22nd Iranian Chemistry Conference, 23-25 August, 2023
University of Kurdistan

Design and Ultrasound-Assisted Synthesis of an anthracene-based Cu-MOF for Hydrogen Sulfide Sensing

Zahra Afravi,[a] Nahid Pourreza[a] and Valiollah Nobakht*

[a]*Department of Chemistry, Faculty of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran*

[*] *E-mail: v.nobakht@scu.ac.ir*

Copper metal-organic framework (Cu-MOF) fluorescent sensing is a relatively new area of research in the field of materials science and chemical sensing. Cu-MOFs are porous materials that have been found to exhibit unique fluorescence properties, which make them attractive for use in sensing applications. H_2S is a toxic gas that is commonly found in natural gas, crude oil, and other industrial processes. It poses a serious threat to human health and safety, and therefore, there is a need for reliable and sensitive detection methods. Cu-MOFs sensors have been shown high sensitivity and selectivity towards H_2S gas, making them a promising candidate for H_2S sensing applications. In addition, anthracene is a common ligand that has been used as a linker in the synthesis of Cu-MOFs for fluorescent sensing applications[1,2].



In this study, a novel anthracene-based Cu-MOF has been synthesized under ultrasound irradiation and used for H_2S detection. The Cu-MOF as a fluorescent sensor has surprising performance and has shown great promise in environmental and industrial monitoring. The ultrasonic-assisted synthesis method was found to produce smaller and more uniform crystals compared to traditional synthesis methods. Interestingly, fluorescence detection studies exhibit that Cu-MOF can detect hydrogen sulfide with high sensitivity and selectivity in the presence of interfering species and also show a quick response in a short time range in water.

Keywords: Cu-MOFs, Hydrogen Sulfide, Sensing, Fluorescence.

[1]. Z. Afravi, V. Nobakht, N. Pourreza, M. Ghomi, D. Trzybiński, K. Woźniak, Design of a Sensitive Fluorescent Zn-Based Metal–Organic Framework Sensor for Cimetidine Monitoring in Biological and Pharmaceutical Samples, *ACS omega*, 7 (**2022**) 22221-22231.

[2]. S. Kamal, M. Khalid, M.S. Khan, M. Shahid, Metal organic frameworks and their composites as effective tools for sensing environmental hazards: An up to date tale of mechanism, current trends and future prospects, *Coordination Chemistry Reviews*, 474 (**2023**) 214859.