

Two new Inorganic-organic Hybrids with Framework Gallium 1,2-ethylenediphosphonates Containing Pyridine

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This paper reports the synthesis of two new open framework gallium 1,2-ethylenediphosphonate materials which contain open zeolite like structure linked to form a completely novel type of open framework architecture with interconnecting channels. The new materials are templated by pyridine. As far as we know, the new structure $[\text{Ga}_3\text{F}(\text{O}_3\text{PC}_2\text{H}_4\text{PO}_3)_2] (\text{C}_5\text{H}_5\text{N})$ (**I**) is not currently known, and the nitrogen atom from the pyridine molecular has coordinated with metal gallium to form strong N-Ga bonds in an octahedral GaO_4FN unit, and pyridine molecules sit in the channels which are formed by building unit, connected by diphosphonate. The structure $[\text{Ga}_4\text{F}_2(\text{O}_3\text{PC}_2\text{H}_4\text{PO}_3)_3]^{2-} 2[\text{C}_5\text{H}_6\text{N}]^+$ (**II**) contains pyridine cations within the channels formed by building unit, connected by diphosphonate and has a stronger hydrogen contact between oxygen from diphosphonate and nitrogen from pyridine. The new structures (**I**) and (**II**) are good examples to present three dimensional structures with channels constructed by two novel building units connecting diphosphonate groups, and two kinds of pyridine moieties. One pyridine has linked through Ga-N bond and another is free as cation, which has been found in channels as a template. The two materials exhibit microporous frame-work materials with pyridine template within the pores.

Keywords: gallium 1,2-ethylenediphosphonate, framework, pyridine