

THE ČANIŠTE EPIDOTE-BEARING PEGMATITE, FYRO MACEDONIA: AN EXAMPLE OF THE MAGMATIC-HYDROTHERMAL TRANSITION

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The Čanište pegmatite is situated approximately 150 km south from Skopje, Republic of Macedonia, on the western slopes of the Selečka Mts. which represents a part of the Eastern Pelagonian tectonostratigraphic unit. The Pelagonian Massif exposes Precambrian crystalline basement made of ortho- and paragneisses, micaschists and amphibolites and includes numerous pegmatites, which differ according to their size, the mineralogical features, the internal structures and the differentiation degree.

The Čanište pegmatite attracts attention due its peculiar Ca-enriched mineral assemblage with unique occurrence of up to 2 meters long epidote crystals. Up to a 10 m wide pegmatite lens-shaped body and adjacent Upper Carboniferous granodiorites cut Precambrian gneisses. The pegmatite exhibits zoned internal structure with the following sub-units: 1) The wall zone; 2) The first intermediate zone; 3) The second intermediate zone, and 4) The massive quartz core.

The wall zone consists predominantly of amazonitic microcline with following unit cell characteristics $a = 8.584(4)$ Å, $b = 12.980(6)$ Å, $c = 7.219(3)$ Å, $\alpha = 90.79(6)^\circ$, $\beta = 115.96(3)^\circ$, $\gamma = 87.60(4)^\circ$ and $V = 721.5(4)$ Å³. Minor quartz and biotite occur as well.

The first transitional zone comprises euhedral columnar, up to 2 m long, crystals of epidote, embedded in a medium- to coarse-grained matrix of hematite, muscovite, quartz, microcline and garnet. Zircon and beryl occur sporadically. The epidote lattice parameters, calculated on the basis of XRD patterns [$a = 8.890(2)$ Å,

$b = 5.634(2)$ Å, $c = 10.147(2)$ Å, $\beta = 115.40(2)^\circ$ and $V = 459.1(2)$ Å³] corresponds well to the data previously reported for epidote from other localities. According to the electron-microprobe data epidote from the Čanište pegmatite belongs to the clinozoisite subgroup with general formula of $\text{Ca}_2\text{Al}_2\text{Fe}^{3+}(\text{Si}_2\text{O}_7)(\text{SiO}_4)\text{O}(\text{OH})$.

The second intermediate zone, composed of albite, quartz and microcline, grades into the monomineralic massive quartz core.

Textural features, melt and fluid inclusion data suggest that the Čanište epidote-bearing pegmatite formed as a result of subsequent and successive crystallization from a granodioritic melt. The absence of aplites suggests a steady pressure condition during the course of pegmatite crystallization. A combination of fluid inclusion data and Na/K geothermometer gained pressure of about 4 kbar (depth ≈ 10.8 km). The primary wall zone mineral assemblage (microcline \pm biotite, quartz) crystallized from the melt between 480 and 640°C. Cooling of the melt below 420°C at oxygen fugacity around 10^{-28} bars ran up deposition of the first intermediate zone (epidote + hematite + grossular + muscovite + quartz \pm almandine, zircon, beryl). The progress of crystallization increased the Na/Ca ration in the residual melt. Consequently, the second intermediate zone, predominantly composed of albite, crystallized at temperature around 390°C. The massive quartz core was deposited around 360°C from the very last melt residue strongly enriched in silica, water and CO₂ content.