Dislocations and Crystallite Size in Forsterite Produced at 11 GPa and 1400 ^{o}C

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Synthetic forsterite is deformed at 11 GPa, 1400 °C in a multianvil high pressure apparatus at the Bayerisches Geoinstitut (Universität Bayreuth, Germany). X-ray diffraction patterns are measured by a special high resolution double crystal diffractometer with negligible instrumental effects. The monochromatised $K\alpha_1$ beam has a footprint on the specimen of 0.1x1 mm^2, enableing microbeam analysis. This condition provides diffraction patterns of the small specimens of the size of 0.2x2 mm^2. High resolution enables to carry out line profile analysis on the reflections well separated from those of platinum and corrundum unavoidable due to the small compact specimen structure. The dislocation densities are found to decrease with holding time at 1400 °C from about between $16x10^{14}$ m^{-2} to $0.04x10^{14}$ m^{-2}. Good correspondence of the dislocation structure determined by X-ray line profile analysis and TEM observations has been established [1].

[1] Couvy H., Frost D., Heidelbach F., Nyilas K., Ungár T., Mackwell S., Cordier P., *European Journal of Mineralogy*, 2004, **16 (6)**, 877-889.

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