

Effect of Zinc (Zn (II)) on the Adsorption Mechanisms of Arsenate (As (V)) at the Goethite-Water Interface. (S02-grafe092408-Oral)

Authors:

- M.Grafe* - *University of Delaware*
- D.L.Sparks - *University of Delaware*

Abstract:

In acid mine drainage and in lime amended metal contaminated sites, metal cations such as Zn (II) may significantly influence the sorption behavior of co-occurring As (V) and vice versa. Using pH-stat controlled batch reactors, the pH and ionic strength dependence of As and Zn adsorption on goethite was investigated over a pH range of 3 to 10. X-ray absorption fine structure (XAFS) spectroscopic data were also collected to help elucidate the mechanism of As and Zn adsorption on goethite. The macroscopic data show that As adsorption on goethite was envelope-like and increased by a factor of two in the presence of Zn and was independent of ionic strength. In contrast, Zn adsorption on goethite was edge-like and did not increase in the presence of As and was strongly ionic strength dependent between pH 3.5 and 5.5. With increasing pH, Zn adsorption on goethite became increasingly independent of electrolyte concentration. Preliminary XAFS data analyses indicate that a As-Zn precipitate formed at pH 7 and with increasing As and Zn surface loadings. These data may prove useful in developing remediation strategies for metal-arsenate contaminated sites.

Corresponding Author Information:

Markus Grafe	phone: (302) 831-1595
University of Delaware	fax: (302) 831-0605
152 Townsend Hall	e-mail: mgrafe@udel.edu
Newark, DE 19717	

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