Removal of Chromium (III) from Water by Using Modified and Nonmodified Carbon Nanotubes

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Abstract

This study was carried out to evaluate the environmental application of modified and nonmodified carbon nanotubes through the experiment removal of chromium trivalent (III) from water. The aim was to find the optimal condition of the chromium (III) removal from water under different treatment conditions of pH, adsorbent dosage, contact time and agitation speed. Multi wall carbon nanotubes (MW-CNTs) were characterized by field emission scanning electron microscopy (FE-SEM) and transmission electron microscopy (TEM). The diameter of the carbon nanotubes produced varied from 20–40 nm with average diameter of 24 nm and 10 micrometer in length. Adsorption isotherms were used to model the adsorption behavior and to calculate the adsorption capacity of the absorbents. The results showed that, 18% of chromium (III) removal was achieved using modified carbon nanotubes (M-CNTs) at pH 7, 150 rpm, and 2 hours for a dosage of 150 mg of CNTs. The removal of Cr (III) is mainly attributed to the affinity of chromium (III) to the physical and chemical properties of the CNTs. The adsorption isotherms plots were well fitted with experimental data.