GS2021-2

Results of a preliminary investigation into the lithium mineralization, distribution trends and remobilization in the Tanco pegmatite, southeastern Manitoba (part of NTS 52L6)

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In Brief:

- Samples of the Tanco pegmatite were taken from drillcore showing different mineralogies, textures and zones associated with lithium mineralization
- High lithium assay values do not always correspond to lithium aluminosilicate (e.g., spodumene) rich zones
- Future analysis of samples will include petrography, electron probe analysis and geochronology of columbite and apatite minerals

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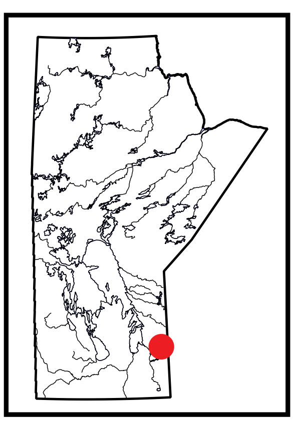

Summary

Drillcore and underground samples were collected at the Tanco pegmatite of southeastern Manitoba in August 2021 to investigate the timing of mineralization phases and subsequent metasomatic processes, which influenced the modern-day Li distributions. Samples taken recorded representative changes in mineralogy, textures and zonation in the southwestern Li-rich region of the pegmatite. Preliminary observations show diverse mineralogical assemblages in drillcore crosscutting zones that correlate with high Li assay values. Future work will include thin-section petrography to confirm the relations of minerals, electron microprobe–based analysis to investigate the mineral chemistry of different generations of Li mineralization, and in situ geochronology of columbite group minerals and apatite to provide ages for the mineralization.

Introduction

Pegmatites are a compelling field of study due to both the dynamic and scientifically interesting modes of genesis and the significant economic importance they can possess (London and Kontak, 2012). The Li-Cs-Ta (LCT) Tanco pegmatite, part of the Winnipeg River–Cat Lake pegmatite field in southeastern Manitoba, presents an exceptional example of pegmatite evolution, fractionation and zonation on all scales from regional to mineralogical. Underground sampling and access to the core library at Tanco provide an excellent opportunity to collect a range of samples from each pegmatite zone, including subsurface exposures. This project aims to investigate the timing of mineralization phases and subsequent metasomatic processes that influenced the modern-day Li distributions. Analysis of the distributions of primary spodumene, petalite, lepidolite and Li phosphates will elucidate crystallization relationships and relative timings of pegmatite emplacement and alteration. This will allow the analysis of mineralization trends from which larger scale conclusions can be drawn and related to other deposits. In addition, this project presents an opportunity to utilize new methods that have been developed more recently and helped improve the general understanding of pegmatite emplacement and development to provide a new perspective on the geological history of this world-class deposit.

Due to logistical and access difficulties, the field sites at Tanco have not been open to sample collection and scientific study for the last decade (e.g., Van Lichtervelde et al., 2008; Kremer, 2010; Camacho et al., 2012). Fieldwork and analysis of this area provides an excellent opportunity to develop new ideas and constrain the Li evolution and mineralization of the region.

Geological setting

The Tanco pegmatite is located within the Bernic Lake group of pegmatites in the Cat Lake–Winnipeg River pegmatite district of southeastern Manitoba (Figure GS2021-2-1). The pegmatites form part of the southern limb of the Bird River greenstone belt (2.75–2.72 Ga; Gilbert, 2006). This belt hosts multiple units divided into northern and southern assemblages, and forms part of the greater Archean Superior province. For detailed descriptions of the Bird River greenstone belt lithologies, refer to Gilbert (2006, 2007, 2008). The Bernic Lake formation (2724.6 ±1 Ma; Gilbert, 2008) forms a 2 by 45 km unit that is composed predominantly of mafic volcanic rocks. It is found in the southern region of the Bird River greenstone belt and contains the Tanco gabbro, the main host of the Tanco pegmatite. The Tanco gabbro crystallized at 2723.1 ±0.8 Ma and was subsequently subjected to amphibolite-grade metamorphic conditions, along with other lithologies in the region, that produced a classic Abukuma-style metamorphic assemblage (Černý, 2005; Gilbert,

