Supported material

Second ligands-assisted structural variation of entangled coordination polymers with polycatenated or polythreaded features

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Magnetic:

It is well known that magnetic research for the high spin Co system is complicated and difficult because the strong spin-orbital coupling. And from a magnetic point of view, the long oba cannot favor any noticeable magnetic coupling. Thus, the whole system for **5** can be considered magnetically as one-dimensional. The 1D infinite metal chain consists of repeated linear Co^{II}_3 unit (Fig. S6). Co1 and Co2 (intratrimer) are bridged by two μ_2-η^2 and one *syn–syn*–μ_2-η^1:η^1 mode of carboxylate groups. Co1 and Co1 (intertrimer) are bridged by two *syn–syn*–μ_2-η^1:η^2 mode of carboxylate groups and one μ_2-η^2 water molecule. To get a reasonable estimate of the spin–orbit coupling, a simple phenomenological equation is introduced as shown below. [1]

$$\chi_m T = A\exp(-E_1/kT) + B\exp(-E_2/kT) \quad (1)$$

In equation (1), $A + B$ equals the Curie constant, and E_1 and E_2 represent the activation energies corresponding to the spin–orbit coupling and antiferromagnetic exchange interactions, respectively. The best fit of the experimental data gives $A + B$ = 16.02 cm^3Kmol^{-1}, E_1/k = +57.35 K, E_2/k = -9.6 K (Fig. S7). The values for E_1/k = +57.35 K is small than those given in the literature for both the effects of spin-orbit coupling and site distortion. [2] The negative values of E_2 indicate that dominant antiferromagnetic interactions between Co^{II} ions exist in **5**.

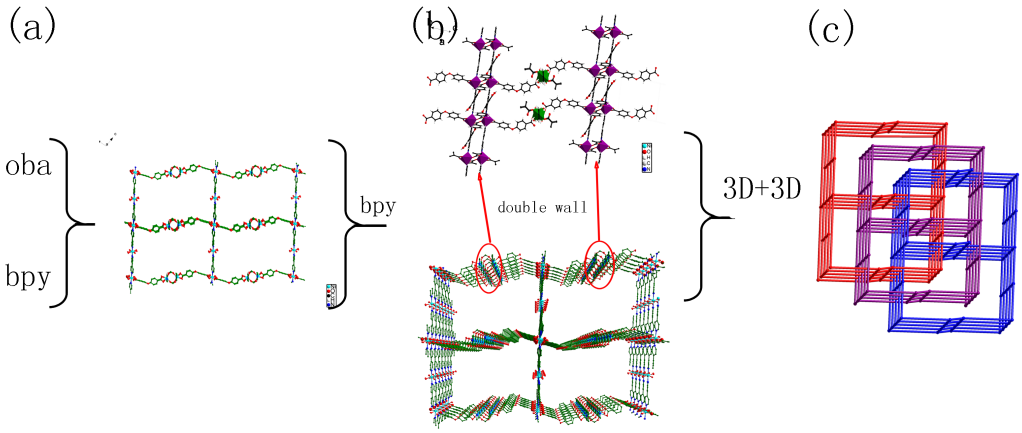

Figure s1. the sql layer of 2.

