

Trace element partitioning: What we know and what we don't

STEPHAN KLEMME¹

¹Westfälische Wilhelms-Universität Münster, Institut für Mineralogie, Münster, Germany

In igneous petrology and geochemistry, trace element concentrations are important indicators of source composition, degree and style of melting or extent of fractional crystallization of igneous rocks. To model the behaviour of trace elements in such systems, one needs to understand the partitioning of trace elements between minerals and melts or fluids ($D_i = c(\text{mineral})/c(\text{melt or fluid})$). Many models of trace element fractionation in igneous rocks assume that D_i is constant, but it is well known that D depends on T , P , crystal and melt or fluid composition. Whilst the effects of T , P , and crystal composition on D are relatively well understood [e.g., 1], there is still scant data on the effects of melt or fluid composition on partition coefficients [e.g. 2-4]. Furthermore, there is little information as to how changing redox conditions affect partition coefficients of multi-valent trace elements [e.g., 5-6].

Here we will focus on some recent experimental advances of how the effect of melt or fluid composition, and of redox conditions in experimental partitioning studies may be investigated. We will show mainly results from mineral/melt partitioning experiments with some additional results in fluid-rich systems.

[1] Wood, B.J., Blundy, J.D., 1997. *CMP* **129**, 166–181. [2] O'Neill, H.S., Eggins, S.M., 2002. *Chem Geol* **186**, 151–181. [3] Prowatke, S., Klemme, S., 2005. *GCA* **69**: 695-709. [4] Schmidt, M.W., et al., 2006. *Science* **312**, 1646–1650. [5] Klemme et al., *GCA*, **69**, 2361-2371 [6] Fonseca, R., et al. *EPSL*, **404**, 1-13