

Surface chemistry of Cr(III) oxidation and precipitation on Mn(IV) oxides

GEOC 29

Gautier Landrot, landrot@udel.edu, Department of Plant and Soil Sciences and Center for Critical Zone Research, University of Delaware, 152 Townsend Hall, Newark, DE 19716 and Donald Sparks, dlsparks@udel.edu, Department of Plant and Soil Sciences and the Center for Critical Zone Research, University of Delaware, 149 Townsend Hall, Newark, DE 19717.

The main soil components that oxidize Cr(III) to the more hazardous chromium species Cr(VI) are manganese oxides. With hydrous manganese oxide (HMO) and birnessite, Cr(III) may react in two steps: a first step in which Cr(III) sorbs to MnO₂ and exchanges its electrons, and a second step when a chromium hydroxide precipitate may form on the surface of the manganese oxide. Our primary goal in this study is to measure the kinetics of surface precipitate formation, to understand its effect on the Cr(III) oxidation rate, and to infer chemical mechanisms that are involved in steps 1 and 2. To address these questions, several spectroscopic and microscopic techniques were used in the study including quick XAFS, TEM, XPS, and SEM. Understanding the reactivity of chromium with manganese oxides from both a molecular spatial scale and a rapid temporal scale will help us predict the fate of chromium in the environment.

[Biogeochemical Redox Processes in Soils and Sediments](#)

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