MINERALOGY AND FORMATION CONDITIONS OF GABBRO PEGMATITES AND OVERPRINTING HYDROTHERMAL PARAGENESES IN THE SZARVASKŐ COMPLEX, BÜKK MTS., NE-HUNGARY

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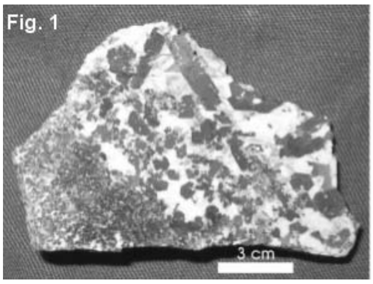
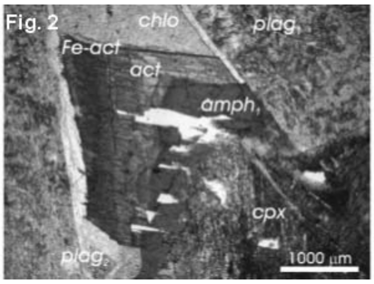
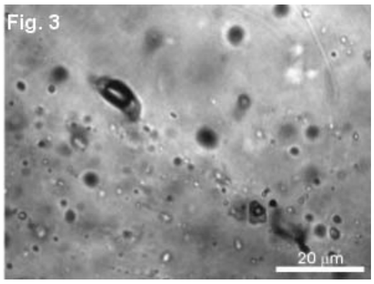
Gabbro pegmatites are common features in the Szarvaskő Ophiolite Complex, Bükk Mts., NE Hungary. Pegmatitic structures like these are less studied in ophiolitic gabbros, especially in those of the Neotethyan realm. Hence, one of the major aspects of our work (PÉNTEK, 2004) was to support the knowledge on pegmatites in ophiolite-related gabbro intrusions by analyzing their relationships to the host rock, textural variations and mineral composition. These observations were used to characterize volatile enrichment, segregation of magmatic fluids and their interaction with silicates during crystallization of the pegmatite bodies. Previous investigations (ÁRKAI, 1983; SADEK *et al.*, 1996) have shown that rocks of the SOC have suffered alteration during sea-floor hydrothermal and low-grade regional metamorphic events. Our study was also aimed to refine knowledge about these processes by combining mineralogical and fluid inclusion data.

Pegmatites of two studied localities were classified according to their shape and texture. Pegmatitic patches, pockets and narrow dykes precipitated from a locally segregated hydrous melt, while thick and felsic dykes were intruded later. Homogeneous pegmatitic pods crystallized simultaneously (Fig. 1) in contrast to zoned pods, indicating further differentiation of the hydrous melt. In pegmatites, clinopyroxene, amphibole, plagioclase, Fe-Ti oxides, biotite, quartz and apatite are the main rock-forming phases. Variation of the mineral assemblages and their chemistry in pegmatite bodies was also influenced by enrichment of volatiles and incompatible elements in the melt due to interaction with the host sedimentary rocks. During crystallization of pegmatites a fluid phase separated, as indicated by granophyric textures and fluorapatite compositions. This magmatic fluid caused deuteric alteration of the primary pegmatitic assemblage, which is manifested by the alteration of magnetite and pyroxene, accompanied by the formation of biotite and zoned amphibole (Fig. 2). This process took place under continuous cooling magmatic-submagmatic conditions.







The pegmatites and the host gabbro underwent postmagmatic alteration due to sea-floor hydrothermal activity. The responsible fluids were identified in two fluid inclusion generations. Both occur secondary in pegmatitic quartz, and have salinities clustering around the mean seawater salinity (~3,2%). One of them (Fig. 3) represents a boiling aqueous system, where heterogeneous entrapment occurred around 300 °C. The other fluid exhibits constant 15-20 vol% vapour phase and an average homogenization temperature of 240 °C. Typical of this process is alteration of all primary phases and formation of actinolite, chlorite, clinozoisite and albite. Mineral assemblage, mineral- and fluid inclusion thermometry indicate a polyphase hydrothermal process between 250 and 400 °C. The Alpine regional metamorphism was accompanied by intense veining of a prehnite-chlorite-quartz-calcite-feldspar assemblage. Chlorite thermometry and isochores of primary fluid inclusions could be used to define entrapment conditions of the low grade metamorphic fluids, ranging between 270–285 °C and 1.5–2 kbars.

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