Sub-mm Chemical Imaging and Isotope Ratio Analysis with Secondary Ion Mass Spectrometry. (S03-cliff122450-Oral)

Authors:

- J.B.Cliff* - *Oregon State University*
- P.J.Bottomley - *Oregon State University*
- D.J.Gaspar - *Pacific North West National Laboratory*
- D.D.Myrold - *Oregon State University*

Abstract:

Although the importance of microsites in soil biochemical processes have long been assumed, techniques to directly probe these features have largely been lacking. In secondary ion mass spectrometry (SIMS), a focused ion beam bombards a sample surface ionizing atomic and molecular secondary fragments, which are focused and accelerated into a mass analyzer. As the primary ion beam is rastered across the sample surface, two-dimensional information is acquired allowing for ion imaging of selected chemical signatures. Spatial resolution of less than 100 nm and mass resolution (m/delta m) of greater than 10,000 are achievable with SIMS. Detection limits of easily ionizable species are often at the low ppb to mid ppt level. In this presentation we will review fundamental concepts of SIMS instrumentation and analysis as well as some examples of recently implemented biological and geological applications. Finally, we describe ongoing research that combines ion imaging with isotope-ratio analysis to shed light on the sub-mm spatial scale and physiochemical controls of inorganic N assimilation by soil microbes.

Corresponding Author Information:

John Cliff
Oregon State University
3017 Ag and Life Sci Bldg
Corvallis , OR 97331

phone: 541-737-9299
fax: 541-737-5725
e-mail: john.cliff@orst.edu

Presentation Information:

Presentation Date: Monday, November 11, 2002
Presentation Time: 2:00 pm

Keywords:

SIMS, Chemical imaging, Isotope ratio