Two Pairs of Zn(II) Coordination Polymer Enantiomers Based on Chiral Aromatic Polycarboxylate Ligands: Synthesis, Crystal Structures and Properties

Ji-Han Huang[a,b], Guang-Feng Hou[b], Dong-Sheng Ma, Ying-Hui Yu[a], Wen-Hong Jiang, Qi Huang, Jin-Sheng Gao[a,b]**

[a]School of Chemistry and Materials Science, Heilongjiang University, Harbin 150080, China.
[b]Engineering Research Center of Pesticide of Heilongjiang University, Heilongjiang University, Harbin 150080, China.

Corresponding Author. *Tel.: +86 451 86609001; Fax: +86 451 86609151; E-mail: yuyinghui@hlju.edu.cn (Y. H. Yu); gaojinsheng@hlju.edu.cn (J. S. Gao).

Figure S16. Excitation spectra of **CCP-3**

Table S1. Selected bond distances (Å) and angles (°) for **CCPs 1−4**

CCP-1			
C(1)-O(3)	1.374(4)	C(1)-C(2)	1.376(6)
C(1)-C(6)	1.389(6)	C(2)-C(3)	1.377(5)
C(2)-H(2)	0.9300	C(3)-C(4)	1.395(6)
C(3)-H(3)	0.9300	C(4)-C(5)	1.395(6)
C(4)-C(7)	1.492(4)	C(5)-C(6)	1.387(5)
C(5)-H(5)	0.9300	C(6)-H(6)	0.9300
C(7)-C(8)	1.392(6)	C(7)-C(12)	1.398(5)
C(8)-C(9)	1.383(5)	C(8)-H(8)	0.9300
C(9)-C(10)	1.383(6)	C(9)-H(9)	0.9300
C(10)-C(11)	1.392(5)	C(10)-C(16)	1.489(4)
C(11)-C(12)	1.376(5)	C(11)-H(11)	0.9300
C(12)-H(12)	0.9300	C(13)-O(1)	1.246(5)
C(13)-O(2)	1.267(5)	C(13)-C(14)	1.525(5)
C(14)-O(3)	1.440(5)	C(14)-C(15)	1.520(6)
C(14)-H(14)	0.9800	C(15)-H(15A)	0.9600
C(15)-H(15B)	0.9600	C(15)-H(15C)	0.9600
C(16)-O(4)	1.257(5)	C(16)-O(5)	1.257(5)
C(16)-Zn(1)#III	2.541(3)	Zn(1)-O(6)	1.963(3)
Zn(1)-O(2)	1.972(2)	Zn(1)-O(5)#II	1.996(3)
Zn(1)-O(1)#I	2.022(3)	Zn(1)-O(4)#II	2.398(3)
Zn(1)-C(16)#II	2.541(3)	O(1)-Zn(1)#IV	2.022(3)
O(4)-Zn(1)#III	2.398(3)	O(5)-Zn(1)#III	1.996(3)
O(6)-H(61)	0.8540	O(6)-H(62)	0.8459
O(3)-C(1)-C(2)	116.2(4)	O(3)-C(1)-C(6)	124.7(4)
C(2)-C(1)-C(6)	119.0(3)	C(1)-C(2)-C(3)	121.0(4)
C(1)-C(2)-H(2)	119.5	C(3)-C(2)-H(2)	119.5
C(2)-C(3)-C(4)	121.8(4)	C(2)-C(3)-H(3)	119.1
C(4)-C(3)-H(3)	119.1	C(5)-C(4)-C(3)	116.2(3)
C(5)-C(4)-C(7)	122.1(4)	C(3)-C(4)-C(7)	121.7(4)
C(6)-C(5)-C(4)	122.5(4)	C(6)-C(5)-H(5)	118.8
C(4)-C(5)-H(5)	118.8	C(5)-C(6)-C(1)	119.5(4)
C(5)-C(6)-H(6)	120.2	C(1)-C(6)-H(6)	120.2
C(8)-C(7)-C(12)	116.4(3)	C(8)-C(7)-C(4)	121.5(4)

C(12)-C(7)-C(4)	122.1(3)	C(9)-C(8)-C(7)	121.8(4)
C(9)-C(8)-H(8)	119.1	C(7)-C(8)-H(8)	119.1
C(10)-C(9)-C(8)	120.9(4)	C(10)-C(9)-H(9)	119.5
C(8)-C(9)-H(9)	119.5	C(9)-C(10)-C(11)	118.1(3)
C(9)-C(10)-C(16)	119.7(4)	C(11)-C(10)-C(16)	122.1(4)
C(12)-C(11)-C(10)	120.7(4)	C(12)-C(11)-H(11)	119.7
C(10)-C(11)-H(11)	119.7	C(11)-C(12)-C(7)	122.0(4)
C(11)-C(12)-H(12)	119.0	C(7)-C(12)-H(12)	119.0
O(1)-C(13)-O(2)	123.1(3)	O(1)-C(13)-C(14)	120.5(3)
O(2)-C(13)-C(14)	116.3(3)	O(3)-C(14)-C(15)	109.5(4)
O(3)-C(14)-C(13)	106.7(3)	C(15)-C(14)-C(13)	109.0(3)
O(3)-C(14)-H(14)	110.5	C(15)-C(14)-H(14)	110.5
C(13)-C(14)-H(14)	110.5	C(14)-C(15)-H(15A)	109.5
C(14)-C(15)-H(15B)	109.5	H(15A)-C(15)-H(15B)	109.5
C(14)-C(15)-H(15C)	109.5	H(15A)-C(15)-H(15C)	109.5
H(15B)-C(15)-H(15C)	109.5	O(4)-C(16)-O(5)	119.6(3)
O(4)-C(16)-C(10)	121.3(4)	O(5)-C(16)-C(10)	119.0(4)
O(4)-C(16)-Zn(1)#III	69.02(19)	O(5)-C(16)-Zn(1)#III	50.62(17)
C(10)-C(16)-Zn(1)#III	169.5(3)	O(6)-Zn(1)-O(2)	112.52(13)
O(6)-Zn(1)-O(5)#II	105.04(14)	O(2)-Zn(1)-O(5)#II	138.45(12)
O(6)-Zn(1)-O(1)#I	106.01(14)	O(2)-Zn(1)-O(1)#I	89.07(13)
O(5)#Ⅱ-Zn(1)-O(1)#I	97.29(12)	O(6)-Zn(1)-O(4)#II	112.59(13)
O(2)-Zn(1)-O(4)#II	90.26(11)	O(5)#II-Zn(1)-O(4)#II	58.44(11)
O(1)#Ⅰ-Zn(1)-O(4)#II	138.33(13)	O(6)-Zn(1)-C(16)#II	111.69(14)
O(2)-Zn(1)-C(16)#II	115.60(11)	O(5)#Ⅱ-Zn(1)-C(16)#Ⅱ	29.13(13)
O(1)#Ⅰ-Zn(1)-C(16)#II	119.94(15)	O(4)#Ⅱ-Zn(1)-C(16)#Ⅱ	29.31(12)
C(13)-O(1)-Zn(1)#IV	136.9(3)	C(13)-O(2)-Zn(1)	119.7(3)
C(1)-O(3)-C(14)	118.6(4)	C(16)-O(4)-Zn(1)#Ⅲ	81.7(2)
C(16)-O(5)-Zn(1)#III	100.2(2)	Zn(1)-O(6)-H(61)	123.4
Zn(1)-O(6)-H(62)	119.1	H(61)-O(6)-H(62)	113.0
Symmetry transformations used to generate equivalent atoms: #I -x,y-1/2,-z+1 #II x-1,y,z-1 #III x+1,y,z+1 #IV -x,y+1/2,-z+1			
CCP-2			
C(1)-O(3)	1.369(3)	C(1)-C(2)	1.375(5)
C(1)-C(6)	1.394(5)	C(2)-C(3)	1.374(5)
C(2)-H(2)	0.9300	C(3)-C(4)	1.402(4)
C(3)-H(3)	0.9300	C(4)-C(5)	1.390(5)
C(4)-C(7)	1.486(4)	C(5)-C(6)	1.382(5)
C(5)-H(5)	0.9300	C(6)-H(6)	0.9300
C(7)-C(8)	1.393(5)	C(7)-C(12)	1.406(4)
C(8)-C(9)	1.381(5)	C(8)-H(8)	0.9300
C(9)-C(10)	1.387(5)	C(9)-H(9)	0.9300

