Geophysical Research Abstracts
Vol. 16, EGU2014-3616-1, 2014
EGU General Assembly 2014

Metasomatism in the lithospheric mantle beneath southern Patagonia, Argentina

Olesya Kolosova-Satlberger (1), Theodoros Ntaflos (1), and Ernesto Bjerg (2)

(1) Dept. of Lithospheric Research, University of Vienna, Austria (leska_kolos@hotmail.com), (2) Universidad Nacional del Sur, Bahía Blanca, Argentina

Mantle xenoliths from Gobernador Gregores, southern Patagonia are spinel- lherzolites, harzburgites and wherlites. A large number of the studied xenoliths have experienced cryptic and modal metasomatism. The xenoliths are mainly coarse-grained with prevalent protogranular texture but equigranular tabular and mosaic textures are present as well.

Xenoliths that have undergone modal metasomatism bear hydrous phases such as amphibole, phlogopite ± apatite and melt pockets. The latter are of particular interest because of their unusually large size (up to 1 cm in diameter) and freshness. They consist of second generation olivine, clinopyroxene and spinel ± relict amphibole ± sulfides that are surrounded by a yellowish vesicular glass matrix. The melt pockets are found in amphibole- and/or phlogopite-bearing wehrlites and harzburgites as well as anhydrous lherzolites. Subhedral primary olivines enclosed by melt pockets show in the BSE images a dark grey margin up to 80 microns thick attributed to the reaction of the primatry olivine with melt. Fine grained spinel inclusions are always associated with the dark grey margin, indicating that they belong to the secong generation assemblage.

There are considerable differences between first and second generation minerals found in melt pockets. While primary olivine has Fo-contents that range from 88.0 to 93.3, second generation olivines in melt pockets vary from Fo89.3 to Fo94.4. Both primary and second generation cpx are diopsides with the latter systematically enriched in TiO_2. The glasses that occur in melt pockets or propagate intergranular have compositions varying from trachyandesite to phonolite. The variable composition of the glass could be attributed to host basalt infiltration and decompressional melting of amphiboles. Some of the studied xenoliths show melt propagation of two compositional different glasses crosscutting primary generation minerals and finally mixing with each other. Microprobe analyses suggest continuous changing of glass composition along the propagation direction. The most striking feature is the rapid decrease of the P2O5-content after the formation of apatite from 2.4 to 1.4 wt% suggesting that the apatite has been formed out of the melt. The P-rich glass suggests that this melt has been introduced short before their transport through the host basalt to the earth surface.

Propagation of metasomatic melt along the grain boundary network causes interaction between primary olivine and orthopyroxene. Reaction front exhibits new growth of the second generation olivine, clinopyroxene and spinel. Textural and mineralogical evidences indicate that amphibole breakdown initiated the melt pocket generation process. It appears that the amphibole breakdown took place rather en route and not prior to their transport to the surface.