

## **Enigmatic Behavior of Hexavalent Chromium in a Superfund Site**

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In order to understand the long-term bioavailability of inorganic pollutants such as chromium(Cr) it is essential to quantify their cycling, stability, and sorption state. Nontoxic Cr(III) is the preferred species in the environment; however, manganese(IV) oxides and industrial activity can transform nontoxic Cr(III) into carcinogenic Cr(VI). Manganese oxides can also help immobilize chromium as surface precipitates, resulting in surface passivation of the Mn oxides and a reduction in redox capacity. This process has profound implications to prevent the formation of chromate [Cr(VI)], sequester free chromium, and minimize the risk of environmental contamination. Despite the significance of Cr in the environment, there is currently a very limited understanding of these reactions. Our research seeks to address these deficiencies by elucidating the mechanisms of chromium oxidation on manganese surfaces in stirred-flow experiments. Additional studies focused on Cr(VI) desorption from contaminated soils. Synchrotron-based X-ray absorption fine structure spectroscopy (XAFS) was used to differentiate chromium phases and understand their long term environmental stability.