

Accepted Manuscript

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PII: S1385-8947(18)30545-X
DOI: <https://doi.org/10.1016/j.cej.2018.03.187>
Reference: CEJ 18794

To appear in: *Chemical Engineering Journal*

Received Date: 7 January 2018
Revised Date: 29 March 2018
Accepted Date: 30 March 2018

Please cite this article as: Y. Li, X. Guo, H. Dong, X. Luo, X. Guan, X. Zhang, X. Xia, Selenite Removal from Groundwater by Zero-valent Iron (ZVI) in Combination with Oxidants, *Chemical Engineering Journal* (2018), doi: <https://doi.org/10.1016/j.cej.2018.03.187>

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Selenite Removal from Groundwater by Zero-valent Iron (ZVI) in Combination with Oxidants

Yameng Li[†], Xuejun Guo^{†*}, Haiyang Dong, Xiaoyan Luo[†], Xiaohong Guan[‡],
Xiangyuan Zhang[†], Xinghui Xia^{†*}

[†]State Key Laboratory of Environment Simulation, School of Environment, Beijing Normal University, No. 19 Xijiekouwai Street, Beijing 100875, China

[‡]State Key Laboratory of Pollution Control and Resources Reuse, College of Environmental Science and Engineering, Tongji University, Shanghai 200092, China

*Corresponding author phone: 86-10-5880-7808 Fax: 86-10-5880-7808

Email: guoxj@bnu.edu.cn; xiakh@bnu.edu.cn

Abstract We recently demonstrated common oxidants simply coupled with ZVI to continuously drive the accelerated Fe^0 corrosion and hence achieve fast and very efficient removal of heavy metals and metalloids from groundwater. In this study, we aimed first to answer a basic question of the oxidant dosage theoretically required to sequester a certain amount of selenite. The specific ratio of oxidant dosage to Se(IV) removal, which reflected the theoretically minimal oxidant dosage required to sequester one mole of Se(IV) , was almost independent of the initial Se(IV) concentration but significantly affected by the difference in oxidant species. To sequester one mole of Se(IV) , the minimum dosage of the required oxidant was calculated to be 3.94~4.09 for NaClO , 3.90~4.33 for H_2O_2 , and 3.29~3.54 for KMnO_4 , respectively. Simultaneous aeration increased the removal efficiency of Se(IV) and substantially reduced the required dosage of oxidants. To form a strong contrast with very limited Se(IV) removal by ZVI alone, the coupling of NaClO and

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