Dislocation Microstructures in Deformed Magnetite

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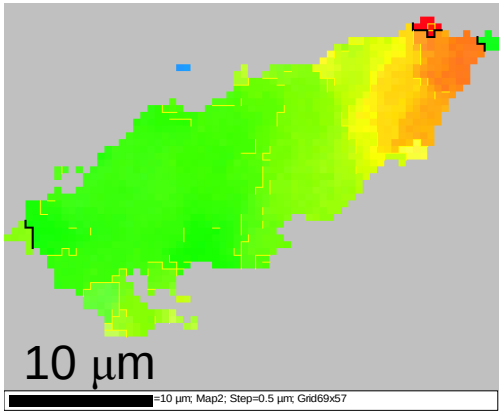
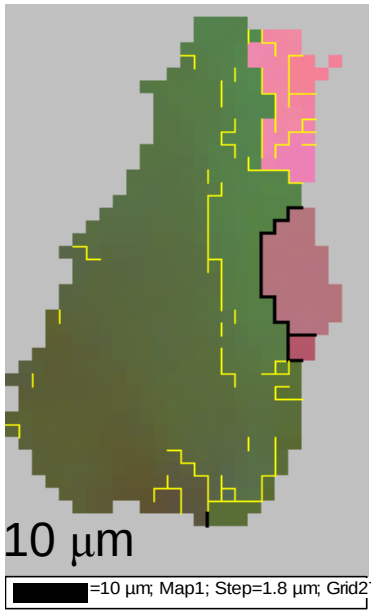
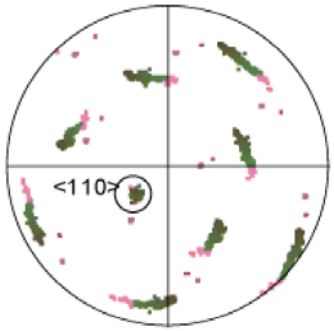
NNIN Facility utilized: Characterization Facility

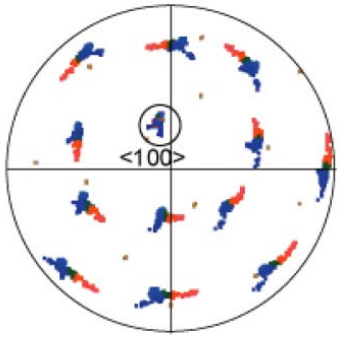
- Project Description
  - Synthetic silicate-magnetite aggregates are sheared at high pressure at 1000-1200°C
  - Electron backscatter diffraction (EBSD) and reflected light images are used to study preferred orientation of magnetite
  - Grain orientation pole figures showing a dispersion axis can be used to determine active slip systems





- MAJOR OBSERVATIONS
  - EBSD maps of individual magnetite grains showing progressive changes in orientation indicate “bending” due to geometrically necessary dislocations.
  - Evidence for plastic deformation at the conditions of the experiments indicate that the existing creep equations for magnetite are flawed.





- Conference Presentations

J L Till, M Jackson, B M Moskowitz (2010), *Constraints on Magnetite-Silicate Strain Partitioning from Magnetic Fabrics in Experimentally-Deformed Synthetic Shear Zones* , Abstract GP22A-05 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.