Abstract

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Novel laser-assisted method for synthesis of SnO2/MWCNTs nanocomposite for water treatment from Cu (II)

A novel multiwalled carbon nanotubes/SnO2 nanocomposite was synthesized by the aid of pulsed laser ablation in liquid media with the assistant of sonication process. In this method, SnO2 was firstly prepared by the laser ablation of tin target immersed in ultra-pure water via Nd:YAG laser, followed by high power ultrasonic irradiation of f-MWCNTs to obtain multiwalled carbon nanotubes/SnO2 nanocomposite to be applied in sorption of Cu(II) for water treatment. The adsorbent was characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), energy-dispersive X-ray, transmission electron microscope (TEM), Raman spectroscopy, X-ray photoelectron spectroscopic analysis (XPS), and Fourier transform infrared spectroscopy (FTIR). The influence of several variables such as pH, contact time, and Cu(II) concentration at room temperature was studied in batch experiments. The adsorption efficiency was evaluated to estimate the nature of the sorption process toward the removal of Cu (II) ions for water treatment.