

## **Use of X-Ray Absorption Spectroscopy to Monitor the Kinetics of Metal Sorption Reactions at the Soil/Water Interface**

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Metal sorption on clay and oxide minerals is typically fast initially with rates gradually diminishing over time. The decline in reaction rate at high surface loadings has been attributed to metal sorption onto sites of lower reactivity, diffusion of the adsorbate into the sorbent or by a precipitation reaction. We investigated the effect of reaction time on the surface coordination environment of Ni sorbed onto clays and aluminum oxides using X-ray absorption fine structure (XAFS) spectroscopy. Sorption kinetics were studied over long reaction periods and structural changes in the sorption product monitored with XAFS spectroscopy. As reaction time progressed, multinuclear Ni complexes increasing in size were depicted. Data analysis suggest the formation of mixed Ni-Al hydroxide phases kinetically controlled by the release of Al from the clay and aluminum oxide surface. This finding illustrates the importance of considering secondary precipitate formation during metal sorption to clay and aluminum oxide surfaces.