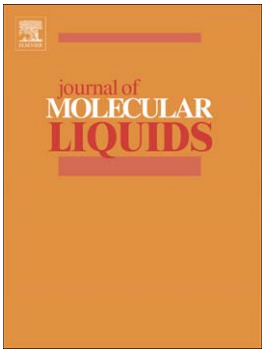
Accepted Manuscript



Synthesis of denim waste-based adsorbents and their application in water defluoridation

D.I. Mendoza-Castillo, H.E. Reynel-Ávila, A. Bonilla-Petriciolet, J. Silvestre-Albero

PII: S0167-7322(16)30785-1
DOI: doi: 10.1016/j.molliq.2016.06.005
Reference: MOLLIQ 5910

To appear in: *Journal of Molecular Liquids*

Received date: 31 March 2016
Revised date: 2 June 2016
Accepted date: 3 June 2016

Please cite this article as: D.I. Mendoza-Castillo, H.E. Reynel-Ávila, A. Bonilla-Petriciolet, J. Silvestre-Albero, Synthesis of denim waste-based adsorbents and their application in water defluoridation, *Journal of Molecular Liquids* (2016), doi: 10.1016/j.molliq.2016.06.005

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

SYNTHESIS OF DENIM WASTE-BASED ADSORBENTS AND THEIR APPLICATION IN WATER DEFLUORIDATION

D.I. Mendoza-Castillo [1,2], H.E. Reynel-Ávila [1,2], A. Bonilla-Petriciolet [1*], J. Silvestre-Albero [3]

[1] Departamento de Ingeniería Química, Instituto Tecnológico de Aguascalientes, Aguascalientes, México, 20256.

[2] CONACYT, Cátedras Jóvenes Investigadores, México, D.F., 03940

[3] Departamento de Química Inorgánica, Universidad de Alicante, Apartado 99, E-03080 Alicante, Spain

ABSTRACT. This study evaluates the application of denim fiber scraps as a precursor for the synthesis of adsorbents for water treatment via pyrolysis and their application in water defluoridation. The best pyrolysis conditions for the synthesis of this novel adsorbent have been identified and a metal doping route with different salts of Al^{3+}, La^{3+} and Fe^{3+} was proposed to improve its fluoride adsorption behavior. Different spectroscopic and microscopic techniques (i.e., FTIR, XPS, XRF, SEM) were used to characterize the precursor and adsorbents, and to analyze the surface interactions involved in the fluoride removal mechanism. Experimental results showed that these adsorbents were effective for fluoride adsorption showing uptakes up to 4.25 mg/g. The Si-O-metal-F interactions appear to be highly relevant for the fluoride removal. This study highlights the potential of denim textile waste as a raw material for the production of added-value products, thus minimizing their associated disposal cost. It also highlights the performance of denim textile waste as a precursor of adsorbents for addressing relevant environmental concerns such as fluoride pollution.

Keywords: Denim fiber scraps, fluoride, adsorption, water treatment

[*] Corresponding author: petriciolet@hotmail.com, 524499105002

Download English Version:

https://daneshyari.com/en/article/5409810

Download Persian Version:

https://daneshyari.com/article/5409810

Daneshyari.com