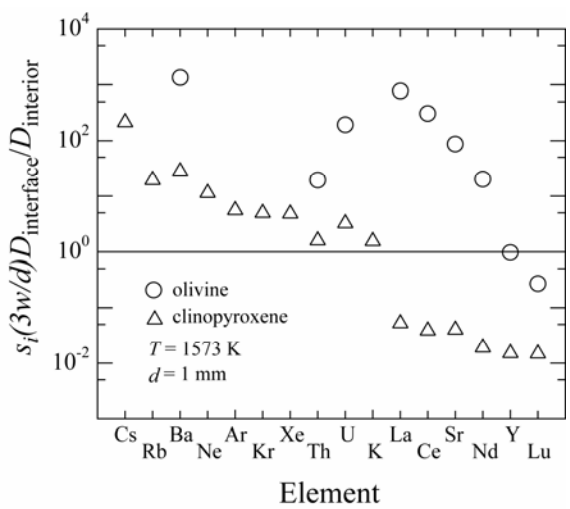
Segregation to Grain and Phase Boundaries

Takehiko Hiraga and David L. Kohlstedt (PI)

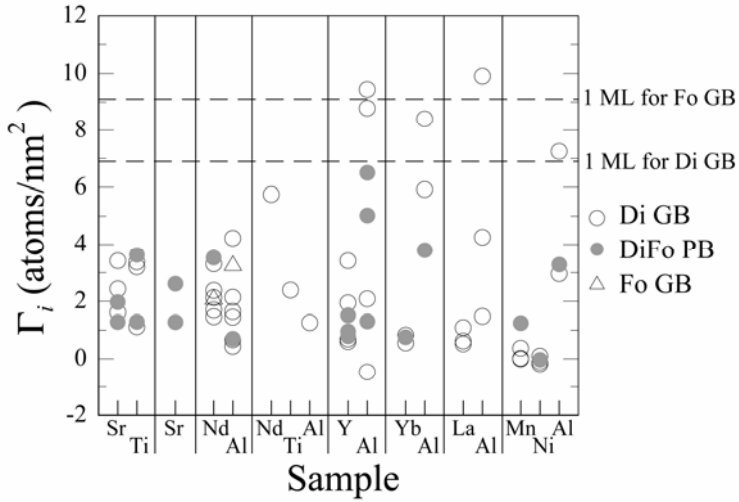
Department of Geology and Geophysics, University of Minnesota

- CHEMICAL ANALYSIS OF GRAIN AND PHASE BOUNARIES IN TWO-PHASE OLIVINE-DIOPSIDE AGGREGATES
  - STEM/EDX analyses of interface composition in synthetic rocks
  - Interpretation in terms of Gibbsian thermodynamics and Langmuir-McLean segregation model



Contributions to bulk/whole-rock diffusion of diffusion along interfaces relative diffusion through interiors of grains for several incompatible elements.

- MAJOR OBSERVATIONS
  - Significant amounts of heavy alkali elements and rare gases reside at grain-grain interfaces
  - Transport of elements that are largely incompatible interiors of grains is dominated by interface diffusion



Interface excess densities for eight different samples. Di = diopside, Fo = forsterite, ML = monolayer.

- Hiraga, T., Kohlstedt, D.L., Equilibrium interface segregation in the diopsideBforsterite system I: Analytical techniques, thermodynamics, and segregation characteristics, *Geochim. Cosmochim. Acta*, 71:1266-1280 (2007).
- Hiraga, T., Hirschmann, M.M., Kohlstedt, D.L., Equilibrium interface segregation in the diopside-forsterite system II: Applications of interface enrichment to mantle geochemistry, *Geochim. Cosmochim. Acta,* 71:1281-1289 (2007).