C(10)-C(11)	1.386(5)	C(10)-C(16)	1.484(4)
C(11)-C(12)	1.377(5)	C(11)-H(11)	0.9300
C(12)-H(12)	0.9300	C(13)-O(1)	1.253(3)
C(13)-O(2)	1.257(4)	C(13)-C(14)	1.523(4)
C(14)-O(3)	1.444(4)	C(14)-C(15)	1.502(5)
C(14)-H(14)	0.9800	C(15)-H(15A)	0.9600
C(15)-H(15B)	0.9600	C(15)-H(15C)	0.9600
C(16)-O(4)	1.256(4)	C(16)-O(5)	1.259(4)
C(16)-Zn(1)#III	2.539(3)	Zn(1)-O(6)	1.958(2)
Zn(1)-O(2)	1.9713(17)	Zn(1)-O(5)#II	1.993(2)
Zn(1)-O(1)#I	2.021(2)	Zn(1)-O(4)#II	2.390(3)
Zn(1)-C(16)#II	2.539(3)	O(1)-Zn(1)#IV	2.021(2)
O(4)-Zn(1)#III	2.390(3)	O(5)-Zn(1)#III	1.993(2)
O(6)-H(61)	0.8543	O(6)-H(62)	0.8465
O(3)-C(1)-C(2)	116.0(3)	O(3)-C(1)-C(6)	124.6(3)
C(2)-C(1)-C(6)	119.3(3)	C(3)-C(2)-C(1)	120.4(3)
C(3)-C(2)-H(2)	119.8	C(1)-C(2)-H(2)	119.8
C(2)-C(3)-C(4)	122.0(3)	C(2)-C(3)-H(3)	119.0
C(4)-C(3)-H(3)	119.0	C(5)-C(4)-C(3)	116.2(3)
C(5)-C(4)-C(7)	122.4(3)	C(3)-C(4)-C(7)	121.4(3)
C(6)-C(5)-C(4)	122.5(3)	C(6)-C(5)-H(5)	118.8
C(4)-C(5)-H(5)	118.8	C(5)-C(6)-C(1)	119.5(3)
C(5)-C(6)-H(6)	120.2	C(1)-C(6)-H(6)	120.2
C(8)-C(7)-C(12)	116.6(3)	C(8)-C(7)-C(4)	121.5(3)
C(12)-C(7)-C(4)	121.9(3)	C(9)-C(8)-C(7)	121.5(3)
C(9)-C(8)-H(8)	119.2	C(7)-C(8)-H(8)	119.2
C(8)-C(9)-C(10)	121.0(3)	C(8)-C(9)-H(9)	119.5
C(10)-C(9)-H(9)	119.5	C(11)-C(10)-C(9)	118.4(3)
C(11)-C(10)-C(16)	121.7(3)	C(9)-C(10)-C(16)	119.8(3)
C(12)-C(11)-C(10)	120.6(3)	C(12)-C(11)-H(11)	119.7
C(10)-C(11)-H(11)	119.7	C(11)-C(12)-C(7)	121.9(3)
C(11)-C(12)-H(12)	119.1	C(7)-C(12)-H(12)	119.1
O(1)-C(13)-O(2)	122.7(3)	O(1)-C(13)-C(14)	120.0(2)
O(2)-C(13)-C(14)	117.3(2)	O(3)-C(14)-C(15)	110.4(3)
O(3)-C(14)-C(13)	106.0(2)	C(15)-C(14)-C(13)	109.5(3)
O(3)-C(14)-H(14)	110.3	C(15)-C(14)-H(14)	110.3
C(13)-C(14)-H(14)	110.3	C(14)-C(15)-H(15A)	109.5
C(14)-C(15)-H(15B)	109.5	H(15A)-C(15)-H(15B)	109.5
C(14)-C(15)-H(15C)	109.5	H(15A)-C(15)-H(15C)	109.5
H(15B)-C(15)-H(15C)	109.5	O(4)-C(16)-O(5)	119.3(3)
O(4)-C(16)-C(10)	121.9(3)	O(5)-C(16)-C(10)	118.8(3)
O(4)-C(16)-Zn(1)#III	68.74(18)	O(5)-C(16)-Zn(1)#III	50.55(15)
C(10)-C(16)-Zn(1)#III	169.2(2)	O(6)-Zn(1)-O(2)	112.32(11)

