PROCESSES OF FRACTIONATION VS. CONTAMINATION AT THE VĚŽNÁ I PEGMATITE, WESTERN MORAVIA, CZECH REPUBLIC

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The well-known Věžná I pegmatite of beryl-columbite subtype has been studied since 1960. It is situated 1 km S from Věžná village in a serpentinite body enclosed in migmatitic gneiss on the boundary between Strážek Moldanubicum and Svratka crystalline complex. The pegmatite dike, up to 3 m thick, shows usual internal structure with symmetric zoning: in its most differentiated part including from the margin to the center : (i) contact reaction rim with the host rock composed by phlogopite, chlorite, anthophyllite and actinolite, (ii) thin granitic wall zone (Kfs + Plg + Qtz + Bt), (iii) dominant intermediate zone of graphic Kfs + Qtz and Plg + Qtz intergrowths, (iv) intermediate unit (core margin) of blocky Kfs, (v) albite-rich unit, (vi) quartz core (isolated central pods, and (vii) very rare pod of Li,Cs-bearing minerals (pollucite, lepidolite, elbaite). The Věžná I pegmatite is currently uncovered at three isolated outcrops from less to more evolved from N to S: (I) fine- to coarse-grained granite, (II) simple pegmatite + granite, and (III) symmetrically zoned pegmatite body with the units (i), (ii), (iii) and (iv) on the currently accessible outcrops.

Chemical compositions of primary minerals (biotite, cordierite and tourmaline) and their evolutions at the outcrops were studied by EMPA. Biotite is present at all outcrops and the compositions show decreasing Ti and increasing F from the outcrop I to III but decreasing of Fe/(Fe + Mg) ratio in the same direction. Cordierite occurs only at the outcrop III as graphic intergrowths with quartz (iii) and rare crystals within blocky unit (iv) with a weak variation in the Fe/(Fe + Mg) ratio. Tourmaline occurs in simple pegmatite (outcrop II) and in several paragenetic and compositional types at the outcrop III: black in graphic intergrowths with quartz (iv), black crystals and aggregates in (v) and green to pink in (vi). Chemical composition shows generally decreasing of Ti and increasing of F and decreasing of Fe/(Fe + Mg) ratio from outcrop II to graphic unit in outcrop III as in biotite. Then Fe/(Fe + Mg) ratio increases to more evolved units in black schorl→ green Fe,Mn -elbaite → pink Mn-elbaite.

The overall diagram (Fig. 1) with Fe/(Fe + Mg) ratio of all presented minerals from three outcrops indicates this evolution: pegmatitic (granitic) melt likely intruded in the direction from outcrop I to III and was contaminated by host rock (serpentinite). After forming of wall zone (and partially graphic zone) in the outcrop III, the contamination finished, at blocky part the rest of Mg was consumed by cordierite and tourmaline, and fractionation continued until the end of crystallization of high fractionated small pods of Cs,Li,Mn-rich unit (vii) with Li-mica, Li-tourmaline, primary triplite, and pollucite. Combination of both principal processes – contamination, characterized by input of Mg, and fractionation, characterized by depletion of Mg, increase of Fe/(Fe+Mg) ratio and then depletion in Fe and enrichment in Li, Cs and Mn, – control chemical composition of minerals in the pegmatite.

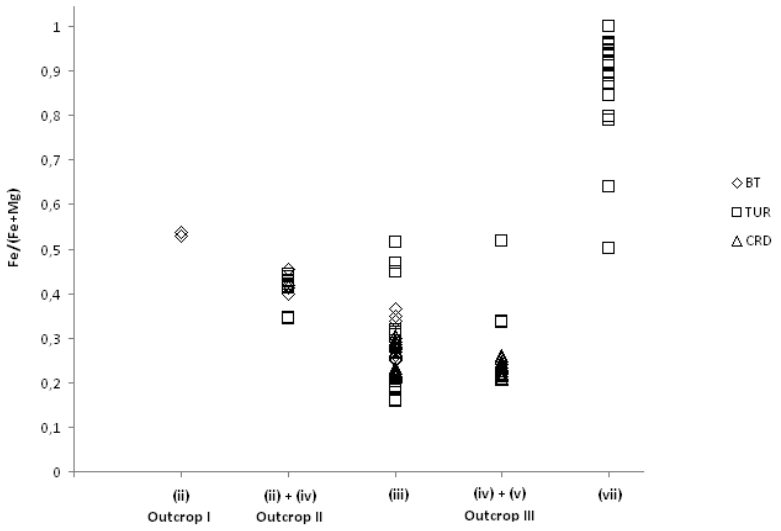

Fig. 1. *Fe/(Fe + Mg) diagram of biotite, tourmaline and cordierite from the outcrops I to III.*