Electronic Supplementary Information (ESI)

Structure diversities of ten entangled coordination polymers assembled from reactions of Co(II) or Ni(II) salts with 5-(pyridin-4-yl)isophthalic acid in the absence or presence of auxiliary N-donor ligands

Fei-Long Hu, *ab* Mi Yan, *b* Yun-Qiong Gu, *b* Li-Gang Zhu, *b* Sheng-Lan Yang, *b* Han Wei, *b* and Jian-Ping Lang*a*

*a* College of Chemistry, Chemical Engineering and Materials Science, Soochow University, Suzhou 215123, Jiangsu, P. R. China.

*b* College of Chemistry and Material, Yulin Normal University, Yulin 537000, P. R. China
Table of Contents

Fig. S1. (a) The 4-fold interpenetrating structure of 10. (b) The pillar which formed by the short and/or long pillars. .......................................................... S3

Fig. S2. PXRD patterns for 1-4. (a) simulated (black) and single-phase polycrystalline sample (red) of 1. (b) simulated (black) and single-phase polycrystalline sample (red) of 2. (c) simulated (black) and single-phase polycrystalline sample (red) of 3. (d) simulated (black) and single-phase polycrystalline sample (red) of 4. ........ S3

Fig. S3. PXRD patterns for 5-8. (a) simulated (black) and single-phase polycrystalline sample (red) of 5. (b) simulated (black) and single-phase polycrystalline sample (red) of 6. (c) simulated (black) and single-phase polycrystalline sample (red) of 7. (d) simulated (black) and single-phase polycrystalline sample (red) of 8. ........ S4

Fig. S4. PXRD patterns for 8-10. (a) simulated (black) and single-phase polycrystalline sample (red) of 9. (b) simulated (black) and single-phase polycrystalline sample (red) of 10. .......................................................... S4

Fig. S5. The TGA curves for compounds 1-3. .......................................................... S5

Fig. S6. The TGA curves for compounds 4-7. .......................................................... S5

Fig. S7. The TGA curves for compounds 8-10. .......................................................... S6

Magnetic properies .......................................................... S7

Fig. S8. (a) $\chi_m T$ vs. T curve of 3 under 0.1 T applied field. (b) Field dependence of the magnetization of 3 at 2K. (c) Plot of $\chi$ vs. T and the fit of Curie-Weiss law (red curve) of 3. (d) 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. .......................................................... S7

S2
Fig. S1. (a) The 4-fold interpenetrating structure of 10. (b) The pillar which formed by the short and/or long pillars.

Fig. S2. PXRD patterns for 1-4. (a) simulated (black) and single-phase polycrystalline sample (red) of 1. (b) simulated (black) and single-phase polycrystalline sample (red) of 2. (c) simulated (black) and single-phase polycrystalline sample (red) of 3. (d) simulated (black) and single-phase polycrystalline sample (red) of 4.
Fig. S3. PXRD patterns for 5-8. (a) simulated (black) and single-phase polycrystalline sample (red) of 5. (b) simulated (black) and single-phase polycrystalline sample (red) of 6. (c) simulated (black) and single-phase polycrystalline sample (red) of 7. (d) simulated (black) and single-phase polycrystalline sample (red) of 8.

Fig. S4. PXRD patterns for 8-10. (a) simulated (black) and single-phase polycrystalline sample (red) of 9. (b) simulated (black) and single-phase polycrystalline sample (red) of 10.
Fig. S5. The TGA curves for compounds 1-3.

Fig. S6. The TGA curves for compounds 4-7.
Fig. S7. The TGA curves for compounds 8-10.
Magnetic properties

In order to further study the magnetic interactions in 3, the noncritical-scaling theory with the following simple phenomenological Eqn (1) was used to fit experimental data from 300 to 2K.

\[
\chi_m T = A \exp(-E_1/kT) + B \exp(-E_2/kT)
\]  

(1)

Here, A+B equals the high-temperature Curie constant for Co(II) cluster unit, and E1 and E2 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 = 9.1cm³Kmol⁻¹, E1/k=86.5K, E2/k=7.2K. These values indicate that dominant antiferromagnetic interactions between Co(II) ions exist in 3.

**Fig. S8.** (a) \(\chi_m T\) vs. T curve of 3 under 0.1 T applied field. (b) Field dependence of the magnetization of 3 at 2K. (c) Plot of \(\chi^1\) vs. T and the fit of Curie-Weiss law (red curve) of 3. (d) 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.

Electronic Supplementary Material (ESI) for CrystEngComm

This journal is © The Royal Society of Chemistry 2013