



Peridotite mantle xenoliths from the Pilchowice basanite (SW Poland): mineral chemistry

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The Cenozoic basanite from Pilchowice (SW Poland) belongs to the Cenozoic alkaline lava occurrences in SW Poland, which form the NE part of the Central European Volcanic Province. The basanite occurs in the Intra-Sudetic Fault, the major Variscan geological border in the NE Bohemian Massif. The rock, known for abundant rhönite (Ladenberger et al. 2006 and references therein) contains numerous, usually small (<10 cm) peridotitic mantle xenoliths.

The protogranular texture (olivine up to 8 mm, common kink bands) of peridotites is obliterated by intense fissuring and fragmentation of the grains. The rocks contain crystallized melt pockets filled with olivine, clinopyroxene and plagioclase. The primary mineral assemblage consists of olivine, orthopyroxene and clinopyroxene and sparse spinel. Clinopyroxene occurs only in the part of the studied samples. The olivine is rich in forsterite (Fo 90.2 – 91.5) and contains 0.35 – 0.45 wt. % NiO. Clinopyroxene-free harzburgite contains Al poor orthopyroxene (mg# 0.92, 0.02 – 0.03 atoms of Al per formula unit, pfu in the following) and Cr –rich spinel (cr# 0.8). The clinopyroxene-bearing peridotites contain Al poor orthopyroxene (mg# 0.92, 0.04 atoms of Al pfu) and mildly Al impoverished clinopyroxene (mg# 0.92, 0.09 atoms Al pfu). The temperatures of equilibration (Brey & Köhler 1990) recorded in ortho- and clinopyroxene pairs are close to 900 °C. One of the peridotites contains clinopyroxene with abundant spongy rims. The orthopyroxene occurring in this rock is Al-rich (mg# 0.92, 0.12 atoms Al pfu) and the primary(non-spongy) clinopyroxene is Al-enriched (mg# 0.92, 0.17 atoms of Al pfu). Major element mineral composition in these rocks suggests that they preserved depleted chemical characteristics, which has been little changed by later metasomatic events, excepting the sample containing spongy clinopyroxene. One of the studied peridotite xenoliths contains low-forsterite olivine (Fo 83.00 – 86.50), relatively rich in nickel (NiO 0.28 – 0.42). This suggests its cumulative origin in upper lithospheric mantle or lower crust.