O(6)-Zn(1)-O(5)#II	105.09(11)	O(2)-Zn(1)-O(5)#II	138.54(10)
O(6)-Zn(1)-O(1)#I	106.26(11)	O(2)-Zn(1)-O(1)#I	89.32(10)
O(5)#II-Zn(1)-O(1)#I	97.00(9)	O(6)-Zn(1)-O(4)#II	112.27(10)
O(2)-Zn(1)-O(4)#II	90.31(9)	O(5)#II-Zn(1)-O(4)#II	58.53(9)
O(1)#I-Zn(1)-O(4)#II	138.35(10)	O(6)-Zn(1)-C(16)#II	111.33(11)
O(2)-Zn(1)-C(16)#II	115.76(9)	O(5)#II-Zn(1)-C(16)#II	29.21(10)
O(1)#I-Zn(1)-C(16)#II	119.95(11)	O(4)#II-Zn(1)-C(16)#II	29.31(10)
C(13)-O(1)-Zn(1)#IV	136.9(2)	C(13)-O(2)-Zn(1)	120.5(2)
C(1)-O(3)-C(14)	119.1(3)	C(16)-O(4)-Zn(1)#III	81.95(19)
C(16)-O(5)-Zn(1)#III	100.2(2)	Zn(1)-O(6)-H(61)	123.4
Zn(1)-O(6)-H(62)	119.2	H(61)-O(6)-H(62)	113.1
Symmetry transformations used to generate equivalent atoms: #I-x+2,y+1/2,-z+1 #II x+1,y,z+1 #III x-1,y,z-1 #IV -x+2,y-1/2,-z+1			

CCP-3

C(1)-C(10)	1.417(3)	C(1)-C(6)	1.419(3)
C(1)-C(2)	1.420(3)	C(2)-C(3)	1.364(3)
C(2)-H(2)	0.9300	C(3)-O(1)	1.394(3)
C(3)-C(4)	1.403(3)	C(4)-C(5)	1.363(3)
C(4)-H(4)	0.9300	C(5)-C(6)	1.411(3)
C(5)-H(5)	0.9300	C(6)-C(7)	1.416(3)
C(7)-C(8)	1.364(3)	C(7)-H(7)	0.9300
C(8)-C(9)	1.419(3)	C(8)-C(11)	1.501(3)
C(9)-C(10)	1.358(3)	C(9)-H(9)	0.9300
C(10)-H(10)	0.9300	C(11)-O(5)	1.235(3)
C(11)-O(4)	1.257(3)	C(12)-O(1)	1.444(3)
C(12)-C(14)	1.514(4)	C(12)-C(13)	1.524(3)
C(12)-H(12)	0.9800	C(13)-O(3)	1.241(3)
C(13)-O(2)	1.252(3)	C(14)-H(14A)	0.9600
C(14)-H(14B)	0.9600	C(14)-H(14C)	0.9600
O(1)-Zn(1)	2.4146(18)	O(2)-Zn(1)	1.964(2)
O(4)-Zn(1)#II	1.9354(18)	O(6)-Zn(1)	1.9884(18)
O(6)-H(61)	0.8499	O(6)-H(62)	0.8500
O(7)-Zn(1)	2.013(2)	O(7)-H(71)	0.8499
O(7)-H(72)	0.8500	Zn(1)-O(4)#I	1.9354(18)
C(10)-C(1)-C(6)	118.34(19)	C(10)-C(1)-C(2)	122.6(2)
C(6)-C(1)-C(2)	119.03(19)	C(3)-C(2)-C(1)	119.1(2)
C(3)-C(2)-H(2)	120.5	C(1)-C(2)-H(2)	120.5
C(2)-C(3)-O(1)	118.3(2)	C(2)-C(3)-C(4)	122.2(2)
O(1)-C(3)-C(4)	119.4(2)	C(5)-C(4)-C(3)	119.7(2)
C(5)-C(4)-H(4)	120.2	C(3)-C(4)-H(4)	120.2
C(4)-C(5)-C(6)	120.4(2)	C(4)-C(5)-H(5)	119.8

C(6)-C(5)-H(5)	119.8	C(5)-C(6)-C(7)	121.1(2)
C(5)-C(6)-C(1)	119.6(2)	C(7)-C(6)-C(1)	119.34(19)
C(8)-C(7)-C(6)	120.5(2)	C(8)-C(7)-H(7)	119.7
C(6)-C(7)-H(7)	119.7	C(7)-C(8)-C(9)	120.3(2)
C(7)-C(8)-C(11)	117.8(2)	C(9)-C(8)-C(11)	121.9(2)
C(10)-C(9)-C(8)	120.0(2)	C(10)-C(9)-H(9)	120.0
C(8)-C(9)-H(9)	120.0	C(9)-C(10)-C(1)	121.4(2)
C(9)-C(10)-H(10)	119.3	C(1)-C(10)-H(10)	119.3
O(5)-C(11)-O(4)	121.3(2)	O(5)-C(11)-C(8)	120.5(2)
O(4)-C(11)-C(8)	117.9(2)	O(1)-C(12)-C(14)	108.7(2)
O(1)-C(12)-C(13)	108.3(2)	C(14)-C(12)-C(13)	111.8(2)
O(1)-C(12)-H(12)	109.3	C(14)-C(12)-H(12)	109.3
C(13)-C(12)-H(12)	109.3	O(3)-C(13)-O(2)	122.3(2)
O(3)-C(13)-C(12)	117.1(2)	O(2)-C(13)-C(12)	120.6(2)
C(12)-C(14)-H(14A)	109.5	C(12)-C(14)-H(14B)	109.5
H(14A)-C(14)-H(14B)	109.5	C(12)-C(14)-H(14C)	109.5
H(14A)-C(14)-H(14C)	109.5	H(14B)-C(14)-H(14C)	109.5
C(3)-O(1)-C(12)	115.68(19)	C(3)-O(1)-Zn(1)	122.35(15)
C(12)-O(1)-Zn(1)	109.50(13)	C(13)-O(2)-Zn(1)	126.03(17)
C(11)-O(4)-Zn(1)#II	108.36(16)	Zn(1)-O(6)-H(61)	114.1
Zn(1)-O(6)-H(62)	118.7	H(61)-O(6)-H(62)	110.4
Zn(1)-O(7)-H(71)	124.3	Zn(1)-O(7)-H(72)	122.4
H(71)-O(7)-H(72)	112.8	O(4)#I-Zn(1)-O(2)	142.59(10)
O(4)#I-Zn(1)-O(6)	102.92(8)	O(2)-Zn(1)-O(6)	106.87(10)
O(4)#I-Zn(1)-O(7)	108.91(10)	O(2)-Zn(1)-O(7)	90.40(9)
O(6)-Zn(1)-O(7)	95.41(9)	O(4)#I-Zn(1)-O(1)	86.01(7)
O(2)-Zn(1)-O(1)	73.17(8)	O(6)-Zn(1)-O(1)	87.83(7)
O(7)-Zn(1)-O(1)	163.47(8)		
Symmetry transformations used to generate equivalent atoms: #I -x,y-1/2,-z+1 #II -x,y+1/2,-z+1			
CCP-4			
C(1)-O(2)	1.240(8)	C(1)-O(1)	1.264(8)
C(1)-C(2)	1.492(8)	C(2)-C(7)	1.356(8)
C(2)-C(3)	1.413(8)	C(3)-C(4)	1.374(8)
C(4)-C(5)	1.420(8)	C(5)-C(11)	1.410(7)
C(5)-C(6)	1.423(7)	C(6)-C(8)	1.408(8)
C(6)-C(7)	1.414(7)	C(8)-C(9)	1.371(8)
C(9)-C(10)	1.404(8)	C(10)-C(11)	1.358(8)
C(10)-O(3)	1.404(6)	C(12)-O(3)	1.445(7)
C(12)-C(13)	1.496(9)	C(12)-C(14)	1.530(8)
C(14)-O(5)	1.238(7)	C(14)-O(4)	1.256(8)

