Glenn T. Seaborg Center Seminar

Crystal Truncation Rod surface diffraction studies of hydrated oxide surfaces: equilibrium structure, sorption effects and time-resolved experiments

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Over the past 7 years crystal truncation rod (CTR) surface diffraction has been developed so that studies of "wet" mineral surfaces can be routinely performed, allowing the study of the effect of water equilibration and pH on surface structure. More recently, CTR work has been done on a number of systems examining the nature of sorbant sites and geometry. This work is highly complimentary to surface grazing-incidence XAFS as it yields information on the sorbate-substrate interaction not available via XAFS. In particular, the nature of silicate-mineral surface interactions are especially important in environmental systems due to passivation effects, and Si XAFS analysis is extremely difficult. However CTR analysis is quite practical for such low Z elements. The results for a set of measurements on the wet surfaces of sapphire, hematite and goethite will be described, along with a discussion of work in progress. Planned work is aimed at continuing studies into the fast time domain to explore surface relaxation processes and electron transfer reactions, and approaches for such studies will be presented.

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