



## **Apatite intergrowths in clinopyroxene megacrysts from the Ostrzyca Proboszczowicka (SW Poland) basanite**

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The Cenozoic basanite from the Ostrzyca Proboszczowicka in Lower Silesia (SW Poland) belongs to numerous lavas occurring in the NE part of the Central European Volcanic Province. Basanite contains clinopyroxene megacrysts up to 3 cm in size. The clinopyroxene has the composition of aluminian-sodian diopside (mg# 0.61-0.70, 0.08-0.12 atoms Na pfu and 0.88-0.93 atoms Ca pfu). Cr is absent. The REE contents are above the primitive mantle reaching up to 18 x PM at Nd. Primitive-mantle normalized REE patterns show enrichment in LREE relative to HREE (LaN/LuN=3.81-5.01). The REE patterns of all the megacrysts show deflection in La-Nd. The trace element patterns are characterized by positive Zr, Hf and in some cases also Ta anomalies, and negative U, La, Sr, Ti and Pb ones. In some samples strong depletion (down to 0.01 x PM) in Rb and Ba is observed. The Ostrzyca megacrysts formed cumulate, which crystallized from magma similar to the host basanite, but more fractionated and enriched in REE, particularly in LREE (Lipa et al., 2014). This happened at mid-crustal depths (10-15 km) and the new pulse of basanitic magma entrained the crystals forming the non-solidified cumulate and brought them to the surface (Lipa et al., 2014).

Clinopyroxene megacrysts contain large, transparent, euhedral apatite crystals up to 7 mm. The major element composition indicates the fluor-apatite with F content ranging from 0.87 to 1.93 wt.%. Chlorine content is strongly variable between grains (0.05-1.75 wt.%). Apatite is strongly enriched in LREE relative to HREE (LaN/LuN=60.39-62.23, about 1000 x PM for LREE and about 10 x PM for HREE). The REE patterns are nearly linear, with slight positive Nd and Gd anomalies. The trace element patterns are characterized by very strong negative anomalies of HFSE (Nb, Ta, Zr, Hf, Ti) and Pb, and weaker negative Sr anomaly. Concentration of Yb and Lu is on the level 10 x PM, whereas Rb, Hf and Ti are depleted relative to PM. Apatite preceded clinopyroxene during crystallization of fractionated basanite magma. The deep HFSE anomalies suggest that apatite saturation in silicate systems has effect similar to that of carbonatitic melt unmixing in a silicate-carbonatite systems.

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### References

Lipa D., Puziewicz J., Ntaflou T., Matusiak-Małek M. (2014): Clinopyroxene megacrysts from basanite of Ostrzyca Proboszczowicka in Lower Silesia (SW Poland). *Geoscience Notes* 2.2: in press.