O(1)-Zn(1)#II	1.941(4)	O(3)-Zn(1)	2.413(4)
O(4)-Zn(1)	1.968(5)	O(6)-Zn(1)	2.017(5)
O(7)-Zn(1)	1.984(4)	Zn(1)-O(1)#I	1.941(4)
O(2)-C(1)-O(1)	120.5(5)	O(2)-C(1)-C(2)	121.9(5)
O(1)-C(1)-C(2)	117.2(5)	C(7)-C(2)-C(3)	119.9(5)
C(7)-C(2)-C(1)	119.2(5)	C(3)-C(2)-C(1)	120.9(5)
C(4)-C(3)-C(2)	120.1(5)	C(3)-C(4)-C(5)	121.0(5)
C(11)-C(5)-C(4)	122.9(5)	C(11)-C(5)-C(6)	118.7(5)
C(4)-C(5)-C(6)	118.4(5)	C(8)-C(6)-C(7)	121.6(5)
C(8)-C(6)-C(5)	119.7(5)	C(7)-C(6)-C(5)	118.7(5)
C(2)-C(7)-C(6)	121.8(5)	C(9)-C(8)-C(6)	120.5(5)
C(8)-C(9)-C(10)	118.9(5)	C(11)-C(10)-O(3)	119.0(5)
C(11)-C(10)-C(9)	122.5(5)	O(3)-C(10)-C(9)	118.4(5)
C(10)-C(11)-C(5)	119.6(5)	O(3)-C(12)-C(13)	109.2(5)
O(3)-C(12)-C(14)	108.2(5)	C(13)-C(12)-C(14)	111.7(5)
O(5)-C(14)-O(4)	122.3(5)	O(5)-C(14)-C(12)	116.9(6)
O(4)-C(14)-C(12)	120.7(5)	C(1)-O(1)-Zn(1)#II	108.4(4)
C(10)-O(3)-C(12)	116.2(5)	C(10)-O(3)-Zn(1)	122.4(4)
C(12)-O(3)-Zn(1)	109.5(3)	C(14)-O(4)-Zn(1)	125.5(4)
O(1)#I-Zn(1)-O(4)	142.4(2)	O(1)#I-Zn(1)-O(7)	103.23(19)
O(4)-Zn(1)-O(7)	106.9(2)	O(1)#I-Zn(1)-O(6)	109.0(2)
O(4)-Zn(1)-O(6)	89.9(2)	O(7)-Zn(1)-O(6)	95.7(2)
O(1)#I-Zn(1)-O(3)	85.95(17)	O(4)-Zn(1)-O(3)	73.43(19)
O(7)-Zn(1)-O(3)	87.87(18)	O(6)-Zn(1)-O(3)	163.26(19)
Symmetry transformations used to generate equivalent atoms: #I -x+1,y+1/2,-z+1 #II -x+1,y-1/2,-z+1			

Table S2. H-bond distances (Å) and angles (°) in **CCPs 1-4**

CCP-1				
D-H···A	d(D-H)	d(H···A)	d(D···A)	<(DHA)
O(6)-H(61)...O(4)#V	0.85	1.83	2.661(4)	163.7
O(6)-H(62)...O(2)#IV	0.85	1.90	2.744(5)	179.1
Symmetry transformations used to generate equivalent atoms: #I -x,y-1/2,-z+1 #II x-1,y,z-1 #III x+1,y,z+1 #IV -x,y+1/2,-z+1 #V x,y,z-1				
CCP-2				
D-H···A	d(D-H)	d(H···A)	d(D···A)	<(DHA)
O(6)-H(61)...O(4)#V	0.85	1.83	2.664(4)	163.8
O(6)-H(62)...O(2)#IV	0.85	1.91	2.756(4)	179.1

Symmetry transformations used to generate equivalent atoms:
#I-x+2,y+1/2,-z+1 #II x+1,y,z+1 #III x-1,y,z-1 #IV -x+2,y-1/2,-z+1 #V x,y,z+1

CCP-3

D-H···A	d(D-H)	d(H···A)	d(D···A)	<(DHA)
O(6)-H(61)...O(3)#III	0.85	1.96	2.784(3)	164.3
O(6)-H(62)...O(5)#IV	0.85	1.78	2.626(3)	176.6
O(7)-H(71)...O(3)#V	0.85	2.05	2.888(3)	166.8
O(7)-H(71)...O(2)#V	0.85	2.47	3.135(3)	135.9
O(7)-H(72)...O(3)#VI	0.85	1.88	2.723(3)	170.6

Symmetry transformations used to generate equivalent atoms:
#I -x,y-1/2,-z+1 #II -x,y+1/2,-z+1 #III -x+1,y-1/2,-z+2 #IV -x+1,y-1/2,-z+1
#V -x,y-1/2,-z+2 #VI x,y-1,z

CCP-4

D-H···A	d(D-H)	d(H···A)	d(D···A)	<(DHA)
O(6)-H(101)...O(5)#III	0.82	1.97	2.725(8)	152.7
O(7)-H(104)...O(5)#IV	0.82	2.03	2.781(6)	152.8
O(7)-H(103)...O(2)#V	0.84(2)	1.80(3)	2.627(6)	168(7)
O(6)-H(102)...O(5)#VI	0.85(2)	2.15(6)	2.879(7)	144(10)
O(6)-H(102)...O(4)#VI	0.85(2)	2.36(6)	3.121(7)	150(9)

Symmetry transformations used to generate equivalent atoms:
#I -x+1,y+1/2,-z+1 #II -x+1,y-1/2,-z+1 #III x,y+1,z #IV -x,y+1/2,-z
#V -x,y+1/2,-z+1 #VI -x+1,y+1/2,-z

