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# Construction of five zinc coordination polymers with 4-substituted bis(trizole) and multicarboxylate ligands:

## Syntheses, structures and properties

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### ABSTRACT

Five zinc coordination polymers  $\{[\text{Zn}_2(\text{mtrb})_2(\text{btec})]\cdot\text{H}_2\text{O}\}_n$  (**1**),  $\{[\text{Zn}(\text{mtrb})(\text{Meip})]\cdot\text{H}_2\text{O}\}_n$  (**2**),  $[\text{Zn}(\text{mtrb})(\text{nip})]_n$  (**3**),  $\{[\text{Zn}(\text{mtrb})(\text{hip})]\cdot\text{H}_2\text{O}\}_n$  (**4**) and  $[\text{Zn}(\text{mtrb})(\text{nbdc})]_n$  (**5**) (mtrb = 1,3-bis(1,2,4-triazol-4-ylmethyl)benzene, btec = 1,2,4,5-benzenetetracarboxylate, Meip = 5-methylisophthalate, nip = 5-nitroisophthalate, hip = 5-hydroxyisophthalate, nbdc = 4-nitro-1,2-benzenedicarboxylate) were synthesized and characterized. **1** shows a (4,4)-connected self-catenated 3D network with a point symbol of  $\{6^2.8^4\}\{6^4.8^2\}_2$ , which belongs to the 4,4T32 topological type. **2** is a 1D chain structure containing  $[\text{Zn}(\text{mtrb})(\text{Meip})]$  20-membered cycle. **3** is a 1D chain structure containing  $[\text{Zn}(\text{nip})_2]$  16-membered cycle and  $[\text{Zn}(\text{mtrb})_2]$  24-membered cycle. **4** and **5** exhibit the undulated 2D (4,4) network. **1** is a highly sensitive and selective luminescence sensor for detection of  $\text{Cr}_2\text{O}_7^{2-}$ ,  $\text{CrO}_4^{2-}$  and  $\text{Fe}^{3+}$  in the aqueous solution. The detection limits for  $\text{Cr}_2\text{O}_7^{2-}$ ,  $\text{CrO}_4^{2-}$  and  $\text{Fe}^{3+}$  are 3.05  $\mu\text{M}$ , 5.72  $\mu\text{M}$ , and 6.28  $\mu\text{M}$ , respectively. The luminescence sensor is stable and can be recycled for detection at least five times. The possible quenching mechanisms were discussed.

*Keywords:* Coordination Polymer; Structure; Luminescent sensor; Detection of dichromate; Detection of ferric

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