IN-SITU EXAFS STUDY ON THE EFFECT OF SORPTION SITE TYPE ON AQUEOUS COBALT(II) AND STRONTIUM(II) SORPTION AT SOLID-WATER INTERFACES. Chia-chen Chen and Kim F. Hayes, Environmental and Water Resources Engineering, The University of Michigan, Ann Arbor, MI 48109-2125, USA.

Metal ion mobility in soil environments is mainly controlled by sorption processes. Sorbent, sorbate characteristics and solution conditions including pH and the presence of competing cation impact the extent and type of sorption reactions which occur. In this study, EXAFS was used to investigate the local structure between metal ions and mineral surfaces in order to distinguish among possible sorption complexes. The experiment conditions included three different ionic strengths, 0.1, 0.01, 0.001 M, and sodium nitrate and calcium chloride background electrolytes. Alumina oxide, kaolinite, illite, hectorite, and montmorillonite were used to represent solids with different structures, surface charges, and cation exchange capacities. Various natural soils were also studied. The results suggest that strontium forms only outer-sphere complexes on a solid surface regardless the solid characteristics and solution conditions. Cobalt sorption, on the other hand, forms different surface complexes depending on the type of sorption sites and solution conditions.

AN XAS ANALYSIS OF LEAD COMPLEXES AT THE GIBBSITE & PYROPHYLITE SOLID/LIQUID INTERFACE. T.E. Alcacio, G.M. Lamble, A.M. Scheidegger and D.L. Sparks, University of Delaware and Brookhaven National Laboratory.

Through macroscopic batch studies, it has been repeatedly demonstrated that heavy metals are attenuated at the solid/liquid interface. Developing our understanding of metal-surface interactions is therefore important to improve current technologies, e.g., clay barriers in land fills, which may influence the fate and transport of contaminants into the environment. In this study, the local molecular environments of Pb treated pyrophyllite and gibbsite were determined by X-ray Absorption Spectroscopy (XAS). After equilibrating both minerals separately, the binding modes appear to be quite different. In both systems, edge sharing with a Pb polyhedra is evident based on best fits of three equidistant Pb-0 bonds at 2.30 Å. However, the spectrum of Pb treated gibbsite also contains a greater number of Pb-0 contributions occurring near 2.55 Å. These dissimilarities suggest that the interaction modes for gibbsite and pyrophyllite are quite different. The variations in the observed Pb surface complexes will be discussed in further detail.

KINETICS OF LEAD ADSORPTION BY IRON OXIDES FORMED AT VARIOUS CITRATE CONCENTRATIONS. C. Liu and P. M. Huang, Dept. of Soil Science, Univ. of Saskatchewan, Saskatoon, SK Canada S7N 5A8

The presence of organic acids greatly affects the formation of iron oxides; however, the subsequent effect on surface chemistry of the iron oxides formed remains obscure. To investigate the kinetics of lead adsorption on the iron oxides formed in the presence of citrate ligands at citrate/Fe(II) molar ratios(MR) of 0, 0.001, 0.01, and 0.1, the experiment(batch method) was