

Accepted Manuscript

XANES and EXAFS investigation of uranium incorporation on nZVI in the presence of phosphate

Muqing Qiu, Min Wang, Qingzhou Zhao, Baowei Hu, Yuling Zhu



PII: S0045-6535(18)30471-5

DOI: [10.1016/j.chemosphere.2018.03.057](https://doi.org/10.1016/j.chemosphere.2018.03.057)

Reference: CHEM 21001

To appear in: *ECSN*

Received Date: 9 February 2018

Revised Date: 7 March 2018

Accepted Date: 8 March 2018

Please cite this article as: Qiu, M., Wang, M., Zhao, Q., Hu, B., Zhu, Y., XANES and EXAFS investigation of uranium incorporation on nZVI in the presence of phosphate, *Chemosphere* (2018), doi: [10.1016/j.chemosphere.2018.03.057](https://doi.org/10.1016/j.chemosphere.2018.03.057).

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.

1 **XANES and EXAFS investigation of uranium incorporation on nZVI**
2 **in the presence of phosphate**

3 Muqing Qiu^a, Min Wang^b, Qingzhou Zhao^c, Baowei Hu^{a*}, Yuling Zhu^{a*}

4 ^a School of Life Science, Shaoxing University, Huancheng West Road 508, Shaoxing
5 312000, P.R. China

6 ^bState Key Laboratory Base of Eco-hydraulic Engineering in Arid Area, Xi'an
7 University of Technology, Jing Hua Road 5, Xi'an 710048, P.R. China

8 ^cCollege of Resources and Environment, University of Chinese Academy of Sciences,
9 19 A Yuquan Road, Beijing 100049, P. R. China

10 * Corresponding Authors: E-mail: hbw@usx.edu.cn (B. Hu); Phone:
11 +86-0575-88342955. Fax: 86-0575-88345021.

12 **ABSTRACT:** Effect of phosphate on the reduction of U(VI) on nZVI was determined
13 by batch, XPS, XANES and EXAFS techniques. The batch experiments showed that
14 nZVI was quite effective for the removal of uranium under the anaerobic conditions,
15 whereas the addition of phosphate enhanced uranium removal over wide pH range. At
16 low pH, the reduction of U(VI) to U(IV) significantly decreased with increasing
17 phosphate concentration by XPS and XANES analysis. According to EXAFS analysis,
18 the occurrence of U-U shell at 10 mg/L phosphate and pH 4.0 was similar to that of
19 U^(IV)O₂(s), whereas the U-P and U-Fe shells were observed at 50 mg/L phosphate,
20 revealing that reductive co-precipitate (U^(IV)O₂(s)) and precipitation of
21 uranyl-phosphate were observed at low and high phosphate, respectively. The findings
22 are crucial for the prediction of the effect of phosphate on the speciation and binding

Download English Version:

<https://daneshyari.com/en/article/8851648>

Download Persian Version:

<https://daneshyari.com/article/8851648>

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