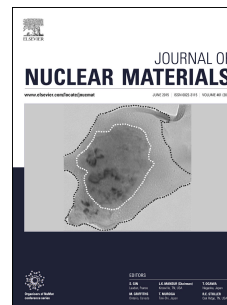


Accepted Manuscript

Uranium extraction by sulfonated mesoporous silica derived from blast furnace slag

M.O. Abd El-Magied, Abdel Ghaffar S.A. Soliman, Abd Allah M. Abd El-Hamid, E.M. Eldesouky



PII: S0022-3115(18)30040-0

DOI: [10.1016/j.jnucmat.2018.06.034](https://doi.org/10.1016/j.jnucmat.2018.06.034)

Reference: NUMA 51047

To appear in: *Journal of Nuclear Materials*

Received Date: 11 January 2018

Revised Date: 19 June 2018

Accepted Date: 19 June 2018

Please cite this article as: M.O.A. El-Magied, A.G.S.A. Soliman, A.A.M. Abd El-Hamid, E.M. Eldesouky, Uranium extraction by sulfonated mesoporous silica derived from blast furnace slag, *Journal of Nuclear Materials* (2018), doi: 10.1016/j.jnucmat.2018.06.034.

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.

Uranium extraction by sulfonated mesoporous silica derived from blast furnace slag

M.O. Abd El-Magied^{a*}, Abdel Ghaffar S.A.Soliman^b, Abd Allah M. Abd El-Hamid^a, E.M. Eldesouky^a

^a Nuclear Materials Authority, P.O. Box 530, El Maadi, Cairo, Egypt

^b Egyptian Petroleum Research Institute, Egypt

Abstract

Blast furnace slag (BFS), mainly from the factory of Helwan for iron making industries, was found to be an economically possible raw material for the production of silica. Silica gel obtained from BFS was activated with concentrated sulfuric acid at high temperature to obtain sulfonated mesoporous silica. The sorption, as well as the mechanisms of uranium ions by the modified silica sorbent, was tested and discussed in term of equilibrium, isotherm, kinetic and applicability. The results show that the sorption of uranium was fast and the majority of sorption was completed in 15 min. The results showed the better fit of pseudo-second-order with the experimental sorption data with a significant high coefficient of correlation ($R^2 > 0.99$). Compared to the other isotherm models, uranium sorption by sulfonated silica follows the Langmuir and D-R isotherm plots. The results from solid/liquid ratio experiments show that the studied sorbent removed uranium nearly 85 and 73% from synthetic and granite leach liquor solutions, respectively. A maximum sorption capacity values of 48.75, 63.74 and 73.8 mg/g were obtained for adsorption of uranium from sulfuric, hydrochloric, and nitric media, respectively. Sulfonated mesoporous silica is a promising adsorbent for the uranium recovery from granite leach liquor.

Keywords: Extraction; Mesoporous; silica; Blast furnace slag.

*Corresponding authors: mahmoud_nma@yahoo.com (Abd El-Magied)

Download English Version:

<https://daneshyari.com/en/article/7962990>

Download Persian Version:

<https://daneshyari.com/article/7962990>

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