

Seminar 8 (to follow Lecture 11)

“Melting in the upper mantle: An ion-microprobe study of diopsides in abyssal peridotites” by Johnson et al., JGR, 95, 2661-2778, 1990.

This paper has been very influential in providing a strong geochemically-based argument that the melting process creating mid-ocean ridge basalt is more akin to fractional melting than batch melting. An explicit assumption is that abyssal peridotites are residues of the partial melting processes that create mid-ocean ridge basalt (MORB). If this melt-residue relationship is valid, the REE contents of clinopyroxene in these peridotites are inconsistent, notably too low in light REE, to be in batch equilibrium with MORB (see their Figures 5, 10, and 11). Also the wide range of Ti/Zr in these clinopyroxenes is much too large to be explained by batch melting (see their Fig. 9).