Fluoride removal from aqueous solution by functionalized-polyacrylonitrile coated with iron oxide nano particles: characterization and sorption studies

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\begin{abstract}
Polyacrylonitrile (PAN)-oxime-nano Fe\textsubscript{2}O\textsubscript{3} was used as an adsorbent for the removal of fluoride from water. The influences of contact time, initial fluoride concentration, and adsorbent dosage were investigated by batch equilibrium studies. The rate of adsorption was rapid with equilibrium being attained after 100 min. The Langmuir isotherm model was found to represent the measured adsorption data well. The adsorption process followed the pseudo-first-order kinetic model. It was found that the adsorbed fluoride could be easily desorbed by replacing the adsorbent in deionized water. This indicates that the material could be easily recycled. The results from the present study show the potential of PAN-oxime-nano Fe\textsubscript{2}O\textsubscript{3} for fluoride removal. Furthermore, the adsorption isotherms of Fluoride removal were examined and the possible desorption process was discussed.

\textit{Keywords:} Polyacrylonitrile; Fe\textsubscript{2}O\textsubscript{3} nanoparticles; Adsorption isotherms; Desorption
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