

Grain boundary energy variation in Olivine.

MARINA SEDLAK, ALEXANDRA AUSTIN AND
KATHARINA TINKA MARQUARDT

Imperial College London

Presenting Author: marina.sedlak21@imperial.ac.uk

The grain boundary energy of olivine is of key importance for the interconnectivity of melt and its extraction and further influences rheology and seismic attenuation. We report measurements of the relative grain boundary energy for forsterite samples with 4 different grain sizes. We extract the grain boundary energy anisotropy from grain boundary grooves formed during annealing. About 100 grain boundaries per sample were analysed by atomic force microscopy (AFM). The groove geometry was evaluated using a simplified form of Young's equation approximating the surface energy as constant and neglecting the torque terms.

We found that the relative grain boundary energy varies between different samples and that grain size potentially impacts the grain boundary energy anisotropy. We discuss our data in the light of grain boundary energy anisotropy in ceramic systems as well as in comparison to the absolute grain boundary energies reported for one natural sample (Duyster and Stöckhert, 2001).

Duyster J. and Stöckhert B. (2001) Grain boundary energies in olivine derived from natural microstructures. *Contrib. to Mineral. Petrol.* **140**, 567–576.