The sorption of arsenite in sulfidic solution on magnetite and ferrous sulfide

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The mobility and fate of arsenic(As) is influenced by its speciation in aquatic environment [1]. Thioarsenic species, including thioarsenates and thioarsenites, are important As species in sulfidic waters, such as geothermal alkaline waters [2]. However, little is known about the sorption behavior of thioarsenite on mineral surfaces. In this work, we investigated the adsorption kinetics and envelopes of arsenite on magnetite and ferrous sulfide from sulfidic solutions at various S/As ratio, in which thioarsenite has been identified as important As species, and characterized the speciation of the adsorbed arsenic by XAS and Raman.

The results showed that adsorption of thioarsenite on magnetite and ferrous sulfide was less than arsenite. The sorption of arsenic from thioarsenite solution on magnetite dropped with increasing pH, while that on ferrous sulfide did not change appreciably with pH. Adsorption of thioarsenites on magnetite caused desulfidization and Fe(III) reduction, and arsenic was adsorbed as arsenite. The adsorbed arsenic on the surface of ferrous sulfide was present partly as thioarsenite and partly as arsenic sulfide.

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[1] Terlecka (2005) *Environmental Monitoring and Assessment* **107**, 259-284.
[2] Keller *et al*. (2014) *Geochimica et Cosmochimica Acta* **142**, 15-26.