
**Microlite in the Greenbushes pegmatite,
Western Australia**

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The Greenbushes rare-element pegmatite, Western Australia, is currently mined for lithium and tantalum and is among the largest tantalum producers in the world. Although tantalite is the dominant ore mineral, more than ten other tantalum-bearing phases have been reported. The tantalum-rich pyrochlore, microlite, has been identified in mill concentrates at the Greenbushes mine, however its paragenesis is not well documented. In the present petrographic investigation of different zones within the Greenbushes pegmatite, microlite was discovered within a fine grained assemblage of quartz, albite and fluorapatite in the border zone near the footwall contact of the pegmatite. It occurs as equant, anhedral to subhedral grains that are generally less than 0.5 mm in diameter. The grains are pale yellow in plane polarized light and sometimes contain small inclusions of a high birefringence mineral. Optical and backscattered electron images (BSEI) indicate that most individual grains are essentially homogeneous in composition and texture. Raman spectra obtained from Greenbushes microlite closely matches that of stannomicrolite, but electron microprobe results reveal significant concentrations of antimony in addition to tin. Microlite occurs in intensely sheared and recrystallized pegmatite; however, individual grains show no sign of deformation or alteration. We suggest that microlite precipitation is coeval with late deformation and the remobilization of tantalum within the pegmatite. The occurrence of microlite and abundant apatite in the border zone is attributed in part to chemical exchange between the pegmatite and the calcium-rich metasedimentary host rocks.