Spring 5-16-2014

Geochemistry, Mineralogy and Evolution of Mica and Feldspar from within the Mount Mica Pegmatite, Maine, USA

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Geochemistry, Mineralogy and Evolution of Mica and Feldspar from within the Mount Mica Pegmatite, Maine, USA

A Thesis

Submitted to the Graduate Faculty of the
University of New Orleans
in partial fulfillment of the
requirements for the degree of

Master of Science
in
Geology

by

Karen L. Marchal

B.S. University of New Orleans, 2005

May, 2014

ACKNOWLEDGEMENT

I would like to thank the many people who have helped, guided and supported me throughout this research. I was fortunate enough to have some of the most knowledgeable, experienced and professional pegmatologists as my thesis advisors and their dedication and commitment made me into the scientist I am today. My heartfelt gratitude to Dr. William "Skip" Simmons for recognizing my qualities as well as giving me the guidance, skills, and opportunities to experience geology first hand, all of which were influential in reaching my potential. His knowledge and wisdom has been instrumental to my success. Profound gratitude is also due Mr. Alexander Falster and Dr. Karen Webber for their endless availability to teach, edit, mentor and help. Special thanks to Encar Roda-Robles for the additional information about micas, analyses from Toulouse, and assisting in the field.

I would like to thank Gary and Mary Freeman of Coromoto Minerals for allowing me access to Mount Mica, and contributing time, samples for analysis and resources. Their firsthand knowledge of Mount Mica, detailed records and commitment to science made this research possible. Thanks also to Brian Pedersen for assistance in underground sampling. I wish to also thank Frank Perham for his observations and insight gained from his extensive experience mining at Mount Mica. Special gratitude to my colleague and friend Kimberly Clark, undertaking research on Mount Mica together has been a true bonding experience. A special thanks to my colleagues; Andrew "Drew" Boudreaux, Leah Grassi, Christopher Mark "Leopold" Johnson, Jon Guidry, Myles Felch and Susanna "Sasha" Kreinik for their help with sampling, and all collaborative efforts throughout this project. I am grateful to the Department of Earth and Environmental Science at the University of New Orleans for partial financial support for this research. Also thanks to Dr. Mark Kulp for helping me recognize my passion for geology and encouraging me to pursue another degree.

Last but not least, deep appreciation to my husband Jim, daughter Kristin, and sons Michael and Brandon for their love, support and encouragement throughout my education.

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ABSTRACT

Mount Mica is a poorly zoned sodic LCT-type pegmatite consisting dominantly of quartz, albite and muscovite in the outer portions. Potassium feldspar and *lepidolite* are restricted to the core zone. Micas in the wall zone are chemically homogeneous, but abruptly evolve into higher Cs + Rb bearing lithian muscovites and *lepidolites* in the core zone. The abrupt increase of the Cs, Rb in K-feldspar, and Cs, Rb and F in muscovite, and *lepidolite* combined with the occurrence of highly evolved species *lepidolite*, pollucite, elbaite, beryl and spodumene in the core zone suggests that incompatible elements were retained in residual fluid until their concentration was high enough to initiate crystallization of incompatible-rich mineral phases. The relatively low abundance of incompatible elements in the hanging wall suggest that the fractionation process was efficient in sweeping incompatibles into the core-zone, producing proportionally small volumes inside the pegmatite with very high enrichment in incompatible elements.

Keywords: Mount Mica, pegmatite, fractionation, lepidolite, muscovite, lithian muscovite, macroscopic interlayering

INTRODUCTION

Micas and feldspars are commonly used indicator minerals to evaluate geochemical evolution within a pegmatite. During late-stage fractional crystallization the concentrations of incompatible elements such as Li, F, Rb and Cs increase until they are incorporated into the final stages of mineral crystallization. Thus, the final minerals that form may contain elevated contents of these incompatible elements and aid in understanding the degree of evolution of the pegmatite melt. Mica minerals are abundant throughout the Mount Mica Pegmatite. The wide range of mica stability, chemical composition and its ability to incorporate a range of incompatible elements, such as Li, Rb, F, Mn and Cs, in its structure, make micas important geochemical indicator minerals reflecting changes in melt chemistry during pegmatite crystallization (*e.g*., Foord *et al*. 1995, Wise 1995, Roda *et al*. 1995, Kile & Foord 1998, Clarke & Bogutyn 2003, Simmons *et al.* 2003, Černý 2005, Roda-Robles *et al.,* 2006). In general, K-feldspar shows the same evolutionary trends as those of micas, with an increase in Li, Rb, and Cs. The purpose of this study is to examine the textural and chemical changes of micas and feldspars in order to better understand the internal evolution of the Mount Mica pegmatite.

History and Geology of Mount Mica

Mt. Mica is known as the first gem pegmatite mine in North America. The mine was worked by many ventures since 1820 when the first tourmalines were discovered by Elijah L. Hamlin and Ezekiel Holmes (Simmons et al., 2005b). Gary and Mary Freeman acquired the mine in 2003 and have kept extensively detailed, precise records and maps of mining activities under their control (Fig. 1).

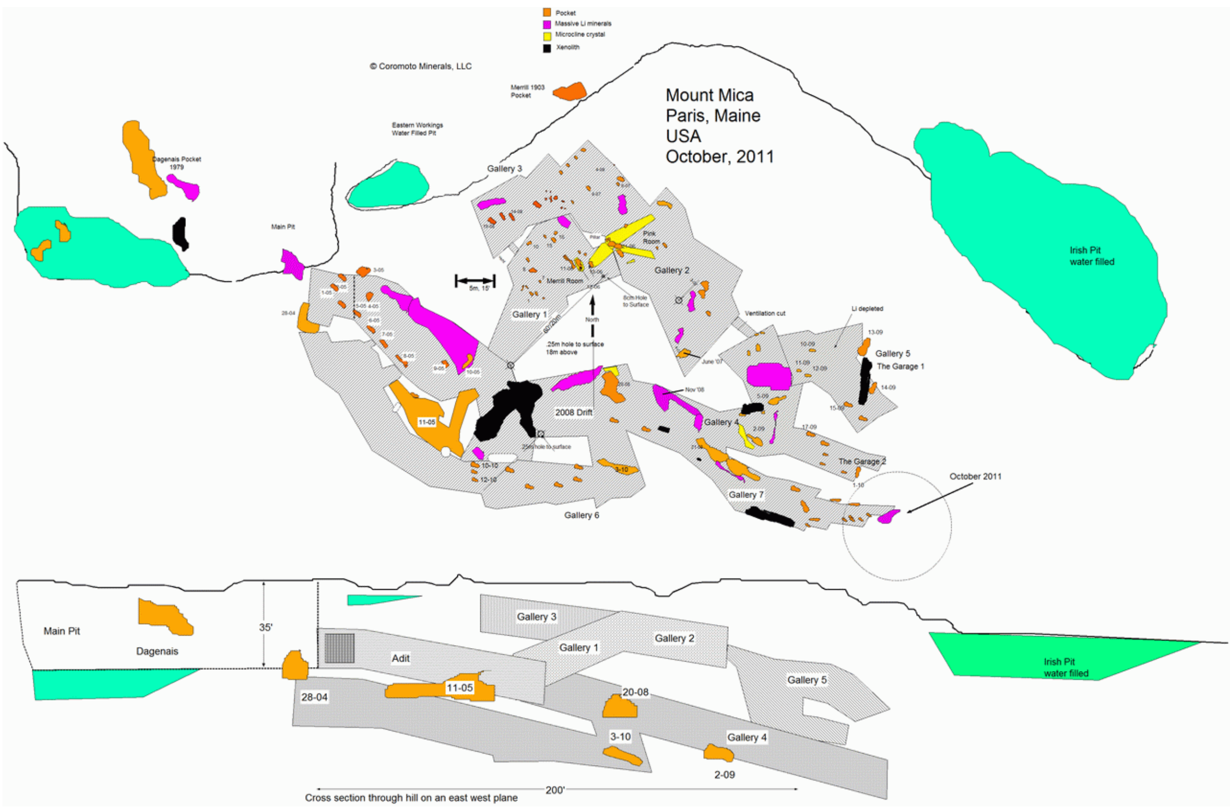

Figure 1 Map documenting mining activities and locations of massive Li-minerals (pink) microcline crystal (yellow), xenolith (black) and pocket (orange) within Mount Mica pegmatite.

Over the last eight years, more than two hundred pockets have been discovered, yielding spectacular gem-stock tourmalines and other pegmatite minerals. Understanding the mineralization, characteristics, and evolution of the pegmatite system will help future prospectors detect and recognize potential gem producing miarolitic cavity locations.

