

Dissolution of Nickel Oxide in a Smelter Contaminated Soil. (S02-mcnear100330-Oral)

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Abstract:

Aerially dispersed nickel oxide particles from a nickel smelter were studied. SXRF mapping and SEM imaging of the soils surrounding the facility revealed distinct spherical particles, 20-50 micro-m in diameter. Bulk XAFS and micro-XAFS analysis, indicates that nickel oxide (NiO) and nickel hydroxide (alpha -Ni(OH)₂) are the predominant species. The presence of Ni(OH)₂ indicates that weathering of the NiO particles is occurring, but perhaps not at previously published rates. The physicochemical properties of the reagent grade nickel oxides used in previous studies may not be representative of that generated from the smelter facility due to different production conditions. Therefore, rates and mechanisms of dissolution were determined for particles generated from the smelter, instead of reagent grade materials, in an effort to better estimate the reaction conditions encountered within the soils surrounding the nickel refinery. Subsequently, dissolution studies using soils that were lab contaminated with the smelter generated nickel oxide particles will be conducted to better understand the degradation pathway of the particles in natural, heterogeneous soil systems.

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