

### Microstructures From Potassium Feldspar Rocks, Hemlo, Ontario

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Samples from two K-feldspar-rich units associated with the Hemlo, Ontario gold deposit have been examined by transmission electron microscopy. In hand specimen, unit M1 is a clean, white K-feldspar, vanadian mica schist, while unit M2 has a classically altered appearance, with red K-feldspar plus quartz, chlorite, calcite and sphene. The present state of these rocks has been interpreted by several workers to result from potassium metasomatism contemporaneous with the formation of the ore deposit. TEM shows that the feldspar occurs as twinned and untwinned regions, often in the absence of optically visible twins. There is a transition from a heterogeneous, low density twin texture in larger grains to more homogeneous twinning, involving larger crystal volumes, in the recrystallized matrix grains. Early stages of this progression involve transformation of Peri-

cline twins to Albite twins. Untwinned, as well as twinned, regions are triclinic (C1) and electron diffraction indicates that twinning occurred solely in the triclinic state and not during the monoclinic to triclinic transition. In contrast to the twinned regions, untwinned feldspar has high densities of voids (fluid inclusions), free dislocations and dislocation networks. Collectively, the TEM microstructures suggest formation and deformation of untwinned K-feldspar during potassium metasomatism, with progressive transformation to twinned microcline. Crystallography of the feldspars requires that feldspathizing fluids have temperatures less than the monoclinic-triclinic transition temperature. This would favour ore formation during a post-peak-metamorphic deformation event.