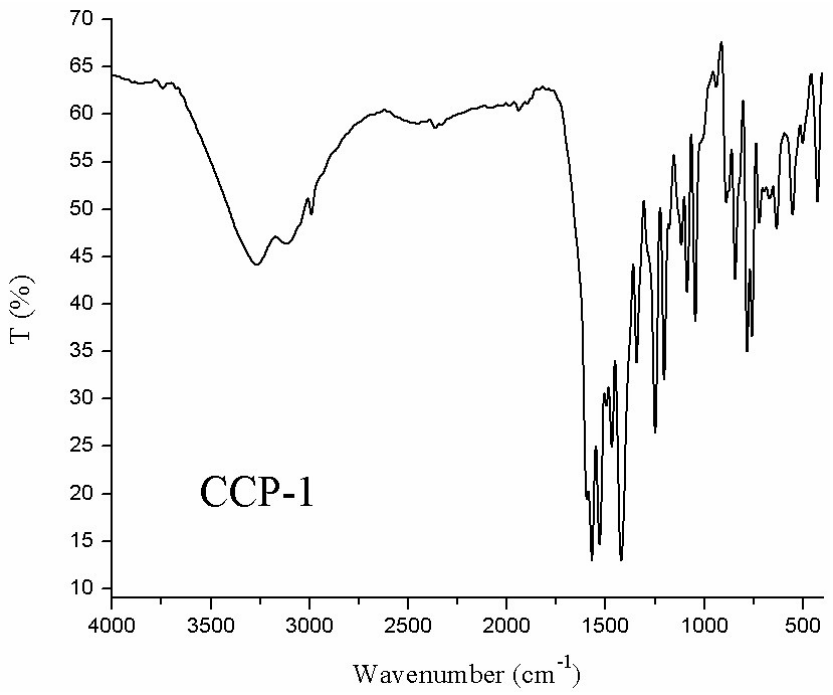

Figure S1. The IR spectra of **CCP-1**

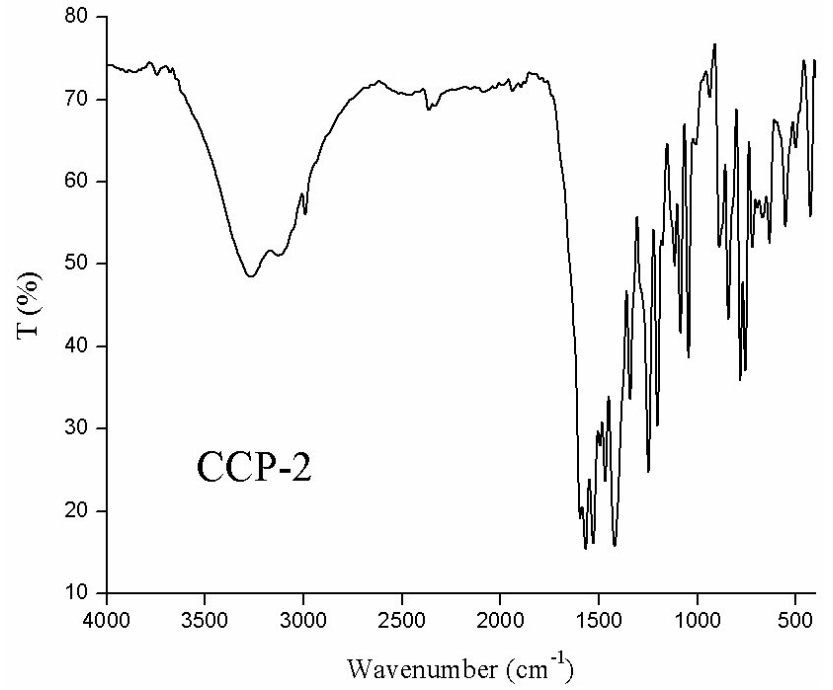

Figure S2. The IR spectra of **CCP-2**

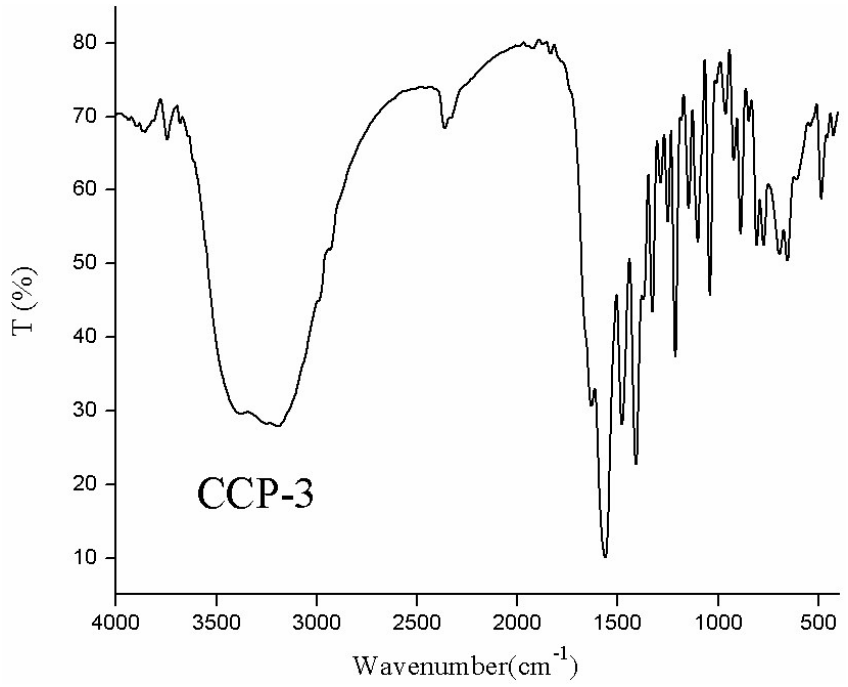

Figure S3. The IR spectra of **CCP-3**

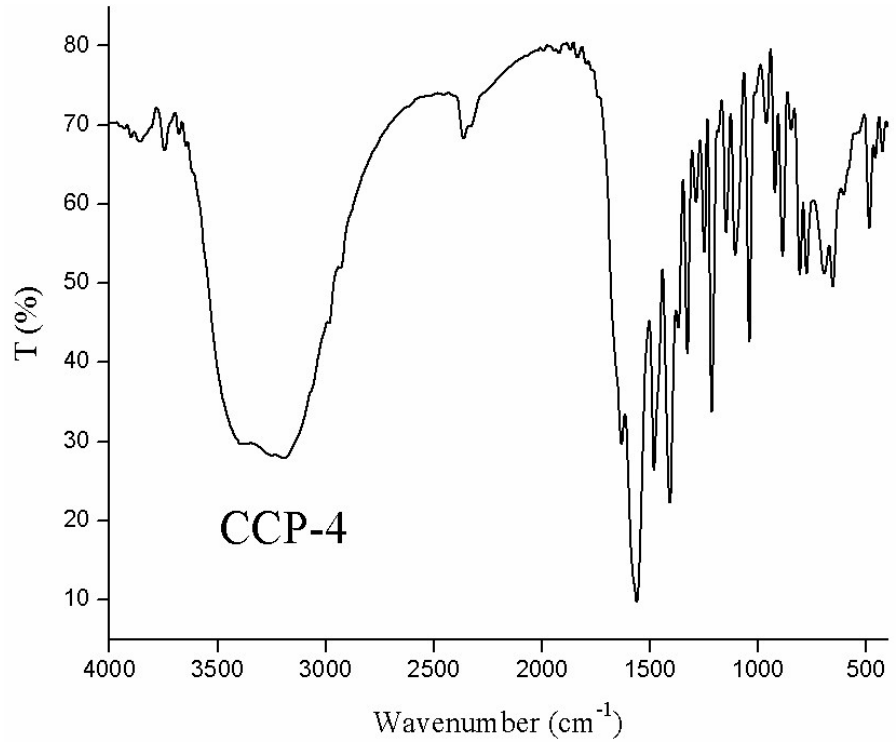

Figure S4. The IR spectra of **CCP-4**

