

Kinetics and Mechanisms of Competitive Metal Sorption on Ferrihydrite.

A. C. Scheinost, D L. Sparks, *University of Delaware*

Due to its high surface area ferrihydrite is an effective sink for metals in natural soils and water bodies as well as during wastewater treatment. Although the competitive sorption of metals onto ferrihydrite has been extensively investigated for many years, knowledge on the mechanisms and kinetics of the sorption process is still small. Therefore, we investigated the time-dependent Cu and Pb sorption by X-ray absorption spectroscopy at the Cu-, Pb-, and Fe-edges. Both Pb and Cu sorbed by formation of inner-sphere sorption complexes, reaching sorption densities up to 0.3 mol metal per mol Fe, at pH 5, and within 48 hours. However, Cu and Pb sorption increased over two months, the extent of the slow sorption depending on the ferrihydrite pretreatment and the metal competition. The results suggest that sorption is controlled by diffusion towards hidden surface sites. The aggregation of ferrihydrite is presently investigated by in-situ X-ray microscopy.

Andreas C. Scheinost, 302 831 1595, scheinost@udel.edu