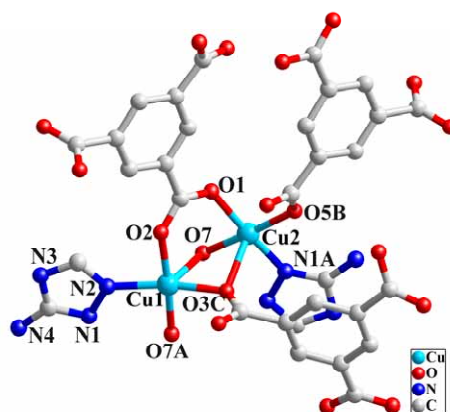


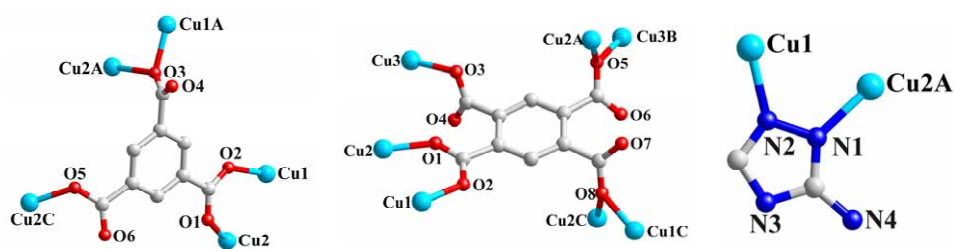
## Two unique antiferromagnetic 3D frameworks with unusual $\text{Cu}^{\text{II}}_4$ cluster and alternate $\text{Cu}^{\text{II}}_4 + \text{Cu}^{\text{II}}_1$ structural motif tuned by aromatic polycarboxylate coligand

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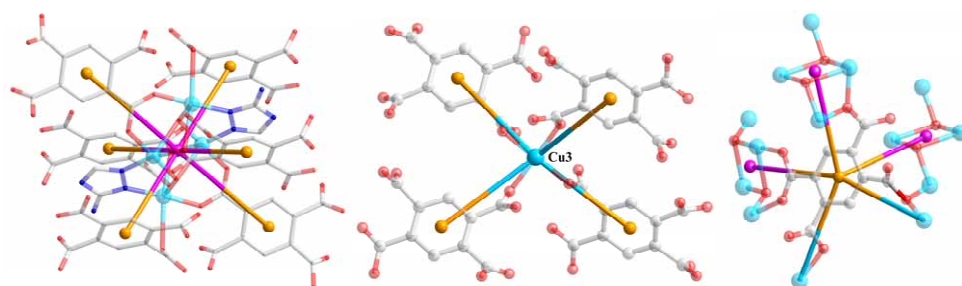
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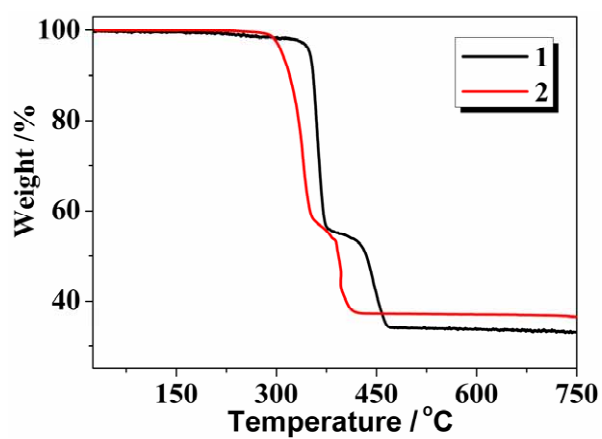
**Fig. S1.** Local coordination environments of  $\text{Cu}^{\text{II}}$  ions in **1** (Hydrogen atoms were omitted for clarity, symmetry codes: A =  $2 - x, 2 - y, 1 - z$ ; B =  $1 - x, 2 - y, 1 - z$ ; C =  $x, 2.5 - y, z - 0.5$ ).



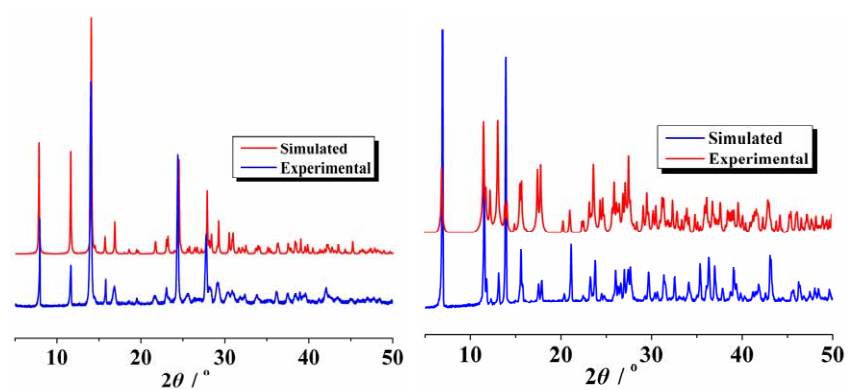
**Fig. S2.** Coordination modes of btc<sup>3-</sup>, btec<sup>4-</sup> and amtrz ligands in the both complexes.



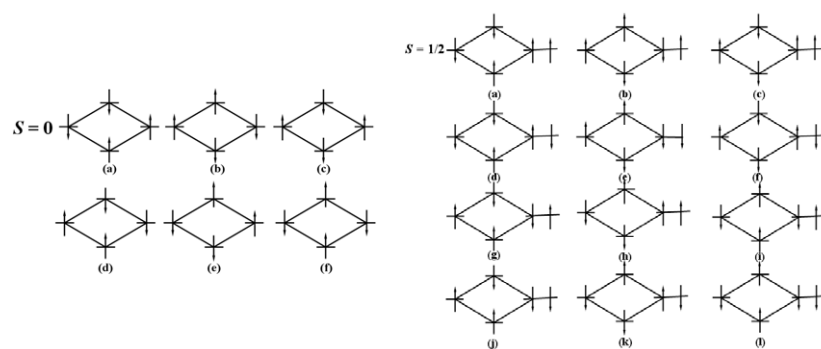
**Fig. S3.** The explanations for the 6-connected Cu<sup>II</sup><sub>4</sub> cluster, 4-connected Cu<sup>II</sup><sub>1</sub> core and 5-connected btec<sup>4-</sup> in **2**.



**Fig. S4.** TG-DTA curves for **1** and **2**, respectively.



**Fig. S5.** X-ray powder diffraction patterns for **1** (left) and **2** (right), respectively.



**Fig. S6.** Spin-coupling diagrams for the magnetic active structures in **1** (left) and **2** (right), respectively.