A Hybrid Cobalt Hydroxyacetate: Ionothermal Synthesis, 3-D Co-O-Co Connectivity and Spin Glass Behavior

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Synthesis of $[Co_3(OH)_2(Oac)_2]$ (**1**): A mixture of $Co(OAc)_2{\cdot}4H_2O$ (0.150g, 0.6mmol) [bmim][BF_4] (1.260g，1ml) were sealed and heated in a 15 mL Teflon-lined stainless steel autoclave at 180 °C for 5 days. After cooling to room temperature and washing with anhydrous ethanol. Purple block crystals were collected with ~75% yield. Anal. Calcd for **1:** $C_8H_{14}Co_3O_{10}$: C, 21.50; H, 3.16, Co, 39.55, O. 35.79. Found: C, 21.23; H, 3.06,Co, 39.98. IR(KBr, $cm^{-}1$): 3585w, 3427m, 3027w, 2995w, 2856w, 2766w, 1575s, 1424s, 1345s, 1033s, 954w, 688s, 611s.

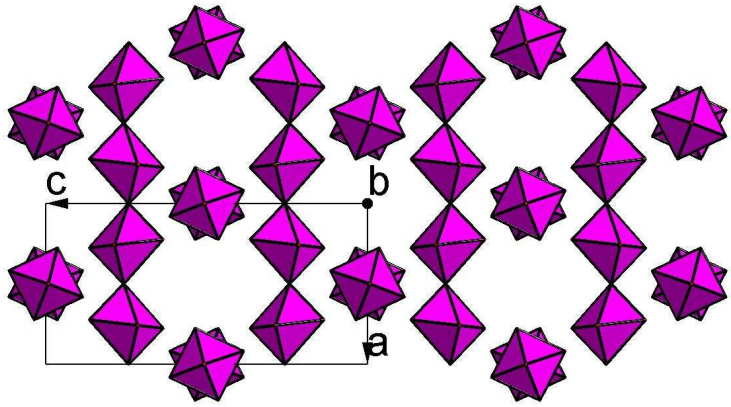

Figure S1 View of perpendicular arrangement of the vertex-sharing octahedral $(CoO_5)_\infty$ chains in *a*- and *b*-axis directions.

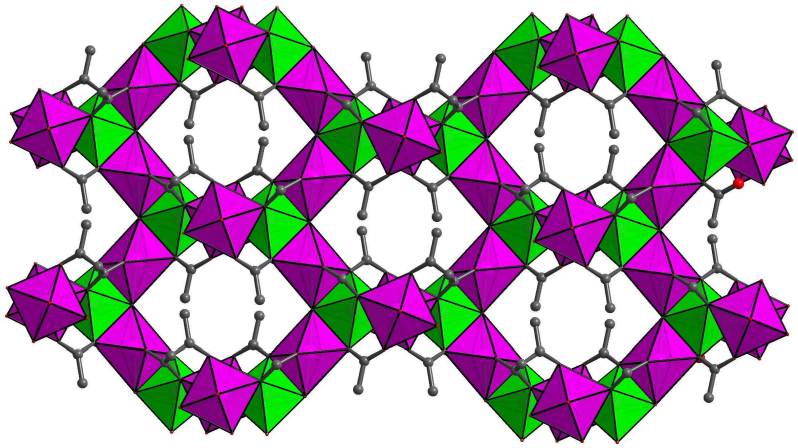

Figure S2 polyhedral view of three-dimensional structure formed by connection of

vertex-sharing octahedral chains via Co(1) atoms. Green and purple octahedra represent Co(1) and Co(2), respectively.

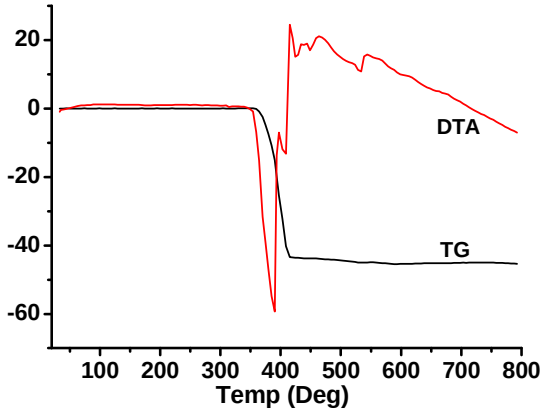

Figure S3 TGA and DTA curves of **1** in air at the heating rate of 10°C per min.

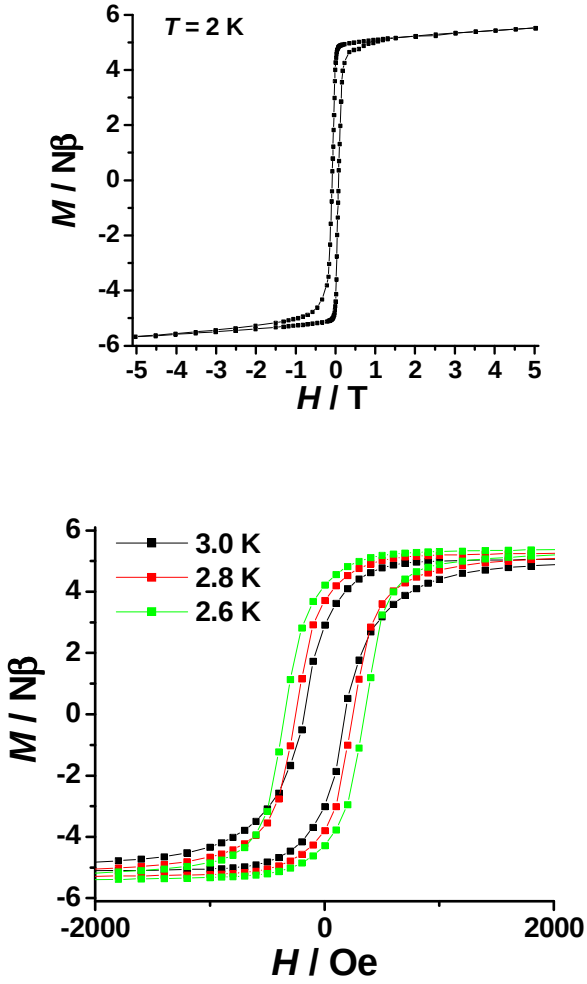

Figure S4. The magnetic hysteresis loop of **1** measured at 2, 2.6, 2.8 and 3 K**.**