



2016-2017 Internship

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Proposed research

Influence of particle size on Zn sorption by phylломanganates

Keywords: Trace metal elements, Environment, Mn oxides, , crystal chemistry, X-ray diffraction, Zinc.

Summary

Lamellar Mn oxide play a pivotal role in the (bio-)geochemical cycling of a variety of metallic and metalloid elements in surficial formations such as soils and sediments. These minerals originate essentially from biological activity (bacteria, fungi, superior plants) and occur as extremely reactive disordered nanocrystals. Their reactivity is directly related to their minute size and to their high density of defects.

Zinc is frequently associated with Mn oxides in nature. Understanding, at the atomic scale, the structural link between this element and (defective) Mn oxides is a key to assess and model the impact of these defective minerals on zinc biogeochemical cycle. Of special importance is the specific affinity of zinc for edge and interlayer adsorption sites.

The proposed work will involve the synthesis of Mn oxides with contrasting proportions of the two sites and their equilibration in the presence of zinc. Resulting Zn-bearing oxides will be thoroughly characterized both chemically (chemical composition, Mn oxidation degree) and structurally (modelling of X-ray diffraction patterns, X-ray absorption spectroscopy). This study will aim at determining the crystal-chemistry of the zinc-bearing Mn oxides, and more especially the relative proportion of zinc sorbed on edge and interlayer sites.