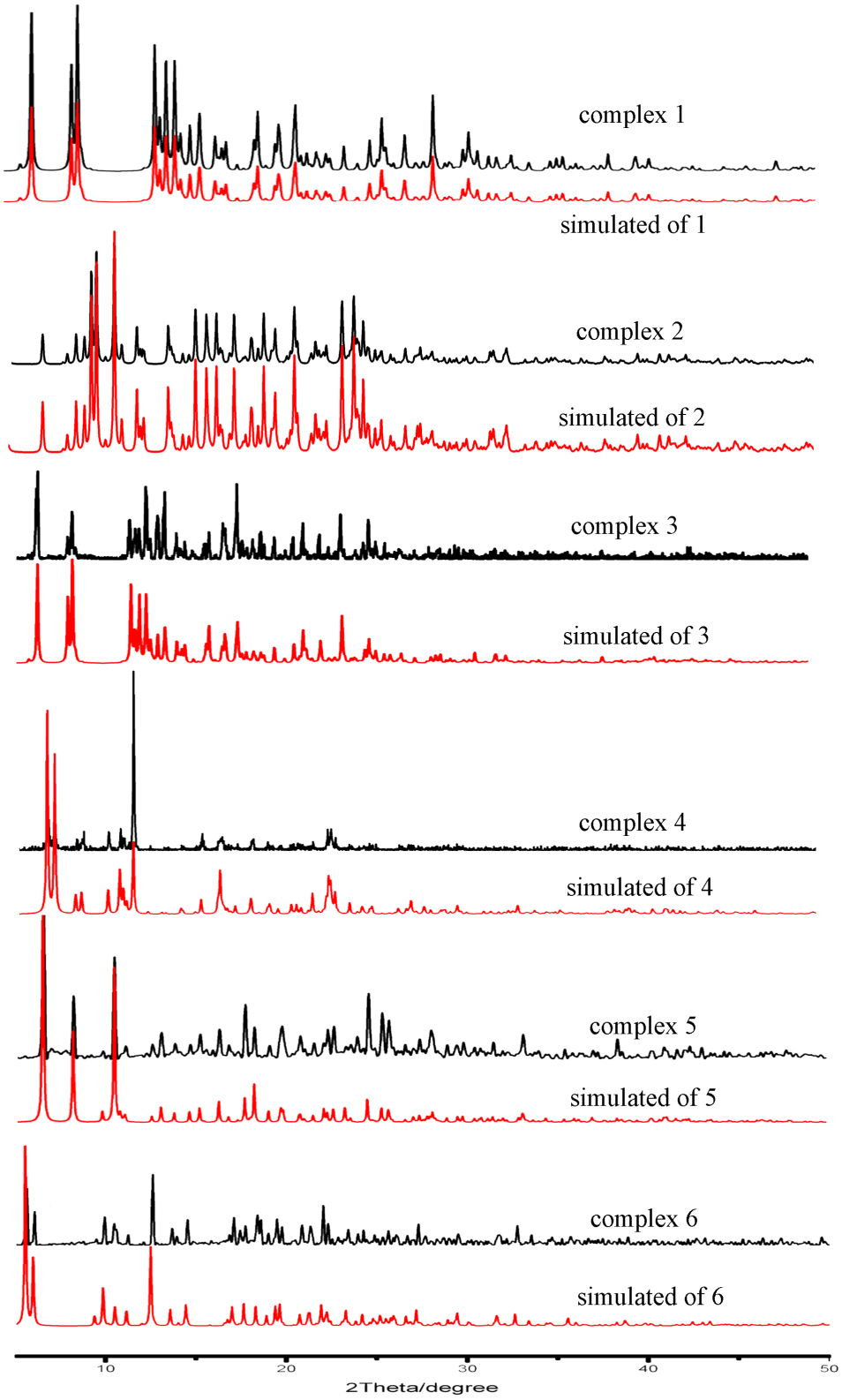

Fig. S1. The xrd pattern of **1-6**.

