***Electric Supplementary Information:***

# Two Isomorphous Mn(II) and Co(II) 5-Amino-Tetrazolate Coordination Polymers with Magnetic Δ-Chain: Crystal Structures and Magnetic Properties

*DongSheng Liu [*, †,‡], Yan Sui, [†] TianWei Wang[§], ChangCang Huang[*, ‡], JianZhong Chen, [‡] XiaoZeng You[*,§]*

*† School of Chemistry & Chemical Engineering, Institute of Applied Chemistry, Jinggangshan University, Ji'an, Jiangxi 343009, P. R. China,*

*‡ School of Chemistry & Chemical Engineering, Fuzhou University, Fuzhou, Fujian 350108, P. R. China,*

*§ State Key Laboratory of Coordination Chemistry, School of Chemistry and Chemical Engineering, Nanjing University, Nanjing 210093, P. R. China*

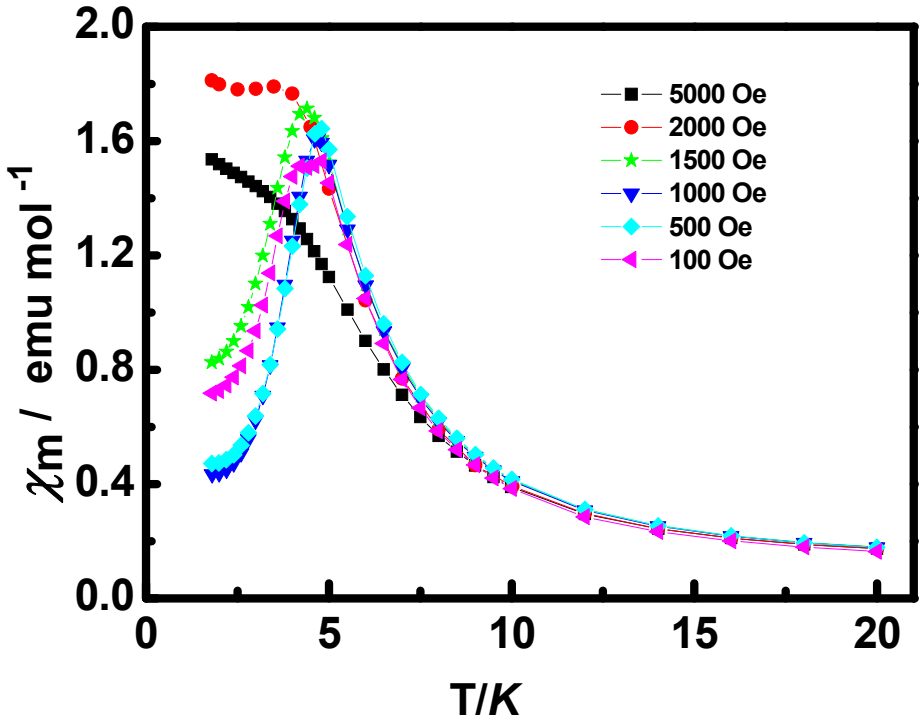


**Fig. S1** $\chi_m$ vs. $T$ plot at various fields in **1**

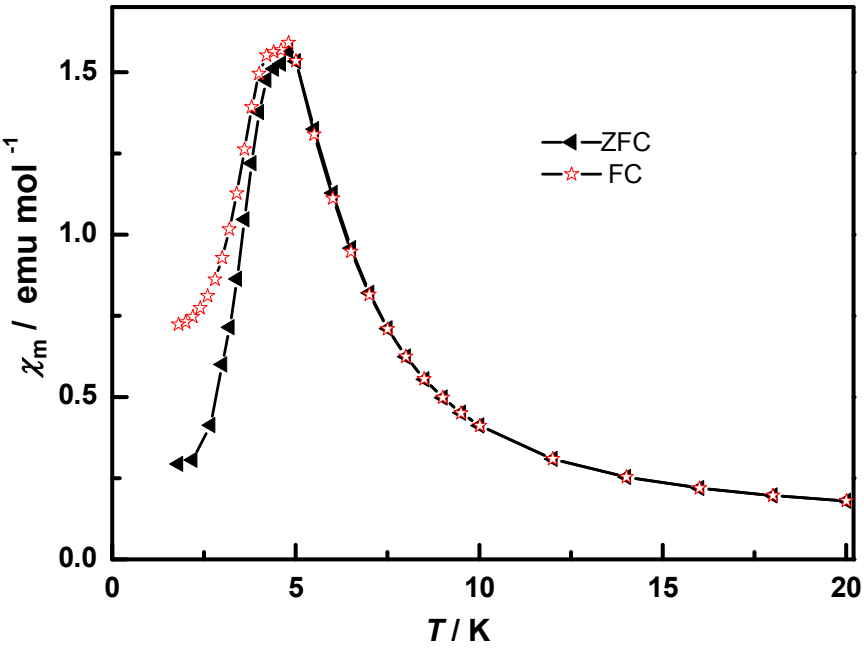


**Fig. S2** FC and ZFC ($H_{dc}$ = 100 Oe) magnetization for **1.**

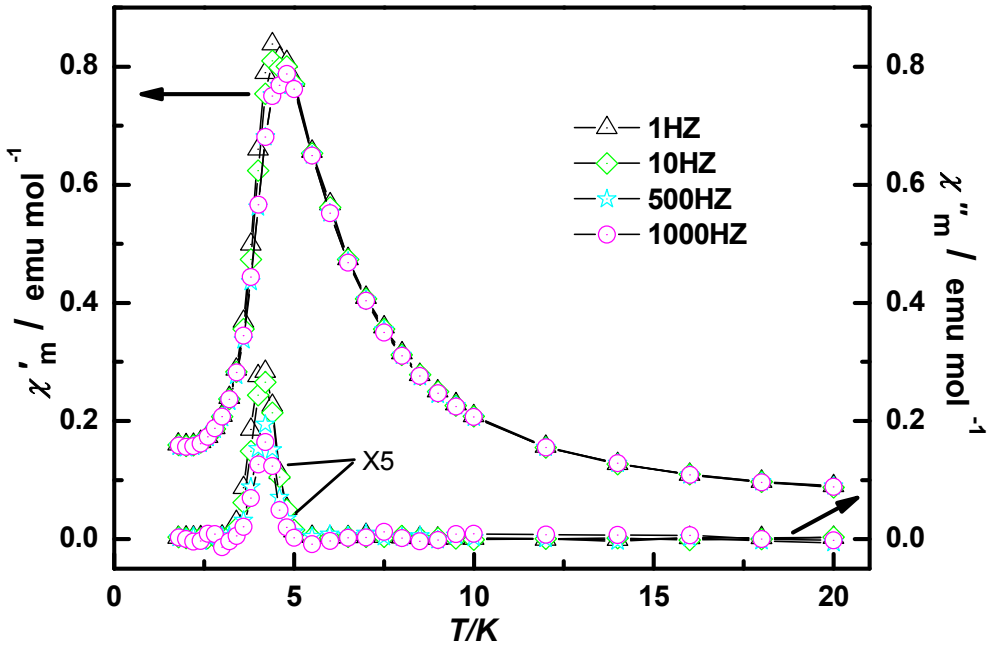


**Fig. S3** Temperature dependence of ac susceptibility at various frequencies from 1.8 - 20 K. ($H_{dc}$ = 0 Oe, $H_{ac}$ = 5 Oe).