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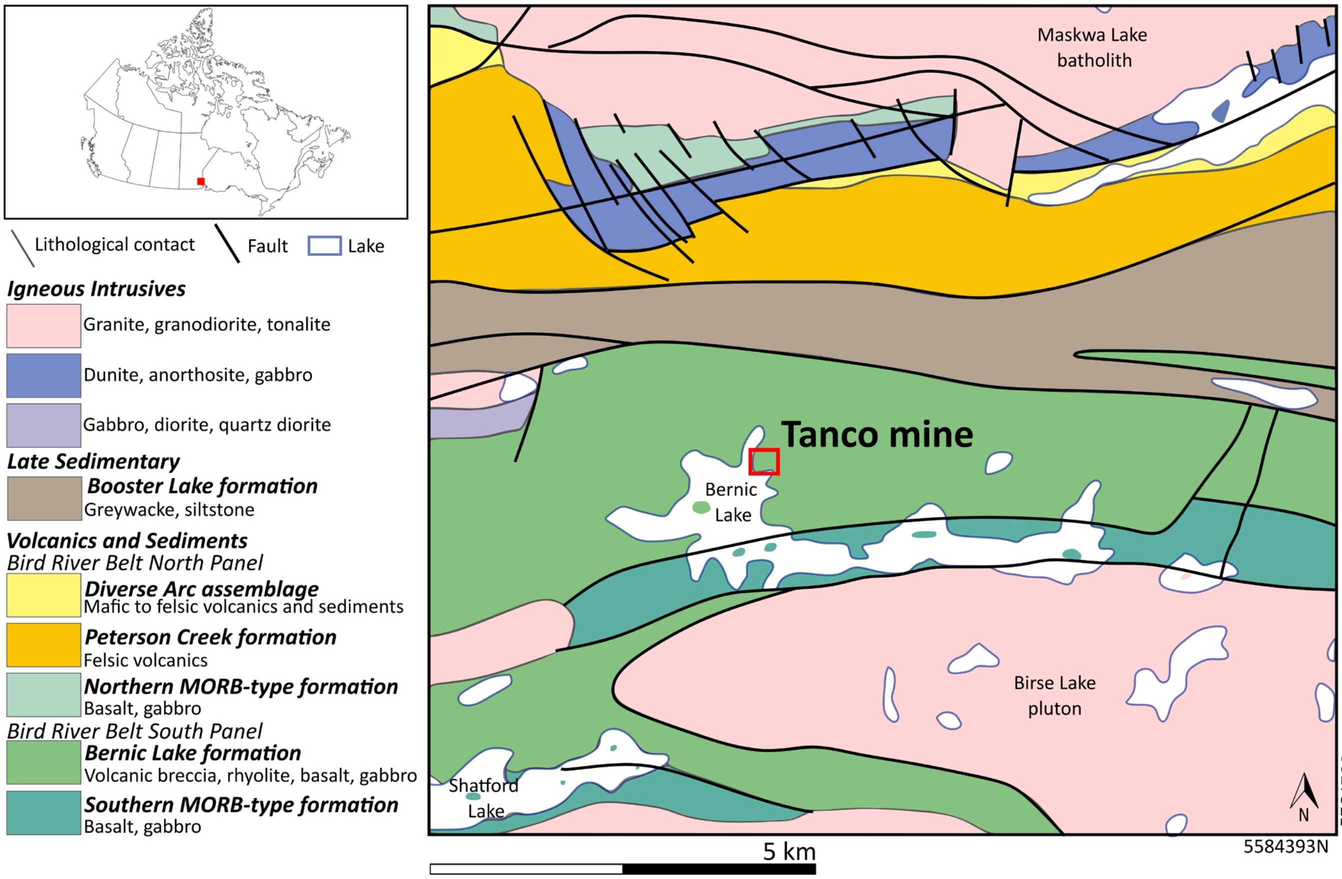

Figure GS2021-2-1: *Geographic location and local geology of the Tanco mine (red square) area, southeastern Manitoba (adapted from Gilbert, 2008). Abbreviation: MORB, mid-ocean–ridge basalt.*

2008; Kremer, 2010). Ages and spatial associations suggest that the Bernic Lake Formation and the Tanco gabbro formed as a result of a single episode (Kremer, 2010).

The Cat Lake–Winnipeg River pegmatite district is large and is subdivided into the Winnipeg River and the Cat Lake–Maskwa Lake subdistricts (Černý et al., 1981). There are multiple further groups within these divisions, including the Bernic Lake pegmatite group (part of the Winnipeg River subdistrict) that includes the Tanco pegmatite. The Bernic Lake group hosts multiple pegmatites that are enriched in Li, but no others are the size and proportions of Tanco, the largest and most Li-rich pegmatite of the group.

Tanco pegmatite

The morphology of the Tanco pegmatite is bilobate and can be traced for 1520 m in length, 1060 m in width and 100 m in thickness (Černý, 2005). It is entirely located in the subsurface and does not outcrop, but has been extensively drilled during past mining and exploration endeavours.

The Tanco pegmatite has been interpreted to have intruded at 2641 ±3 Ma (U-Pb tantalite dating; Camacho et al., 2012) and 2647.4 ±1 Ma (U-Pb zircon dating; Kremer, 2010). These dates correspond with a phase of tectonism in the region at 2650–2640 Ma that is hypothesized to have reactivated the Bernic Lake shear zone, which facilitated intrusion of the pegmatite along the west- and east-trending fault system of the region (Kremer, 2010; Martins et al., 2013). Although the parental granitic source or feeder zone for the pegmatite has not been found (Černý et al., 1996), it has been hypothesized that it should be located beneath the crystallized zone (Bradley et al., 2017). Upon emplacement, the intrusion crystallized in a unique pattern. In contrast to the typical pegmatite crystallization pattern of border zone inward solidification, Tanco is thought to have crystallized in a honeycomb-shaped pattern, leading to complex, evolutionary, geochemical enrichment patterns in the various zones (London, 2008).

Tanco is classified as a complex LCT pegmatite of petalite subtype (Černý and Ercit, 2005) that is peraluminous in composition and depleted in Fe, Mg and Ca (London, 2008). This classification was selected because the dominant primary phase of Li mineralization was petalite, even though the vast majority of this mineralogy subsequently re-equilibrated to spodumene and quartz (SQUI) intergrowths. The presence of mineral assemblages that are indicative of other LCT subclasses, such as primary spodumene, amblygonite-montebrasite and lepidolite, also occur in this pegmatite (Černý, 2005).

Zone mineralization

Tanco has been historically divided into nine major mineralized zones that are geochemically, texturally and mineralogically distinct (Stilling, 1998). These zones have been described extensively in previous works (e.g., Černý et al., 1998; Černý, 2005; Stilling et al., 2006); this report presents a brief overview of the main characteristics of each zone.

