

Geology of the Paleoproterozoic Järkvissle Li-Sn-Ta Pegmatite System, Central Sweden

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The Järkvissle Li-Sn-Ta prospect in central Sweden is a key example of an LCT-type granitic pegmatite system in the country. Historical exploration at Järkvissle identified pegmatite dikes containing spodumene, petalite, cassiterite, and columbite group minerals, and produced a pre-regulatory resource of c. 600 kt grading 0.45% Li, 0.07% Sn, and 80 ppm Ta. In this presentation, we give an overview of the geology of the Järkvissle prospect based on new field mapping, lithogeochemistry and geophysical data, and 3D geomodelling. Results form part of the larger EIS project* which aims to develop new digital exploration tools for several critical metal-bearing mineral systems.

The oldest rocks at Järkvissle are metamorphosed siliciclastic sedimentary and intercalated volcanic rocks that form part of a Paleoproterozoic (c. 1.9 Ga) continental margin termed the Bothnian Basin. The sedimentary-volcanic package records at least two episodes of ductile deformation as evidenced by bedding-cleavage relationships, large- to mesoscale folds, crenulation cleavages, shear bands, and boudin structures. Two main intrusive rock types also occur; a foliated biotite-muscovite granodiorite-granite, and a foliated garnet-bearing granite with unzoned "simple" pegmatite parts.

At Järkvissle, a set of subvertical, mainly NNE- to NNW-trending, spodumene-bearing pegmatite dikes occur over a c. 2- × 7-km area. The pegmatites range from c. 0.2 to 2.0 m in thickness, are c. 10 to 800 m in length, have planar to somewhat wavy forms, and are internally zoned. They occur as either individual dikes or grouped "sheeted" bodies that preferentially intrude the eastern limb and hinge zone of a large-scale, steeply SSE-plunging asymmetrical fold. Pegmatite orientations follow those of pre-existing planar fabrics in metasupracrustal host rocks, indicating earlier-formed structures were pathways and/or traps for pegmatite-forming volatile-rich melts. Several pegmatites also display folded forms, suggesting localized ductile deformation accompanied pegmatite emplacement.

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