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Selective adsorption of gold ions from complex system using oxidized multi-walled carbon nanotubes

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The selective adsorption and removal of Au(III) ions using oxidized multi-walled carbon nanotubes from aqueous solutions containing different metal ions were studied. Characterization studies showed that MWCNTs were oxidized by the concentrated nitric acid under normal laboratory conditions. The adsorption study results showed that only Au(III) ions could be adsorbed completely from the complex system containing other metal ions at pH 2.0, and within a few minutes at ambient temperature. Also, the interfering effect of other ions that may co-exist with the Au(III) ions in aqueous solutions was explored, and the results showed no sign of interference with the Au(III) ions for the adsorption at the oxidized multi-walled carbon nanotube surface. The adsorption was studied at equilibrium and was found to follow the Langmuir adsorption model, and kinetically obey the pseudo second order kinetic model. The adsorption capacity obtained using oxidized multi-walled carbon nanotubes was 62.3 mg g⁻¹, which is higher than any reported value. Finally, the selective removal and adsorption of Au(III) ions from real environmental water samples were studied and the results showed that oxidized multi-walled carbon nanotubes had high affinity and selectivity for Au(III) ions and could be used successfully for the removal of Au(III) ions from aqueous solutions.

Biography

Huda Abdulaziz Shaheen obtained her Bachelor's degree in General Chemistry in 2008 at King Abdulaziz University. In 2013, she completed her Master's degree in Analytical Chemistry at King Abdulaziz University. The focus of her research is nanotechnology and specifically studied the use of carbon nanotubes as adsorbent and demonstrated several methods to improve this material and use it to estimate the elements negligible concentrations of different water samples. Currently, she is PhD student in the second year of analytical chemistry PhD program. She has published an article in September 2015 in the *Journal of Molecular Liquids* and work is underway to publish other articles.

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