

Introduction to the magmatic-hydrothermal evolution and structural setting for the East Kemptville Sn-Cu-Zn-Ag(-In) deposit, Nova Scotia, Canada

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The East Kemptville Sn-Cu-Zn-Ag(-In) deposit in southwest Nova Scotia, previously mined from 1985-1992, remains a potential metal resource of value to both the industrial and technology sector. Renewed interest in East Kemptville has led to advances in the property development by Avalon Rare Metals Inc., a company specializing in both rare- and critical metals; Avalon has published a remaining in-pit resource of 49.3 million tonnes at 0.113% Sn, 0.131% Zn and 0.053% Cu. Interest returning to East Kemptville has provided an opportunity to further characterize and study the magmatic-hydrothermal evolution of this deposit thereby contributing to exploration strategies for similar granitoid-related deposits both locally and globally. The greisen style deposit is hosted in the highly-evolved East Kemptville topaz-muscovite leucogranite (EKL) that is localized on a NE-trending, ore zone-controlling structural corridor; the East Kemptville Shear Zone (EKSZ). The EKL is found on the western edge of the large Late Devonian South Mountain Batholith (SMB), a composite suite of crustally derived intrusions emplaced during the waning stages of deformation related to the Neo-Acadian Orogeny, which intrudes metasandstones and metasilts/slate of the Meguma terrane. The timing and duration of emplacement of the more evolved portions of the SMB are poorly understood. Furthermore, these latter phases, despite similar character to the EKL (e.g., F-rich), lack significant rare metal mineralization. This study aims to address several issues: 1) constrain the structural evolution of the EKSZ with respect to mineralization; 2) constrain the age and duration of mineralization and timing of the EKL emplacement; 3) better understand fluid evolution at the deposit and control of fluid:rock interaction on mineralization through fluid inclusion and isotopic data; 4) constrain the duration of the emplacement of the SMB; and 5) understand metallogenic disparity between East Kemptville the rest of the SMB.