

## **SYNTHESIS AND ADSORPTION BEHAVIOR OF CHITOSAN-COATED MnFe<sub>2</sub>O<sub>4</sub> NANOPARTICLES FOR TRACE HEAVY METAL IONS REMOVAL**

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**H**heavy metal ions such as Cr (VI), Cu (II), Zn (II) and Cd (II) are known to be toxic and hard to be biodegraded. With the rapid development of industry, large amounts of wastewater containing heavy metal ions, which destroy the environment and harm human health, are produced by metal-plating facilities, tanneries, power generation facilities, paper industries, mining operations and fertilizer industries. Therefore, the removal of such toxic metal ions from wastewater is a crucial issue. Adsorption is now recognized as an effective and economic method to remove heavy metal ions from wastewater. The adsorption process offers flexibility in design and operation and in many cases will produce high-quality treated effluents. In addition, since the adsorption is sometimes reversible, adsorbents can be regenerated by suitable desorption process. In this work, chitosan-coated MnFe<sub>2</sub>O<sub>4</sub> nanoparticles (CCMNPs) were synthesized by an eco-friendly method. The as-synthesized products were characterized by X-ray powder diffraction (XRD), transmission electron microscopy (TEM), Fourier transform infrared (FTIR) and superconducting quantum interference device (SQUID). The results showed that NaOH played a key role in the preparation of CCMNPs. The as-prepared CCMNPs with a saturation magnetization of 16.5 emu/g were used as a magnetic nanoadsorbent to remove toxic Cu(II) and Cr(VI) from aqueous solution. Factors influencing the adsorption of heavy metal ions, such as pH value, agitation time and initial metal concentration were investigated. The maximum adsorption capacities of Cu(II) and Cr(VI) on CCMNPs were 22.6 and 15.4 mg/g, respectively. The competitive adsorption of Cu(II) and Cr(VI) from binary solution by CCMNPs was also studied, and the results showed that the affinity between Cu(II) and CCMNPs was much higher than that between Cr(VI) and CCMNPs.

## **BIOGRAPHY**

Zhoucheng Wang has completed his PhD from Xiamen University in 1997. He is the professor of the College of Chemistry and Chemical Engineering at Xiamen University since 2006. His research interests concern synthesis and characterization of nano-composite materials and multilayer coatings, materials electrochemistry and surface engineering. He has published more than 120 papers in reputed journals.

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