The Mount Mica Pegmatite, located near the town of Paris, Oxford Co., Maine, is situated within the Central Maine belt (CMB) that formed during the Acadian orogeny (Solar & Brown 2001) (Fig. 2). It is part of the Oxford pegmatite field and is spatially associated with the Permian Sebago Pluton and the surrounding Sebago Migmatite Domain (SMD) in Southwestern Maine (Solar & Tomascak 2009) (Figs. 2 & 3).

Mount Mica is classified as an LCT pegmatite (Černý & Ercit 2005) (Fig. 4), which is typically associated with peraluminous, S-type granites (Winter 2001) resulting from anatexis of clay-rich metasediments. Rare elements such as Li, Cs, and Ta associated with LCT pegmatites are derived from these sedimentary sources (Černý *et al*. 2012). LCT pegmatite formation is generally related to late- and post-tectonic convergent processes (Černý *et al*. 1985).

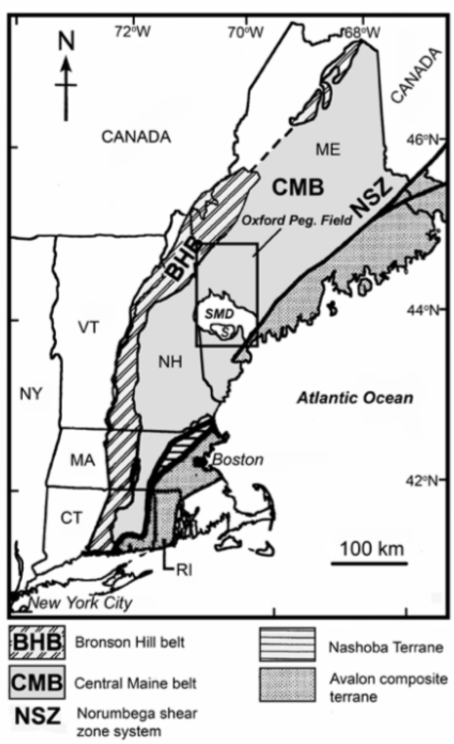

Figure 2 Map of the New England area showing the location of the Oxford Pegmatite Field and Sebago Migmatite Domain within the Central Maine Belt (CMB) (Wise et al. 2012)

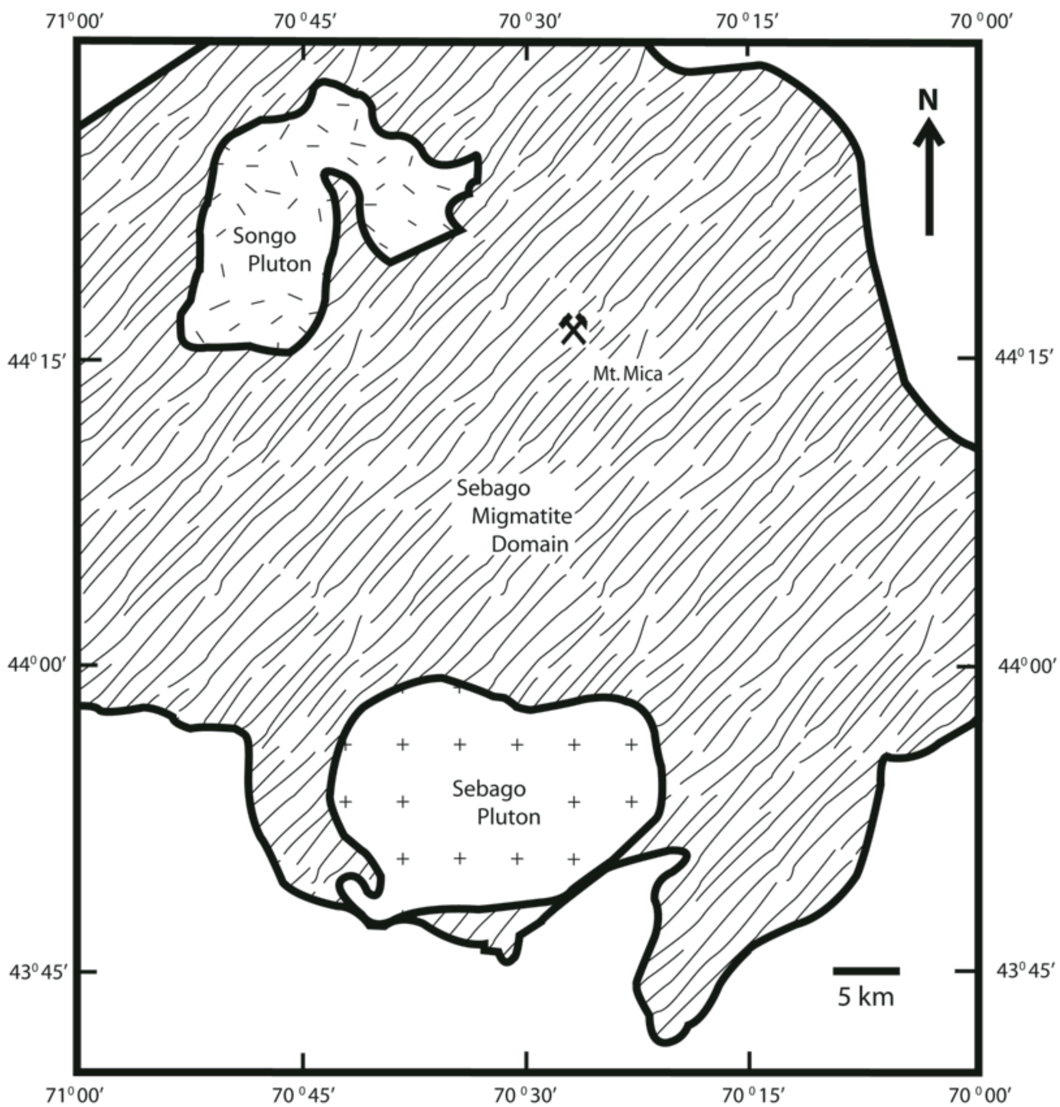

Figure 3 Map showing the location of Mount Mica and its relation to the Sebago Migmatite Domain and Sebago Pluton. Modified by Kimberly Clark and Myles Felch from Wise & Brown (2010).

Table 1. "The Family System of Petrogenetic Classification of Granitic Pegmatites of Plutonic Derivation" according to Černý & Ercit (2005).

Family	**Pegmatite subclass**	**Geochemical signature**	**Pegmatite bulk composition**	**Associated granites**	**Granite bulk composition**	**Source lithologies**
LCT	REL-Li MI-Li	Li, Rb, Cs, Be, Sn, Ga, Ta>Nb, (B, P, F)	Peraluminous to subaluminous	**synorogenic to late-orogenic (to anorogenic);** largely heterogeneous	Peraluminous, S, I or mixed S+I types	Undepleted upper-to middle crust supracrustals and basement gneisses
NYF	REL - REE MI - REE	Nb>Ta, Ti, Y, Sc, REE, Zr, U, Th, F	subaluminous to metaluminous (to subalkaline)	**syn-, late, post to mainly anorogenic;** quasi-homogeneous	peraluminous to subaluminous and metaluminous ; A and I types	depleted middle to lower crustal granulites, or juvenile granitoids
Mixed	Cross-bred: LCT & NYF	mixed	metaluminous to moderately peraluminous	**postorogenic to anorgenic;** heterogeneous	subaluminous to slightly peraluminous	mixed protoliths or assimilation of supracrustals by NYF granites

The Mount Mica pegmatite intruded into migmatite host rock belonging to the SMD composed of a Silurian to Devonian metasedimentary sequence (Solar & Tomascak 2009). The pegmatite dike strikes N35E and dips SE25°, and ranges in thickness from 1.5 m to 8 m down dip. There is a sharp contact with the melanosome portion of the migmatite country rock and an indistinct boundary with leucosomes adjacent to the contact (Fig. 1). The Mount Mica pegmatite is poorly zoned with respect to the classic zonal pattern of New England pegmatites. In Mount Mica only a wall zone ranging in thickness from 1.5 to 5 m at its widest point, and a core zone are distinct. The wall zone from the hanging-wall contact to the core zone is designated as the hanging-wall zone (HWZ) and the wall zone from the footwall contact to the core zone as the footwall zone (FWZ).

Figure 4 Entrance to Mount Mica pegmatite shows a sharp contact with the amphibolite portion of the country rock. The pegmatite is currently being mined underground for gem tourmaline. The entrance opening is approximately 8 ft. tall.

Mica, quartz, and plagioclase constitute the major minerals of the pegmatite. Grain size increases from fine grain at the contact to coarse grain in the wall zone to very coarse in the core zone. Muscovite is the primary mica and only trace amounts of biotite occur sporadically along the country rock contact. Mica textures range from small subhedral crystals in the wall zone to large, euhedral crystal books adjacent to and along the margins of pockets in the core zone.

