Acta Mineralogica–Petrographica, Szeged, XLI, Supplementum, 2000

SOME PEGMATOPHILE AND SIDEROPHILE ELEMENT ENRICHMENTS IN MAFIC AND ULTRAMAFIC ROCKS IN HUNGARY

DITRÓI-PUSKÁS, Z., GÁL-SÓLYMOS, K., KUBOVICS, I., NAGY-BALOGH, J., (Department of Petrology and Geochemistry, Eötvös L. University, Budapest, Hungary) & NAGY, B. (Hungarian Academy of Sciences, Budapest, Hungary)

We have studied the enrichments of some pegmatophile (Zr, Nb), transitional (Cr) and siderophile (Ni, Co) elements in more than 700 igneous and meta-igneous rocks in Hungary. Our aim was to delineate positive geochemical anomalies using optical emission spectroscopy and, as far as possible, to identify the mineral species bearing the above elements using electron microprobe analysis and optical microscopy.

The above pegmatophile elements were found to be enriched in the Mesozoic alkaline rocks from the Mecsek Mountains. The highest Zr enrichment (1119 μg/g) was found in the phonolite of Dunaszekcső-2 core sample (248.4 m), where abundant eudialyte (with around 14 % ZrO_2 content) was identified in the groundmass by both the microprobe and under the microscope. The eudialyte appears to be stuffed with groundmass mineral inclusions (alkaline feldspars and foids) pointing to its late-stage crystallization from the silicate liquid. The highest Nb enrichment (190 μg/g) was also found in the same rock. The Nb bearing phases, however, are far less abundant, and could only be identified by the microprobe as minute mineral grains of epistolite (Nb_2O_5 content of around 45 %) and loparite (Nb_2O_5 content of around 78 %). Significant Nb enrichment (171 μg/g) was found in the alkaline trachyte sample of Somberek-1 core sample (1305 m), too. The Nb containing minerals here were TiO_2 phases (Nb containing rutile or nioboanatase) with Nb_2O_5 content of around 4–8 %. Their varied textural appearance may point to both primary and secondary origin of the phases.

The transitional Cr with siderophile character as well as the siderophile Ni and Co are mostly enriched in metamorphosed Mg-rich ultramafic rocks (serpentinites). Cr, Ni and Co was found to attain highest enrichments in serpentinites of Felsőcsatár, Gyód (Gyód-2, 108 m) and Helesfa (Helesfa-1, 156 m). The element contents are around 0.3 %, 0.22–0.25 % and 80–100 μg/g, respectively. The principal Cr bearing phases in the Gyód and Helesfa core samples were Cr-magnetite with Cr_2O_3 content of around 7-14%. In the serpentine itself, Cr_2O_3 content of around 0.5 % and 0.8 % could also be found in the Felsőcsatár and Helesfa samples, respectively. In Felsőcsatár, Ni and Co enrichments were found in different phases, namely in gersdorffite-cobaltite intergrowths (with Ni content of around 14–18 % and Co content of around 12–16 %) and in linneite (with Ni and Co content of around 21 % and 7 %, respectively). Ni was rarely found also in ullmannite (with Ni content of around 34 %). The origin of these sulfide phases can most probably be linked to fluid remobilisation processes during metamorphism. Unlike the Felsőcsatár serpentinite, the Ni bearing phase in Gyód is the secondary Ni silicate, garnierite (with Ni content 31–39 %). In the Helesfa serpentinite the only Ni containing mineral found was the serpentine itself with around 1.3 % NiO.