Geophysical Research Abstracts
Vol. 14, EGU2012-13654, 2012
EGU General Assembly 2012


# Aluminum colloid formation and its effect on co-precipitation of zinc during acid rock drainage remediation with clinoptilolite in a slurry bubble column

W. Xu (2), L. Y. Li (1), and J. R. Grace (2)

(1) The University of British Columbia, Civil Engineering, Vancouver, Canada (lli@civil.ubc.ca), (2) The University of British Columbia, Chemical and Biological Engineering (jgrace@chbe.ubc.ca)

Zinc and other metal ions were adsorbed in a laboratory slurry bubble column (SBC) by natural clinoptilolite sorbent particles. During the remediation process, significant white precipitates were sometimes observed. Both zinc and aluminum were detected in the colloidal mixtures. It is shown that Al leached from clinoptilolite during the agitation, contributing to the precipitate. As a result of the Al leaching and increase of pH during the remediation process, the formation of an Al colloid and zinc adsorption onto it could significantly improve ARD remediation, given the high adsorption capacity of the colloid. Sorption of cations increased with increasing colloid formation. Various conditions were tested to investigate their impact on (a) dealumination of clinoptilolite; (b) Al hydrolysis/colloid formation; and (c) adsorption onto the colloidal mixture. The test results indicate that dealumination contributes to the excess aluminum in the aqueous phase and to precipitates. The excess dealumination varies with pH and agitation time. Al hydrolysis occurs with increasing pH due to the neutralization effect of clinoptilolite. A significant proportion of zinc adsorbed onto the collectible aluminum precipitates.