Zone 10 (border zone): This is a fine crystalline contact zone with amphibolitic country rock that represents the portions of the Tanco pegmatite that crystallized first. It is the least geochemically evolved section of the pegmatite, typically hosts a composition of mainly albite and quartz, and is less than 30 cm in thickness.

Zone 20 (wall zone): This zone is located in the footwall, has a thickness of up to 35 cm and is predominantly megacrystic microcline-perthite with major components of quartz, albite and lithian muscovite.

Zone 30 (albitic aplite zone): The main constituents of this zone, which can exceed 16 m in some areas, include albite and quartz with lesser muscovite. An interesting feature is the presence of a 'beryl fringe' found at contact zones with other units, and it is typically associated with Ta and Nb mineralization.

Zone 40 (lower intermediate zone or mixed zone): This zone is up to 25 m thick and consists mainly of microcline-perthite crystals and intimate growths of spodumene and quartz that follow the remnant crystalline structure of petalite crystals. Other components include quartz, albite, mica and amblygonite.

Zone 50 (upper intermediate zone): This unit is up to 24 m thick and generally has a gradational contact with zone 40. There is a notable lack of albite and mica, which aids in distinguishing it from zone 40. The main components are SQUI, amblygonite, petalite and pollucite.

Zone 60 (central intermediate zone): This zone is up to 45 m thick and has notably sharp contacts. It hosts prominent Ta- and Nb-oxide mineralization within major components of microcline-perthite, quartz, albite and muscovite.

Zone 70 (quartz zone): Zone 70 comprises monomineralic lenses as opposed to the classic quartz-rich core typically found in highly evolved pegmatites. It is difficult to distinguish in drillcore from quartz pods present in other zones and can contain minor amblygonite and spodumene as rare accessory phases.

Zone 80 (pollucite zone): This zone is geochemically part of zone 50 but large enough in scale to be defined as a new unit. It hosts a remarkably 75% pure pollucite unit and is commonly crosscut by later veins of lepidolite, quartz and feldspar.

Zone 90 (lepidolite zone): This zone is >18 m thick and is predominantly composed of relatively fine-grained lithian mica. It is economically important due to the high content of Rb and Cs micas, and Ta and Nb oxides.

The multiple geological cross-sections that have been constructed using these zone definitions at Tanco show the complex nature and spatial relationships of the zones (Stilling et al., 2006).

Geochemical evolution

The degree of fractional crystallization at Tanco can be revealed by whole-rock geochemical evolutionary-trend indicators: K/Rb = 4.7, K/Cs = 9.3, Rb/Cs = 2.0, Rb/Tl = 137, Fe/Mn = 0.63, Mg/Li = 0.02, Al/Ga = 917, Zr/Hf = 2.6, Zr/Sn = 0.21 and Nb/Ta = 0.19 (Stilling et al., 2006). These values suggest that the Tanco pegmatite represents a highly evolved pegmatitic melt (Černý, 2005).

From less to more evolved zones of the pegmatite, the mineralogies of different crystal groups are seen to reflect the increase in volatiles and incompatible elements over time as the body crystallized. These studies suggest that Tanco underwent a complex crystallization history and preserved an interesting end-member scenario of least to most evolved zones. An increase in rare alkalis in feldspar and beryl with evolution is evidenced by the incorporation of increasing Li, Rb and Cs into crystal structures (London, 2008). Tourmalines exhibit a transition from Fe- and Al-rich schorl-foitite-olenite to Li- and Al-rich elbaite-rossmanite (Selway et al., 2000a; London, 2008). Oxides in the deposit tend to shift from columbite and wodginite assemblages (disordered Sn, Nb and Ta minerals) to more ordered simpsonite, stibiotantalite, tantite and lithiowodginite (Grice et al., 1972; Selway et al., 2000a; Černý, 2005). A muscovite to lepidolite mica transition was also noted (Van Lichtervelde et al., 2008).

Mineralogy

Tanco is known for its diverse mineralogy, with more than 100 minerals having been identified within the pegmatite (Černý, 2005; Martins et al., 2013). This section describes the dominant mineral phases that were sampled in this study for their potential Li-bearing nature or association with Li mineralization.

Silicates

Lithium aluminosilicates: petalite ($LiAlSi_4O_{10}$), spodumene ($LiAlSi_2O_6$) and eucryptite ($LiAlSiO_4$)

Petalite is found in zones 50 and 80 as individual crystals with amblygonite-montebrasite, pollucite and feldspar (Černý and Ferguson, 1972). Petalite is not common throughout the pegmatite and is mostly replaced by SQUI.

Spodumene is milky white in colour and can range in size from micro-SQUI texture to megacrysts. Černý and Ferguson (1972) described three different types of spodumene at the Tanco pegmatite: 1) secondary breakdown product of petalite into spodumene and quartz intergrowths (known as SQUI); 2) primary spodumene; and 3) spodumene that has broken down and recrystallized into spodumene and quartz. This final spodumene type is distinct from SQUI and occurs as coarser crystals that lack the intimate intergrowth textures shown by SQUI. In zones 40 and 50, 90% of the spodumene is SQUI, which is the target for Li exploration and mining.

Eucryptite at Tanco is grey to pink with a distinct red-orange fluorescence in ultraviolet light (Černý, 1972). Crystals are up to 4 cm long and occur as individual crystals, intergrown with SQUI or in crosscutting vein structures.

The Li aluminosilicate relationships at Tanco are explained by a reaction path that shows the nature of primary Li crystallization (London, 1986; London, 1990; Černý et al., 1998). The hypothesized crystallization path shows an initial primary petalite crystallization phase from a hydrous melt. As the melt cools, it crosses the petalite-spodumene reaction boundary, where the bulk of petalite is hypothesized to have broken down into SQUI. The crystallization path then shows a period of primary spodumene growth, followed by a transition to primary eucryptite growth as the spodumene-eucryptite reaction boundary is crossed at 270°C and 1.8 kbar.