Approximately 1 m above the footwall contact is a distinctive layer of reddish-brown euhedral to anhedral garnet crystals ranging in size from a few mm to some as large as a cm. In some places the garnets are rimmed by fine-grained blue tourmaline. Prismatic schorl crystals occur above and below the garnet line. Miarolitic cavities are never found below the garnet line.

Miarolitic cavities, or "pockets," are abundant in Mount Mica in the central core zone region of the dike and are spaced on average every 3 m (Simmons *et al*. 2005b). The cavities range in size from small 16 x 13 x 10 cm to very large in excess of 11 x 3 x 2 m and can be distinguished based on their size and mineralogy (Boudreaux *et al.* 2013). Tapered, prismatic schorl crystals commonly surround miarolitic pockets with their thicker ends pointing toward the cavity. Lithian muscovite crystals in close proximity or in direct contact with the pockets may have distinct *lepidolite* rims. The pockets are the source of gem quality elbaite tourmaline, Cs-rich beryl, *var*. morganite, specimen grade fluorapatite and minor altered spodumene.

Both fine- and coarse-grained *lepidolite* pods up to several meters across are dispersed randomly within the core zone of the pegmatite. Large mica crystal books occur adjacent to *lepidolite* pods, and crystals closely associated with *lepidolite* pods may also exhibit *lepidolite* rims (Fig. 5). Altered spodumene, elbaite tourmaline, pollucite, and montebrasite can occur interstitially throughout *lepidolite* pods (Fig. 5). The presence of *lepidolite*, elbaite, beryl, fluorapatite, montebrasite and pollucite in the core zone attests to enrichment in Li, F, B, Be, P and Cs.

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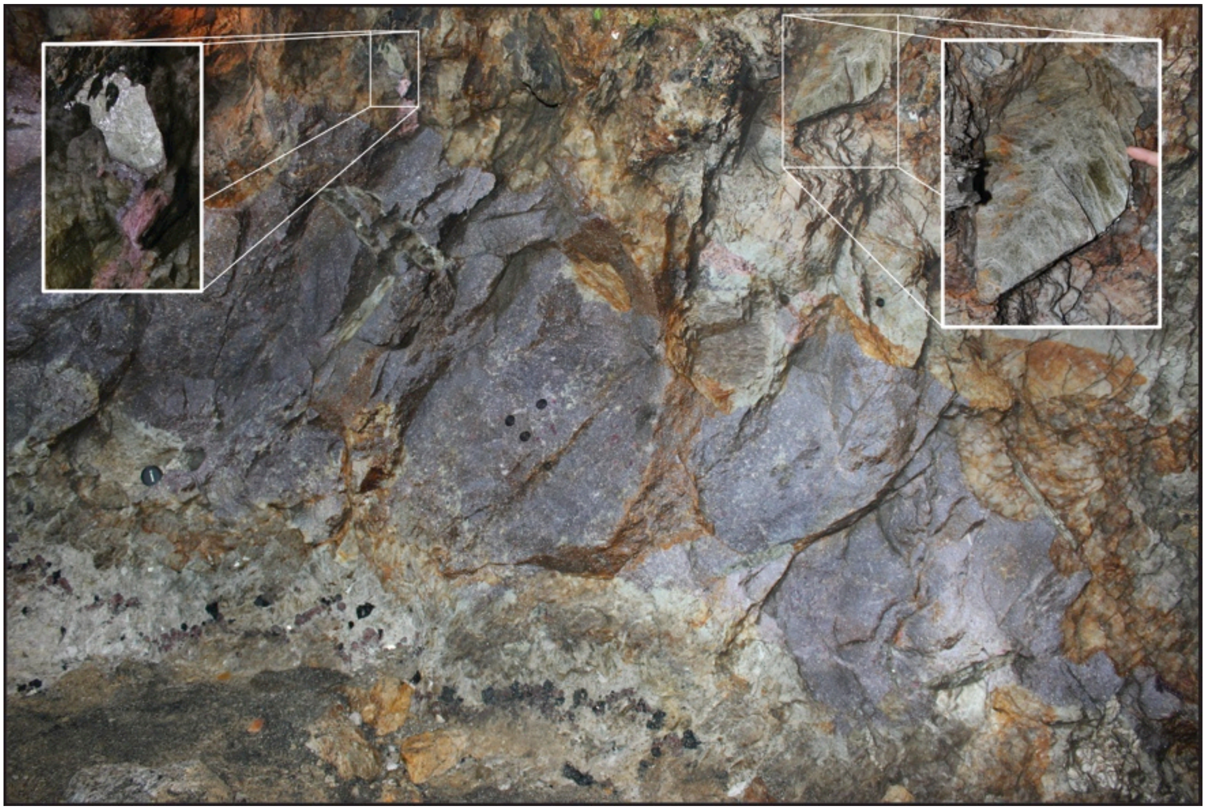

Figure 5 *Lepidolite* pod approximately 60 cm tall, intergrown with altered spodumene (center), elbaite tourmaline, and pollucite (bottom right). Box on upper right corner enhances a 17 cm mica crystal and box on upper left enhances a mica crystal overgrown by *lepidolite* (*lepidolite* rim).

SAMPLING AND METHODS

In May 2011 and 2012, fieldwork at Mt. Mica Mine was conducted for this thesis while attending the Maine Pegmatite Workshop. Careful sampling, mapping, and photographing of the positions of sample locations of micas and feldspar throughout the pegmatite were conducted. In total more than 70 samples were obtained throughout Mount Mica pegmatite and over 300 microprobe analyses were performed. Representative mica samples were collected underground along a 3 m stratigraphic transect across the pegmatite from the hanging-wall contact to the footwall contact. An additional 3 meter stratigraphic transect was taken across the pegmatite to collect feldspar samples. Grain size measurements of micas and feldspar were recorded to obtain insight of the crystal growth dynamics throughout the pegmatite. Individual mica crystals typically show zonation, and analysis from core to rim of each mica crystal was performed to show the range of chemistry in the micas. Micas in the HWZ and FWZ appear to be primary formed by crystallization from the melt. In the core zone, both primary and secondary micas were analyzed.Quantitative analytical results were documented and plotted to determine textural and composition changes of micas and feldspars from throughout the pegmatite intrusion. Applied Petrographic Services, Inc prepared thin sections of representative *lepidolite* and feldspar samples.

In attempt to identify K-feldspar in the samples from the HWZ & FWZ, thin sections were prepared on epoxy mounts and examined using a scanning electron microscope (SEM) (Fig. 6). To verify that there was no K- feldspar in the HWZ & HWZ, slabs of wall rock were etched with hydrofluoric acid then stained with cobaltinitrite. Sample preparation and analyses were performed at the University of New Orleans and in the Laboratoire de Minéralogie *et* Cristallographie of the Université Paul Sabatier, Toulouse, France. Samples were prepared by carefully hand picking mica grains using a binocular microscope to select clean samples that were free of inclusions and unaltered. Zoned mica crystals were analyzed from core to rim. At the University of New Orleans, prepared epoxy mounts for analysis were first evaluated using an Amray 1820 SEM, operated at 20 kV accelerating potential, 18 mm working distance, a sample tilt of 10° and a final aperture of 400 μ m. X-ray maps and digital images were acquired at a resolution of 2048 X 2048 pixels for Back Scattered Electron (BSE) images, and 512 X 512 pixels for maps, with a dwell time of 50 ms per pixel, using Iridium Ultra part of an integrated software package by IXRF-SYSTEMS, Inc. Quantitative chemical analyses of these samples were obtained using an ARL-SEMQ electron microprobe (Fig. 7) in the wavelength dispersive mode with an accelerating potential of 15kV, 15 nA beam current, and 2 μ m beam diameter. The following standards were used: Adularia (Fibbia) (K, Si), albite (Tiburon) (Na, K, Al), An_{50} (Ca, Al), Cpx-26 (Fe, Mg), rhodonite (Broken Hill) (Mn), TiO_2 synthetic (Ti), pollucite (Cs), Rb-leucite (Rb), fluorapatite (P), fluorphlogopite (F). Five spots per sample were analyzed with count times was of 30 seconds per spot. Backgrounds were determined using the MAN method (Donovan & Tingle 1996), utilizing any standard listed above applicable and the following standards: hematite (Elba), and synthetics: V_2O_5, ZrO_2, MgO, PbO, ZnO, and Al_2O_3. Matrix effects were corrected using Φ (ρ Z) correction procedure (Pouchou & Pichoir 1991). Some additional microprobe analyses were performed in the Laboratoire de Minéralogie *et* Cristallographie of the Université Paul Sabatier, Toulouse, France on polished thin sections using a Camebax SX-50 electron microprobe using a 15kV voltage and 10 nA beam current. The following internal standards were used: SiO_2 (Si), $MnTiO_3$ (Ti, Mn), wollastonite (Ca), corundum (Al), hematite (F), periclase (Mg), synthetic glass (Rb_2O = 1.11%, and Cs_2O = 1.89%), $BaTiO_3$ (Ba), sphalerite (Zn), and tugtupite (Cl). As discussed below, these analyses were compared with those made on the same samples at the University of New Orleans (see *Microscopic interlayering of muscovite and lepidolite section).*

Selected primary mica samples of ~ 200 mg each were dissolved in 5-10 mL of 51% hydrofluoric acid and later diluted with distilled water to 0.035L. Concentrations of Li (wavelength 670.784 nm), were determined by a Beckman Spectraspan V, Direct-Coupled Plasma (DCP) spectrophotometer (Fig. 8) operated at indicated wavelengths for 10 second count times, high standards ranged from 10 to 100 ppm, low standards ranged from 0.001 to 0.1 ppm. Lithium was checked on selected samples by DCP analyses, but overall, the results were inconsistent because of the heterogeneity of the bulk samples. The equations of Tischendorf *et al*. (1997) were used to calculate the Li content. The equation: $Li_2O = 0.3935F^{1.326}$ was chosen for samples containing < 8 wt.% F and the equation $0.237F^{1.544}$ was used for samples containing ≥ 8 wt.% F.

