Thioarsenite solution species and complexation on kaolinite. (S02-bostick014709-Oral)

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Abstract:

Arsenic, a common soil contaminant, may form strong complexes with dissolved sulfide, potentially impacting both its solubility and reactivity. Here we examine the structure of arsenic(III)-sulfide complexes formed under neutral to basic pH and varying sulfide activities using EXAFS and Raman spectroscopy, and examine adsorption of these complexes on kaolinite. Several distinct arsenic (III)-sulfide complexes were identified, ranging from monothioarsenite in sulfide-deficient solutions to trithioarsenite complexes when excess sulfide is present. These species are retained on kaolinite as inner-sphere complexes through bridging oxygen groups and are accompanied by the release of sulfide into solution. The formation of arsenic(III)-sulfide dissolved complexes and their weak reaction with mineral surfaces may explain the limited arsenic retention observed in sulfide-rich solutions and needs to be considered when predicting the fate of arsenic in the environment.

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