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Reza Abazari, Ghazal Salehi, Ali Reza Mahjoub

PII: S1350-4177(18)30163-9
DOI: https://doi.org/10.1016/j.ultsonch.2018.02.001
Reference: ULTSON 4062

To appear in: *Ultrasonics Sonochemistry*

Received Date: 27 December 2017
Revised Date: 19 January 2018
Accepted Date: 3 February 2018

Please cite this article as: R. Abazari, G. Salehi, A.R. Mahjoub, Ultrasound-assisted preparation of a nanostructured zinc(II) amine pillar metal–organic framework as a potential sorbent for 2,4-dichlorophenol adsorption from aqueous solution, *Ultrasonics Sonochemistry* (2018), doi: https://doi.org/10.1016/j.ultsonch.2018.02.001

Ultrasound-assisted preparation of a nanostructured zinc(II) amine pillar metal–organic framework as a potential sorbent for 2,4-dichlorophenol adsorption from aqueous solution

Reza Abazari, Ghazal Salehi, Ali Reza Mahjoub*

Department of Chemistry, Tarbiat Modares University, P.O. Box 14115-175, Tehran, Iran

*** Corresponding Author.** Tel: (+9826) 44260688; Fax: (+9821) 22853650; E-mail address: r.abazari@sina.kntu.ac.ir (R. Abazari), mahjouba@modares.ac.ir (A. R. Mahjoub).

Abstract

Using a green and simple route with ultrasound illumination under atmospheric pressure and at room temperature, the nanosized preparation of a Zn(II) metal–organic framework, $[Zn(ATA)(BPD)]_{\infty}$ (ATA = 2-aminoterephthalic acid), BPD = 1,4-bis(4-pyridyl)-2,3-diaza-1,3-butadiene), having nano-plate shape and 3D channel framework, was considered and the product was named as compound 1. The X-ray diffraction (XRD), scanning electron microscopy (SEM), IR spectroscopy, Brunauer–Emmett–Teller (BET), and thermogravimetric analysis (TGA) were used for characterization of the synthesized micro/nano-structures. Further, impact of different sonication times and initial reagent contents on the shape and size of the micro/nano-structures was investigated. The results show that under ultrasound irradiation non-aggregated plates with uniform morphology can be obtained with content of [0.0125] M of the initial reagents in the presence of triethylamine (TEA) at 120 min. Moreover, through N_2 adsorption, effect of the