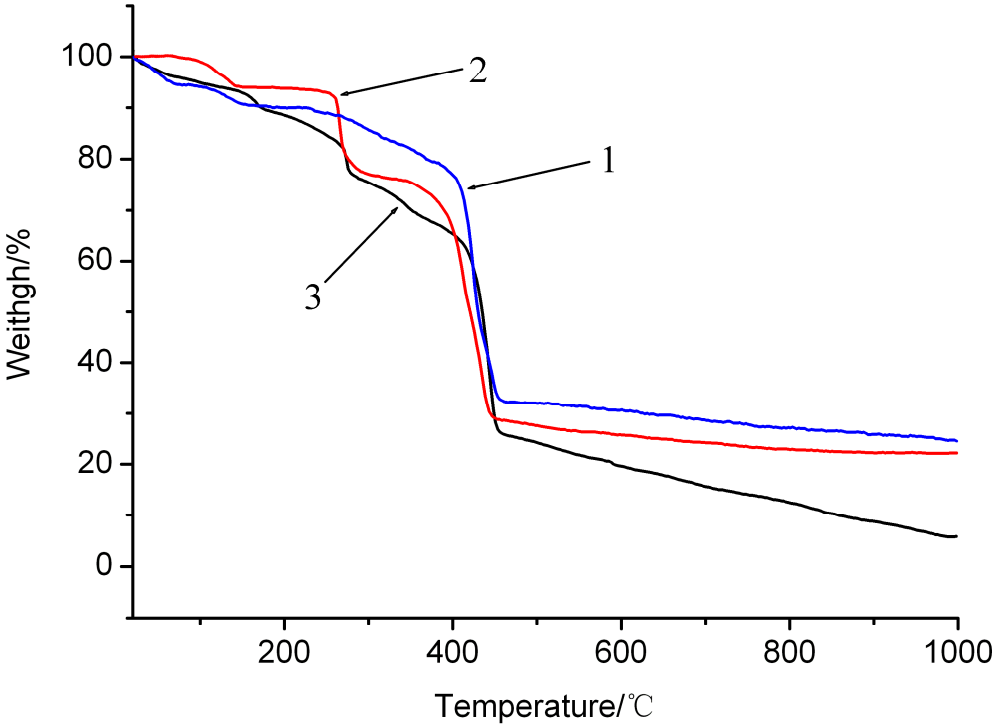

Fig. S2. The TG curves of **1-3**.

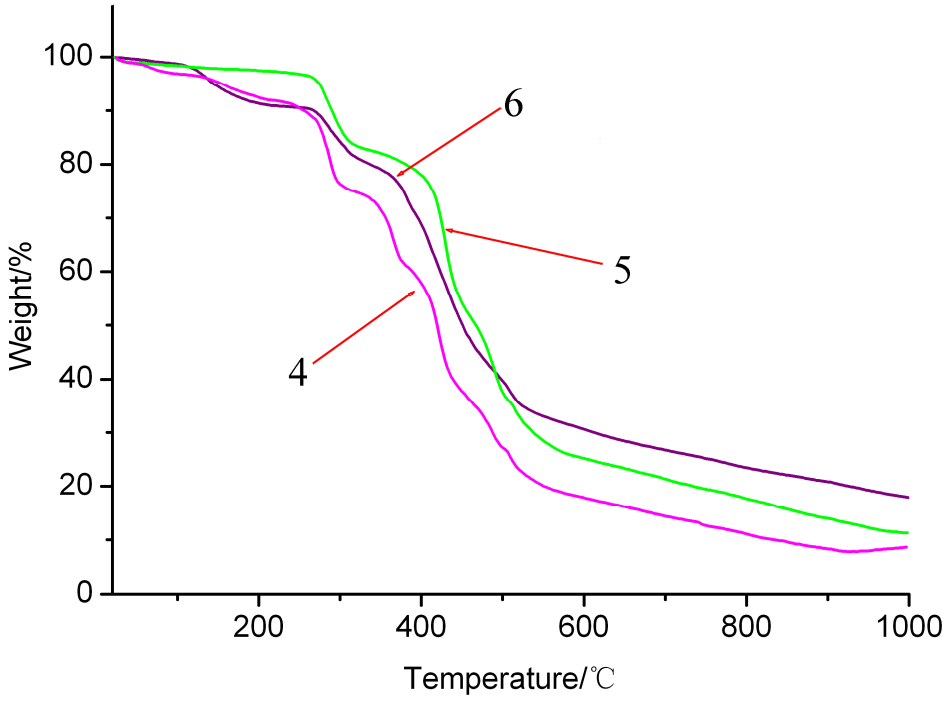

Fig. S3. The TG curves of **4-6**.

