#### Oxidized Mg- and Fe-rich tourmaline with significant amounts of Sr and Pb

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A near-rim zone of an oxidized Mr- and Fe-rich high-pressure tourmaline from an eclogite (Kreuzeck Mountains, East- ern Alps, Austria) contains 0.6 wt% SrO, 0.6 wt% Cr2O3 and 0.5 wt% PbO2. Optical absorption spectroscopy was used to estimate the percentage of Fe2+. For this purpose the band near 1120 nm was used, because it is the band that is best separated from other bands. To estimate the proportion of the two oxidation states, the intensity of the Fe2+ bands in the investigated tourmaline was compared to the intensity of the Fe2+ bands in two zones of a previously very well characterized Fe-bearing elbaite from the Himalaya Mine [1] assuming that a Beer’s Law calibration applies equally to all the crystals. The result infers that in the investigated tourmaline only ca. 20% of the total iron is in the 2+ oxidation state. It can be presumed that this high-pressure tourmaline crystallized under oxidizing conditions, which would also be amenable to the mobilization of Sr. Advantages of using optical absorption spectroscopy for such an estimation are that it can be obtained much faster compared to Mössbauer spectroscopy and the estimation can be done on small, individual areas of a crystal, down to 100 x 100 mm.

The sum of (Na + Ca + Sr + K) for the different zones shows that the [9]-coordinated X site is completely filled up by these occupants. Because in this tourmaline ca. 80% of the total Fe is oxidized, it is likely that also Pb is oxidized to Pb4+. In a [6]-coordination Pb4+ has an effective ionic radius, which is very similar to Mg and Fe2+. Therefore we assigned these small amounts of Pb in tourmaline to the [6]-coordinated Y site and not to the X site.

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**References**

[1] Ertl, A., et al. (2010) Am. Mineral. 95, 24–40.