



Fenitrothion pesticide adsorption from aqueous solution using copper nanoparticles modified 13X zeolite

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ABSTRACT

In this study, the modified 13X zeolite by copper nanoparticles (copper nanoparticles were coated on a bed of 13X), was used as an adsorbent for adsorption of fenitrothion from aqueous solutions in a batch process. The results indicated that the maximum adsorption rate was 97% (with values of 6, 0.2 g, 20 min, and 20°C for pH, adsorbent mass, contact time, and temperature respectively). Kinetic studies showed that the pesticide adsorption process could be well described using the pseudo-second-order (Type 1) kinetic model. Langmuir-Type 1 isotherm, as well, covers the equilibrium data with a maximum absorption capacity of 63.29 mg/g for modified 13X. The results of the tests showed that the temperature increase has a negative effect on the removal efficiency. The thermodynamic parameters showed that the adsorption of fenitrothion pesticide on modified 13X in the studied conditions was spontaneous and exothermic.

Keyword: Zeolite; Fenitrothion; Modified 13X; Nanoparticles
