

Synthesis and characterization of bimetallic metal-organic frameworks based on Cu and Zr for absorption and photocatalytic degradation of organophosphorus compounds

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Metal-organic framework (MOF) is a new class of porous crystalline materials featured with regular pores, open channels and high surface area [1,2]. In particular, a few bimetallic MOFs can be obtained when two kinds of metal ions are coordinated with ligands among the MOF structures [3]. Adsorption desulfurization is very effective for the removal of organophosphorus compounds from the environment. The metal-organic frameworks have emerged as a new type of adsorbents because of their porous nature and large specific surface area [4]. In this study, Cu²⁺ was covalently introduced into the UiO-66 framework at the defective sites with H₂BDC as a ligand by the solvothermal method. Then, the structure of the synthesized compounds is investigated by using SEM, TEM, EDX, XRD, DRS and FT-IR. The photocatalytic activities were investigated via the degradation of organophosphorus pesticides using the Cu/Zr MOFs under UV light irradiation. On the basis of the results, a possible photocatalytic mechanism of the prepared samples was proposed. The results indicate that Cu/Zr bimetallic metal-organic framework have great application potential in pollutant degradation.

Keywords: metal organic framework, bimetallic MOF, photocatalyst, photocatalytic degradation, organophosphorus compounds

References

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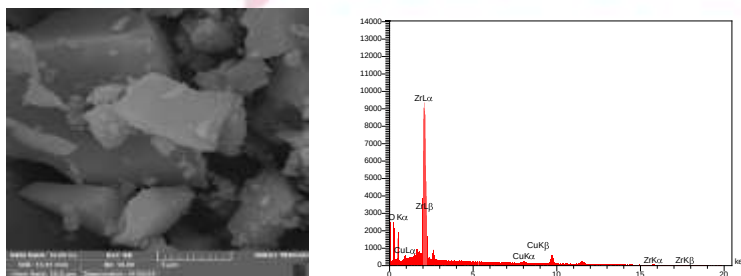


Fig. 1. SEM and EDX of Cu/Zr-MOF prepared by hydrothermal method.