



Chromism, positional, conformational and structural isomerism in a series of Zn(II) and Cd(II) coordination polymers based on methylated azine N,N'-donor linkers

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Abstract

Seven new coordination polymers $[\text{Zn}(\text{I})_2(4\text{-bpmhz})]_n$ (1), $[\text{Cd}(\text{I})_2(4\text{-bpmhz})]_n$ (2), $[\text{Zn}(\text{I})_2(3\text{-bpmhz})]_n$ (3), $[\text{Cd}(\text{I})_2(3\text{-bpmhz})_2]_n$ (4), $[\text{Zn}(\text{NO}_3)_2(\text{H}_2\text{O})_2(4\text{-bpmhz})]_n \cdot 0.5n(\text{EtOH})$ (5), $[\text{Cd}(\text{NO}_3)_2(4\text{-bpmhz})_{3/2}(\text{MeOH})]_n \cdot 0.5n\text{H}_2\text{O}$ (6) and $[\text{Zn}(\text{NO}_3)_2(3\text{-bpmhz})_2]_n$ (7) were prepared following the reactions of the zinc and cadmium iodide or nitrate salts with the methylated azine ligands of the bis-monodentate N,N'-donor type, 1,2-bis(1-(pyridin-4-yl)ethylidene)hydrazine (4-bpmhz) and 1,2-bis(1-(pyridin-3-yl)ethylidene)hydrazine (3-bpmhz). The single-crystal X-ray diffraction studies show that compounds 1–5, and 7 display 1D chain structures, while compound 6 shows a 2D coordination network, and both 4-bpmhz and 3-bpmhz act as bidentate bridging ligands. The crystals 1 and 2 are isomorphous, and differ by the metal cation only. The single coordination chains in 1–3 have zigzag structures; they are linear in 5, while 4 and 7 display similar double-chain structures. The crystal packing in 5 and 6 provides cavities occupied by solvent molecules, ethanol and water. The compounds were characterized in the solid state and in solution by spectroscopic (FTIR, UV–Vis, NMR) methods; the solid state emissive properties were studied for all compounds, while their thermal stability and behaviour were investigated by thermogravimetry under inert atmosphere, while the thermochromism for several compounds was registered and discussed.

Keywords: azine ligands, coordination polymers, crystal structure, spectroscopic studies, conformational isomerism, thermal stability

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