Analysis of Soil Minerals Using XAFS Spectroscopy. (S09-hesterberg162544-Oral)

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Abstract:

X-ray absorption fine structure (XAFS) spectroscopy is an element-specific approach for analyzing trace minerals in soils. This presentation will summarize steps involved in x-ray absorption near edge structure (XANES) and extended x-ray absorption fine structure (EXAFS) analyses. These techniques determine the local molecular bonding coordination of an element, and involve three main phases: (1) sample preparation, (2) data collection, and (3) data analysis. Sample preparation includes sample preservation and mounting for data collection in fluorescence or transmission mode. Data collection at a synchrotron facility depends on the x-ray energy used (soft or hard x-rays), and includes monochromator calibration and energy scans on both standards and samples at an x-ray absorption edge. Data processing includes data conversion, deglitching, monochromator energy calibration, and merging of multiple spectra. To obtain quantitative information on chemical speciation, the XANES and EXAFS portions of a spectrum are normalized to a per-atom basis through baseline and background correction procedures, and are treated as independent from each other.

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