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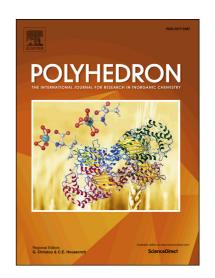
PII: S0277-5387(18)30558-8

DOI: https://doi.org/10.1016/j.poly.2018.09.009

Reference: POLY 13406

To appear in: Polyhedron

Received Date: 13 June 2018 Accepted Date: 5 September 2018



Please cite this article as: Z. Moghadam, K. Akhbari, A. Phuruangrat, Irreversible Conversion of Nanoporous Lead(II) Metal-Organic Framework to a Nonporous Coordination Polymer upon Thermal Treatment, *Polyhedron* (2018), doi: https://doi.org/10.1016/j.poly. 2018.09.009

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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(NO₃)₂ in the presence of hydrogen peroxide and triethylamine with mechanochemical solid-solid and solid-gas processes results in formation of [Pb(1,4-BDC)(C₂H₅OH)(C₂H₅OH)]_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-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

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