Feldspars

Feldspars found at Tanco include albite, which is commonly present as radial aggregates that show a cleavelandite texture. The albite is typically milky white and characteristically shows multiple striations. Microcline-perthite also occurs commonly and is orange to pale pink with mottled internal exsolution textures visible in hand sample. Orthoclase has also been identified but is more rare (Brown et al., 2017).

Quartz

Quartz occurs as equant primary phases in multiple zones (e.g., zones 70, 90, and 60; Černý et al., 1996). It can be found as smoky quartz (where related to Ta mineralization) and intergrown with spodumene (Černý et al., 1996), as well as equant pale white-grey crystals.

Micas

A wide variety of micas can be found in nearly all zones of the Tanco pegmatite. Magnesium-rich, dark brown to black biotite is found in zone 10, whereas late-stage green metasomatic mica, white muscovite, lithian mica and lepidolite occur elsewhere (Rinaldi, 1972). There are noticeable changes in the growth habits of micas from curvilamellar 'ballpeen' crystals to normal micaceous books. The micas at Tanco were described by Rinaldi (1972) and were investigated in relation to Ta mineralization by Van Lichtervelde et al. (2008).

Tourmalines

Tourmaline is easily distinguishable and abundant in many zones. Multiple types have been identified that have highly variable colours based on their crystal chemistry and correlate with different mineralogical zones. In zones 10, 20, 30 and 60, the tourmalines tend to be brown/black, and occasionally green, in colour. Pink and green tourmalines are found in zones 40 and 50 (Selway et al., 2000a). Tourmalines present a detailed geochemical evolution series and are also found in contact zones with the country rock (Selway et al., 2000b).

Beryls

Beryl is a common accessory phase found in almost every pegmatite zone at Tanco. It has a variable composition and colour and is typically found as hexagonal dispersed crystals (Černý and Simpson, 1977). A prominent example of this is the white, Cs-rich beryl in zone 30 (Martins et al., 2013).

Phosphates

Amblygonite-montebrasite

The amblygonite-montebrasite series occurs as large primary crystals up to 1.5 m in size but can also be present as smaller tabular aggregates (from 1 to 3 cm in size). Montebrasite can also be present as a secondary phase along grain boundaries and fractures (Černá et al., 1972).

Apatite

Apatite occurs as an accessory phase in almost all zones at Tanco, commonly in a pale blue to blue-black colour (Černý et al., 1996).

There are multiple other phosphates present, but this study details minerals that occur in large amounts. It has never been economical to mine phosphates at Tanco, but analysis of the Li distributions in the different mineral phases could provide information on future mining sources, which could become economic.

Oxides

Ta/Nb oxides

Tantalum and niobium oxides represent one of the most economically important groups of minerals found at Tanco. They typically occur as discrete dark specks accompanied by proximal red staining and can be difficult to classify in hand sample (Černý et al., 1996).

Other

Other minor phases at Tanco include sulphides, native elements, halides, carbonates, sulphates and borates. Tanco has also been the source of major new mineral discoveries, including černýte, $Cu_2(Cd,Zn,Fe)SnS_4$, a tetragonal metallic sulphide (Kissin et al., 1978); and tancoite, $HNa_2LiAl(PO_4)_2(OH)$, an orthorhombic-dipyramidal anhydrous phosphate (Ramik et al., 1980). Ercitite, $Na_2(H_2O)_4[Mn^{3+}{}_2(OH)_2(PO_4)_2]$ was also identified at Tanco (Fransolet et al., 2000). Groatite, $NaCaMn_2(PO_4)[PO_3(OH)]_2$, a translucent and vitreous phosphate typically found in acicular sprays, was also discovered (Cooper et al., 2009), along with titanowodginite, (Mn>Fe)(Ti>Sn, Ta, Fe)$(Ta>Nb)_2O_8$, a monoclinic-prismatic oxide (Ercit et al., 1992). For an extensive list of minerals present at Tanco the reader is referred to Martins et al. (2013).

Lithium at Tanco

Lithium exploration and extraction is becoming increasingly important as the world transitions to greener sources of energy that depend heavily on the use of rechargeable batteries. The Li mineralization at Tanco is also commercially important for use in ceramics due to its low Fe content (Černý and Ferguson, 1972).

The bulk of Li mineralization at Tanco is found in the Upper Intermediate zone (zone 50), where the megacrystic nature and low Fe content make spodumene an attractive exploration target. However, the majority of the spodumene at Tanco occurs in a recrystallized SQUI form (Černý, 2005). This breakdown, as previously mentioned, is interpreted to have replaced petalite; however, it is debated whether this process is entirely isochemical (Lima and Dias, 2019). As petalite can only take up a certain volume of Fe into its structure, it can be expected that the SQUI would inherit this low Fe content if the breakdown process is entirely isochemical. If the breakdown path is not isochemical, unfavourable chemical contamination from external fluids and reactions can make the spodumene less economically viable for extraction. Secondary hydrothermal alteration can also introduce Fe contamination from fluids, which is undesirable for extraction purposes (Černý, 1972).

The metasomatic effect of Tanco on the country rock is known to have occurred on a large scale (Morgan and London, 1987). Whether other metasomatic processes were pervasive throughout the entire crystallized body is unknown. This is an important field of study, as this knock-on effect has the potential to alter the economic viability of Li extraction at Tanco.

