Research paper

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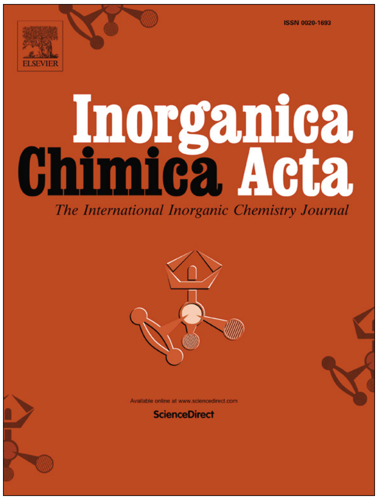

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A rational synthesis of ladder-like motif in zinc-methylphosphonate from a preformed coordination assembly

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Abstract

The study describes the synthesis of new hybrid zinc phosphonates, {Zn(O_3PMe)(4,4´-bipy)$_{0.5}$}.2H_2O (**2**), {Zn(O_3PMe)(1,2-bpe)$_{0.5}$}.H_2O (**3**) and Zn(O_3PMe)(Im) (**4**) [4,4´-bipyridine (4,4´-bipy), 1,2-bis(4-pyridyl)ethane (1,2-bpe) and imidazole (Im)] by hydro(solvo)thermal reaction (140-150 °C, 3 days) of a preformed coordination polymer, zinc bis(*O*-methyl methylphosphonate), Zn{OP(O)(OMe)Me}$_2$ (**1**) with an appropriate N-donor ligand. X-ray crystallographic studies reveal structural transformation of a linear chain zinc-phosphonate framework in **1** to a ladder motif in **2-4** which is constructed by corner sharing of ZnO_3N and CPO_3 tetrahedra. For **2** and **3**, the bifunctional N-donor ligands act as linkers to afford the formation of a layered structure. The lattice water molecules in **2** form an infinite array of cyclic tetramers *via* O-H···O2(P) hydrogen bonding interactions and occupy the interlayer region.

Keywords: zinc, methylphosphonate, ladder framework, hydro(solvo)thermal