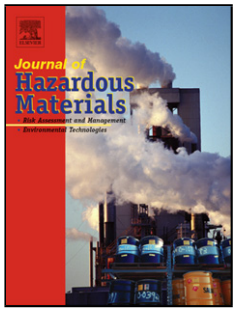


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PII: S0304-3894(13)00555-4
DOI: http://dx.doi.org/doi:10.1016/j.jhazmat.2013.07.076
Reference: HAZMAT 15301

To appear in: *Journal of Hazardous Materials*

Received date: 9-1-2013
Revised date: 24-7-2013
Accepted date: 30-7-2013

Please cite this article as: N.M. Bandaru, N. Reta, H. Dalal, A.V. Ellis, J. Shapter, N.H. Voelcker, Enhanced adsorption of mercury ions on thiol derivatized single wall carbon nanotubes, *Journal of Hazardous Materials* (2013), http://dx.doi.org/10.1016/j.jhazmat.2013.07.076

# Enhanced adsorption of mercury ions on thiol derivatized single wall carbon nanotubes

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***Abstract***

Thiol-derivatized single walled carbon nanotube (SWCNT-SH) powders were synthesized by reacting acid-cut SWCNTs with cysteamine hydrochloride using carbodiimide coupling. Infrared (IR) spectroscopy, Raman spectroscopy and thermo gravimetric analysis (TGA) confirmed the successful functionalization of the SWCNT. SWCNT-SH powders exhibited a threefold higher adsorption capacity for Hg(II) ions compared to pristine SWCNTs, and a fourfold higher adsorption capacity compared to activated carbon. The influence of adsorption time, pH, initial metal concentration and adsorbent dose on Hg(II) ion removal was investigated. The maximum adsorption capacity of the SWCNT-SH powders was estimated by using equilibrium isotherms, such as Freundlich and Langmuir, and the maximum adsorption capacity of the SWCNT-SH powder was found to be 131 mg/g. A first-order rate model was employed to describe the kinetic adsorption process of Hg(II) ions onto the SWCNT-SH powders. Desorption studies revealed that Hg(II) ions could be easily