

086. MONITORING THE KINETICS OF METAL SURFACE PRECIPITATE FORMATION USING X-RAY ABSORPTION FINE STRUCTURE (XAFS) SPECTROSCOPY. Andre M. Scheidegger, Donald L. Sparks, Department of Plant and Soil Sciences, University of Delaware, Newark, Delaware 19717-1303, and Geraldine M. Lamble, Building 510E, NSLS, Brookhaven National Laboratory, Upton, New York 11973.

Metal sorption on clay and oxide minerals is typically fast initially, then the rates gradually diminish. In the literature the decline in reaction rate has been attributed to metal sorption onto sites of lower reactivity, diffusion of the adsorbate into the adsorbent or by a precipitation reaction. Unfortunately, the above hypotheses were normally based solely on macroscopic studies. We investigated the effect of reaction time on the surface coordination environment of Ni sorbed onto pyrophyllite using X-ray absorption fine structure (XAFS) spectroscopy. The kinetics was studied over a long reaction period (minutes to months) and changes in the XAFS spectra were monitored. As reaction time progresses, surface precipitates increasing in size were depicted. This finding implies that slow nucleation processes cause the slow sorption kinetics. This study also emphasizes the importance of coupling kinetic studies with in-situ spectroscopic investigation in elucidating sorption mechanisms of metal ions onto mineral surfaces.