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Kinetics of Chromium(III) Oxidation on Manganese Oxides Using Real-Time Molecular Scale Approaches.

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Manganese oxides are an important soil component capable of oxidizing chromium(III) to the more hazardous and mobile chromium(VI). Although the kinetics of chromium oxidation by Mn-oxides have been studied, the calculated rate parameters are apparent since transport phenomena are not eliminated. Moreover, a significant portion of the oxidation process, which is quite rapid, is not measured using traditional batch and flow techniques. In this study, we measure the chemical kinetics of Cr (III) oxidation on Mn-oxides, at second time scales, using real-time molecular scale Attenuated Total Reflectance Fourier Transform Infrared Spectroscopy (ATR-FTIR) and Quick X-ray Absorption Fine Structure (QXAFS) Spectroscopy.. These are promising techniques that can be employed to investigate a range of rapid soil chemical processes.

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