

Crystallochemical characterization of white micas from the East Kemptville tin deposit, Nova Scotia

David A.S. Palmer

Department of Geology, St. Francis Xavier University, Antigonish, Nova Scotia B2G 1C0, Canada

Numerous descriptive and experimental studies of micas have shown that their chemical and structural character is sensitive to the PTX conditions of their formation. In an attempt to gain a better understanding of the formation of the late Devonian (370 Ma) East Kemptville tin deposit, accurate chemical and structural determinations have been made on white micas from different mineral associations. These associations represent distinct paragenetic stages in the evolution of the deposit.

Micas from leucogranite, pegmatite-aplite and greisen were hand picked, on the basis of optical and textural characteristics, for X-ray and chemical analysis. X-ray powder diffraction photographs using a Debye-Scherrer camera (114.6 mm diameter)

were taken with Cu K α radiation. This method was chosen to avoid the problem of preferred orientation of mica grains. Chemical analysis was obtained by both electron microprobe and by wet chemical techniques.

Although previous studies from similar granite-related tin deposits show the presence of both trioctahedral and dioctahedral white micas, all micas examined from the East Kemptville deposit were shown to be muscovites of a 2M structure. However, gross differences in lattice plane spacings were observed, in muscovites, between the paragenetic sequences. Most noticeable are shifts in the d(002) reflection, which is sensitive to substitution of the interlayer cations. These measurements are consistent

with the observed variations in the Na/Na + K ratios. These preliminary data show a direct relationship between muscovite crystal chemistry and paragenesis. It may therefore be possible to

classify white micas at the East Kemptville deposit on the basis of their environment of formation.