Analysis of whether Li was remobilized during interaction with hydrothermal fluids on a large scale is also important, as high-grade regions within the pegmatite could be the result of reprecipitation along fractures. Weathering processes have also acted on Tanco, where primary Li silicates have broken down into secondary assemblages (e.g., petalite breaking down into montmorillonite; Černý, 2005).

It is traditionally assumed that spodumene and petalite are the most important minerals for Li extraction (Kesler et al., 2012), with spodumene and SQUI being the current targets of mining at Tanco. There has been little research to assess the Li concentrations of other minerals, so potential exists to open up new avenues of future economic viability.

Understanding the nature of Li distribution between minerals and assessing its mode of transportation are key in analyzing enrichment patterns and drawing conclusions regarding deposit-scale mineralization. Two of the greatest unknowns in the current understanding of pegmatites are 1) the distinction between magmatic and metasomatic processes; and 2) the impact these processes have on the control of mineralization (Kontak, 2020). This is particularly true for Li because the relations between Li-bearing silicate and phosphate minerals in magmatic, metasomatic and hydrothermal environments remain poorly constrained.

Summary of fieldwork

Between the 9th and 20th of August 2021, underground sampling and drillcore logging and sampling were conducted at the Tanco mine. The underground zone selected for sampling was an area that is currently being mined for Li and hosts lithologies with diverse zonation and mineralogy (Figure GS2021-2-2). This region is thus promising for an investigation of how Li-mineral assemblages are dispersed and altered.

Sampling strategy

Drillcore sampling

Four transects of drillholes were selected in the Li-rich region of the pegmatite. These transects, labelled A, B, C and D, are oriented east-west and cores from six drillholes were sampled per transect (Figure GS2021-2-2).

Drillcore logs and assay values were cross-referenced with drillcore upon sampling. Rock samples were collected to be representative of the different mineralized zones described in the drillcore logs and assay values (Sinomine, unpublished data, 2021). Major textural changes within the cores were noted and sampled, and mineral assemblages from each drillhole were sampled for further analysis. These mineral assemblages included Li silicates, amblygonite, mica, quartz, albite, potassium feldspar, phosphates, apatite, Ta oxides, tourmaline and any other notable mineralized phases (Figure GS2021-2-3).

Notes were made on whether the minerals appeared to be primary or secondary in nature, based on textural evidence, crystal size and appearance. Samples of the upper and lower contact of the pegmatite with the country rock were also taken, along with a sample as far as possible from the pegmatite lower contact for potential future Ar/Ar analysis.

Underground sampling

Lithium West and Lithium South, two regions of active Li mining, were visited over two days and pegmatite zones and mineral assemblages were identified and sampled. Both areas contain large (up to 5 m) crystals of SQUI and spodumene, with other megacrysts of feldspars and quartz (Figure GS2021-