Carefully selected representative mica samples were pulverized to <200 mesh using a mortar and pestle and mounted according to standard procedures. Analyses were performed on a Scintag XDS 2000 X-ray diffractometer (Fig. 9) at a voltage of 35kV and a current of 15mA using Cu_{Ka} radiation. The mica polytypes were identified from X-ray powder diffractograms, by comparison with the standard data in Bailey (1984). Unit cell dimensions were obtained using a version of the Appleman & Evans (1973) cell edge program locally modified for the PC.

Figure 6 Amray 1820 SEM used for sample evaluation with Back Scattered Electron (BSE) images and creating X-ray maps.

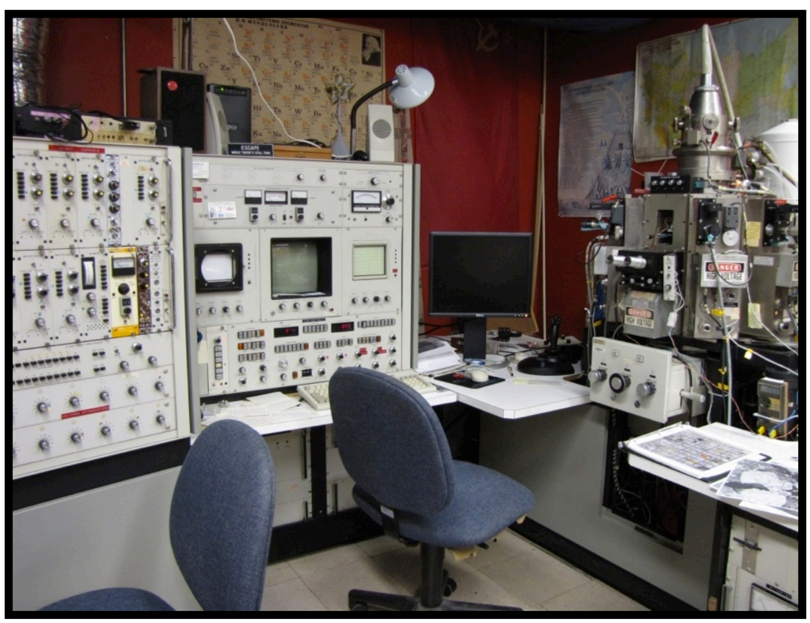

Figure 7 Quantitative chemical analyses of samples were obtained using an ARL-SEMQ electron microprobe.

Figure 8 A Beckman Spectraspan V, Direct-Coupled Plasma (DCP) spectrophotometer used to determine concentrations of trace elements.

Figure 9 Polytypes, and unit cell dimensions for micas, and alkali feldspar structural state were determined using Scintag XDS 2000 X-ray diffractometer.

MICAS

The Al-rich micas belong to muscovite – polylithionite compositional trend from dioctahedral muscovite $[K_2(Al_4\square_2)(Si_6Al_2)O_{20}(OH,F)_4]$ to trioctahedral trilithionite $[K_2(Li_3Al_3)(Si_6Al_2)O_{20}(F,OH)_4]$, and polylithionite $[K_2(Li_4Al_2)(Si_8)O_{20}(F_4)]$. *Lepidolite* is a series name used for trioctahedral micas on or close to the trilithionite – polylithionite join (Rieder *et al.* 1998). The mechanism for Li substitution into the octahedral site of the mica structure is controlled by the substitution mechanism $Li_3Al_{-1}\square_{-2}$ ($\square$=vacancy) (Foster 1960, Hawthorne & Černý 1982). A positive relationship exists between Li_2O and F (Tischendorf *et al*. 1997). Based on chemical evidence alone, Al-Li micas may appear to be members of a solid solution series. However, according to Foster (1960), the Li-Al mica series is not structurally or compositionally continuous, but has a miscibility gap midway between muscovite and polylithionite. Analyses that fall within this region represent "mixed forms", a physical mixture of muscovite and *lepidolite*. Mixed forms may be a result of an intergrowth or intermixture of *lepidolite* and muscovite at a scale too fine to detect optically (Foster 1960, Monier & Robert 1986, Tindle & Webb 1990, Tischendorf *et al*. 1997, Roda-Robles *et al.* 2006).

Micas in the FWZ and HWZ grow interstitially with quartz and albite and range from 1 to 5 cm subhedral to anhedral crystals. Crystals gradually increase in size from fine-grained (2 to 5 mm) subhedral flakes along the hanging-wall and footwall contacts, to coarse-grained (up to 5 cm) anhedral crystals along the margin of the core zone. Some of the larger grains occur as aggregates of platy crystals that form interlocking plates or books, some of which exhibit A-type mica twinning. Schorl inclusions occur in a few of the mica crystals.

Lithian muscovite from the core zone is generally large euhedral books measuring up to 18 cm (Fig. 10). Lithian muscovite crystals adjacent to and along the margins of pockets exhibit

A-type mica twinning. Some of the larger lithian muscovite books have inclusions of schorl, elbaite, quartz and fluorapatite. Lithian muscovite crystals in close proximity to or in direct contact with the pockets may have distinct *lepidolite* rims ranging in thickness from 0.5 to 1 cm in width (Fig. 11).

Figure 10 Large mica crystals, *lepidolite* pods and elbaite tourmaline adjacent to a miarolitic cavity in outside wall near mine entrance.

Figure 11 A-type twinned lithian muscovite crystal (Xl) rimmed in *lepidolite* from a miarolitic cavity.

Fine- and coarse-grained *lepidolite* pods occur sporadically throughout the core. The size of these pods range from ~ 92 x 30 x 49 cm to ~ 11 x 17 x 3 m (Fig. 2) with larger pods generally related to larger pockets (Boudreaux *et al*. 2013). Quartz, elbaite and albite are intergrown with the coarse-grained (Fig. 12). The fine-grained *lepidolite* is extremely compact and nearly monomineralic (Fig. 13). Lithian muscovite books spatially associated with *lepidolite* pods may exhibit *lepidolite* rims. Aggregates of curved ball shaped *lepidolite* are extremely rare and were found only on one slightly altered spodumene (Fig. 14).

Figure 12 Coarse-grained *lepidolite* with quartz, albite and elbaite.

Figure 13 Fine-grained *lepidolite* is very compact and nearly pure.

Figure 14 Ball *lepidolite* on slightly altered spodumene.

Structural characteristics

The majority of micas found in Mount Mica belong to the muscovite-*lepidolite* series. Selected micas were examined by X-ray diffraction to determine if there was a difference between muscovite and *lepidolite*. The polytypes and structural data of representative micas from the wall zone and core zone are reported in Table 1. The only polytype found for the lithian muscovite from both the FWZ and the core zone was $2M_1$. Polytypes 1M and $2M_2$ were found in F-rich *lepidolite* from the core zone. These mica structural configurations are consistent with typical dioctahedral and trioctahedral micas described by Hawthorne & Černý (1982)

Table 2 Unit-cell dimensions and polytypes of micas from the footwall wall zone (FWZ) and core zone of the Mount Mica pegmatite.

