



Preparation and characterization of chitosan/halloysite magnetic microspheres and their application for removal of tetracycline from an aqueous solution

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Received 13 March 2014; Accepted 7 November 2014

ABSTRACT

In the work, magnetically separable adsorbent, named chitosan (CTS)/halloysite nanotubes (HNT)HNT-Fe₃O₄ microspheres are prepared by emulsion cross-linking method and characterized by Fourier transform infrared spectroscopic analysis, vibrating sample magnetometer, X-ray powder diffraction, scanning electron microscope, and transmission electron microscopy. The microspheres are applied as adsorbents for the removal of tetracycline (TC) from aqueous solution. The effects of the initial concentration of TCs solution (C_0), temperature, initial pH value (pH_0) of TC solution, and the adsorption dose on the adsorption capacity of the microspheres are investigated. The optimum pH value for TC adsorption is found at pH 5.0, and the adsorption capacity increased with the increase in adsorption temperature. The adsorption kinetics is better described by the pseudo-second-order equation, and their adsorption isotherms are better fitted to the Langmuir equation. CTS/HNT-Fe₃O₄ microspheres could be easily separated from the aqueous solution in a magnetic field. The adsorption–desorption experiments implied that CTS/HNT-Fe₃O₄ microspheres can be used as promising adsorbents for the removal of TC from wastewater HNT.

Keywords: Chitosan; Halloysite; Magnetic microspheres; Adsorption; TC

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