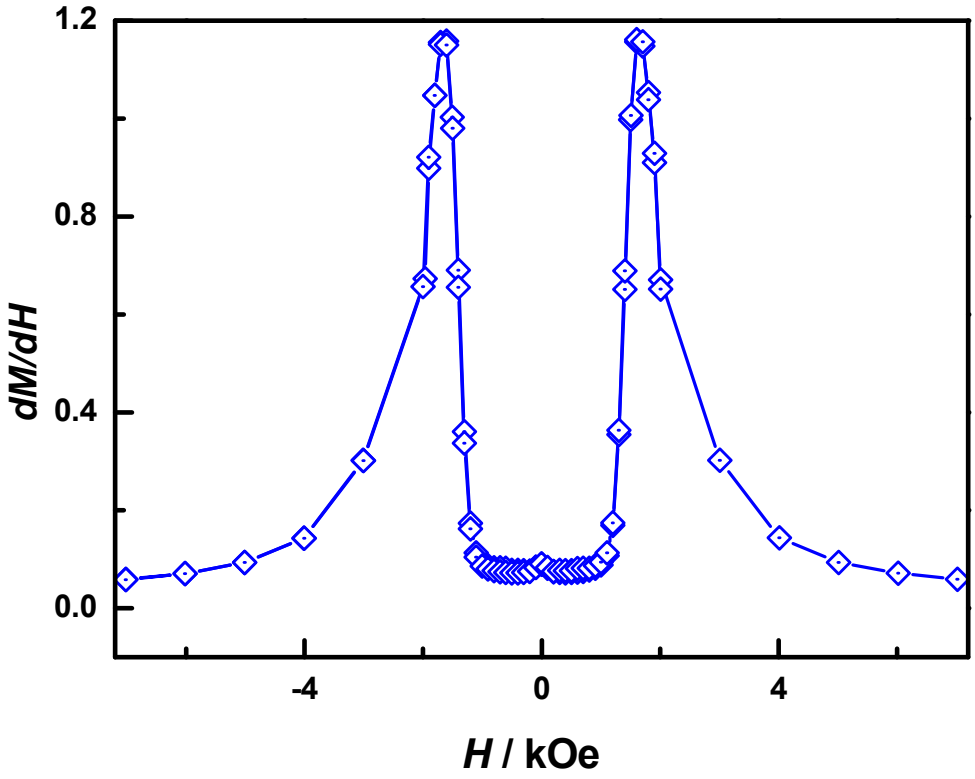


**Fig. S4** Plot of *dM/dH vs. H* at at 1.8 K showing *Hc* = 2 kOe

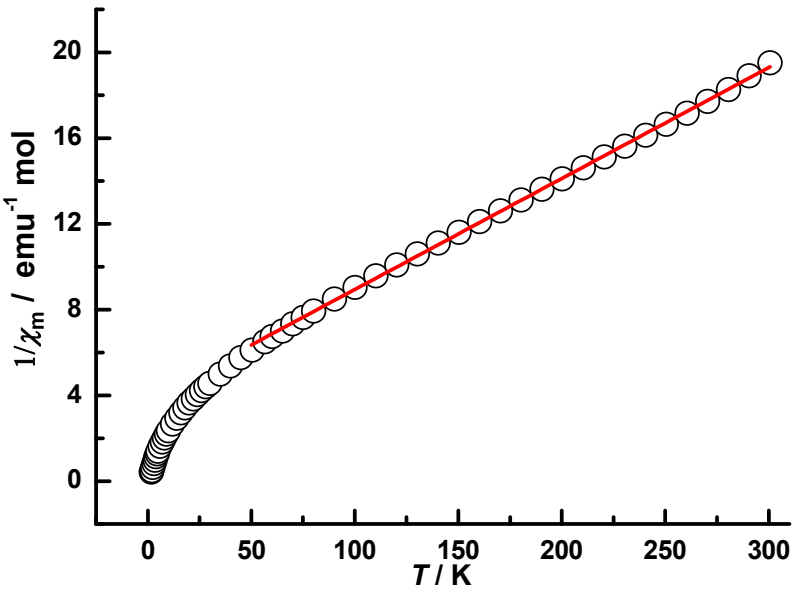


**Fig. S5** $1/\chi_m$ vs *T* plot for **2** above 60 K is exactly linear following the Curie-Weiss law with C = 19.32 emu K $mol^{-1}$ and θ = -72.68.

