Accepted Manuscript

Research paper

A Multifunctional Luminescent Metal-Organic Framework Showing Sensing, Sensitization, and Adsorbent Abilities

Yanan Zhang, Peng Zhang, Jing Cheng, Wenhuan Huang, Peizhi Li, Yangmin Ma

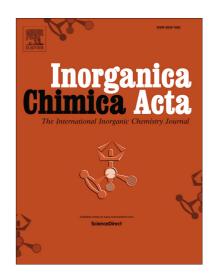
PII: S0020-1693(17)31272-0

DOI: https://doi.org/10.1016/j.ica.2017.11.011

Reference: ICA 17981

To appear in: Inorganica Chimica Acta

Received Date: 10 August 2017 Revised Date: 3 November 2017 Accepted Date: 4 November 2017



Please cite this article as: Y. Zhang, P. Zhang, J. Cheng, W. Huang, P. Li, Y. Ma, A Multifunctional Luminescent Metal-Organic Framework Showing Sensing, Sensitization, and Adsorbent Abilities, *Inorganica Chimica Acta* (2017), doi: https://doi.org/10.1016/j.ica.2017.11.011

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.

ACCEPTED MANUSCRIPT

A Multifunctional Luminescent Metal-Organic Framework Showing Sensing, Sensitization, and Adsorbent Abilities

Yanan Zhang*, Peng Zhang, Jing Cheng, Wenhuan Huang, Peizhi Li, Yangmin Ma

College of Chemistry & Chemical Engineering, Shaanxi University of Science & Technology,

Xi'an, Shaanxi, 710021, P.R. China

ABSTRACT: The luminescent metal-organic frameworks (LMOFs) have been widely used as sensors for toxic organic compounds or heavy metals due to their functional sites and accessible pores. About this work, a new luminescent metal-organic framework, {[Cd₃(L)₂(H₂O)₄]·4H₂O}_n (1) has been synthesized through the spontaneous self-assembly of V-shaped asymmetrical tricarboxylate ligand (H₃L= 2-(4-carboxylphenoxy)terephthalic acid) and Cd(NO₃)₂·4H₂O under hydrothermal condition. Single crystal X-ray diffraction analysis H₃L is completely deprotonated and connects Cd(II) to exhibit a 3D microporous structure. Furthermore, the complex shows a strong fluorescence emission, and can act as a potential multifunctional fluorescent probe for detection of nitroaromatic, Fe³⁺, Cr₂O₇²⁻ and CrO₄²⁻ anions with high stability, selectivity and sensitivity. Secondly, the complex can effectively sensitize visible-light-emitting Tb³⁺ ions as an antenna and rapidly remove harmful organic dye Methylene Blue (MB) as an adsorbent. Thus, the multifunctional complex 1 combines optical-sensing, adsorption, and sensitization properties, which is very useful in many potential applications.

Keywords: Fluorescent sensor; Metal-organic frameworks; Sensitization; Adsorbent

1. Introduction

Exploring sensors as fast detectors of toxic organic compounds, heavy metals and noxious anions play an important role in environmental monitoring, medical science, and industrial production [1]. Nitroaromatic compounds (NACs), widely used in the agrochemical industry, are not only well-known explosives, but also notorious environmental pollutants [2]. Inhalation of NACs will lead to vomiting and coma, to which long-term exposure can even cause respiratory failure. So the harm of NACs on the security and environment has attracted people's attention. Additionally, Fe³⁺ ion is an indispensable biological element and plays a crucial role in the transport and storage of oxygen, the deficiency or excess of Fe³⁺ can induce physiological disorder

1

^{*} Corresponding author. E-mail address: yanan12151215@163.com

Download English Version:

https://daneshyari.com/en/article/7750840

Download Persian Version:

https://daneshyari.com/article/7750840

<u>Daneshyari.com</u>