

Nanotechnology and nanomaterials

Heavy metal ions removal by pyrolox

- static and dynamic studies

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Adsorption is one of the most economical, effective and widely used methods for the removal of toxic metals from aqueous environments. The great advantage of this method over others is the low generation of residues, easy metal recovery and the possibility of the reuse of the adsorbent. The manganese dioxide sorbent can be readily used for iron, manganese and arsenic removal especially in the pH range from 5 to 9 pH [1, 2]. The paper presents on the use of Pyrolox containing nano oxides which was used for the removal of Cu(II), Zn(II), Cd(II) and Pb(II) as well as U(VI) ions. Their concentrations were analyzed using the atomic absorption spectrometer SpectrAA 240 FS (Varian) as well as UV-vis method. For this aim the static kinetic and equilibrium studies were carried out. The effect of solution pH, shaking time, initial metal ion concentrations, sorbent dosage and temperature was investigated. The equilibrium data were analyzed using sorption isotherm models. The kinetic results showed that the pseudo second order kinetic model was found to correlate the experimental data well. For the optimal parameters the dynamic method was also used. Nitrogen adsorption/desorption, infrared spectroscopy (FTIR) and scanning electron microscopy (SEM) measurements for adsorbent characterization were performed.

1. *C.-I. Lee, W.-F. Yang, C.-I. Hsieh. Removal of copper(II) by manganese-coated sand in a liquid fluidized-bed reactor // J. Hazard. Mater. -2004. -114 P 45-51.*
2. *Y.-Y. Chang, J.-W. Lim, J.-K. Yang. Removal of As(V) and Cr(VI) in aqueous solution by sand media simultaneously coated with Fe and Mn oxides // J. Ind. Eng. Chem. -2012. -18 P 188-192.*