

عنوان مقاله:

Studying efficiency of multi-walled carbon nanotubes modified with chitosan in removal of heavy metals of lead, zinc and cadmium from aqueous solutions

محل انتشار:

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نویسندگان:

Farzad Hashemzadeh - *master of environmental engineering (water and wastewater), School of Environment and Energy, Science and Research Branch, Islamic Azad University, Tehran, Iran*

Amir Hessam Hassani - *an associate professor in department of environmental engineering (water and wastewater), School of Environment and Energy, Science and Research Branch, Islamic Azad University, Tehran, Iran*

Homayun Ahmad Panahi - *Associate Professor in Department of Chemistry, School of Basic Science, Islamic Azad University, Tehran, Iran*

Seyed Mehdi Borghei - *an full professor in department of environmental engineering (water and wastewater), School of Environment and Energy, Science and Research Branch, Islamic Azad University, Tehran, Iran*

خلاصه مقاله:

Background and Objective: environmental pollution by hazardous toxic metals is one important environmental issue, nowadays. Extensive use of heavy metals in the industry has increased concentrations of these metals higher than background values in water, wastewater, air and soil. These heavy elements and compounds have irreparable impacts on the environment and human. The present study aimed to remove or reduce heavy metals of lead, zinc and cadmium from aquatic solutions by carbon nanotubes modified with chitosan. Materials and Methods: In this study, multi-walled carbon nanotubes modified with chitosan were used as absorbent. Heavy metal nitrate salt in distilled water was used as sample. Following variables were measured: different pH values of the solution, contact time, concentration of heavy metals and absorbent mass. All experiments were performed using standard methods. Fourier transform infrared (FT-IR) spectroscopy and scanning electron microscopy (SEM) were used to identify and verify modification of the absorbent. Findings: The results showed that efficiency of the absorbent for absorption of pollutants was increased by an increase in contact time, concentration of heavy metals up to 20 mg per liter and pH value. Maximum efficiency of the absorbent (more than 75%) was observed at pH=7, contact time=120 minutes and concentration of heavy metals = 20 mg per liter. Diagrams of Langmuir and Freundlich adsorption isotherms were drawn, which showed that adsorption process obeys Freundlich isotherm. Conclusion: Due to high efficiency of absorbent concentration and no need for pH modification as well as accessible and inexpensive modifying agent (chitosan), it is recommended to use carbon nanotubes modified with chitosan as effective absorbent for removal of heavy metals of lead, zinc and cadmium in aquatic solutions

کلمات کلیدی:

Carbon Nanotubes, chitosan, heavy metals, water and wastewater treatment, absorption