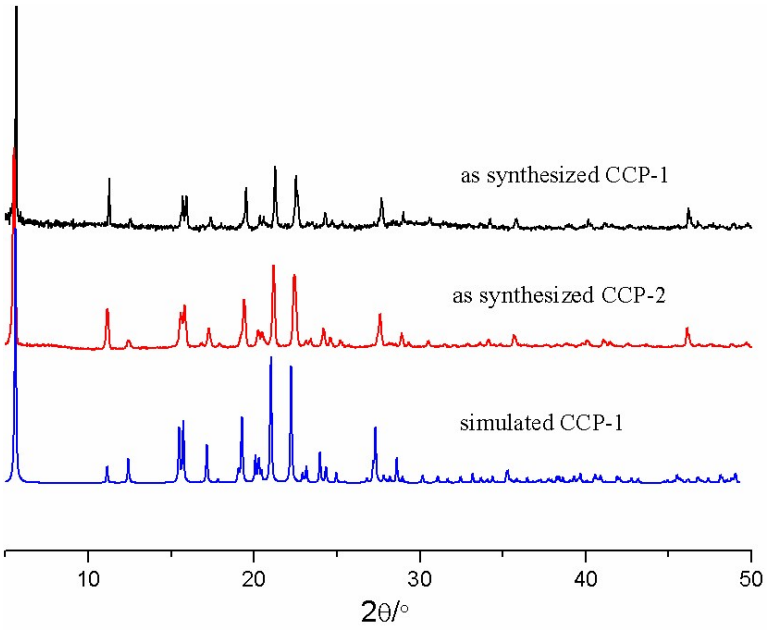

Figure S5. PXRD patterns of **CCP-1 and CCP-2**

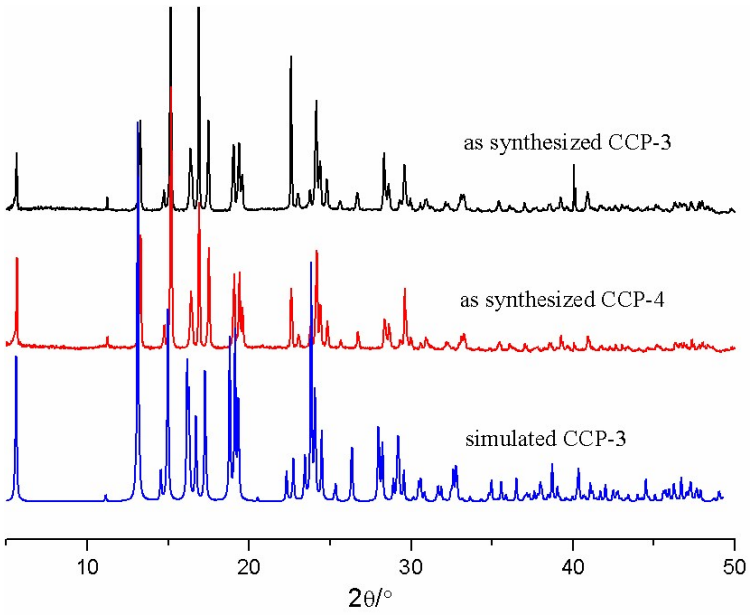

Figure S6. PXRD patterns of **CCP-3 and CCP-4**

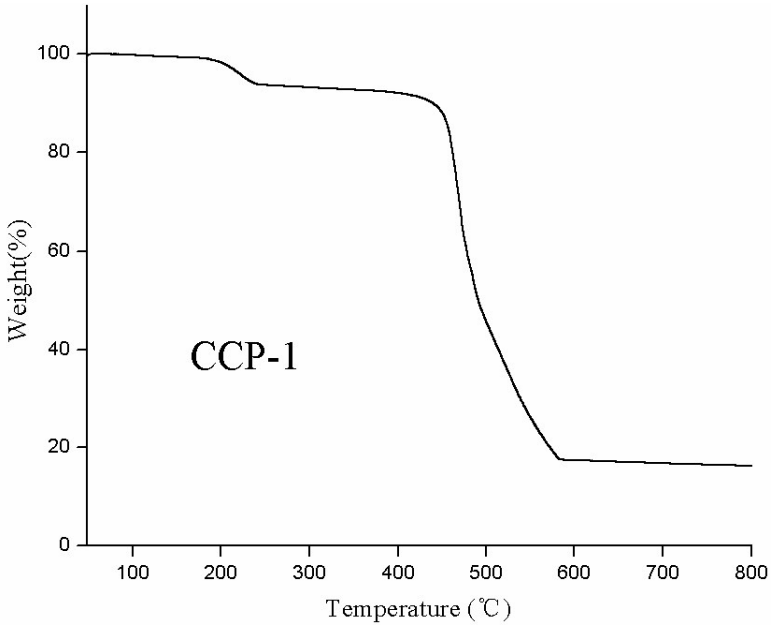

Figure S7. TGA curves of **CCP-1**

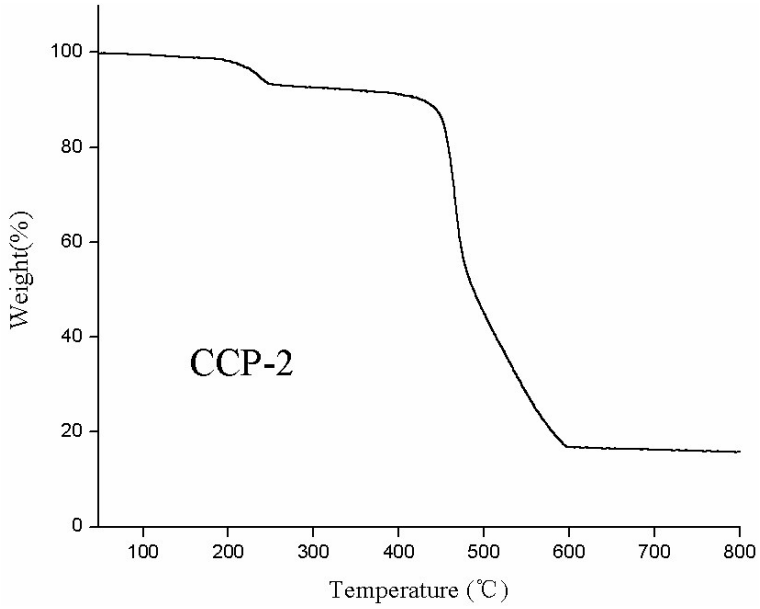

Figure S8. TGA curves of **CCP-2**

