Accepted Manuscript

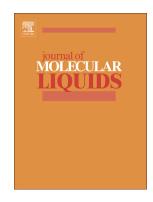
Water and soil decontamination of toxic heavy metals using aminosilica-functionalized-ionic liquid nanocomposite

Mohamed E. Mahmoud, Maher M. Osman, Amr A. Yakout, Amir M. Abdelfattah

PII:	80167-7322(18)31851-8
DOI:	doi:10.1016/j.molliq.2018.06.055
Reference:	MOLLIQ 9253
To appear in:	Journal of Molecular Liquids
Received date:	8 April 2018
Revised date:	10 June 2018
Accepted date:	13 June 2018

Please cite this article as: Mohamed E. Mahmoud, Maher M. Osman, Amr A. Yakout, Amir M. Abdelfattah , Water and soil decontamination of toxic heavy metals using aminosilica-functionalized-ionic liquid nanocomposite. Molliq (2018), doi:10.1016/j.molliq.2018.06.055

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.



ACCEPTED MANUSCRIPT

Water and Soil Decontamination of Toxic Heavy Metals using Aminosilica-Functionalized-Ionic Liquid Nanocomposite

Mohamed E. Mahmoud^{a*}, Maher M. Osman^a, Amr A. Yakout^{b,a}, Amir M. Abdelfattah^a

^a Faculty of Sciences, Chemistry Department, Alexandria University, P.O. Box 426, Ibrahimia 21321, Alexandria, Egypt. (E.Mail:memahmoud10@yahoo.com), Telephone number: 0020-1140933009, Fax number: 00203-3911794

^b Chemistry Department, Faculty of Science, University of Jeddah, Jeddah, Saudi Arabia.

Abstract

A chemical modification method is presented to establish a surface functionalization procedure of amino modified nanosilica (NS-amine) with 1-(3cyanopropyl)-3-methylimidazolium-bis(trifluoromethylsulfonyl) type of ionic liquid, $[CN-C_3-MIm]^+[NTf_2]^-$ for the formation of a novel NS-amine-IL nanocomposite. Based on the TEM analysis and DLS technique, the diameter of the proposed nanocomposite was found 25.4±0.8 nm. The designed NS-amine-IL nanocomposite was additionally characterized using FT-IR, XRD, EDX, TGA, SEM and Zeta potential. The sequestration performance of NS-amine-IL was investigated for remediation of bivalent lead and cadmium ions from aqueous solutions. The effects of medium acidity, contact time, NS-amine-IL dosage, interfering ions, temperature and initial adsorbates concentrations on the removal processes of investigated cations were excessively studied. The maximum extraction values of Pb(II) and Cd(II) were recorded at pH 4-5 and pH 7, respectively. The thermodynamic profiles of the adsorption process were searched at optimal conditions. The adsorption processes were feasibly endothermic and fitted well with the Langmuir isotherm and *pseudo*-second-order kinetics equation. The experimental data indicated that the novel nanocomposite was a promising material for the extraction of both metal ions from wastewater and soil samples with determined recoveries 98.0-99.0% ±4.9.

Download English Version:

https://daneshyari.com/en/article/7841990

Download Persian Version:

https://daneshyari.com/article/7841990

Daneshyari.com