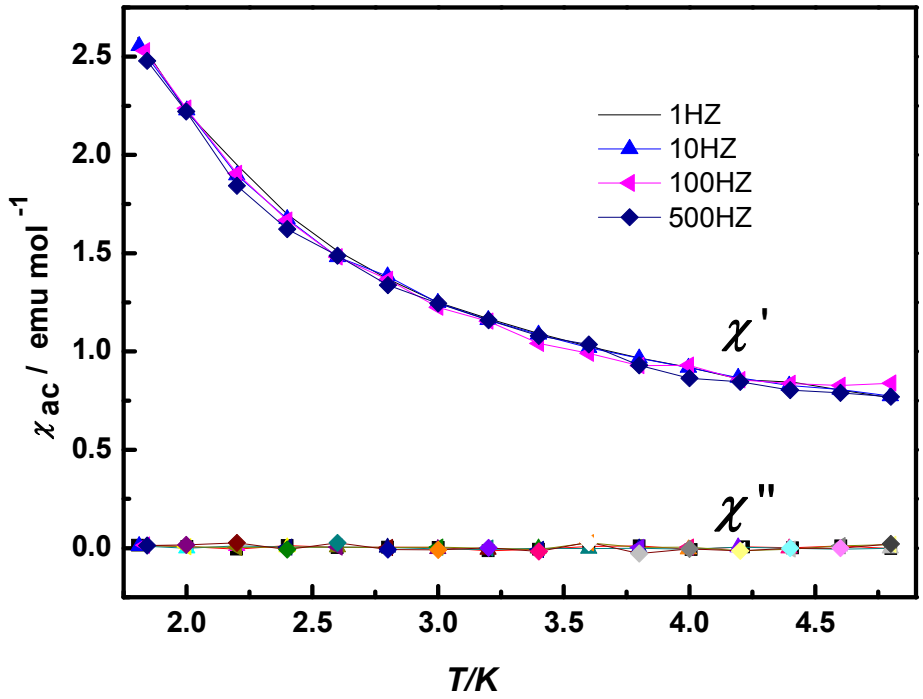


**Fig. S6** Temperature dependence of ac susceptibility at various frequencies from 1.8 - 5 K. ($H_{dc}$ = 0 Oe, $H_{ac}$ = 5 Oe).

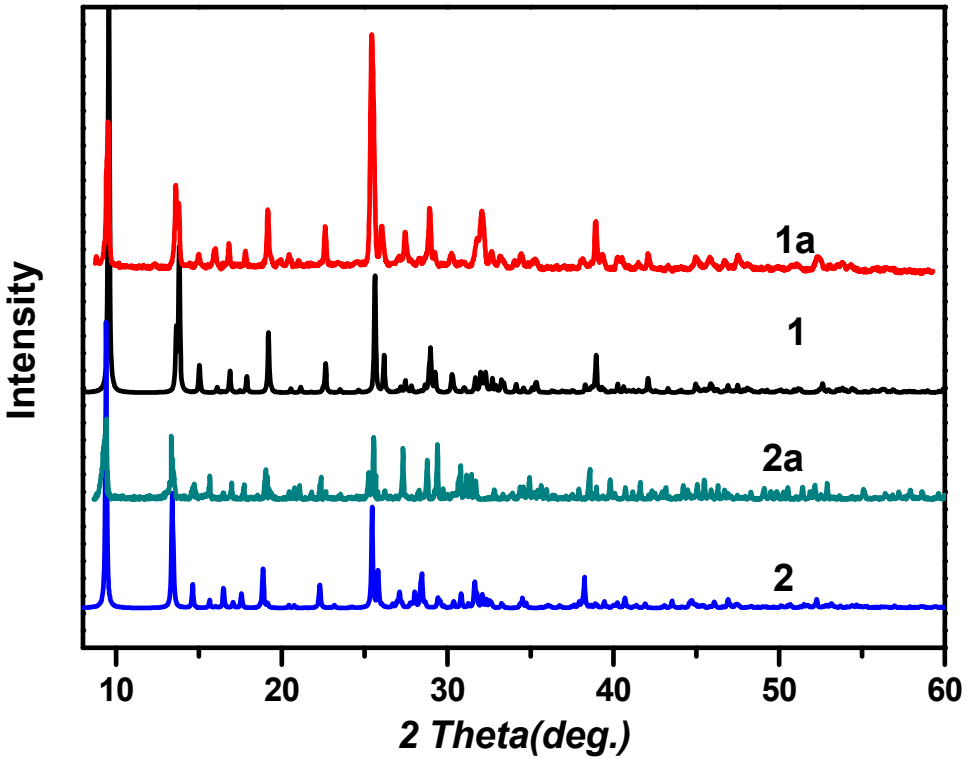


**Fig. S7** Powder XRD pattern of the product obtained from the experiment (**1a-2a)** associated with the simulated XRD pattern from the single crystal X-ray data (**1-2**).