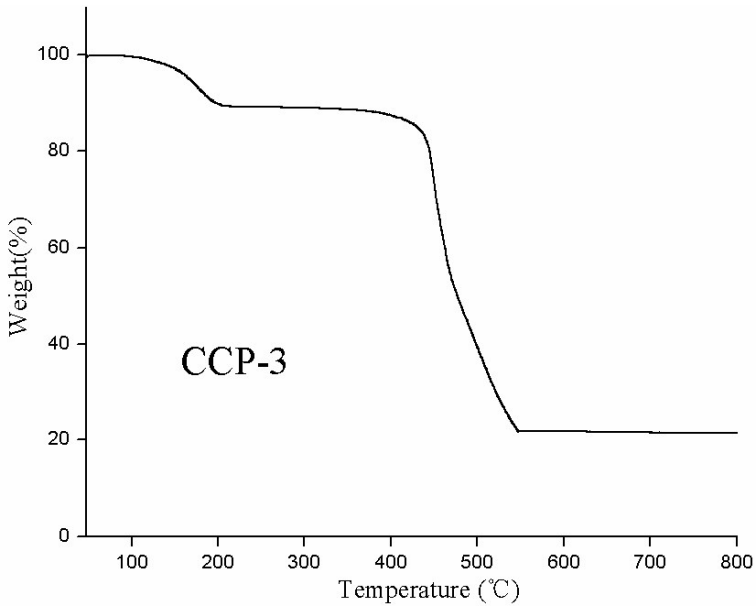

Figure S9. TGA curves of **CCP-3**

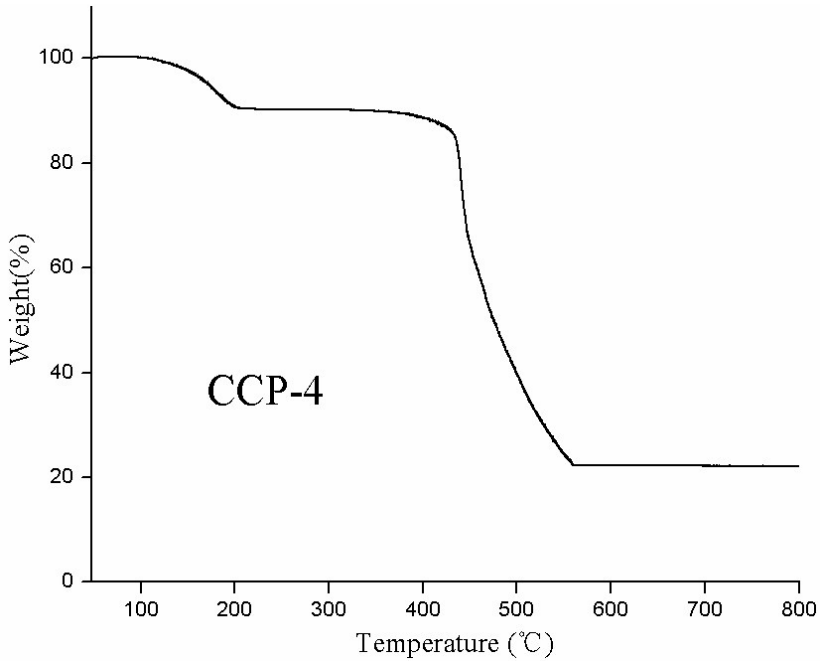

Figure S10. TGA curves of **CCP-4**

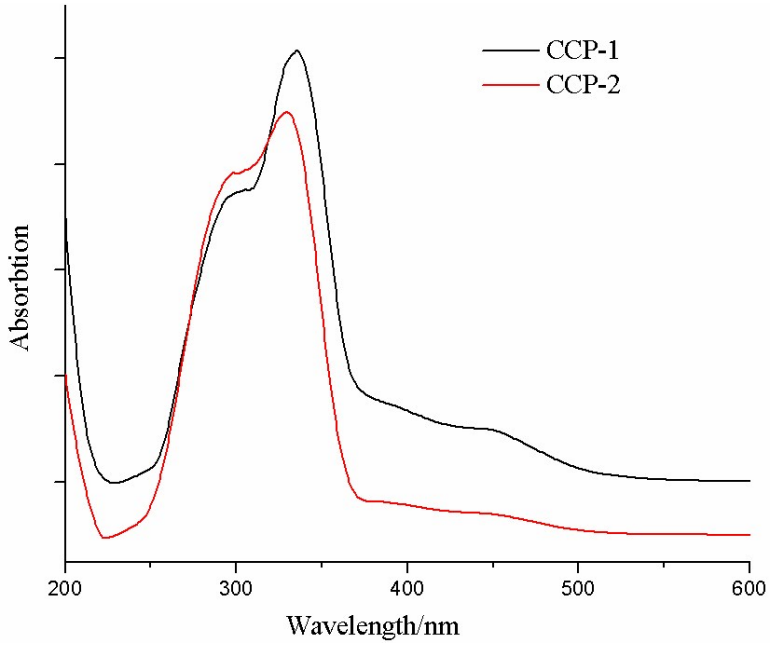

Figure S11. Solid−state UV−Vis of **CCP-1** and **CCP-2**

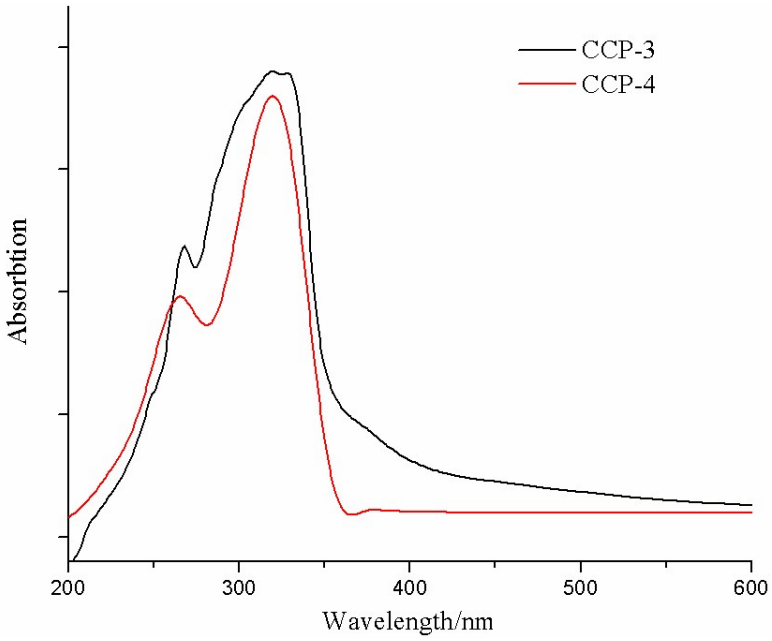

Figure S12. Solid−state UV−Vis of **CCP-3** and **CCP-4**

