mL H_2O	—	Red cubic single crystal (small)
88	0.1 mmol $CoCl_2$	0.1 mmol	0.1 mmol H_2*o*-bdc	5 mL EtOH and 5 mL H_2O	3.5	Red cubic single crystal (small)
89	0.1 mmol $CoCl_2$	0.1 mmol	0.1 mmol 1,3,5-H_3btc	5 mL EtOH and 5 mL H_2O	4.5	Red cubic single crystal (small)
90	0.1 mmol $CoCl_2$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	5 mL EtOH and 5 mL H_2O	4.5	Red cubic single crystal (small)
91	0.1 mmol $CoCl_2$	0.1 mmol	0.1 mmol 1,2,4-H_3btc	5 mL EtOH and 5 mL H_2O	4.5	Red cubic single crystal (small)
92	0.1 mmol $CoCl_2$	0.1 mmol	0.1 mmol 1,2,4,5-H_4btec	5 mL EtOH and 5 mL H_2O	4.5	Red cubic single crystal (small)
93	0.05 mmol $CoCl_2$	0.05 mmol	—	2 mL EtOH and 8 mL H_2O	—	Brown block single crystal (small) and red powder
94	0.05 mmol $CoCl_2$	0.05 mmol	—	1 mL EtOH and 4 mL H_2O	—	Brown block single crystals(small) and red powder
95	0.1 mmol	0.1	—	8 mL EtOH	—	Red cubic

	$CoCl_2$	mmol		and 2 mL H_2O		single crystal (small)
96	0.1 mmol $CoCl_2$	0.1 mmol	—	4 mL EtOH and 6 mL H_2O	—	Red cubic single crystal (small)
97	0.1 mmol $CoCl_2$	0.1 mmol	0.1 mmol Imidazole	5 mL EtOH and 5 mL H_2O	—	Red cubic single crystal (small) and red twin crystals
98	0.1 mmol $CoSO_4$	0.1 mmol	0.1 mmol 1,2,3-H_3btc	5 mL EtOH and 5 mL H_2O	—	Orange cubic single crystal (small)
99	0.1 mmol $CoSO_4$	0.1 mmol	—	2 mL EtOH and 8 mL H_2O	—	Orange cubic single crystal (small)
100	0.1 mmol $CoSO_4$	0.1 mmol	—	3 mL EtOH and 7 mL H_2O	—	Orange cubic single crystal (small)
101	0.1 mmol $CoSO_4$	0.1 mmol	—	10mL H_2O	—	Orange cubic single crystal and yellow single crystal
102	0.2 mmol $CoSO_4$	0.1 mmol	—	10mL H_2O	—	Orange cubic single crystal and yellow single crystal
103	0.4 mmol $CoSO_4$	0.1 mmol	—	10mL H_2O	—	Orange cubic single crystal and yellow

104	0.1 mmol $CoSO_4$	0.2 mmol	—	10mL H_2O	—	single crystal Orange cubic single crystal (small), brown powder and yellow single crystal