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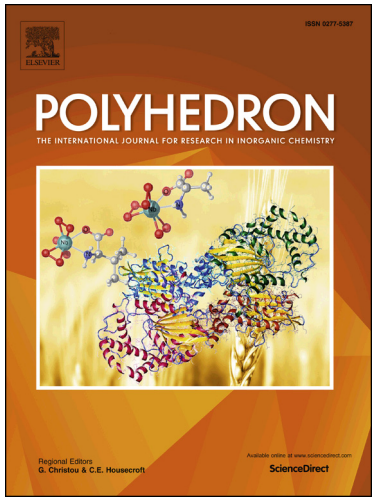

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Irreversible Conversion of Nanoporous Lead(II) Metal-Organic Framework to a Nonporous Coordination Polymer upon Thermal Treatment

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Abstract

The reaction between 1,4-benzenedicarboxylic acid and $Pb(NO_3)_2$ in the presence of hydrogen peroxide and triethylamine with mechanochemical solid-solid and solid-gas processes results in formation of $[Pb(1,4\text{-BDC})(C_2H_5OH)(C_2H_5OH)]_n$ (**1**) nanoflowers. This compound also recognized as MOF-70. The MOF-70 porosity did not maintain by heating up to 100 °C and converted to nonporous coordination polymer of $[Pb(1,4\text{-BDC})]_n$ (**2**) with agglomerated nanoparticle morphology. Thus the pore destruction in **1** during removal of coordinated EtOH molecules and formation of **2** with higher thermal stability than **1** are two driving force during this irreversible conversion.

Keywords: Nanoporous; Metal-Organic Framework; Nanoflowers; Coordination Polymer; Conversion; Activation process.

1. Introduction

MOFs are organic-inorganic hybrid solids with infinite, uniform framework structures built from organic linkers and inorganic metal (or metal-containing cluster) nodes [1,2]. The combination of these two building units leads to the formation of crystalline, porous structures, which, in many instances have unique chemical functionality [3-6]. It is clear that