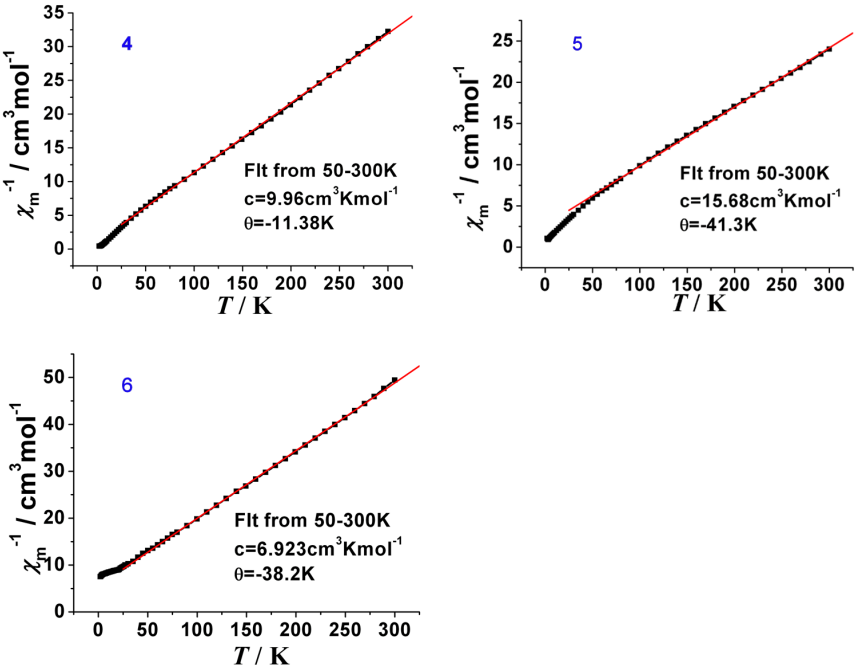

Fig S4. Plots of χ^{-1} vs. *T* and the fit of Curie-Weiss law (red curve) of **4-6**.

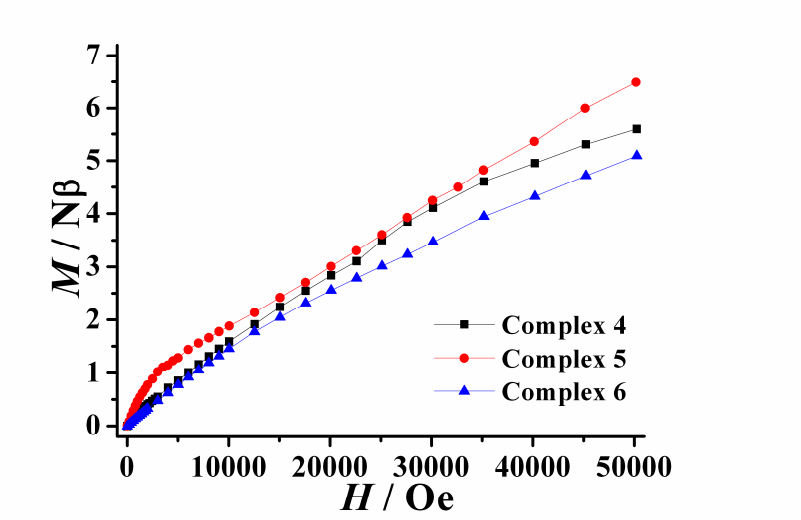

Fig S5. Field dependence of the magnetization of **4-6** at 2 K.

