



## Removal of $\text{Cu}^{2+}$ from aqueous solution by Chitosan/Rectorite nanocomposite microspheres

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### ABSTRACT

The novel chitosan/rectorite nanocomposite microspheres were prepared by controlling mass ratios of chitosan and rectorite at 6:1. The microspheres were characterized by Fourier transform infrared spectrophotometer, X-ray diffraction, and scanning electron microscope. The interlayer distance of rectorite was enlarged from 2.53 to 3.01 nm. Adsorption of  $\text{Cu}^{2+}$  from aqueous solution onto chitosan/rectorite nanocomposite microspheres was studied. The results showed that the  $\text{Cu}^{2+}$  adsorption process is dependent on pH, contact time, initial CR concentration, and temperature. The maximal  $\text{Cu}^{2+}$  uptake was  $190.2 \text{ mg g}^{-1}$  in the test. The adsorption kinetics, isotherms, and thermodynamics were also studied. The maximum sorption capacities calculated from the pseudo-second-order rate equation and Langmuir isotherm were 209.5 and  $201.6 \text{ mg g}^{-1}$ , respectively, which were close to the experimental values. Adsorption thermodynamics study indicated the spontaneous nature and endothermic of the adsorption process.

*Keywords:* Chitosan; Rectorite; Microspheres; Adsorption;  $\text{Cu}^{2+}$

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