(4,4)-Metal-Organic Framework Templated by 1,2,3,4-Butanetetracarboxylic Acid

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The design or selection of a suitable ligand containing certain features, such as flexibility, versatile binding modes and ability to form hydrogen bonds are crucial in the building of polymeric complexes. In this line we have chosen a new ligand, known as 1,2,3,4-butanetetracarboxylic acid, which possesses several interesting characteristics: (a) it has four carboxyl groups that after partial or full deprotonation, can be coordinated to the metal ions in a wide variety of coordination modes leading to high dimensional structures; (b) it can act not only as hydrogen-bond acceptor but also as hydrogen-bond donor, depending upon the number of deprotonated carboxylic groups; (c) its carboxylic groups may not lie in the same plane upon complexation to metal ions owing to geometrical constraints and thus, the ligand may connect metal ions in different directions; (d) finally, its conformation without any phenyl ring gives new possibilities of torsion angles in the structure. All these characteristics make the ligand an excellent candidate to build three-dimensional architectures.

Herein we report the synthesis and X-ray structure of several novel complexes with 1,2,3,4-butanetetracarboxylic acid $[M_2(but)(H_2O)_5] \cdot xH_2O$ with M = Transition metals.

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