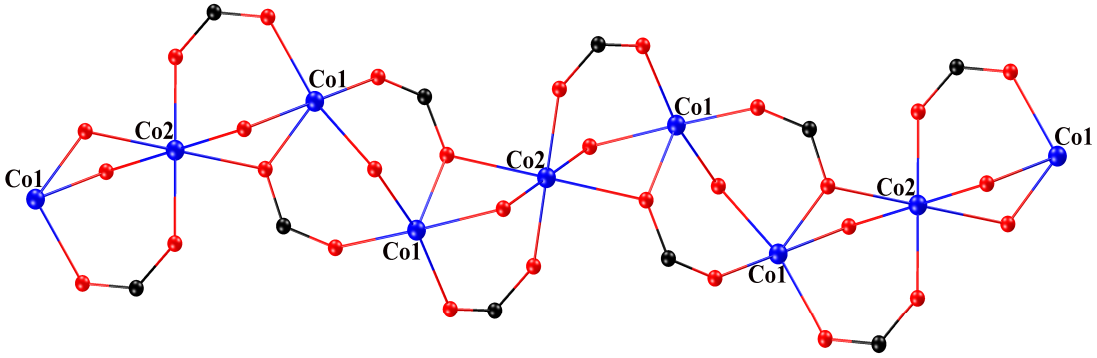

Fig S6. 1D metal chain of **5**.

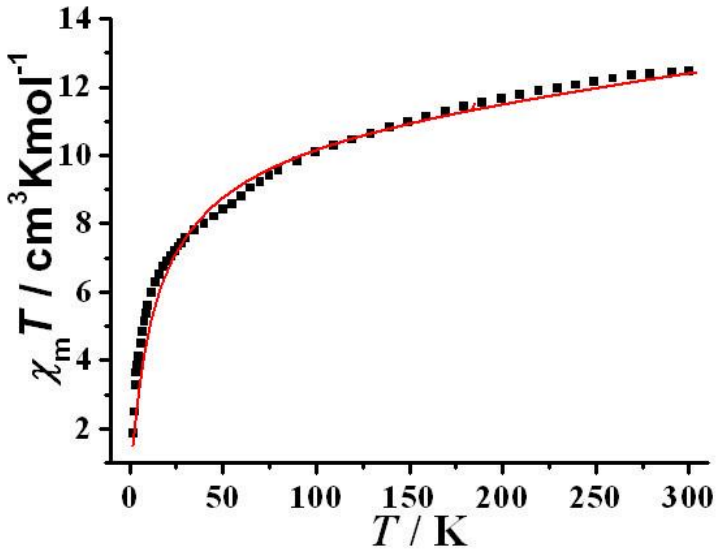

Fig S7. Temperature dependence of magnetic susceptibilities in the forms of $\chi_m T$ at an applied field of 1 kOe and red solid line shows the best fit at 2–300 K.

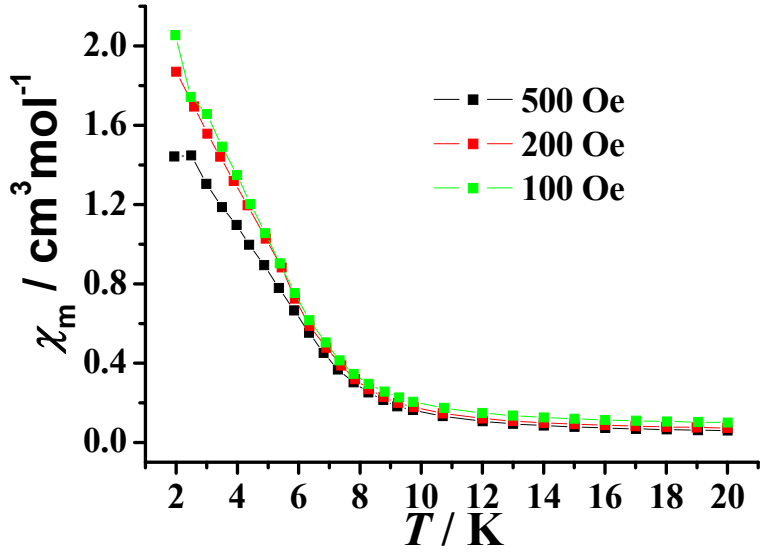

Fig. S8. Temperature dependence of χ_m at different fields of **4**.

[1] S.J. Liu, L. Xue, T.L. Hu, X.H. Bu, *Dalton Trans*., 2012, 41, 6813.
[2]J.M. Rueff, C. Paulsen, J. Souletie, M. Drillon, P. Rabu, *J. Solid State Chem*., 2005, 7, 431.