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Gahnite under high pressure: A XRD insitu study CHRISTIAN LATHE, Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences, Potsdam, Germany, MICHAEL WEHBER, FRANK SCHILLING, KIT, Karlsruhe Institute of Technology, Institute for Applied Geosciences, Karlsruhe, Germany, HANS MUELLER, Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences, Potsdam, Germany — Placing P-T-t constraints on planetary differentiation Natural gahnite has the ideal formula ZnAl_2O_4 . Together with franklinite (ZnFe_2O_4) it forms a limited solid solution at high temperatures and occurs as an accessory phase in magmatic and metamorphic rocks, but mainly in the Franklin marble and skarn deposits (Carvalho and Sclar 1988, Frondel and Baum 1974). A natural gahnite sample was investigated with large volume presses at the Synchrotron source DESY. Pressure was stepwise increased to 5 GPa at the MAX80 and 15 GPa at MAX200x and diffraction patterns were collected after each step. The determined volume-pressure-data are fitted to a 2nd and 3rd order Birch-Murnaghan equation of state to obtain the isothermal bulk modulus K_{T0} and its pressure derivative K' . Isothermal bulk modulus was derived from XRD data. Using a 2nd and 3rd order Birch-Murnaghan equation of state revealed $K_{T02\text{nd}} = 207(4)$ GPa $K_{T03\text{rd}} = 204(4)$ GPa and $K' = 4.9(3)$, respectively. A significant change of the pressure derivatives of C11, C12 and C44 at a pressure of approximately 15 GPa indicates a 2nd order phase transition in gahnite.

Christian Lathe
Helmholtz Centre Potsdam GFZ German Research
Centre for Geosciences, Potsdam, Germany

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