

High-pressure X-ray diffraction study of manganite

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High-pressure X-ray diffraction study of natural manganite (γ -MnOOH) has been performed at room temperature up to 9 GPa in order to investigate the compressibility of the InOOH-related structure.

The natural crystal of manganite (γ -MnOOH) from Harz Mountain, Germany was ground into powder. Electron microprobe analysis of the sample was conducted to determine its composition, with the elements Mn, Fe, Cr, and Al being analyzed. The resultant formula of our sample is MnOOH, and the content of other elements are below detection limit. Powder X-ray diffraction data were collected by the energy-dispersive method using a Ge-SSD detector at the BL04B1 beamline at SPring-8.

A second order Birch-Murnaghan equation of state fit to the experimental data yields $V_0=135.12 \text{ \AA}^3$ with a bulk modulus (K) of 91(2) GPa, assuming the pressure derivative $K'=4$. Our results show that γ -MnOOH is very compressible, contrary to δ -AlOOH by Vanpeteghem et al. (2002, GRL).