Oxyanion Immobilization in Soil by Reactions with Zero-Valent Iron Corrosion Products. (S02-manning134610-Oral)

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Abstract:
The occurrence of inorganic oxyanion contaminants (As(III), As(V), Cr(VI), and Se(VI)) in soil and groundwater is a major environmental problem, often requiring in-situ remediation strategies for removal and/or immobilization. Zero-valent iron (Fe(0)) is a reactive material shown to be effective in both detoxification of chlorinated organic solvents and in-situ immobilization of dissolved inorganic contaminants. The objective of this paper is to present recent research results which elucidate the chemical characteristics of zero-valent iron and it's iron oxide corrosion products when reacted with synthetic groundwater containing arsenite (As(III)), arsenate (As(V)), chromate (Cr(VI)), or selenate (Se(VI)). Iron oxide corrosion products included a mixture of lepidocrocite (gamma-FeOOH), magnetite (Fe3O4) and maghemite (gamma-Fe2O3). In all cases, reactions of As(III), As(V), Cr(VI), and Se(VI) with corroding Fe(0) resulted in strongly adsorbed reaction products that are partially occluded within the iron oxide solid. Analytical techniques for speciation of As(III)/(V), Cr(III)/(VI), and Se(IV)/(VI) reaction products in the solid and liquid phase will be also be discussed.

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