

Sorption study of two amide-based MOFs towards heavy metal cations in aqueous environment.

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Metal-Organic Frameworks (MOFs) are coordination polymers consisting of metal ions acting as nodes and organic ligands acting as edges.^[1] Main characteristics of these materials are their crystallinity and high porosity. Due to the variety of the metal centers and the organic functional groups, these polymers can be used to various applications such as gas storage and separation, catalysis and wastewater purification from organic and inorganic pollutants.

Heavy metal cations such as Pb^{2+} , Hg^{2+} , Cd^{2+} are hazardous for living organisms, so it's important their capture from water streams. For that reason, the materials that will act as sorbents should be water-stable and contain suitable functional groups (such as -COOH groups).^[2] One famous MOF for its water and pH stability is UiO-66-NH₂, which is consisted of Zr₆ nodes connected with amino-terephthalates (NH₂-BDC²⁻). In this work we modified the organic ligand using chlorides, ending up with two amide ligands containing a free carboxylic group. In a second step, the ligands reacted with a Zr salt, and the final products identified as UiO-66 analogues. The sorption studies conducted using Pb^{2+} solutions and the results are quite promising.

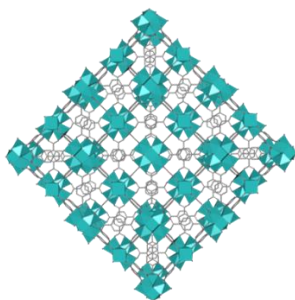


Figure 1: The 3D crystalline structure of UiO-66 (*fcu* topology).

References:

- [1] O. M. Yaghi and H. Li, *J. Am. Chem. Soc.* 1995, 117, 10401–10402
- [2] Hamid Reza Sobhi et al., *RSC Adv.* 2024, 14, 16617-16623.

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