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IN SITU SPECTROSCOPIC STUDIES OF SULFATE AND BORATE ADSORPTION MECHANISMS ON IRON OXIDES: IMPLICATIONS FOR SURFACE COMPLEXATION MODELING. ***J. D. Peak***, *and D. L. Sparks, Dept of Plant and Soil Sciences, University of Delaware, 149 Townsend Hall, Newark, DE 19717, Fax: 302-831-0605, dpeak@udel.edu*

Understanding and predicting adsorption reactions at the mineral-water interface is an important area of geochemical research. Typically, in situ spectroscopy is used to determine adsorption mechanisms, while surface complexation modeling is applied to describe the extent of adsorption over a range of pH and surface loading. As surface complexation models become more sophisticated, it becomes increasingly important to refine them with results from complementary spectroscopic studies. In this paper, the authors will present information on sulfate and borate surface complexation mechanisms on iron (III) oxides and hydroxides obtained via ATR-FTIR spectroscopy. The effect that reaction variables such as pH, ionic strength, surface loading, and sorbent structure have on adsorption mechanisms will be discussed in detail. The results will also be contrasted with predictions of adsorption mechanisms obtained from surface complexation models in the literature.