Durbachites from Luleč Conglomerates - their Possible Source

Kateřina ZACHOVALOVÁ and Jaromír LEICHMANN

Department of Geology and Paleontology, Masaryk University, Kotlářská 2, 611 37 Brno,Czech Republic

Durbachites belong to the oldest (340 - 330 Ma) Variscan magmatites (Schalteger 1997). The members of this suite grade from K-rich diorites to syenites and granites. The characteristic features for the whole suite are high concentrations of LILE (K, Rb, Ba) and radioactive elements (U, Th), which are accompanied by high concentrations of Mg, Cr and Ni. Holub (1997) and Gedres et al. (1998) interpreted these rocks as being a product of mixing of an enriched mantle magma and crustal melt. Three major bodies of durbachites crop out close on the eastern margin of the Bohemian Massif. These are the Jihlava batholith (Tonika 1970) and Třebíč batholith (Holub 1997, Zachovalová et al 1999) in western Moravia and Rastenberg pluton in Lower Austria (Gedres 1998).

Big pebbles of durbachites up to two metres in size were found in the Upper Visean Luleč Conglomerates (Myslejovice Formation) in the Drahany Culm (Maštera 1987). The Luleč conglomerates are composed of 78.3 % of high-grade metamorphic rocks (e.g., granulites), 4.1 % magmatic rocks, 15 % sediments and 2.6 % quartz.

Two types of durbachites were found as pebbles in the Luleč Conglomerates. The first, most common type is a dark, porphyric rock containing up to 2 cm long K-feldspar phenocrysts, plagioclase, quartz, biotite and amphibole. This type can be compared with durbachites from the Třebíč batholith. The second type is light coloured, in which K-feldspar phenocrysts are up to 4 cm long. This type does not contain amphibole and the content of the biotite is significantly lower if compared with the first type; it exhibits a certain similarity with durbachites from the Rastenberg pluton. Feldspars in the first type and in their possible "parents" from the Třebíč batholith were analysed in detail yet, using cathodoluminescence technique.

Both rocks exhibit very similar features. Plagioclase is dominated by a primary magmatic structure - distinctive oscillatory zoning. An-rich zones in the plagioclase are locally replaced by carbonate and epidote. In addition, plagioclases from the Třebíč batholith underwent a strong sericitization. This later alteration was not observed in the plagioclases from the pebbles. Euhedral to subhedral phenocryst of K-feldspar up to 2 cm in size exhibit a more complex internal structure. The grains contain some small plagioclase inclusions. These inclusions are irregularly spread within the K-feldspar and resemble perthites or individual grains. They are remarkable if observed using CL equipment, because of their yellow-violet luminescence, which contrasts with the blue luminescence of K-feldspar. Some inclusions are often arranged in zones parallel to the external shape of the crystal. In this case, some inclusions are very small and observable only as very thin zones, which may be confused with a real oscillatory zoning. Not only relics of plagioclase, but also sericite, epidote and scapolite appear in these zones. Such style of zoning indicates an important role of the replacement processes in the origin of K-feldspar phenocrysts (cf. Tonika 1970).

Apart from the origin of thse structures, their common occurrence in the durbachites from the Třebíč batholith and those from the Luleč Conglomerate indicate that at least the dark durbachites were derived from the Třebíč batholith. The widespread sericitization found in the Třebič batholith only indicates post-Visean alteration events which affected the Třebíč batholith.