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## Methyl red removal from water by iron based metal-organic frameworks loaded onto iron oxide nanoparticle adsorbent

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### ABSTRACT:

The objective followed by this research is the synthesis of iron based metal organic framework loaded on iron oxide nanoparticles ( $\text{Fe}_3\text{O}_4@\text{MIL-100}(\text{Fe})$ ) and the study of its capability for the removal of methyl red. Effective parameters in the selection of a new adsorbent i.e. adsorption capacity, thermodynamics, and kinetics were investigated. All the studies were carried out in batch experiments. Removal of methyl red from aqueous solutions varied with the amount of adsorbent, methyl red contact time, initial concentration of dye, adsorbent dosage, and solution pH. The capability of the synthesized adsorbent in the removal of methyl red was compared with the metal organic framework (MIL-100(Fe)) and iron oxide nanoparticles. The results show that  $\text{Fe}_3\text{O}_4@\text{MIL-100}(\text{Fe})$  nanocomposite exhibits an enhanced adsorption capacity.

*Keywords:* Metal organic framework; Langmuir isotherm; Methyl red removal; Iron oxide nanoparticles; Surface modification

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