

TI: Arsenic Speciation in Groundwater: Role of Thioanions

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AB: The behavior of arsenic in groundwater environments is fundamentally linked to its speciation. Understanding arsenic speciation is important because chemical speciation impacts reactivity, bioavailability, toxicity, and transport and fate processes. In aerobic environments arsenic is mainly present as arsenate. In the subsurface, reducing conditions frequently prevail and arsenite species dominate. At sites where groundwater remediation is necessary, understanding arsenic speciation is critical, especially when technologies that strategically manipulate redox conditions are used. In sulfate-reducing environments and where free sulfide is available thioarsenic species are known to exist, yet compared to the oxyanion species of arsenic little is known about the formation, structure, chemistry, and stability of arsenic thioanions in the environment. In particular, data are lacking that pertain to the redox behavior of arsenate and arsenite in the presence of aqueous sulfide and at variable pH. In this presentation, results are discussed of recent speciation studies using extended X-ray absorption fine structure (EXAFS), X-ray absorption near edge spectroscopy (XANES), and chromatographic analysis. Data from both experimental and field systems will be presented. Results indicate that both thioarsenite and thioarsenate species exist and both forms of thioarsenic species need to be considered in sulfidic environments.

This is an abstract of a proposed presentation and does not necessarily reflect EPA policy.