

Geochemical modelling of mantle metasomatism in wehrlite xenoliths from the Nógrád-Gömör Volcanic Field (Carpathian-Pannonian region)

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The Nógrád-Gömör Volcanic Field (NGVF) is situated in the northern part of the Pannonian Basin, and is one of the five known xenolith bearing alkaline basalt occurrences in the region.

After thorough sampling, a number of metasomatized wehrlite xenoliths with unique textural features have been recognized in addition to the dominant lherzolites. The major and trace element geochemistry of their rock-forming minerals show basaltic (e.g. Ti, Al, Fe, Mn) and LRE element (e.g. La, Ce, Pr) enrichment compared to compositions of lherzolite xenoliths.

The newly formed clinopyroxene and olivine grains of wehrlites contain numerous silicate melt inclusions. In order to constrain the composition of the metasomatic agent, five representative wehrlite xenoliths, from different localities, have been selected for detailed silicate melt inclusion study using LA-ICP-MS. Enrichment in incompatible elements, especially LIL (e.g. Ba, Sr, Pb) and HFS elements (e.g. Nb, Ta, Zr) compared to the host mineral was detected.

Computational modelling was carried out in order to constrain the metasomatic agent and to test our hypothesis on the melt evolution model. As a conclusion we suggest that an extensive metasomatism caused by mafic melts has transformed much of the beneath the NGVF lherzolite into wehrlite.