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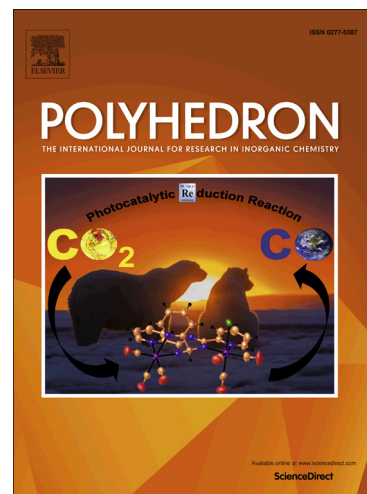
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**Effect of solvents and metal ions on the structural diversity of coordination polymers based on a dipyridylamide ligand: Construction, fluorescent and photocatalytic properties**

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**Abstract**

Five new Ni<sup>II</sup>/Cd<sup>II</sup>/Co<sup>II</sup> coordination polymers (CPs), namely [Ni(3-pna)(mip)]·H<sub>2</sub>O (1), [Ni(3-pna)(mip)(H<sub>2</sub>O)]·4H<sub>2</sub>O (2), [Cd<sub>2</sub>(3-pna)(mip)<sub>2</sub>(H<sub>2</sub>O)]·2H<sub>2</sub>O (3), [Cd(3-pna)(mip)]<sub>2</sub>·3H<sub>2</sub>O (4) and [Co(3-pna)(mip)]·H<sub>2</sub>O (5) [3-pna = 3-pyridylnicotinamide, H<sub>2</sub>mip = 5-methylisophthalic acid], have been hydrothermally or solvothermally synthesized. These complexes were characterized by IR spectroscopy, thermal analysis and single-crystal X-ray diffraction. Complexes 1-5, based on the same dipyridylamide (3-pna) and dicarboxylate (mip) ligands but using different solvent systems and metal ions, exhibit various structures. Complexes 1 and 5 feature isostructural 2D networks, which are very similar to that of 4. Their structures contain [M<sub>2</sub>(COO)<sub>2</sub>(3-pna)<sub>2</sub>]<sub>n</sub> (M = Ni, Cd or Co) ladder-like double chains. Complex 2 displays a 2D 4-connected grid structure consisting of 1D [Ni-3-pna]<sub>n</sub> and [Ni-mip]<sub>n</sub> chains. Complex 3 presents a new 3D framework constructed from Cd<sub>4</sub>(COO)<sub>4</sub> subunits and μ<sub>2</sub>-bridging 3-pna ligands. The versatile structures reveal the remarkable impact of the solvent systems on the architectures. Furthermore, the fluorescent behaviors of 3-4 and the photocatalytic properties of 1-5 under UV irradiation have been studied.

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