



ASA-CSSA-SSSA

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# 2009 International Annual Meetings

*Footprints in the Landscape: Sustainability through Plant and Soil Sciences*

Kinetics of Chromium(III) Oxidation by Manganese(IV) Oxides Using Quick X-Ray Absorption Fine Structure Spectroscopy (Q-XAFS).

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*Thursday, November 5, 2009: 9:30 AM*

*Convention Center, Room 413, Fourth Floor*

**Gautier Landrot**, Univ. of Delaware, Newark, DE, Matt Ginder-Vogel, Plant and Soil Science and Center for Critical Zone Research, Univ. of Delaware, Newark, DE and Donald Sparks, 152 Townsend Hall, Univ. of Delaware, Newark, DE

The rapid kinetics of Cr(III) oxidation on mineral surfaces is poorly understood, yet a significant portion of the oxidation process occurs on rapid time scales. In this study, the initial rates of Cr(III) oxidation on hydrous manganese oxide (HMO) were measured at three different pH values (pH=2.5, 3 and 3.5), using a Quick X-Ray Adsorption Fine Structure Spectroscopy (Q-XAFS) batch method. The calculated rate constants were 0.201sec<sup>-1</sup>, 0.242sec<sup>-1</sup>, and 0.322sec<sup>-1</sup> at pH=2.5, 3, and 3.5, respectively. These values were independent of both [Cr(III)] and [Mn(II)], suggesting that the reaction was chemically controlled and not dependant upon diffusion at the time period the rate parameters were measured. A second-order overall rate was found at three pH values. This represents the first study to determine the chemical kinetics of Cr(III) oxidation on Mn-Oxides. The results will be useful in predicting the fate and transport of Cr in the environment.

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See more of: [Surface Chemistry and Reactions: II](#)