

Characterization of Selenium Speciation on Mineral Surfaces in San Joaquin River Sediments. (S11-nam150743-Poster)

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Abstract:

Se contamination in California's Central Valley arises from agricultural drainage due to cultivating seleniferous soils. Generally, Se is found as inorganic oxyanions, which have varying affinity for metal oxides surfaces found in soil and sediment. It is understood that the reduced form, selenite (Se(IV)), is less mobile than the oxidized form, selenate (Se(VI)). Manganese dioxide, a naturally occurring mineral, can play a role in oxidizing Se(IV) to Se(VI). In this study the speciation of Se(IV) and Se(VI) and their reactions with river sediment and manganese dioxide were investigated by hydride generation atomic absorption spectrometry (HGAAS). The surface chemical Se(IV) oxidation reaction on manganese dioxide is comprised of adsorption of Se(IV), electron transfer, and desorption of Se(VI). Results suggest the reaction does not result in complete Se(IV) oxidation. Some of the Se(IV) remains adsorbed onto the reactive surface sites of the manganese dioxide. By lowering the pH to below pH 6, the oxidation of Se(IV) by manganese dioxide is increased. Selenate, being more mobile, does not absorb onto the surface of manganese dioxide.

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