

Article Abstract

Title:	Characterization and fluoride uptake studies of nano-scale iron oxide-hydroxide synthesized by microemulsion method
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Journal:	<i>International Journal of Engineering, Science and Technology</i> , Vol. 2, No. 8, 2010, pp. 1-12.
Abstract:	In the present study nano scale iron oxide hydroxide was synthesized by water in oil microemulsion method. A non-ionic surfactant span 80, hexanol and FeCl ₃ were chosen as starting materials. The prepared sample was characterized by XRD, TEM, TGA and FT-IR. X-ray diffraction pattern showed it be 2- line ferrihydrite like structure. TEM showed aggregated particles in the range of 5-10 nm size. The fluoride adsorption efficiency of the nano powder was determined with respect to contact time, initial F ⁻ concentration and pH of the solution. The batch adsorption data revealed that the fluoride adsorption efficiency was highly influenced by the studied factors. Equilibrium was attained within one hour of contact time indicating fast kinetics. The adsorption data followed second order kinetic model. The isothermic data fitted to both Langmuir and Freundlich models and maximum loading capacity as estimated by Langmuir model was 62.89 mg/g for the studied concentration range of 10-30 mg/L. The high loading capacity points towards the potential of this adsorbent for fluoride removal from aqueous streams.
Keywords:	Fluoride, nano-iron oxide hydroxide, adsorption, kinetics, isotherm study.