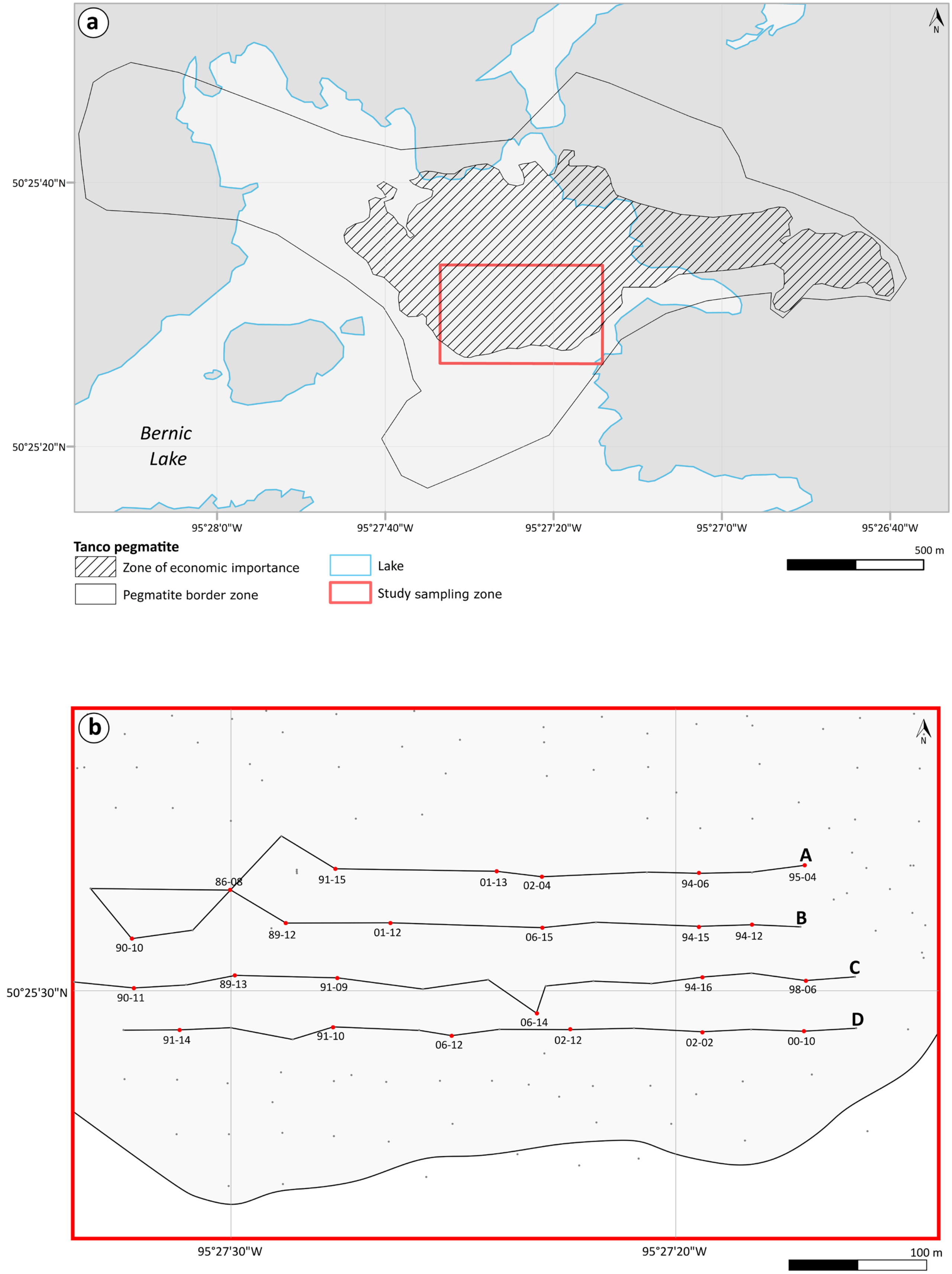

Figure GS2021-2-2: a) *Outline of the Tanco pegmatite border zone (Stilling et al., 2006) and zone of economic importance (Sinomine, unpublished data, 2021) projected to surface and shown in relation to Bernic Lake; study area is highlighted by red box;* ***b)*** *Sampled drillcore locations along four selected transects (A, B, C and D) of a Li-rich region of the Tanco pegmatite (shown by diagonal hatching on grey background). Red dots indicate location of sampled drillcore (with drillhole number). Grey dots beyond transect lines indicate drillholes not sampled.*

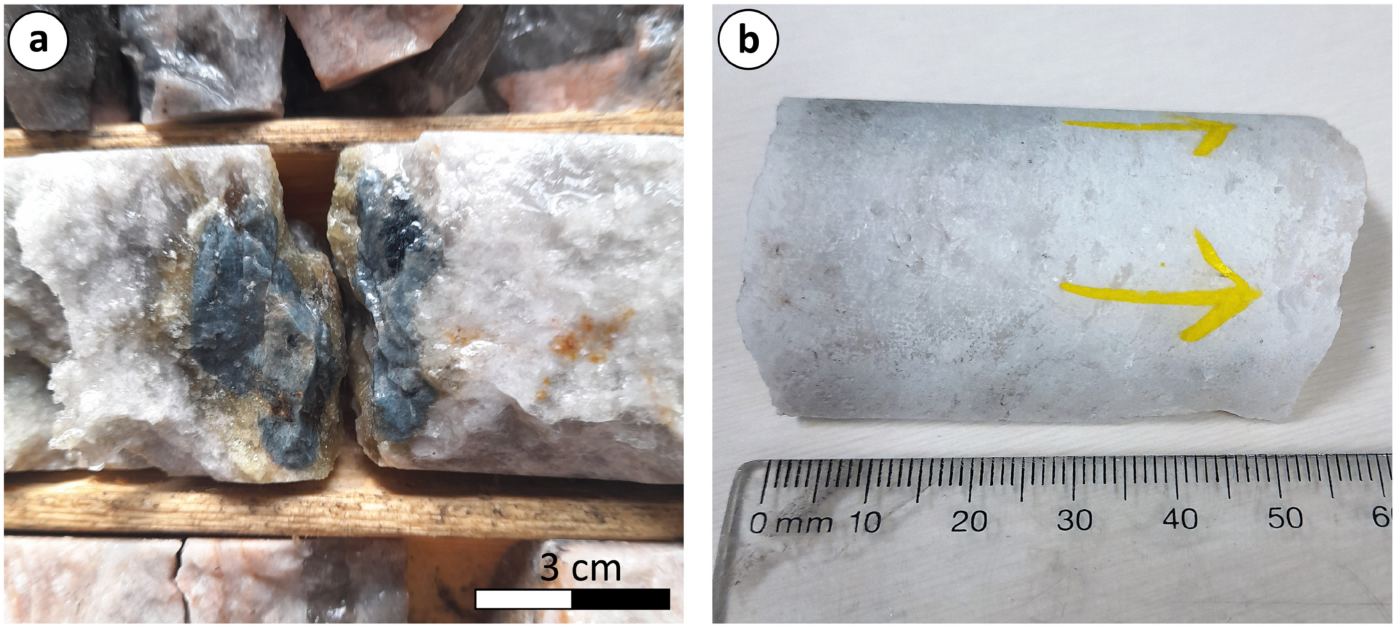

Figure GS2021-2-3: *Drillcore samples showing **a)** large central apatite crystal (blue) with secondary metasomatic microcrystalline mica halo (green) within pale grey SQUI (sample CB18.08.21, 91-10, B5C3, 173.9–174.4 ft); and **b)** classic SQUI intergrowth textures after petalite (sample CB12.08.21, 94-12, B3C2, 95–95.2 ft).*

