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Crystal-chemical characterization of tourmalines from the English Lake District: Electron-microprobe analyses and Mössbauer spectroscopy

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Abstract

Electron-microprobe analyses (EMPA) and Mössbauer spectra (MS) have been acquired for natural tourmalines sampled near Crummock Water and Haweswater, English Lake District. In the former, the dravite-schorl series is prevalent, whereas in the latter, the dravite species is dominant. All tourmaline samples presently studied are chemically disordered. The compositional and MS data give an insight into the thermal and fluid evolution experienced by the tourmalinite rocks. The tourmalines from Crummock Water crystallized in a closed, low f_{O_2} environment, under the influence of a magmatic fluid. The tourmalines from Haweswater are of hydrothermal origin and were formed under low, variable T and low f_{O_2} conditions, from a fluid of constant composition.