MINERALOGICAL AND GEOCHEMICAL STUDY OF ALTERATION HALOES IN BASALTS OF THE BAKONY–BALATON HIGHLAND VOLCANIC FIELD, HUNGARY

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Alteration haloes occurring around the cavities in basalt of the Bakony–Balaton Highland Volcanic Field (BBHVF) are 0.5 to 3 centimetres wide, having light or dark gray, rarely greenish brown colour. The rims have always a larger grain size than basalt matrix indicating this similar to the pegmatite stage (pseudo-pegmatite texture).

Minerals, chemical composition and paragenesis of the alteration halo are less studied in basalts. The haloes have not been mentioned before from BBHVF. However, our recent studies found alteration haloes in 365 samples. Based on appearance and grain size of rims, these were classified to three groups. Group 1: grey, fine-grained, massive alteration haloes with green olivine phenocrysts and rare cavities filled with phillipsite. Group 2: grey, coarse-grained, massive haloes with pyroxene, feldspar and opaque crystals in matrix. Group 3: greenish grey fine- and coarse-grained alteration haloes with olivine, pyroxene, feldspar and opaque crystals in matrix (Fig. 1). 15 of these rims were characterized in detail by XRD, thin section and ICP-MS methods.

One part of the minerals of alteration haloes equal to the basalt matrix: apatite, biotite, K-feldspar, magnetite, nepheline, olivine, pyroxene and plagioclase. The other part of minerals consists of hydrothermal phases: zeolites (analcime, chabazite, phillipsite) and clay minerals (chlorite, illite, illite/smectite mixed layer minerals and smectite).

Chondrite-normalized rare earth elements are very similar to the other alkaline basalts in Carpathian-Pannonian Region (SEGHEDI *et al.,* 2004). Basalts and alteration haloes of BBHVF show enrichment in LREE and depletion in HREE, with a negative Eu anomaly.

The main mineralogical components (apatite, pyroxene, K-feldspar, plagioclase, olivine, phillipsite and smectite) of alteration haloes can observed in the most of the rims. Consequently the crystallization and then alteration were very similar in the haloes. Occurrence of high temperature (miarolitic) minerals was followed by alteration of these minerals at low temperature. Coloured phases altered to smectite, and colourless phases (e.g. nepheline) altered to zeolites by hydrothermal fluids. Differences in the quantity of hydrothermal minerals show the distinct degree of alteration.

Reference

SEGHEDI, I., DOWNES, H., SZAKÁCS, A., MASON, P.R.D., THIRLWALL, M.F., ROŞU, E., PÉCSKAY, Z., MÁRTON, E. & PANAIOTU, C. (2004): Lithos, 72(3-4): 117–146.

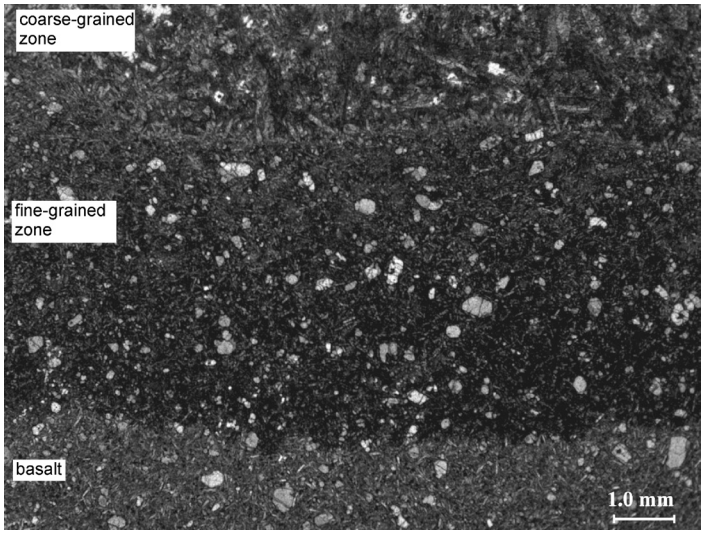

Fig. 1. *Fine- and coarse-grained alteration halo.*