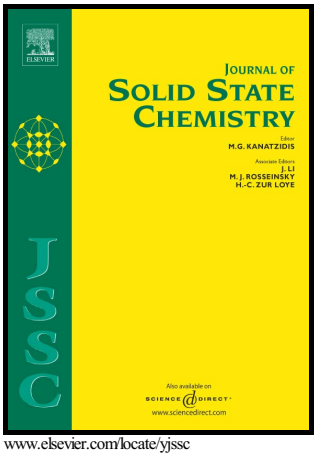

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Self-assembly of Zn/Cd-coordination polymers based on 3,3′,4,4′-biphenyltetracarboxylic acid and N-donor ligands and luminescence sensing of Fe^{3+} ions

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Abstract:

Two new d^{10} configuration coordination polymers based on H_4bpta (H_4bpta = 3,3′,4,4′-biphenyltetracarboxylic acid) and N-donor ligands, namely $[Zn_2(1,3\text{-bimb})_2(bpta)]_n$ (**1**) and $[Cd_2(1,3\text{-bimb})(bpta)(H_2O)]_n \cdot 0.5nH_2O$ (**2**) (1,3-bimb = 1,3-bis((1H-imidazol-1-yl)methyl)benzene), have been obtained under solvothermal conditions. The $bpta^{4-}$ ligands show various coordination modes due to the different radiuses of metal ions in structures **1** and **2**. Compound **1** is a 3D network built up of 4-connected $bpta^{4-}$ and 1,3-bimb ligands bonding with Zn^{2+} ions in monodentate modes. Compound **2** also exhibits a 3D structure formed through H_4bpta and 1,3-bimb linkers cross-linking the $[Cd_3(\mu\text{-}COO)_2]^{2+}$ secondary-building units (SBUs), in which the carboxylate groups can adopt three coordination modes with chelating, μ_2-O and *syn–syn* bridging types. In addition, different 1D zigzag chains (–Zn–(1,3-bimb)–Zn– for **1**, and –Cd–(1,3-bimb)–Cd–(μ-O)–Cd– for **2**) are formed by the 1,3-bimb ligands with *trans*-conformation linking metal ions. The fluorescence properties of the free ligands, **1** and **2** have been investigated carefully, and compound **2** displays highly selective and sensitive sensing for Fe^{3+} ions in DMF solution.