

Transmission electron microscopy of muscovite alteration of tourmaline

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ABSTRACT

Partially sericitized tourmaline from a pegmatite was investigated using high-resolution transmission electron microscopy (HRTEM). Fine-grained muscovite crystals form extensive narrow veinlets preferentially developed along the {110} and {100} cleavages of tourmaline, indicating that a cleavage-controlled alteration mechanism was dominant. HRTEM images show that tourmaline-muscovite interfaces parallel well-defined {110} and {100} of tourmaline. In general, (001) of muscovite parallels the *c* axis of tourmaline, but otherwise tourmaline and replacing muscovite lack crystallographically oriented relationships. The muscovite consists of numerous 100 to 1000 Å thick subparallel packets, and the angles between (001) of muscovite and (110) of tourmaline are highly variable. Aluminous minerals other than muscovite were not observed as alteration products of tourmaline, suggesting that the tourmaline reacted directly to form muscovite; the alteration apparently involved residual fluids in which K⁺ was available and silica was not deficient.