

INFRARED STUDY OF BRAZILIAN TOURMALINES FROM DIFFERENT GEOLOGICAL ENVIRONMENTS

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Infrared spectra of nineteen granitic-pegmatitic, seven metamorphic, and ten hydrothermal tourmalines were investigated to establish parameters from spectral data to serve as petrogenic reference. Geological studies and electron microprobe analyses of the samples have been previously conducted. The elbaite-schorl series is prevalent in pegmatite. However intermediates members of the dravite-schorl serie are prevalent in metamorphic, and uvite species in the hydrothermal deposits studied. IR analyses were restricted the OH-stretching. The O-H-stretching of elbaite at 3641,3580,3458cm⁻¹, Fe-elbaite at 3592,3557,3484cm⁻¹, Li-schorl at 3635,3593,3553,3485cm⁻¹ and schorl at 3628,3548,3480cm⁻¹, are fine narrow bands suggestive of a high crystallinity, resulting from the fractional crystallization environment. A fourth O-H-stretching band in the spectrum of Li-schorl is due to the presence of Li⁺ in schorl crystallized in Li-bearing pegmatites. For some tourmalines of substitution bodies, the O-H-stretching are broad and asymmetric bands, as a consequence of the poor crystallinity conditions and the increase of water (~3340cm⁻¹) in the final fluid. IR spectra of metamorphic tourmalines (one broad and asymmetric band) suggest a low crystallinity due to physical-chemical perturbations of the environments. The O-H-stretching at 3532,3540, 3545,3547,3559,3559cm⁻¹ doesn't show a relationship with the compositional variation in dravite-schorl serie. IR spectra show that is possible to differentiate the schorl of the dravite-schorl from those elbaite-schorl serie. Two different behaviors are observed in hydrothermal tourmaline spectra. The first, fine narrow bands, suggests a high crystallinity. The second, one broad and asymmetric band suggests a low crystallinity in the Fe-rich uvite. Results suggest the role of the fluid-host rock interaction as a mineral chemistry controler.