

GEOC 14

Use of novel synchrotron-based techniques to explore the connection between metal speciation in soils and plants

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We investigated the speciation of Ni in smelter contaminated soils in order to discern what effect Ni speciation has on the availability and compartmentalization of Ni in the hyperaccumulator *Alyssum murale*. Using a combination of techniques including SEM, micro-XAFS and SXRF it was found that the primary phases present in the soils were NiO and Ni(OH)₂ with minor solid phase Ni associations. Preliminary results identified Ni-citrate and Ni-histidine complexes as the primary interplant metal species. To ascertain the partitioning of metals within the plant tissue, SEM and SXRF as well as micro-fluorescence computed tomography were employed. Additionally the novel application of transmission computed tomography was used to quickly determine metal partitioning within freshly excised plant leaves and stems. These techniques revealed that Ni is concentrated in the periphery of the leaves and stems as well as indicating an association of Ni with Mn at the base of the trichome.

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