058. KINETICS AND MECHANISMS OF METAL CATION SORPTION AT THE MINERAL/WATER INTERFACE.

D. L. Sparks, A. M. Scheidegger, D. G. Strawn, and K. G. Scheckel, Plant and Soil Sciences Department, University of Delaware, Newark, DE 19717-1303.

Metal cation sorption/release on natural materials is often biphasic. A fast reaction on time scales of minutes to hours is followed by a slow reaction that often continues for days and months. The mechanism for the slow reaction has been ascribed to diffusion phenomena, sorption on sites of varying reactivity, and formation of polynuclear surface precipitates. X-ray absorption fine structure (XAFS) spectroscopic studies of Ni(II) and Co(II) sorption on an array of clay minerals and metal oxides have shown the formation of mixed metal surface precipitates that occur at low metal sorbate levels and at relatively rapid times. Other studies with larger metal cations such as Pb(II) do not indicate significant surface precipitation formation. This overview paper will discuss the elucidation of metal cation sorption mechanisms via modern in-situ molecular techniques coupled with equilibrium and kinetic approaches.