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"Gheorghe Asachi" Technical University of Iasi, Romania

OPTIMIZATION OF SOME CATIONS FOR REMOVAL OF ARSENIC FROM GROUNDWATER BY ELECTROCOAGULATION PROCESS

Mehmet Kobya[1], Emrah Sık[2], Erhan Demirbas[2*], Aysegul Yagmur Goren[1], Mehmet Salim Oncel[1]

[1]*Department of Environmental Engineering, Gebze Institute of Technology, Gebze-Turkey*
[2]*Department of Chemistry, Gebze Institute of Technology, Gebze-Turkey*

Abstract

This study dealt with investigation of arsenic removal from groundwater using electrocoagulation (EC) method in a batch mode by the Box-Behnken experimental design method. Effects of some cations like Ca, Fe, Mg, Mn and operating time on the removal were explored by an air injected EC reactor. The combined effects of these variables were analyzed by the quadratic model for predicting the highest removal efficiency of arsenic from groundwater. The arsenic removal efficiency was found to be dependent on increase with operating time and concentrations of Ca, Mg, Fe and lower concentration of Mn. When operating variables were considered as minimum operating cost and maximum removal efficiency, the optimum operating parameters were determined to be 132 mg/L of C_{Ca}, 55 mg/L of C_{Mg}, 4.5 mg /L of C_{Fe}, 4.5 mg/L of C_{Mn} and operating time of 3 min to meet the target concentration of <10 µg/L. Values of removal efficiency and operating cost at the optimum conditions were 95.1% and 0.041 \$ /m^3.

Key words: arsenic removal, cations effects, electrocoagulation, groundwater, reactor design

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[*]Author to whom all correspondence should be addressed: e-mail: erhan@gyte.edu.tr; Phone: +90 2626053010; Fax: +90 2626053005