

## Co(II) coordination polymers with co-ligand dependent dinuclear to tetranuclear core : spin-canting, weak ferromagnetic, and antiferromagnetic behavior.

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Four new Co(II) containing coordination polymers have been synthesized using an ether bridged tricarboxylic acid ligand, *o*-cpiaH<sub>3</sub> (5-(2-carboxy-phenoxy)-isophthalic acid). This ligand readily reacts with CoCl<sub>2</sub>·6H<sub>2</sub>O in the presence of different nitrogen donor ligands such as 1,10-phenanthroline (phen), 4,4'-bipyridyl (bpy), 4,4'-azopyridine (apy), and 1,4-bis(4-pyridinylmethyl)piperazine (bpmp) under hydrothermal conditions to afford three 3D and one 2D coordination polymers, {Co<sub>3</sub>(*o*-cpia)<sub>2</sub>(phen)(H<sub>2</sub>O)·5H<sub>2</sub>O}<sub>n</sub> (**1**), {Co<sub>1.5</sub>(*o*-cpia)(bpy)}<sub>n</sub> (**2**), {Co<sub>2</sub>(*o*-cpia)(OH)(apy)<sub>0.5</sub>}<sub>n</sub> (**3**), and {Co(*o*-cpiaH)(bpmp)<sub>0.5</sub>}<sub>n</sub> (**4**). Single crystal X-ray studies show that these coordination polymers contain homometallic clusters varying from dimeric to tetrameric depending upon the co-ligand used. In complexes **1** and **2**, Co(II) ions form an angular and linear trimeric unit that extends along all directions to generate an overall 3D structure. In contrast, **3** forms a 3D coordination polymer containing a tetranuclear Co(II) unit. When the distance between the two donor N atoms of the co-ligand is further increased as in **4**, a (4,4) net connected 2D coordination polymer results where the Co(II) ions form a dimeric paddle wheel unit. In addition to single-crystal X-ray crystallography, the complexes are also characterized by IR spectroscopy, thermogravimetry, and elemental analysis. Variable temperature magnetic susceptibility measurements on the complexes were carried out over the temperature range 1.72–300 K. Complex **1** exhibits ferromagnetic interactions due to uncompensated magnetic moments of the system leading to spin-canted antiferromagnetic behavior, while **2** and **3** show predominantly antiferromagnetic interactions. Complex **4** exhibits weak ferromagnetic behavior below 9 K.

### Adres publiczny

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Strona internetowa wydawcy

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