# Synchrotron Micro X-ray Diffraction Analysis of Soil Materials. (S09-schulze120354-Oral)

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## Abstract:

Mineral phase information is critical for assessing metal solubility and bioavailability in soils, but traditional bulk diffraction techniques are inadequate for detecting trace phases. Synchrotron micro-x-ray diffraction allows simultaneous acquisition of both elemental and phase information at spatial resolutions on the order of 10 x 10 um. We prepared samples as selfsupporting, 30 um sections impregnated in epoxy resin, as ~200 um grains mounted on glass fibers, and as ~100 um grains mounted on Kapton tape. Kaolinite and quartz were prominent in XRD patterns from thin sections of a Brazilian Oxisol. Grains from crushed Fe-Mn nodules from an Indiana Aquoll provided the best patterns. Many contained goethite and quart, a few contained chlorite and mica, and some contained romanechite, a rare Ba-Mnoxide. Small grains in a contaminated soil contained crocoite, PbCrO4, the pigment 'chrome yellow.' The XRD patterns almost always consist of diffuse rings typical of fine-grained phases, and discrete, bright spots typical of larger crystals. By masking the bright spots, the powder pattern can be extracted for phase identification. (Supported by USDA NRI and DOE NABIR.)

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