

Accepted Manuscript

Ultrasound-assisted synthesis of metal organic framework for the photocatalytic reduction of 4-nitrophenol under direct sunlight

S. Melvin Samuel, Jayanta Bhattacharya, C. Parthiban, Gayathri Viswanathan, N.D. Pradeep Singh

PII: S1350-4177(18)30839-3

DOI: <https://doi.org/10.1016/j.ultsonch.2018.08.004>

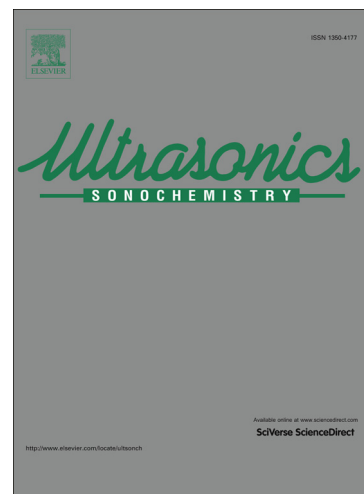
Reference: ULTSON 4268

To appear in: *Ultrasonics Sonochemistry*

Received Date: 1 June 2018

Revised Date: 20 July 2018

Accepted Date: 9 August 2018



Please cite this article as: S. Melvin Samuel, J. Bhattacharya, C. Parthiban, G. Viswanathan, N.D. Pradeep Singh, Ultrasound-assisted synthesis of metal organic framework for the photocatalytic reduction of 4-nitrophenol under direct sunlight, *Ultrasonics Sonochemistry* (2018), doi: <https://doi.org/10.1016/j.ultsonch.2018.08.004>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Ultrasound-assisted synthesis of metal organic framework for the photocatalytic reduction of 4-nitrophenol under direct sunlight

Melvin Samuel. S^a, Jayanta Bhattacharya^a, Parthiban. C^b, Gayathri Viswanathan^c, and N. D. Pradeep Singh^{c*}

^a*School of Environmental Science and Engineering, Indian Institute of Technology, Kharagpur, West Bengal - 721302, India.*

^{*b}*Department of Chemistry, Indian Institute of Technology, Kharagpur, West Bengal - 721302, India. Email: ndpradeep@chem.iitkgp.ernet.in*

^c*Department of Cardiology, Duke University Health system, North Carolina, United States*

Abstract

In this study, the metal organic framework MOF [Zn(BDC)(DMF)] crystal was synthesized *via* ultrasonic irradiation and solvothermal method. The synthesized MOF [Zn(BDC)(DMF)] crystal was characterized by PXRD, FTIR, FESEM-EDX, TGA, UV-DRS and BET. The catalytic activity of MOF [Zn(BDC)(DMF)] was investigated by 4-nitrophenol (4-NP) degradation under direct sunlight irradiation. The influence of various degradation parameters such as initial 4-NP concentration, dosage, pH and H₂O₂ concentration were investigated. The results indicated that the synthesized MOF [Zn(BDC)(DMF)] exhibited strong photocatalytic activity in the presence of NaBH₄ under sunlight irradiation and the reduction of 4-NP to 4-aminophenol (4-AP) completed within 10 min. The study provides the synthesized MOF [Zn(BDC)(DMF)] crystal can be used as a high performance catalyst for the treatment of dyes in wastewater.

Keywords: Metal organic framework, Ultrasound, photocatalytical reduction, 4-nitrophenol, 4-aminophenol.

Introduction

In recent years, water pollution increases due to hazardous waste and toxic organic pollutants. Nowadays the amount of waste discharged into water is a serious problem in the modern world [1]. Particularly, the phenolic compounds and their derivatives are more stable and causes water pollution when they are discharged directly into the water, without proper treatment [2–4]. Compared to existing pollutants, phenol and its derivatives are very steady

Download English Version:

<https://daneshyari.com/en/article/8961236>

Download Persian Version:

<https://daneshyari.com/article/8961236>

[Daneshyari.com](https://daneshyari.com)