

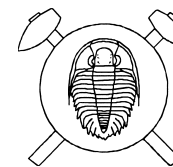
High-K Gabbros Related to the durbachites (Jihlava Massif, Moldanubian Zone)

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Two approximately 2 km long bodies of mafic rocks ranging from gabbros to monzodiorites were found in the eastern Moldanubian Zone approximately 10 km east from the city of Jihlava. The southern body is situated within the Jihlava durbachite. The nature of relation between gabbro and durbachite – an intrusion or inclusion in durbachites – could not be determined directly in the field because of poor outcrop evidence. The second body was found within Moldanubian migmatites, 5 km NE from the Jihlava batholith. Both bodies are well visible in the gravity map as two local positive gravity anomalies superimposed on a regional gravity high. The residual gravity map shows the extent of the bodies and can also be used to estimate the mass excess. The measured density varies between 2.84–3.05 g/ccm.

The concentrations of (wt.%) MgO (7–16), SiO₂ (49–52) CaO (4.4–10.3), Na₂O (0.9–3.4) and FeO (8.3–11.02) are typical of basaltic chemistry. However, elevated concentrations of mainly LIL elements as K₂O (1.9–3.9 wt.%), Rb (95–239 ppm), Ba (1100–1868 ppm), but also P₂O₅ (0.4–1.47 wt.%), and REE (up to 209 ppm) with weak negative Eu anomaly and preponderance of LREE over HREE indicate a more complex origin of the rocks.

Two mineralogical associations were found in the rock. The primary paragenesis is characterised by slightly zoned plagioclase (An_{59–48}), Cpx (X_{Mg} 0.75) with Opx admixture, relics of Opx (X_{Mg} 0.67) with Cpx admixtures, perthitic K-feldspar with high BaO content (up to 3.5 wt.%). Perthites (An_{39–42}) compose up to 30 vol. % of the grain. Up to 2 mm long apatites, rutile as tiny inclusions in both feldspars and ilmenite are accessory.

Secondary paragenesis includes Ti-rich biotite (X_{Mg} 0.5–0.6), hornblende (X_{Mg} 0.7–0.75), quartz, rare zoisite and titanite. Plagioclase (An_{30–52})-quartz myrmekites are commonly developed between K-feldspar and biotite. Quartz form inclusions in biotite or is with biotite closely

spatially associated. Some relics of Opx are rimmed by biotite, the Opx admixtures in Cpx are commonly replaced by biotite. Hornblende replaces Cpx in some samples.

The textural evolution of the rock strongly suggests, that the primary Opx and K-feldspar were replaced by biotite and quartz. Because, biotite exhibits a lower X_{Mg}, compared with Opx, and TiO₂ content in biotite (~ 3.3 wt.%) is much higher than those in Opx (less than 0.1 wt.%), it seems to be probable that ilmenite and rutile were involved in the reaction as well. The plagioclase component from perthites is probably accommodated in myrmekites developed between K-feldspar and biotite and in the zoisite inclusions in biotite. The X_{Mg} numbers from hornblende and Cpx are mostly identical. The Al necessary for amphibolization of Cpx comes probably from partly albitised primary An rich feldspars.

Our observation indicates that the lower crustal granulite facies assemblage Cpx + Opx + Kf + Pl(An rich) + ilm + rt was replaced by the amphibolite facies paragenesis bt + amp + qtz + Pl(An poor). The temperature of K-feldspar crystallisation was estimated from recalculated composition of primary, ternary feldspar at around 1100 °C. The equilibrium was not reached in the rock during the amphibolite facies event.

These gabbros exhibit some similarities with durbachites, some of them are ultrapotassic, and strongly enriched in LILE and LREE. Inclusions of similar gabbros were found in the durbachites from Trebic batholith too. The gravimetry documents that such gabbroic intrusions are not unimportant in the present day crustal composition. The intrusion of such already primary enriched gabbros into the upper crustal levels, followed by slower cooling will produce an extensive partial melting of surrounding metapelites leading to the additional enrichment of the rock via magma mixing, and finally, contribute in this way to the origin of the durbachites.