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Effect of solvent on porosity, crystallinity and thermal stability of ZIF-8 metal-organic framework

This study investigated the effect of three different solvents including water, methanol, and ethanol on the structural properties and stability of metal-organic frameworks (MOFs) of ZIF-8 type. The synthesis of ZIF-8 was done using zinc nitrate and 2-methylimidazole in the mentioned solvents, and the characteristics of the synthesized materials were analyzed and compared by XRD, BET, FTIR, and TG analyses. The results show that different solvents significantly affect the percentage of crystallinity, crystal structure, specific surface area, porosity, and thermal stability of ZIF-8. In particular, ZIF-8 synthesized with methanol and ethanol has higher crystallinity and thermal stability than the sample synthesized in the presence of water. The present research findings show that adjusting the synthesis conditions makes it possible to achieve suitable structural, crystalline, and morphological properties of the ZIF-8 metal-organic framework for adsorption and catalyst applications.

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