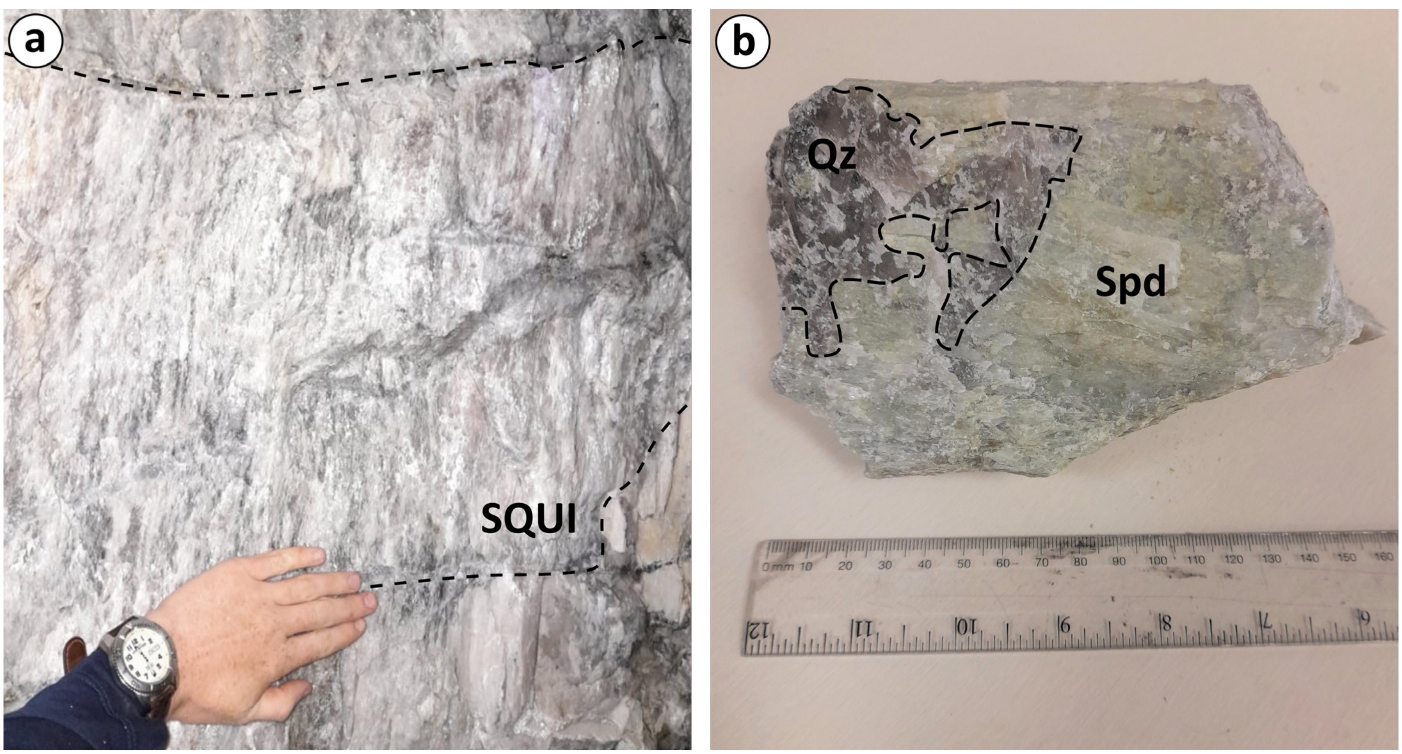

Figure GS2021-2-4: *Underground images and samples showing **a)** large in-place SQUI (spodumene and quartz intergrowth) crystal showing characteristic replacement textures (highlighted with dashed line; hand for scale); and **b)** sample of green spodumene (Spd) and smoky quartz (Qz) from the Li-rich zone.*

2-4). Interesting textures observed include regions indicative of rapid cooling, honeycomb texture and sharp contacts between zones. Multiple underground zones showed transitional boundaries between country-rock rafts and pegmatite mineralization.

Preliminary observations

Some preliminary observations could be made based on sampling of drillcore and underground features. Identification and sampling of multiple minerals, when correlated with Li assay values, suggests that Li concentrations may not be entirely from Li aluminosilicates such as spodumene. Low assay values typically correspond to quartz pods or country-rock rafts, but some regions with diverse mineralogies (in particular the highly variable zone 40) were remarkably low in Li. The multiple spodumene textures observed were interpreted to show both primary and secondary features. Large, pale white spodumene crystals with equant quartz crystals were interpreted to be primary phases (Figure GS2021-2-5a). In contrast, large amounts of SQUI were identified where spodumene occurs as elongate crystals that are intimately intergrown with quartz (Figure GS2021-2-4a). These crystals follow remnant shapes of previous petalite crystals and show finer growths of oriented crystals in comparison to the primary spodumene.

Evidence of metasomatism includes green colouring of micas, fine to coarse crystalline growth in vein structures and mineralogical differences, all of which cut through primary textures within the rock. Various mica growth habits were identified in cores, including ballpeen habit, books of primary micaceous growth and coarse secondary metasomatic growths.

The pegmatite shows varied contact boundaries ranging from gradational to sharp. Some contact zones show monomineralic growth of crystals (in particular beryl) at boundary zones, while others exhibit a submillimetre transition of microcrystalline mineralogy (Figure GS2021-2-5b).

Future work

Laboratory analyses will include thin-section petrography to analyze textural relationships and geochemical analysis to constrain the relative timing of mineralization phases. The micas in the Tanco pegmatite provide a unique opportunity to employ electron microprobe–based analysis to investigate the different generations of precipitation (Tischendorf et al., 1997). The use of electron microprobe and laser-ablation inductively coupled plasma–mass spectrometry techniques will provide new insights into the Li content of the mineral phases and information on the geochemical-partition behaviour of Li into different phases and how this is potentially altered by metasomatic processes. These techniques will also be used to investigate how Li mineralization relates to the various generations of mica precipitation.