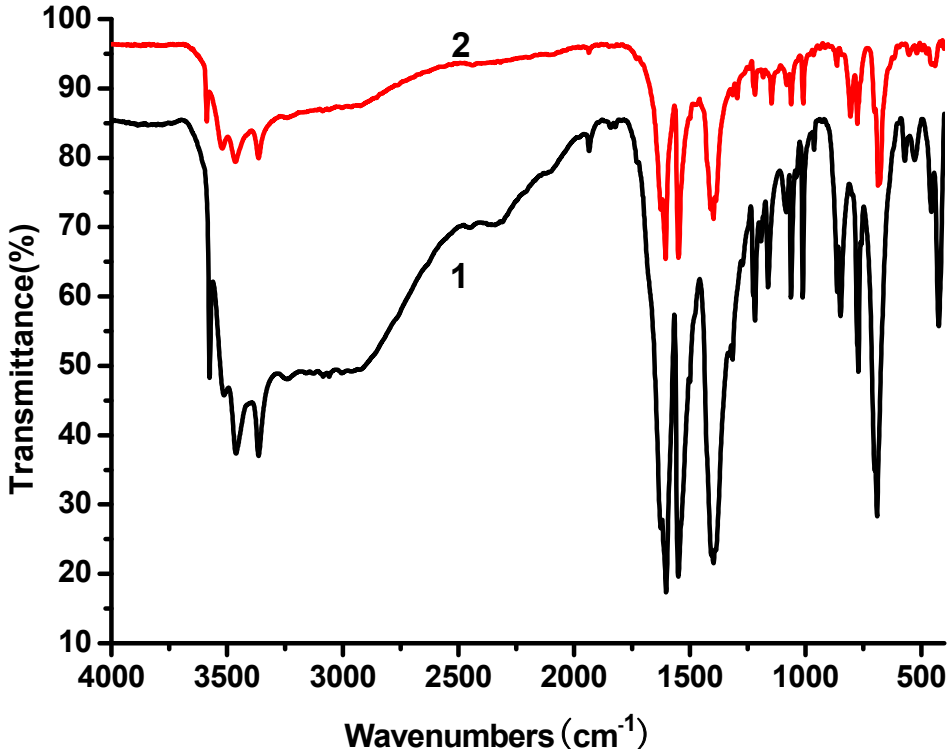


**Fig. S8** Infrared spectra of compounds **1-2**.

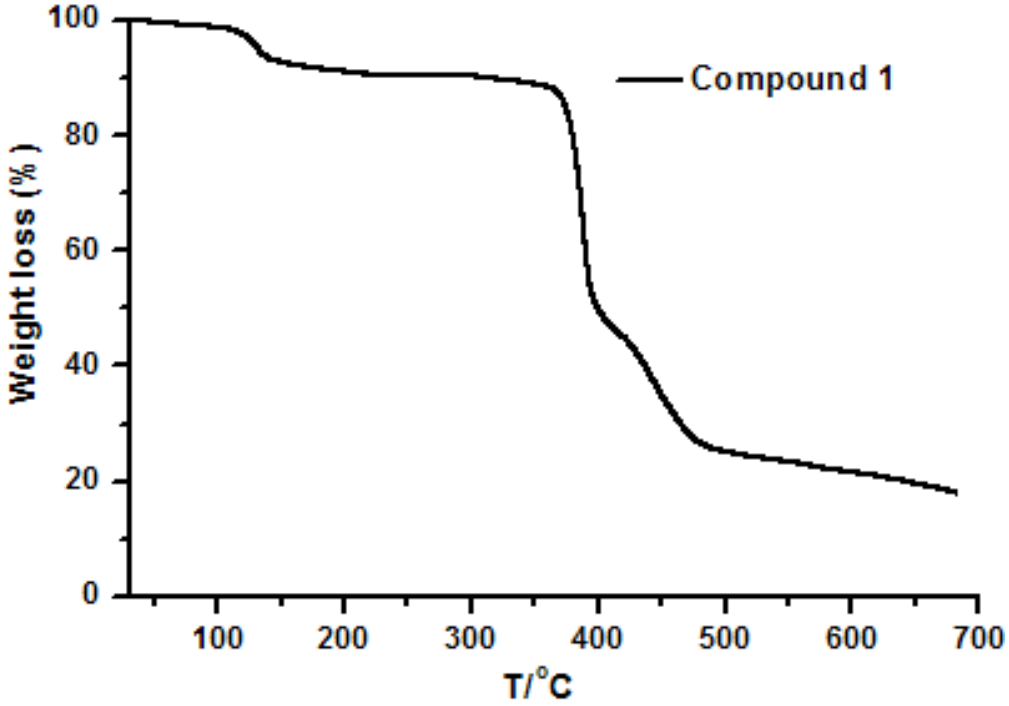


**Fig. S9** TGA diagram of compound **1**.

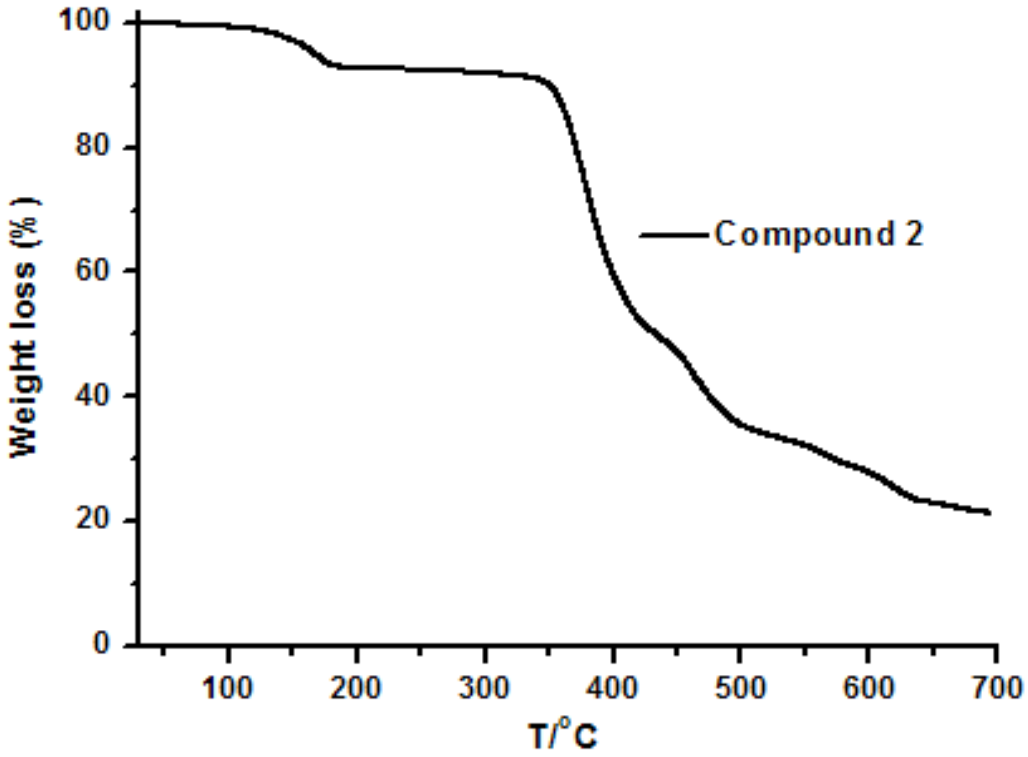


**Fig. S10** TGA diagram of compound **2**.

**Table S1. Bond lengths [Å] and angles [°] for 1-2.**

| | | | |
|---|---|---|---|
| **Complex 1[a]** | | | |
| Co(1)-OW1 | 2.044(3) | Co(1)-O(1) | 2.116(3) |
| Co(1)-N(3) | 2.200(4) | Co(1)-N(6)#1 | 2.202(4) |
| Co(1)-N(2) | 2.223(4) | Co(1)-N(1) | 2.247(4) |
| Co(2)-O(1) | 2.068(3) | Co(2)-O(1)#2 | 2.071(3) |
| Co(2)-O(2)#3 | 2.081(3) | Co(2)-O(3)#4 | 2.090(3) |
| Co(2)-N(5)#5 | 2.125(4) | Co(2)-N(4) | 2.130(4) |
| O(1)-Co(1)-N(6)#1 | 86.76(11) | N(3)-Co(1)-N(6)#1 | 173.26(13) |
