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# Adsorption performance of Cerium-based MOF toward malachite green removal

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These days tension of clean water has become a major issue for most of the countries in whole world. the footprint of water is followed everywhere, all the living species, most of the chemical and biochemical reactions are dependent on water. In parallel to improvements of human life, new water pollutants are developed and removing these contaminants from water is one of the most concerning issues for the human of 21'st century [1]. These pollutants are toxic and they harm to ecosystem, environment and human health [2]. Metal-Organic frameworks (MOFs) are a novel class of highly porous and crystalline materials that have catched a lot of attentions for past 10 years [3]. These materials are constructed from metal ions and organic ligands that play the role of connectors through coordination bonds. Because of their great porosity, large specific surface area (typically more than 10000 m2/g), large pore volume, great affinity to specific molecules, ability for tuning the pore size as well as structural controllability. MOFs are known as a new class of highly porous materials for gas storage and adsorption, photocatalysis, bio medical imaging, ion exchange, water purification, drug adsorbent and sensing [4]. In this research the (MG) is used as model pollutant and the high crystalline and porous Ce-based UiO-66 (Ce-UiO-66) MOFs as adsorbent. Various factors which influence on adsorption capacity had been investigated. The aim of this work was to use green synthesis method to synthesize Ce-UiO-66 MOF. According to the results, this MOF can successfully adsorb this dye from water. Based on the obtained results, the pseudo-second-order kinetic model matched well for the elimination of the MG from aqueous media through adsorption onto the Ce-UiO-66. Adsorption capacity of this adsorbent changes with the initial pH solution, which demonstrates that the adsorption mechanism could be electrostatic interaction among dye and MOFs.

**Keywords:** Ce-UiO-66, Malachite green, Green synthesis, Dye removal.

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