



1. Title

Mineralogy and Reactivity of Soil Microsites

2. Type

Commission Symposium: Comm. 2.4-Soil Mineralogy

3. Organizer(s) & Convener

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4. Rationale

Molecular-level analytical tools have provided a wealth of insights on fundamental geochemical reaction mechanisms in model systems, but these tools have limitations when applied to multi-component, heterogeneous soil matrices. Scientific advances are needed to accurately predict reaction mechanisms and kinetics in soils and other complex geochemical matrices. Analysis of chemical reactions in relation to properties of soil microsites can potentially identify mechanisms and matrix-component interactions in these complex systems.

5. Objectives

- Present state-of-the art analytical tools for identifying chemical species and chemical reactivity of trace elements and other strongly bound soil elements directly in soil microsites.
- Illustrate transferability of reaction mechanisms identified in model systems to soils.
- Identify research pathways for increasing our knowledge of microsite chemistry.

6. Description

Molecular-level analytical tools have provided a wealth of insights on fundamental geochemical reaction mechanisms in model systems, but these tools have limitations when applied to multi-component, heterogeneous soil matrices. Synchrotron X-ray microprobes have revealed mineralogy by (micro) diffraction, element distributions by fluorescence, and element-specific, chemical speciation by absorption spectroscopy within discrete micron to submicron sized areas. With this suite of analyses, geo- and bio-chemical transformations of elements may be analyzed and give rise to unique, yet seemingly interconnected mineralogical and chemical micro-environments: reactive soil micro-sites. This symposium intends to present research related to reactive soil microsites as a novel conceptual model to help explain reaction mechanisms in multi-component, heterogeneous soil matrices.

