

Adsorption of organic dye (Rhodamine B) by zeolite-imidazole-frameworks

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Abstract

Zeolitic Imidazolate Frameworks (ZIFs) are a highly sought-after class of porous materials. ZIFs are formed through the robust interaction between metal ions and organic linkers containing imidazole groups. By carefully selecting these building blocks, ZIFs possess exceptional properties, including a high surface area, remarkable chemical stability, and precisely defined pore volume. In this study, we synthesized ZIF to assess their ability to adsorb organic dyes such as Rhodamine B. The adsorption process likely involves a combination of electrostatic interactions, hydrogen bonding, and π - π interactions (stacking interactions). Interestingly, irradiation with UV-visible light can trigger the excitation of electrons within the organic dye molecules. These excited states exhibit enhanced interactions with the active sites on the ZIFs, leading to a more efficient adsorption process. ZIFs composites find as a promising multifunctional platform, functioning as both a superior adsorbent and an efficient photocatalyst.

Keywords: adsorption, degradation, nanocrystal, ZIF, microporous material.