Zone	FWZ	Core	Core	Core	Core
Sample	WZ-6	M27-Xl	M62	M54	M8
Polytype	$2M_1$ Musc.	$2M_1$ Musc.	$2M_2$ Lep.	1M Lep.	1M Lep.
a(Å)	5.195	5.166	5.093	5.823	5.634
b(Å)	9.001	8.975	9.079	9.385	9.485
c(Å)	20.205	20.204	20.469	10.591	10.600
β (°)	96.223	95.223	98.366	108.230	106.574
F (wt%)	2.12	1.91	5.07	5.84	6.81

FWZ = footwall wall zone; WZ = wall zone; Musc = muscovite; Lep = *lepidolite*

Mica chemistry

Thirty five representative chemical compositions shown in Table 2 reveal a compositional trend from dioctahedral muscovite and lithian muscovite with ranges of SiO_2 (45.32 to 46.72 wt.%), Al_2O_3 (34.05 to 37.88 wt.%), K_2O (9.44 to 10.75 wt.%), F (0.13 to 2.45 wt.%), and $Li_2O_{(calc.)}$ (0.03 to 1.29 wt.%) to trioctahedral *lepidolite*s with an enrichment in SiO_2 (49.24 to 51.12 wt.%), F (5.82 to 8.31 wt.%), and $Li_2O_{(calc.)}$ (4.07 to 6.13 wt.%), a reduction in Al_2O_3 (25.73 to 28.57 wt.%), and a small range in K_2O (9.47 to 10.17 wt.%). Analyses falling in the range of SiO_2 (48.41 to 51.36 wt.%), Al_2O_3 (27.78 to 30.73 wt.%), K_2O (9.58 to 10.10 wt.%), F (4.48 to 5.15 wt.%), and $Li_2O_{(calc.)}$ (2.87 to 3.70 wt.%) are inferred to be mixed form. Analyses show a cation deficiency at the interlayer site Σ(Ca + Na + K + Rb + Cs) below the ideal 2.00, with lithian muscovite (1.77 to 1.95 *apfu*), mixed form (1.80 to 1.90 *apfu*), and *lepidolite*s (1.80 to 1.94 *apfu*). Occupancy in the octahedral site of the lithian muscovite ranges from 4.16 to 4.51 *apfu*, higher than the ideal 4.00 dioctahedral mica, but not uncommon for pegmatitic environments (Vieira *et al.* 2011, Martins *et al*. 2012). Octahedral site occupancy for *lepidolite* is higher with values closer to trioctahedral mica from 5.33 to 5.97 *apfu*. Mixed form micas have octahedral site occupancy between dioctahedral (4.95 *apfu*) and trioctahedral (5.20) values, consistent with the mixed-form classification of Foster (1960) and Hawthorne & Černý (1982).

Large books of Li-rich micas from the core zone that have *lepidolite* rims show no significant changes in composition across the cleavage surface of the crystal but abruptly change from lithian muscovite to high-F *lepidolite* rims. X-ray maps performed parallel to cleavage reveal that these micas are Al-rich, lithian muscovite across the crystal face with a sharp boundary where Mn-rich *lepidolite* rims the crystal (Fig 15).

Analyses show a clear compositional trend of Li substitution from dioctahedral muscovite to lithian muscovite to trilithionite in the plot ^{VI}Li *vs.* ^{VI}Al + vacancies (Fig. 6). There is a cluster of analyses in the muscovite to lithian muscovite range, a gap between 0.8 – 1.5 Li *apfu*, and a nearly linear trend to just beyond trilithionite. A few analyses that fall in the range of 1.5 to 2.1 *apfu* Li are inferred to be "mixed form" as indicated by Foster (1960), Hawthorne & Černý (1982).

The ^{VI}Al negatively correlates with Li in all of the micas (Fig. 17). The (Mg-Li) *vs.* ($Fe_{(tot)}$+Mn+Ti-^{VI}Al) diagram introduced by Tischendorf *et al.* (1997), shows a well-defined trend from lithian muscovite, a gap between (-0.08) – (-1.5) Mg-Li *apfu,* to trilithionite (Fig. 18). Based on these trends, it appears that the principal mechanism for the incorporation of Li into the mica structure is $Li_3Al_{-1}\square_{-2}$ ($\square$=vacancy).

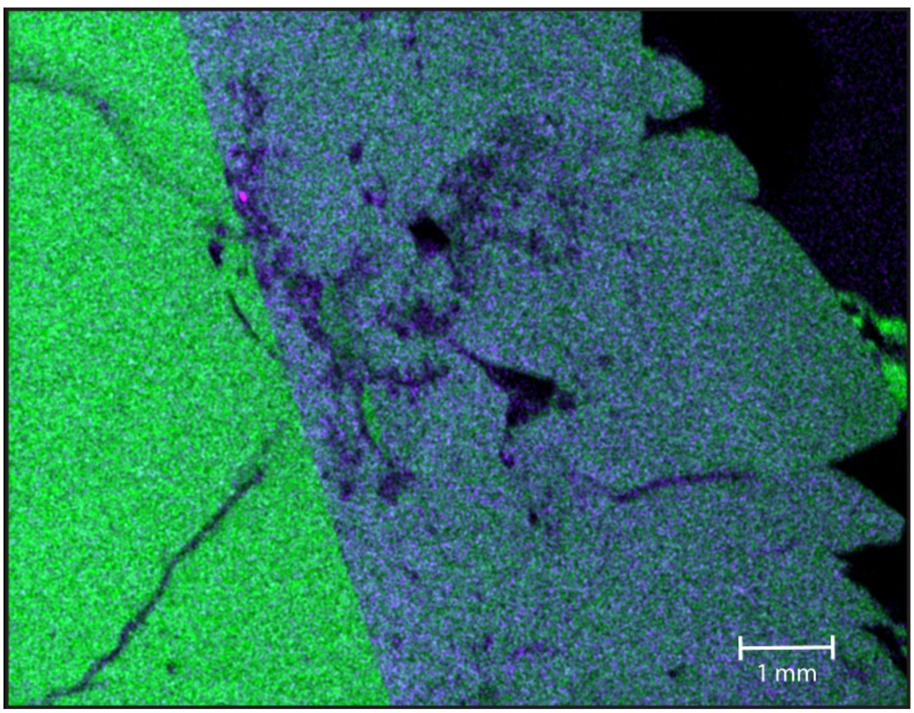

Figure 15 X-ray map performed parallel to cleavage of a rimmed mica crystal reveals an Al-rich, lithian muscovite across the crystal face with a sharp boundary where Mn-rich *lepidolite* rims the crystal. Al = Green (muscovite), Mn = Purple (*lepidolite*).

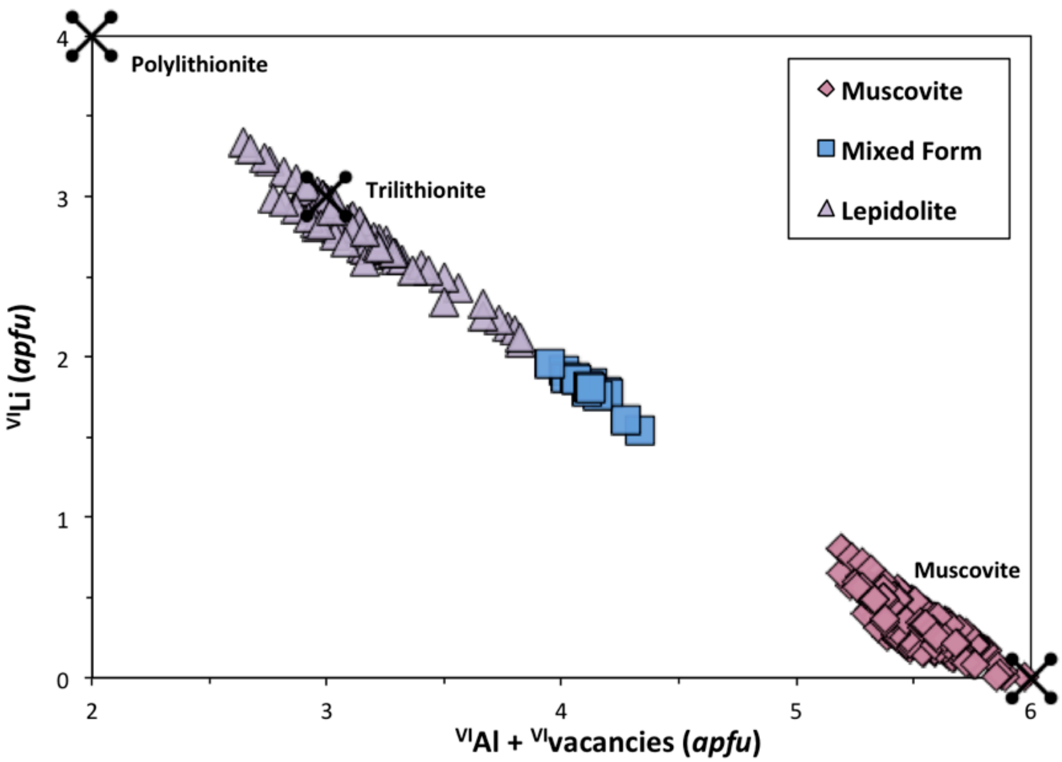

Figure 16 Octahedral site occupancy for muscovites, mixed form and *lepidolite* shows a negative relationship between ^{VI}Al and Li (Foster 1960).

