Short Communication

One-step removal of thallium (I) from groundwater by electrocoagulation using an aluminum anode

Wei Wang, Baogang Zhang*, Yunlong Li, Shuai Liang

School of Water Resources and Environment, MOE Key Laboratory of Groundwater Circulation and Environmental Evolution, China University of Geosciences (Beijing), Beijing 100083, P. R. China

*E-mail: zbgcugb@gmail.com, baogangzhang@cugb.edu.cn

doi: 10.20964/2020.02.31

Received: 16 January 2018 / Accepted: 8 March 2018 / Published: 31 December 2019

Thallium (Tl) contamination in groundwater is a widespread issue, and the development of an efficient treatment process is of strong interest. We present, herein, a one-step Tl(I) removal method using electrocoagulation systems. Using this method, $86.4\% \pm 1.0\%$ of total Tl was removed within 60 min by an aluminum anode, with an initial Tl(I) concentration of 10 mg/L and current density of 10 mA/cm². The Tl removal efficiency increased with increasing current density. However, Tl removal efficiency increased first and then decreased with increasing pH in alkaline pH range. Tl(I) was partly oxidized to Tl(III) and both species precipitated with function of synchronously produced coagulants. X-ray photoelectron spectroscopy was used to analyze the recovered precipitate as well as to confirm the generation of Tl(III) and simultaneous adsorption of Tl(I). This study provides an efficient alternative for one-step Tl removal from groundwater via electrocoagulation.

Keywords: Thallium; Electrocoagulation; Aluminum anode; Groundwater

[FULL TEXT](#)

© 2020 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).