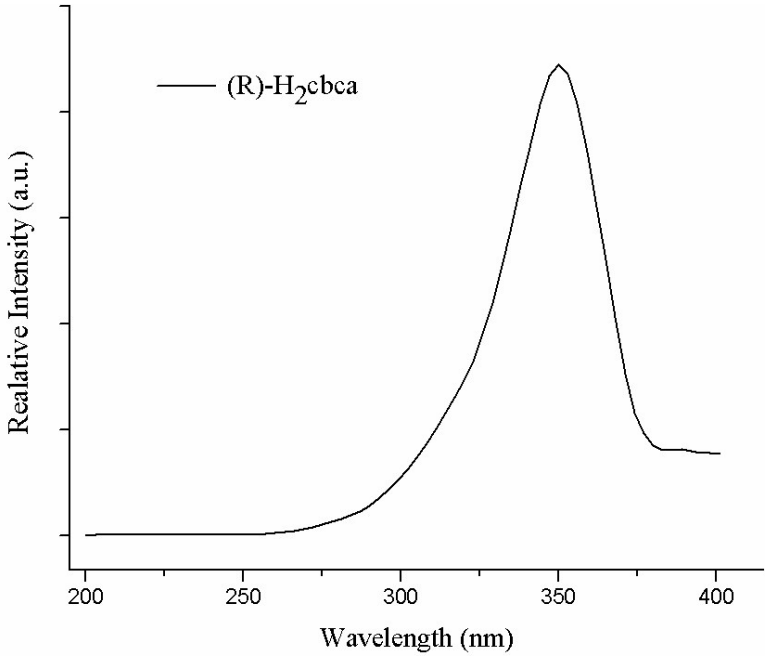

Figure S13. Excitation spectra of (R)-H_2cbca

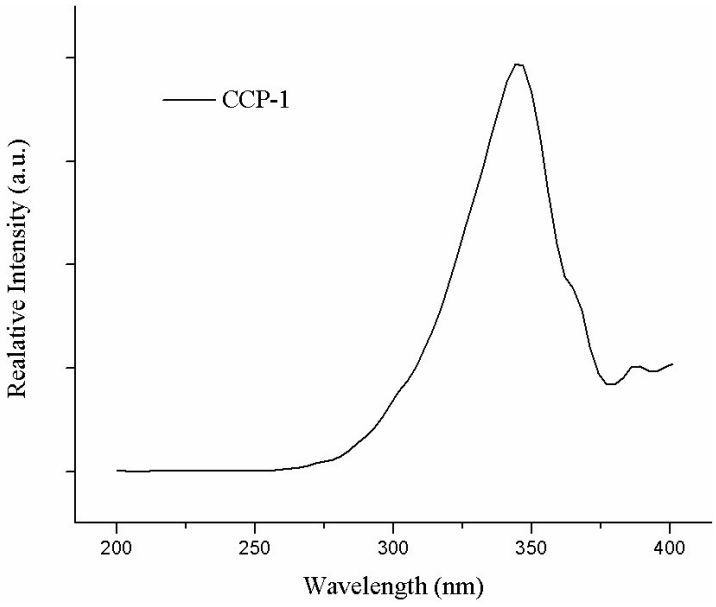

Figure S14. Excitation spectra of **CCP-1**

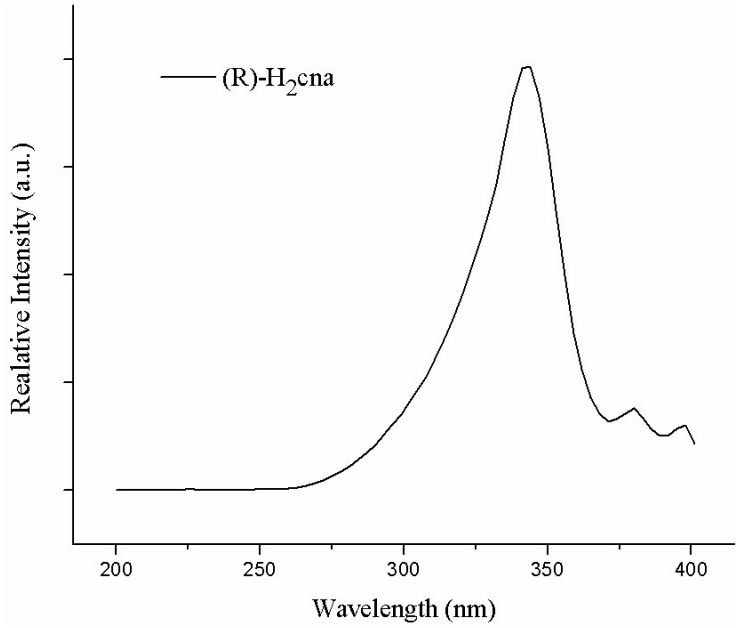

Figure S15. Excitation spectra of (R)-H_2cna

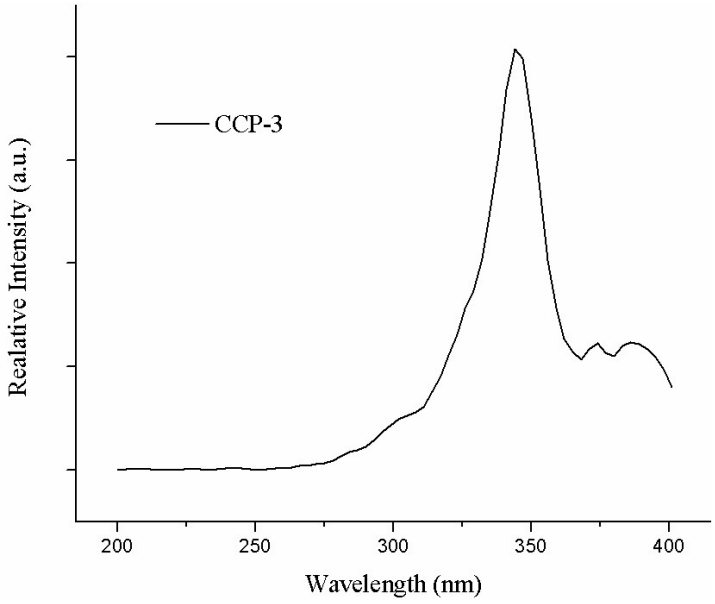

Figure S16. Excitation spectra of **CCP-3**