Oxygen- and Li-isotope distributions within the rock samples will differentiate fluid-flow processes of metasomatic and hydrothermal origin (Liu et al., 2010; Deveaud et al., 2015). The timing of Li mineralization will be investigated via textural relationships and in situ geochronology of columbite-group minerals, apatite and other suitable minerals. Samples were also collected for possible future Ar/Ar dating of amphibole and mica. This would provide information on the crystallization history and speed of cooling of the pegmatite.

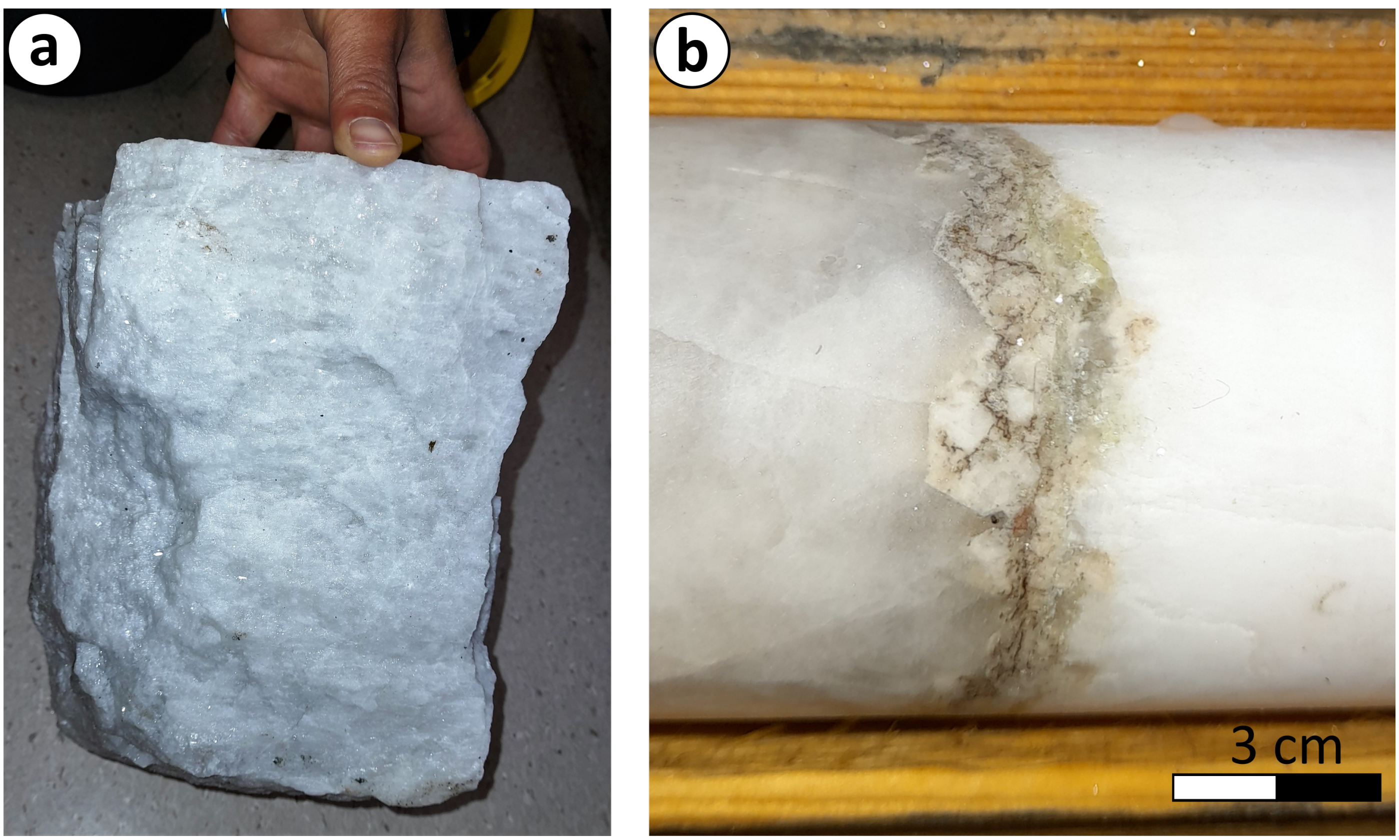

Figure GS2021-2-5: *Images illustrating preliminary observations of **a)** large monomineralic spodumene sample hypothesized to be primary in nature (hand for scale); and **b)** beryl fringe showing contact between pale grey quartz (left) and milky white albite (right), with a thin band of green metasomatic mica.*

Economic considerations

Lithium-cesium-tantalum pegmatites host a suite of economically critical elements (Linnen et al., 2012). Lithium is a prime example of a critical element, with research into this element seen to be essential as the world transitions to green technology and a decarbonized economy (Zubi et al., 2018). Furthermore, the government of Canada has recognized it as a critical mineral (Government of Canada, 2021). From use in batteries to ceramics, Li is an important commodity and is often found in association with other critical elements. Examples of these include Ta, Rb and Be. Manitoba has abundant sources of Li, the richest and most economically viable of which lies within the Tanco pegmatite detailed in this study. Knowledge of the processes that led to the accumulation and concentration of Li within this pegmatite is therefore key for targeting and exploring Li sources in this deposit and elsewhere in the region.

Understanding the nature of Li distributions between minerals and assessing its mode of transportation are important in analyzing enrichment patterns and drawing conclusions regarding deposit-scale mineralization. These relationships are vital for targeting and analyzing the economic viability of the deposit and will improve the general scientific understanding of one of the world's best-known examples of highly evolved, economically important pegmatites. The post-fieldwork analysis of these samples currently being undertaken will help elucidate these relationships.

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