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**The Influence of Phosphate and Sulfate on Arsenic Oxidation Via Hydrrous Mn-Oxides.**

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Surface catalyzed oxidation of arsenite via Mn-oxides can occur within the first few minutes of reaction. The effect of competing ions, such as sulfate and phosphate, on initial oxidation rates and extent of oxidation is of particular interest for soils receiving poultry manure applications with elevated arsenic concentrations. In this study, single bounce ATR-FTIR spectroscopy has been employed to collect *in situ* rapid kinetic data on the oxidation of arsenite [As<sup>III</sup>] via hydrrous Mn-oxides (HMO). Using a rapid scan technique, IR spectra are collected every 2.55 seconds (24 scans, 8 cm<sup>-1</sup> resolution). Through observation and analysis of IR bands corresponding to arsenate (As<sup>V</sup>), rapid chemically-controlled As<sup>III</sup> oxidation is observed. Analysis of first-order rate kinetics revealed 95% transformation of As<sup>III</sup> to As<sup>V</sup> in < 3 min ( $t_{1/2}$  < 1 min). Investigations reveal that the presence of both sulfate and phosphate do not influence the initial reaction rate, but do significantly reduce the amount of As<sup>III</sup> which converted to As<sup>V</sup>.

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