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Sorption of cadmium (II) from aqueous solution by magnetic clay composite

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A B S T R A C T

The objective of this work is to compare the removal of cadmium (II) by the natural bentonite and composite, prepared by magnetic modification of the clay. Both, the bentonite and the composite material were characterized with the aim to describe their structural and surface properties by the X-ray diffraction, FE–TEM method and low nitrogen adsorption method. The surface charge of the materials was studied by the zeta potential measurement. The sorption properties were examined under the different conditions such as pH of the model solutions, contact time and initial metal ion concentration. The optimal pH for the removal of cadmium (II) was found equal 5. The equilibrium data was analyzed using the linearized Langmuir isotherm. The maximum adsorption capacities obtained from the sorption experiments realized in initial concentration range 10–750 mg L^{-1} were 61.35 and 63.29 mg g^{-1} for the bentonite and composite, respectively. Refining the initial metal concentration range to 1–10 mg L^{-1}, the sorption efficiency of composite achieved more than 98%.

Keywords: Natural bentonite; Composite material; Cadmium (II); Sorption

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