

Polymetamorphic history of the Bôrka Nappe as revealed by chemistry of tourmaline and epidote (Western Carpathians, Slovakia)

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We found two generations of tourmaline and epidote in pelagic metasediments of the Bôrka Nappe (Meliatic Unit) [1]. The first generation of homogenous tourmaline (Tur1) doesn't contain inclusions. The younger (Tur2) typically comprises numerous inclusions (Qz, Ab, Ep, Ttn, Fe-oxides and Tur1). Based on EMPA analyses, the Tur1 has higher content of Al₂O₃ (33–35 wt%), and lower contents of FeO (<8 wt%) and MgO (<6 wt%). Weight contents of Tur2 amount to 25–27 wt% of Al₂O₃, 10–14.5 wt% of FeO and 6–7.5 wt% of MgO. Compared to Tur2, Tur1 is characterized by a higher number of X-site vacancies and higher Mg/(Mg+Fe) ratio. Both generations belong to the group of alkali tourmalines with chemical composition of dravite–schorl continual series. Older Tur1 is representant of dravite group, whilst schorl is prevailing in rims of Tur2. In the same sample, two generations of epidote were identified as well. The older generation (Ep1) is homogeneous and without inclusions. The younger generation (Ep2) always includes numerous inclusions (Qz, Ab, Ttn, Fe-oxides and Ep1). Ep1 is often surrounded by a thin transitional zone (Ep1-2) between Ep1 and Ep2. Chemical composition of Ep1 differs from Ep2 by a higher content of Al₂O₃ (23–33 wt%) and lower content of FeO (1–7 wt%) and MnO (<0,5 wt%). Contents of Al₂O₃ vary in the range 21–23 wt%, FeO 10–15 wt% and MnO 0,5 - 1,3 wt% in Ep2. Compared to Ep1, the Ep1-2 shows higher content of FeO (7–10 wt%), MnO (4–6 wt%) and REE (ΣREE 7–11 wt%). Content of Al_{TOT} apfu in Ep1 is higher than in Ep2, while contents of Fe apfu and Mn apfu are lower. Contents of Fe apfu and Mn apfu are highest and Al_{TOT} apfu lowest in the Ep1-2. Based on composition Ep1 corresponds to clinozoisite and Ep2 to epidote. The first generation of Tur1 and Ep1 originated in the blueschist-facies metamorphic conditions [2], whereas origin of the second generation (Tur2, Ep2) was connected with the superimposed metamorphism in the greenschist-facies [1], which affected the studied metasediments during exhumation of the Bôrka Nappe.

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- [1] Plašienka et al. (2019) *Swiss J. Geosciences*, **112**, 55-81.
[2] Faryad & Henjes-Kunst (1997) *Tectonophysics*, **280**, 141-156.