

Low-temperature magnetism of alabandite: crucial role of surface oxidation

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Field Cooled (FC) and Zero Field Cooled (ZFC) induced and remanent magnetization measurement procedure

The temperature dependence of the magnetization was recorded in the sweep mode of 1.5 K/min employing following measurement procedures:

- Field-cooled measurement of induced magnetization (induced FC): sample was cooled from 300 to 5 K in an external magnetic field (e.g., 1 mT) and measurement was carried out on warming from 5 to 300 K at the same value of the external magnetic field (i.e., 1 mT).
- Zero-field-cooled measurement of induced magnetization (induced ZFC): sample was cooled from 300 to 5 K in a zero magnetic field and measurement was carried out on warming from 5 to 300 K at external magnetic field (i.e., 1 mT).
- Field-cooled measurement of remanence (remanent FC): sample was cooled from 300 to 5 K in a magnetic field of 2.5 T and the measurement was carried out on warming from 5 to 300 K in a zero magnetic field.
- Zero-field-cooled measurement of remanence (remanent ZFC): sample was cooled from 300 to 5 K in a zero magnetic field, remanent magnetization was imprinted by an external magnetic of 2.5 T at 5 K and the measurement was carried out on warming from 5 to 300 K in a zero magnetic field.

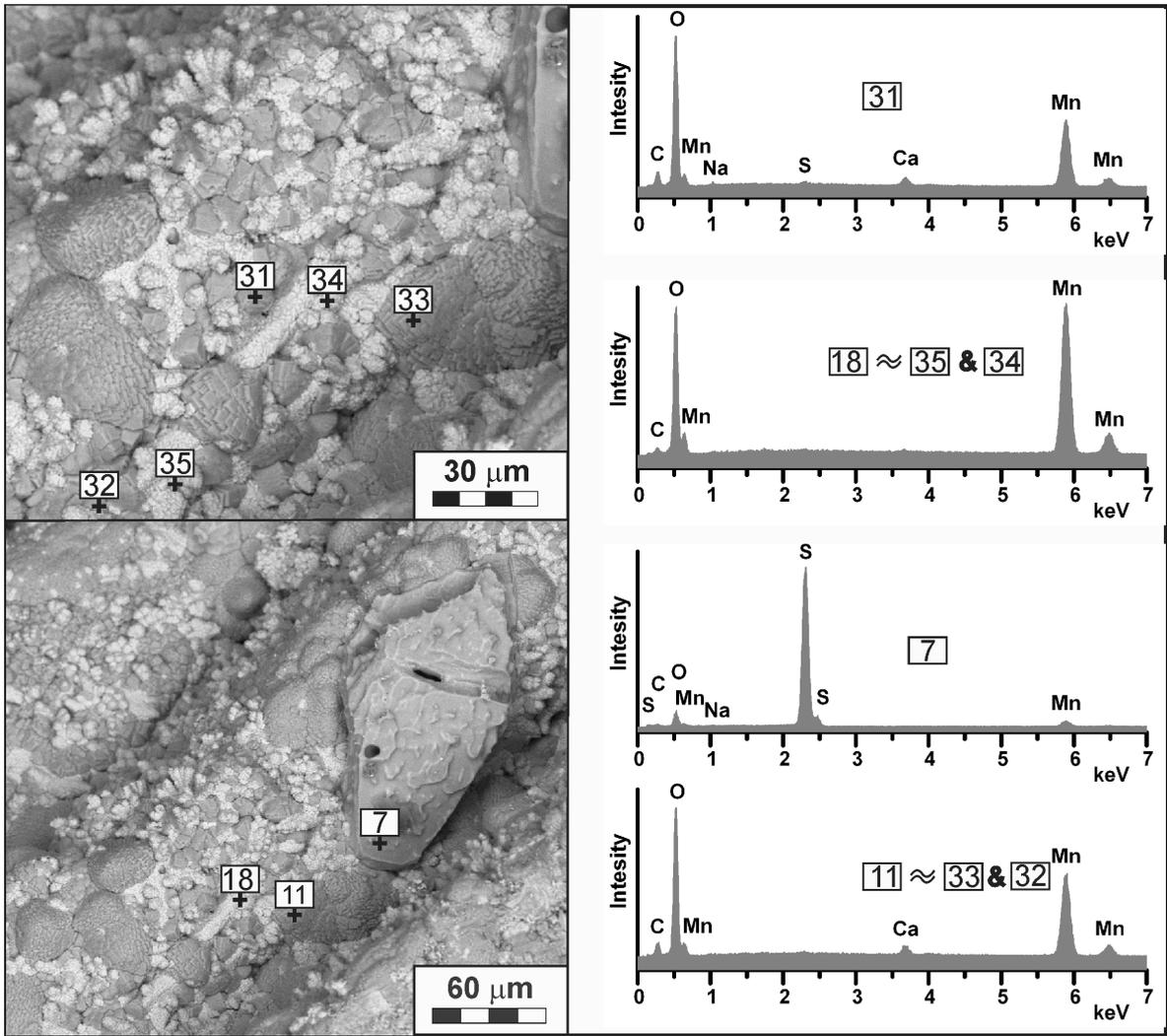


Figure S1. SEM images of NA surface and corresponding EDX spectra showing a presence of manganese oxides and sulfur.