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Zirconium-based metal organic framework as novel adsorbent for Indigo Carmine

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Drinking water is a vital component for sustaining life on our planet. Unfortunately, the presence of numerous recalcitrant organic and inorganic contaminants in the aquatic environment cause adverse health effects in humans, rendering water consumption dangerous. Therefore, it has become urgent to develop and establish treatment methods to decontaminate waters from persistent chemicals. Adsorption is such a promising method, mainly due to its low-cost, high performance, easiness of operation, and effectiveness in a wide pH range. The current research work focuses on the effectiveness of a novel Zirconium-based metal organic framework (MOF) solvothermally synthesized in our laboratory to remove Indigo Carmine from water. Indigo Carmine is a water-soluble organic salt used as colorant in pharmaceuticals, foods, and cosmetics; however, its presence in water has been associated with hypertension, cardiovascular and respiratory effects, carcinogenesis, and neurotoxicity. MOFs are novel compounds consisting of metals ions coordinated to organic ligands. They possess high surface areas and porosity, which classify them as ideal for the adsorption of various water contaminants. This work aims to develop comprehensive insights that will lead to more advanced efficient adsorption processes.