

## **Arsenic sequestration by pyrite framboids**

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A large amount of excavated soils with low-level As contamination generated from civil construction projects is of great concern in the world. The objective of this study was to determine As speciation in soils collected from the sites affected and unaffected (naturally contaminated) by anthropogenic pollution. Synchrotron based micro-XAFS was used to determine As species and distribution in soils. The results of As K-edge XANES demonstrated that naturally contaminated soils were grouped into two types: i) soils containing FeAsS-like and As<sub>2</sub>S<sub>3</sub>-like species (53%, As-S species) and ii) soils with no or minor As-S species (3%). In naturally contaminated soils enriched with As-S species, a sequential extraction technique found that >50% As was extracted in the oxidizable fraction. Micro-XAFS and micro-XRF revealed that the naturally contaminated soils enriched with As-S species contained pyrite framboids (ave. 20 microns) in which As was present with multiple oxidation states between As(-I) and As(V). Grains of framboidal pyrite was intact in water but dissolved in part by exposing to an oxidizing agent (H<sub>2</sub>O<sub>2</sub>), suggesting that framboidal pyrite becomes a source of As in naturally contaminated soils after being excavated and exposed to the surface environment.