| N(3)-Co(1)-N(2) | 91.11(13) | N(6)#1-Co(1)-N(2) | 88.45(13) |
| N(3)-Co(1)-N(1) | 90.37(13) | N(6)#1-Co(1)-N(1) | 90.52(13) |
| N(2)-Co(1)-N(1) | 175.97(14) | O(1)-Co(2)-O(1)#2 | 179.38(6) |
| O(1)-Co(2)-O(2)#3 | 88.01(12) | O(1)#2-Co(2)-O(2)#3 | 92.24(12) |
| O(1)-Co(2)-O(3)#4 | 92.71(12) | O(1)#2-Co(2)-O(3)#4 | 87.05(12) |
| O(2)#3-Co(2)-O(3)#4 | 178.60(13) | N(5)#5-Co(2)-N(4) | 179.50(13) |
| Co(2)-O(1)-Co(2)#5 | 106.05(13) | Co(2)-O(1)-Co(1) | 120.58(13) |
| Co(2)#5-O(1)-Co(1) | 119.69(13) | OW1-Co(1)-O(1) | 172.15(12) |
| | | | |
| **Complex 2[b]** | | | |
| Mn(1)-OW1 | 2.121(3) | Mn(1)-O(5) | 2.194(3) |
| Mn(1)-N(2) | 2.304(3) | Mn(1)-N(4)#1 | 2.315(3) |
| Mn(1)-N(7) | 2.316(3) | Mn(1)-N(1) | 2.376(3) |
| Mn(2)-O(5) | 2.139(3) | Mn(2)-O(5)#2 | 2.144(3) |
| Mn(2)-O(2)#3 | 2.159(3) | Mn(2)-O(1)#4 | 2.170(3) |
