



Zirconium-immobilized bentonite for the removal of methyl orange (MO) from aqueous solutions

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ABSTRACT

Zirconium-immobilized bentonite was prepared by hydrothermal reaction, and characterized by scanning electronic microscope (SEM) and X-ray diffraction (XRD) techniques. Removal of methyl orange (MO) from aqueous solutions with zirconium-immobilized bentonite was investigated by a batch method. These factors including adsorbent dosage, pH value of MO solution, and contact time were evaluated. Adsorption equilibrium was achieved at 60 min or so. The experimental isotherm data were described by the Langmuir isotherm model. The maximum adsorption capacity obtained from the Langmuir isotherm model was 44.13 mg/g at 298 K and natural pH value. An increase in temperature reduced the adsorption of MO while the increasing amount of zirconium enhanced the adsorption of MO onto Zr-immobilized bentonite. 1 M HCl was identified as the best eluent.

Keywords: Methyl orange; Adsorption; Zirconium-immobilized bentonite; Isotherm

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