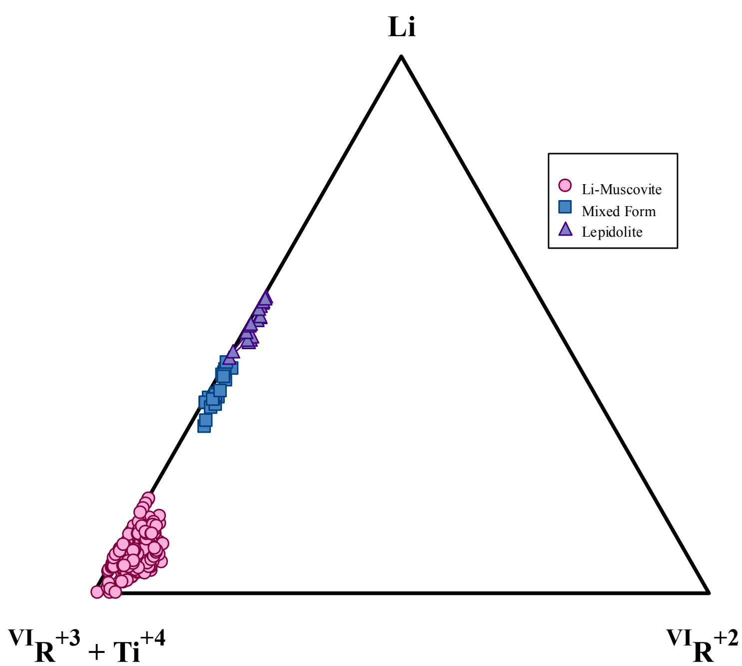

Figure 17 Relationship between Li, $^{VI}R^{+2}$ (Mg, Mn^{+2}, Fe^{+2}) and $^{VI}R^{+3}$ (Al, $Fe^{+\#}$) + Ti^{+4} in Al-Li micas (Foster, 1960).

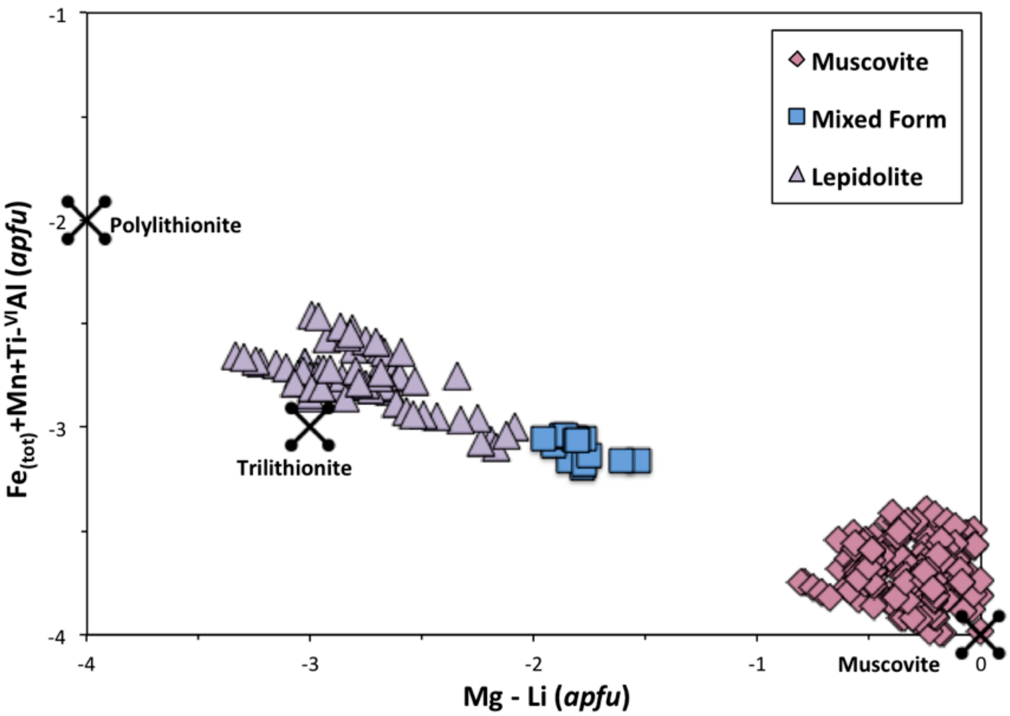

Figure 18 Al-mica classification plot Mg – Li (apfu) vs. ($Fe_{(total)}$ + Mn + Ti) - ^{VI}Al according to Tischendorf et al., (1997).

The chemical compositions of representative micas are in Table 2 and are listed as to how they appear in Figs. 19 & 20. The (Rb+Cs) content of these micas is plotted relative to their position within the pegmatite on Fig. 16. Some of the core-zone samples are zoned muscovite crystals with *lepidolite* rims. Analyses were performed on the inner portion of the muscovite crystal, designated as (Xl), and on the rim of the crystal, designated as (Rim) (Fig. 19). Tie lines link analyses from the same crystal (Fig. 19). A ball *lepidolite* (BL) on spodumene (Fig. 19) from the core zone was also analyzed. The remaining *lepidolite* samples, which are not labeled on Fig. 19, are fine- and coarse-grained *lepidolite* from pods. Representative mixed-form micas (M62 and M27-Xl) are also shown.

The (Rb+Cs) content of micas from the FWZ and HWZ, ranges between 0.001and 0.018 *apfu*, with the lowest values occurring near the footwall contact and FWZ garnet line (Fig. 19). Overall, the Rb and Cs content in the FWZ and HWZ is very low. . The Rb and Cs content abruptly increases in the mica crystals (Xl), *lepidolite* (Rims), and *lepidolite* pods that occur in the core zone. The majority of *lepidolite* rims, *lepidolite* from pods, ball *lepidolite* and mixed form crystals are relatively enriched in (Rb + Cs) ranging between 0.048 and 0.095 *apfu* (Fig. 8). The *lepidolite* rims of samples M52 and M2 have the highest (Rb+Cs) content of 0.143 and 0.156 *apfu* respectively (Fig. 19).

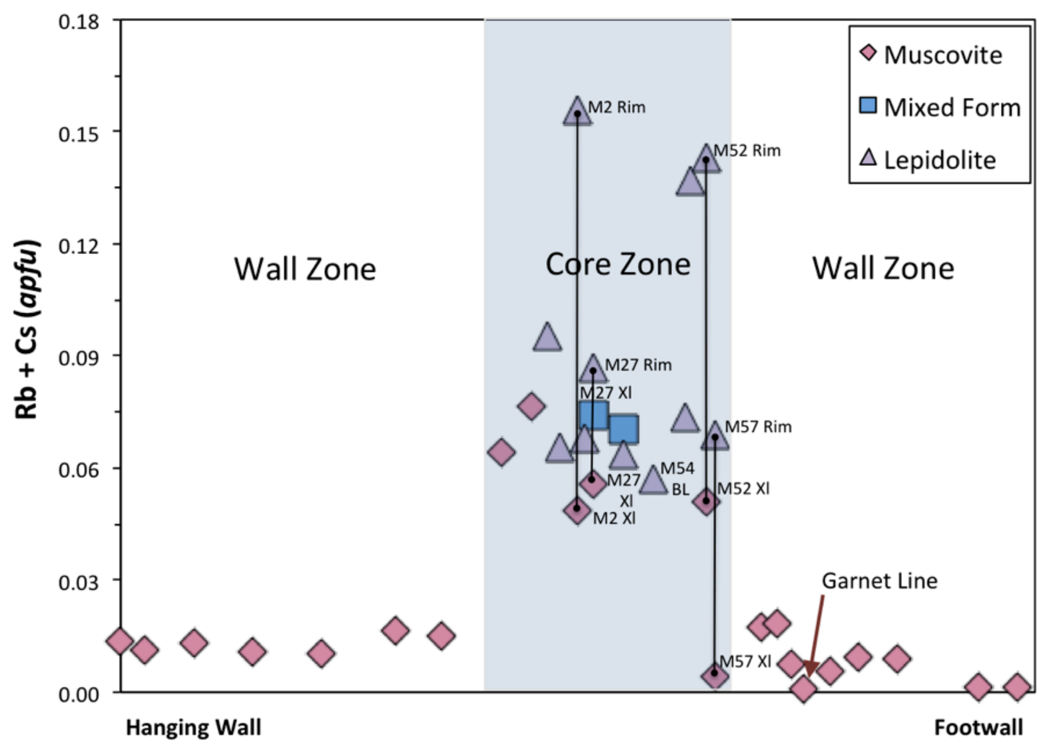

Figure 19 A schematic diagram showing relative position of the samples analyzed vs. the (Rb + Cs) apfu content of representative micas. Symbols: muscovite crystals (Xl) with *lepidolite* (Rim) are linked with tie lines, ball *lepidolite* (BL), unlabeled triangles represent *lepidolite* from *lepidolite* pods.