| Mn(2)-N(6) | 2.277(3) | Mn(2)-N(5)#5 | 2.285(3) |
| OW1-Mn(1)-O(5) | 169.93(11) | N(2)-Mn(1)-N(4)#1 | 93.15(11) |
| N(2)-Mn(1)-N(7) | 88.34(11) | N(4)#1-Mn(1)-N(7) | 174.76(12) |
| N(2)-Mn(1)-N(1) | 175.90(12) | N(4)#1-Mn(1)-N(1) | 90.00(11) |
| N(7)-Mn(1)-N(1) | 88.75(11) | O(5)-Mn(2)-O(5)#2 | 179.57(8) |
| O(2)#3-Mn(2)-O(1)#4 | 179.43(12) | O(5)#2-Mn(2)-O(1)#4 | 92.96(11) |
| Mn(2)-O(5)-Mn(2)#5 | 105.89(11) | N(6)-Mn(2)-N(5)#5 | 179.51(11) |
| Mn(2)#5-O(5)-Mn(1) | 119.77(11) | Mn(2)-O(5)-Mn(1) | 118.68(11) |

Symmetry code:

(a) #1 x,y+1,z; #2 -x+1/2,y-1/2,-z+1/2; #3 -x+3/2,y-1/2,-z+1/2; #4 x-1,y,z; #5 -x+1/2,y+1/2,-z+1/2; #6 -x+3/2,y+1/2,-z+1/2.

(b): #1 x, y-1, z; #2 -x+1/2, y+1/2, -z+1/2; #3 x-1, y, z; #4 -x+3/2, y+1/2, -z+1/2; #5 -x+1/2, y-1/2,-z+1/2.