

Accepted Manuscript

Water-Dispersible Magnetic Nanoparticle–Graphene Oxide Composites for Selenium Removal

You Fu, Jingyi Wang, Qingxia Liu, Hongbo Zeng

PII: S0008-6223(14)00530-2

DOI: <http://dx.doi.org/10.1016/j.carbon.2014.05.076>

Reference: CARBON 9042

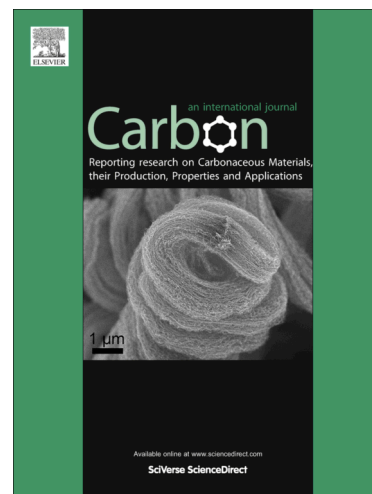
To appear in: *Carbon*

Received Date: 14 January 2014

Accepted Date: 27 May 2014

Please cite this article as: Fu, Y., Wang, J., Liu, Q., Zeng, H., Water-Dispersible Magnetic Nanoparticle–Graphene Oxide Composites for Selenium Removal, *Carbon* (2014), doi: <http://dx.doi.org/10.1016/j.carbon.2014.05.076>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Water-Dispersible Magnetic Nanoparticle–Graphene Oxide Composites for Selenium Removal

You Fu, Jingyi Wang, Qingxia Liu*, Hongbo Zeng*

*Department of Chemical and Materials Engineering, University of Alberta,
Edmonton, Alberta, T6G 2V4 Canada*

*E-mail: hongbo.zeng@ualberta.ca, Phone: +1-780-492-1044, Fax: +1-780-492-2881;
or qingxia2@ualberta.ca

Abstract

Selenium ions are toxic at concentrations of >40 ppb ($40 \mu\text{g L}^{-1}$) which has been a very challenging environment issue. Compared to Se (IV), Se (VI) is more bioavailable and much more difficult to be removed from water. Conventional adsorbent materials only show well defined removal capacity for Se (IV) while perform poorly for Se (VI) (typical removal percentage $<50\%$). In this report, functionalized water-dispersible magnetic nanoparticle–graphene oxide (MGO) composites were synthesized, characterized and applied to remove selenium ions (both Se (IV) and Se (VI)) in aqueous system. MGO (dosage 1 g L^{-1}) shows removal percentage of $>99.9\%$ for Se (IV) and $\sim 80\%$ for Se (VI) from water (pH 6-7) within 10 seconds. Effect of pH ranging from 2 to 11 was investigated, and the results show that acidic pH enhances the adsorption of selenium ions on MGO resulting in an increased removal percentage of Se (VI) to $>95\%$ at pH ~ 2 . MGO can be separated effectively under an external magnetic field and recycled for reuse in water treatment. Our results show that MGO composites have favorable removal capability of both selenite and selenate in water with important potential practical applications in removing selenium from wastewater.

* Corresponding author. E-mail: hongbo.zeng@ualberta.ca or qingxia2@ualberta.ca

Download English Version:

<https://daneshyari.com/en/article/7853717>

Download Persian Version:

<https://daneshyari.com/article/7853717>

[Daneshyari.com](https://daneshyari.com)