The fluorine content of muscovite and lithian muscovite, *vs* relative position within the pegmatite is shown on Fig. 20. In the HWZ analyses are very uniform averaging about 0.83 *apfu* fluorine. The FWZ lithian muscovite samples show a gradual increase from 0.56 *apfu* at the footwall contact to 0.92 *apfu* at the garnet line where there is an abrupt decrease in the F content to 0.06 *apfu,* a nearly pure muscovite composition. Subsequently, F increases steeply to about 0.62 *apfu* at the core-zone margin. The, F content of lithian muscovite samples in the core zone are lower (0.44 – 0.64) *apfu* than the average content in the wall zones (FWZ & HWZ) (Fig. 20).

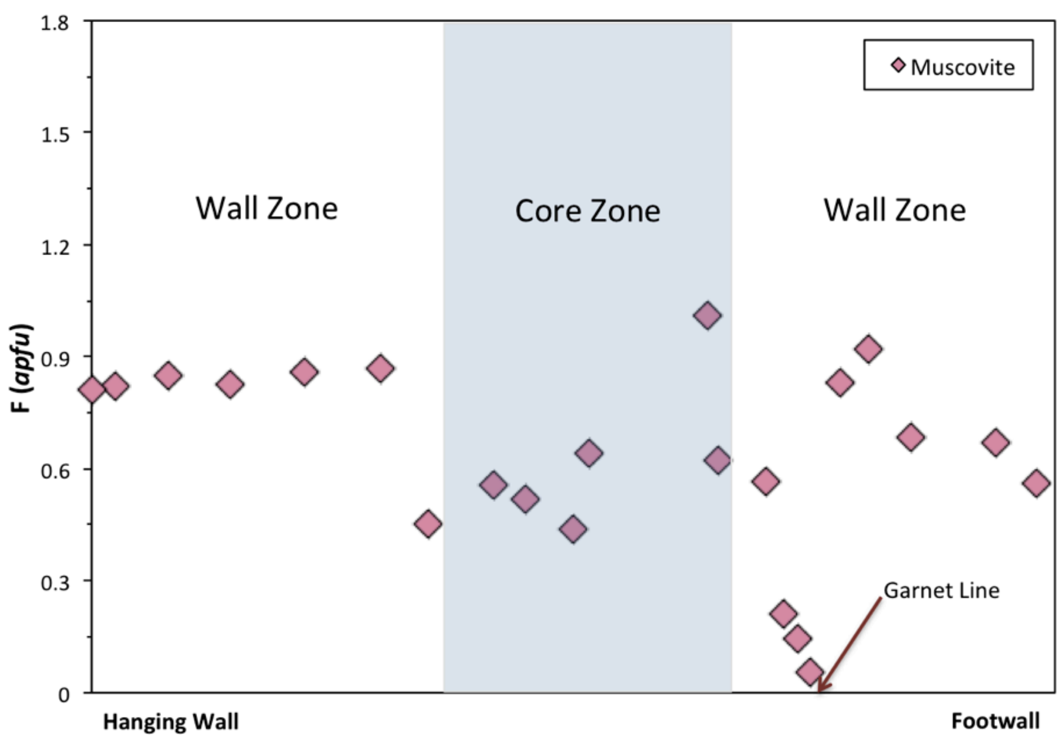

Figure 20 A schematic diagram showing relative position of the samples analyzed vs. the F apfu content of representative micas.

Microscopic interlayering of muscovite and lepidolite

One *lepidolite*-rimmed muscovite sample that was adjacent to a pocket in the core zone revealed a very interesting compositional layering that was discovered as a result of the inconsistencies of analyses performed parallel and perpendicular to cleavage. Initially, microprobe analyses were performed across the cleavage surfaces of the lithian muscovite crystals and *lepidolite* rims. A separate set of analyses of five samples were performed by one of the authors (ERR) in Laboratoire de Minéralogie *et* Cristallographie of the Université Paul Sabatier, Toulouse, France. These samples were mounted perpendicular to cleavage and analyzed in 7 different areas from core to rim. One crystal gave conflicting results. The sample mounted parallel to cleavage shows uniform composition up to the *lepidolite* rim, whereas, the sample oriented perpendicular to cleavage shows a very heterogeneous distribution and a nearly complete range of composition from lithian muscovite to *lepidolite* with a much smaller a gap (Fig. 21), implying a greater range in solid solution than that shown in other studies (Foster 1960, Hawthorne & Černý 1982) (Fig. 21).

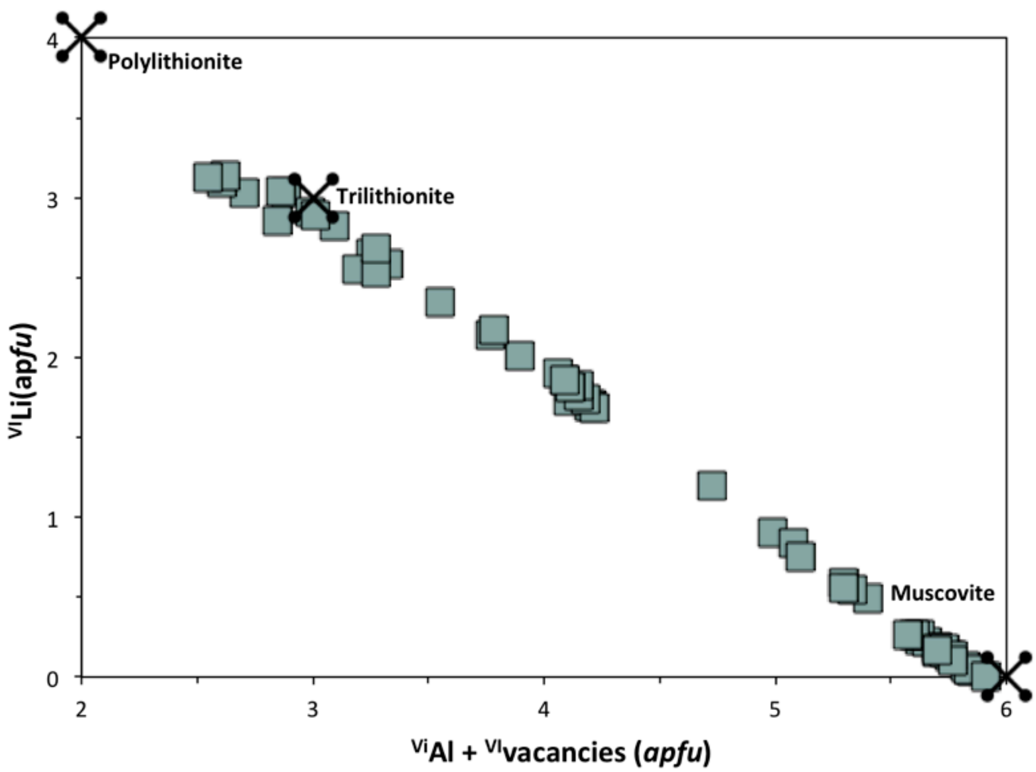

Figure 21 Analyses of the cross-section sample from core to rim shows a very heterogeneous distribution and a complete range of composition from lithian muscovite to *lepidolite* without a gap.

Individual analyses from each area (1-7) show a very anomalous and heterogeneous composition within each area analyzed (Fig 22). These anomalous results were investigated further by making X-ray maps of the 7 areas analyzed along the cross-section.

The X-ray maps reveal distinct compositional microscopic interlayering of muscovite and *lepidolite* ranging between <1 μm and 20 μm in thickness and between 50 μm and > 200 μm in length (Fig 11). Reanalysis of the sample by carefully positioning the beam on compositionally homogeneous domains indicate compositions of lithian muscovite and a range of *lepidolite* with a gap identical to the compositional trend previously observed by analyses on the cleavage surface of the crystal. Since the layering perpendicular to cleavage was not optically apparent, it is obvious that the anomalous compositions were the result of analyzing areas containing both lithian muscovite and *lepidolite* on the interlayered sample, *i.e.* the microprobe beam was straddling both phases. These results exemplify the possibility of obtaining erroneous results when there are two distinct compositional types of micas present, underscoring the importance of checking for microscopic interlayering when analyzing muscovite with *lepidolite* rims perpendicular to cleavage.

