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OPTIMIZATION OF SYNTHESIS AND CHARACTERIZATION OF ZNBTC-BASED MOFS

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Abstract. Metal-organic framework (MOF) are a class of crystalline coordination compounds with a 1-, 2-, 3-dimensional structure consisting of metal ions or clusters linked by organic linkers. The large internal surface area, low density, and the possibility of chemical functionalization make these compounds promising materials for heterogeneous catalysis, sensor development, drug delivery, gas storage and separation.[1,2]

Most of the literature on MOFs focuses on the ordered crystal structure of these materials.[3] However, all MOFs contain insignificant surface defects.[4] In some cases, these effects do not affect the resulting material properties. However, in other situations, the presence of defects can have consequences. Therefore, understanding the nature of MOF defects can be an advantage in tuning material properties.

In this work we studied optimization of synthesis of different types of MOFs (ZnBTC) on the based H_3BTC (1,3,5-benzenetricarboxylic acid) and variety of type Zn salts. We showed the relationship between the optimal condition of synthesis such as temperature, mix and ratio of solvents and defective surface of MOF. Synthesized MOFs have been characterized by PXRD, EDX and SEM.

In the future, it is planned to work on the description and control of defects obtained by MOF.

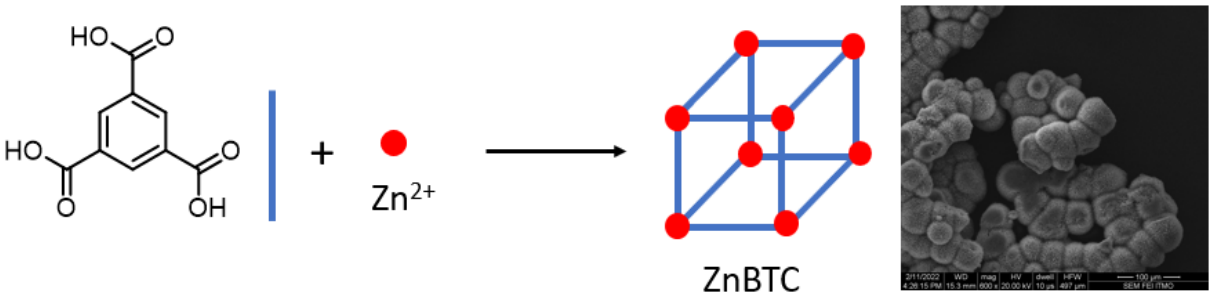

Figure 1. Synthetic scheme of ZnBTC

References

1. Furukawa H. et al. The chemistry and applications of metal-organic frameworks //Science. – 2013. – Т. 341. – №. 6149. – С. 1230444.

2. Hong D. H. et al. MOF-on-MOF architectures: applications in separation, catalysis, and sensing //Bulletin of the Korean Chemical Society. – 2021. – Т. 42. – №. 7. – С. 956-969.

3. Xu G. et al. Facile “modular assembly” for fast construction of a highly oriented crystalline MOF nanofilm //Journal of the American Chemical Society. – 2012. – Т. 134. – №. 40. – С. 16524-16527.

4. Fan D. et al. Engineering MOF surface defects in mixed matrix membranes: An effective strategy to enhance MOF/polymer adhesion and control interfacial gas transport //Journal of Membrane Science Letters. – 2022. – Т. 2. – №. 2. – С. 100029.

This work was supported by the Russian Science Foundation (No. 22-73-10069)