

# Fluid inclusion and textural evidence of boiling in epithermal veins in the Cobequid Highlands, central Nova Scotia, Canada

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Low-sulphidation epithermal Au mineralization has been the focus of recent bedrock mapping, geochemical, and geochronological studies in the northeastern part of the Cobequid Highlands, Nova Scotia. Mineralization is hosted in Late Devonian to Early Carboniferous bimodal, rift-related felsic (Byers Brook Formation) and mafic (Diamond Brook Formation) volcanic and volcanoclastic rocks. The Warwick Mountain area located in the northwestern part of the Diamond Brook Formation shows the most potential for gold mineralization, with two zones of intensely silicified and sulphidized basalt recognized. Assays show anomalous Au concentrations up to ~660 ppb, as well as anomalous As, Sb, Cd, W, and Hg. A key question in this epithermal setting is: “Has boiling occurred, what is the evidence for this potentially important mechanism for gold mineralization?” To answer this question, representative samples of epithermal veins were obtained from the only two diamond drill holes targeting this mineralization style (R and J Drilling Ltd for Sugarloaf Resources Incorporated). The specific goals of the research are to (i) characterize vein textures (quartz-carbonate intergrowths) using established criteria for boiling vs. rapid boiling (flashing) vs. non-boiling systems, and (ii) and utilize fluid inclusions to constrain conditions such depth, fluid salinity, and fluid temperature during, prior to, and after mineralization. Boiling textures are typically associated with the presence of ore elements (Au, Ag, Cu, Pb, Zn, As, Hg, and Sb). Mineral and fluid inclusion textures such as colloform and plumose quartz, lattice bladed calcite ( $\pm$  replacement by quartz), as well as coexisting liquid-rich and vapour-rich fluid inclusions are definitive characteristics of boiling. These will be investigated by petrographic microscopy. With fluid inclusion micro-thermometry, the P-T-X characteristics will be determined. This study will help refine ore exploration models in the Cobequid Highlands. From initial petrographic analysis, boiling textures have been identified in some areas of the drill core but not all, suggesting that distinct boiling “horizons” existed. The relationship between these and gold mineralization is unknown but will be investigated. [Poster]