

Tourmaline as a petrogenetic indicator in the W Tauern Window

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Schorl-dravite tourmaline (Tur) is a striking and pervasive feature of the metasedimentary Pfitsch formation in the Pfitscher Joch area in the W Tauern Window (Eastern Alps). Whereas the age, *P-T* path, and tectonic history of this area are well known, the Tur provides new insight into the metamorphic fluid history. Tur is most abundant in a ~ 25 m thick unit of feldspathic gneiss, where it occurs in the matrix and in feldspar-dominated segregations, the latter hosting the largest crystals. Whole rock $\delta^{11}\text{B}$ values range from -10 to values as low as -33 ‰, suggesting a ^{10}B -rich B-source, such as metaevaporites. Individual Tur grains record up to three growth stages (Fig. 1), distinguished by their major element chemistry, inclusion mineralogy, and B isotope signature. Sector-zoning thermometry reveals Tur grew on the pro- and retrograde path. The Ca/Na of the Tur increases continuously with growth, and the $\delta^{11}\text{B}$ values decrease within the range of -7 to -20 ‰, reflecting the evolution of the metamorphic fluid composition through time.

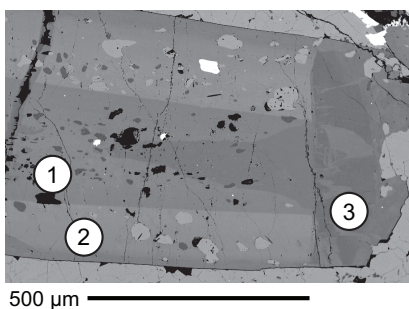


Figure 1: BSE image of a single Tur crystal showing three stages of growth each with distinct inclusions, major element chemistry, boron isotope composition, and formation temperature.