A Linear Combination Analyses Approach For Directly Speciating Ni Contaminated Soils. (S02-trivedi215458-Oral)

Authors:

- P.I.Trivedi* - *University of Delaware, Newark, DE*
- D.McNear - *University of Delaware, Newark, DE*
- D.L.Sparks - *University of Delaware, Newark, DE*

Abstract:

To provide an accurate description of the fate of Ni in aerial-contaminated soils neighboring a smelter refinery, it is essential to understand its speciation. This research asserts the need to combine multiple analytical techniques to accurately determine metal speciation in complex soil systems. Micro-XRF analyses reveal that Ni species exist as discrete particles that are associated neither with any of the mineral phases nor with the organic components of these soils. As a result, linear combination analyses were constrained to estimating the relative concentrations of NiO and Ni(OH)2 in the soil samples, where the Ni-Ni bond distance in the second shell is the key parameter. Combined results of bulk and micro-focussed spectroscopic studies on soils located closer to the Ni refinery, where pH ranges from 5.9 to 6.6, is dominantly in the form of nickel oxide. On the other hand, in the soil samples (~ pH 7) collected at approximately 3.0 km from the refinery, nickel predominantly exists as a disordered hydroxide. Interestingly, soil samples that were collected from intermediate locations contained significant fractions of both nickel oxide and the disordered hydroxide.

Corresponding Author Information:

Paras Trivedi
University of Delaware
152, Townsend Hall, Dept. of Plant and Soil Sci.
Newark, DE 19717

phone: 302-831-1595
fax: 302-831-0605
e-mail: paras@udel.edu

Presentation Information:

Presentation Date: Thursday, November 14, 2002
Presentation Time: 10:15 am

Keywords:

X-ray absorption spectroscopy (XAS), metal speciation, contaminated soils, linear combination analyses