

## **Tourmaline in mineralized porphyry systems**

**CE Beckett-Brown<sup>1</sup>, AM McDonald<sup>1</sup>, MB McClenaghan<sup>2</sup>**

<sup>1</sup>Harquail School of Earth Science, Mineral Exploration Research Centre, Laurentian University, Sudbury, Ontario; <sup>2</sup>Geological Survey of Canada, Ottawa, Ontario;

Tourmaline is a common accessory mineral in porphyry systems that shows promise as an indicator mineral for porphyry (Cu-Mo-Au) mineralization. Goals of this research are to establish a baseline useful in differentiating between mineralized and unmineralized systems, then apply the results to tourmaline grains recovered from surficial sediments (*i.e.* as pathfinders). The tourmaline supergroup is capable of accommodating a wide-range of elements with many of these having partition coefficients close to unity, meaning that tourmaline is capable of recording physiochemical changes in fluid composition throughout its crystallization. Tourmaline from Canadian porphyry systems (Highland Valley Copper, Schaft Creek, Woodjam, and Casino) have been examined to document their relationship to mineralization and trace-element signatures. Three major textural types of tourmaline were observed in porphyry systems: 1) disseminated, 2) vein, and 3) breccia. Tourmaline grains can also exhibit highly variable growth histories, including oscillatory, patchy, and sector zoning that provide a record of evolving geologic processes. Tourmaline major-element chemistry suggests that the bulk variation is between oxy-dravite and povondraite components. Defining characteristics of tourmaline trace-elements developing in mineralized porphyry systems will provide a baseline when examining tourmaline grains recovered from surficial sediment surveys.