The absence of the gap implies that there is a linear trend in composition from lithian muscovite to *lepidolite*, which was not observed in any other core to rim analyses. To further distinguish the trend, points from each area (1-7) were plotted individually showing a very heterogeneous chemical compositional distribution within each area analyzed (Fig. 22). To investigate the inconsistent results, X-ray maps from the cross-section and parallel to (001) sample were prepared. The cross-section maps reveal distinct compositional interlayering of muscovite and *lepidolite* at a scale of several microns (Fig. 23). Reanalysis of the sample on compositionally homogeneous domains indicate compositions of lithian muscovite and a range of *lepidolite* with a gap identical to the compositional trend previously observed. Since the layering was not optically apparent, we infer that the anomalous compositions were the result of analyzing areas containing both lithian muscovite and *lepidolite* on the interlayered sample, *i.e.* the microprobe beam was straddling both phases

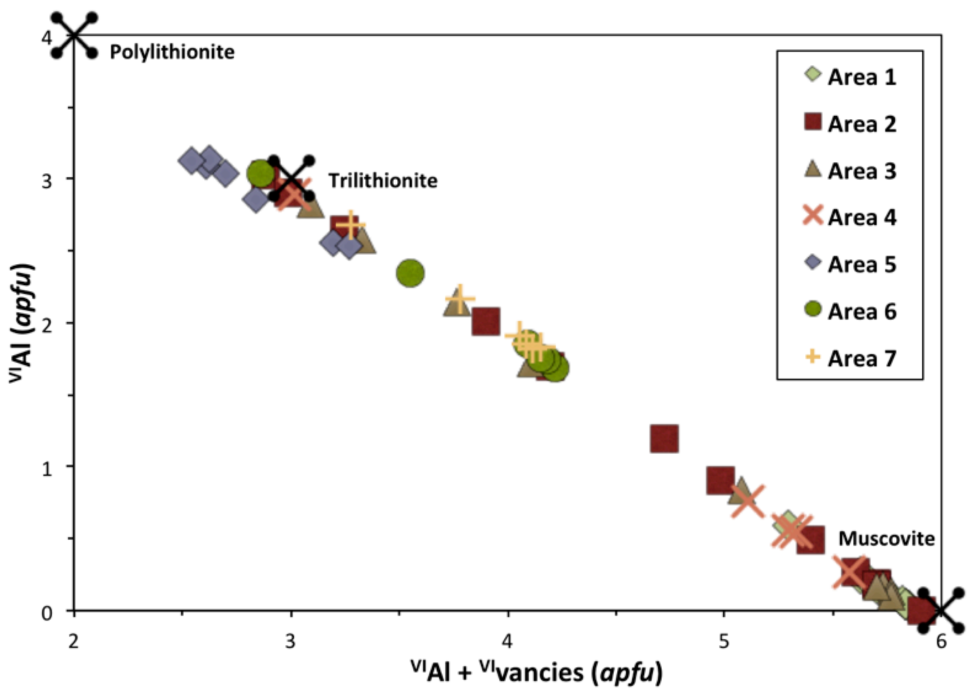

Figure 22 Microprobe point analyses were performed in 7 different areas across the crystal (Xl) core and associated *lepidolite* rim perpendicular to cleavage and plotted individually showing a very heterogeneous chemical compositional distribution within each area analyzed.

To understand how extensive this type of microscopic interlayering is throughout Mount Mica, additional mica samples from the wall zone, and in and around pockets were analyzed using both parallel and perpendicular-to-cleavage orientations. Analyses from core to rim of these samples were uniform in chemical composition and did not exhibit interlayering perpendicular to cleavage. This interlayering phenomenon appears to be rare and has only been found in some large *lepidolite*-rimmed mica crystals in close proximity to pockets and *lepidolite* pods.

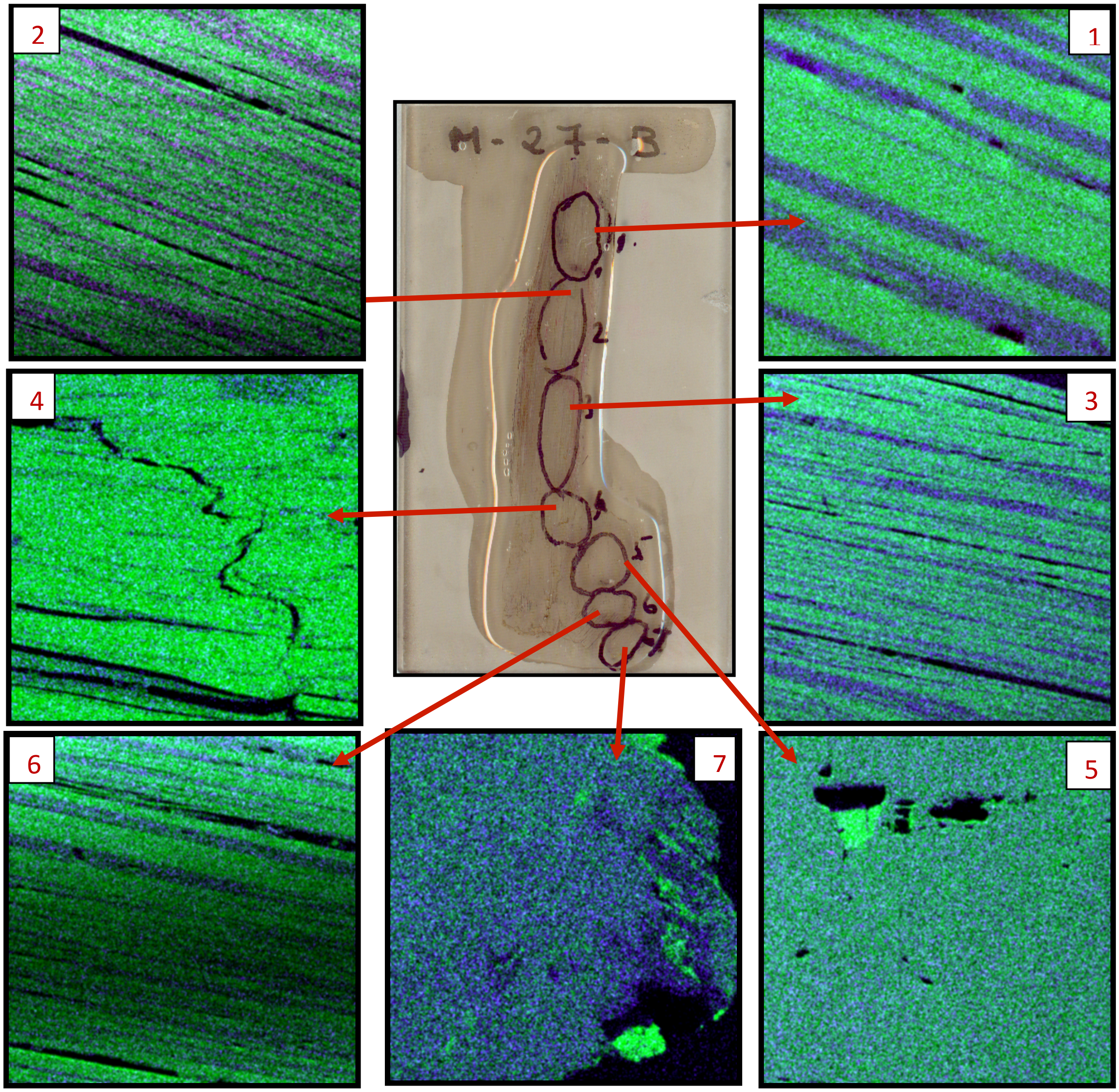

Figure 23. SEM X-ray maps reveal an interlayering of Al-rich muscovite and Mn-rich lepidolite within the mica crystal (Xl) of a lepidolite rimmed pocket mica. Al = Green (muscovite), Mn = Purple (lepidolite).

Table 3 Chemical compositions of representative micas from hanging wall to footwall of the Mount Mica pegmatite.

Location	Hanging Wall			Wall Zone (HWZ)			
Sample	M1	M2	M3	M4	M5	M6	M7
Mica Type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %							
SiO_2	46.28	46.72	46.53	45.92	45.67	45.82	45.90
TiO_2	0.01	0.01	0.01	0.01	0.01	bd	0.02
Al_2O_3	37.54	37.58	37.55	37.54	37.45	37.41	36.73
FeO	0.58	0.49	0.70	0.95	1.04	1.12	1.75
MnO	0.11	0.15	0.15	0.12	0.18	0.09	0.10
MgO	bd	bd	bd	bd	0.01	0.01	bd
CaO	0.02	0.02	0.02	0.02	0.02	0.03	0.02
Na_2O	0.51	0.52	0.65	0.56	0.61	0.60	0.14
K_2O	10.06	9.88	9.56	9.95	9.69	10.11	0.06
Rb_2O	0.15	0.13	0.15	0.12	0.12	0.19	0.47
Cs_2O	0.02	0.01	0.02	0.02	0.01	0.01	0.53
Li_2O *	0.96	0.99	1.03	0.98	1.03	1.05	10.36
F	1.97	2.00	2.07	1.99	2.06	2.10	1.08
H_2O *	3.65	3.66	3.62	3.63	3.58	3.58	4.02
O=F	0.83	0.84	0.87	0.84	0.87	0.88	0.45
Total	101.03	101.31	101.17	100.96	100.62	101.24	100.73

Structural formula on the basis of 24 (O, OH, F) atoms
* Calculated, bd = below detection level
Li-musc. = lithian muscovite, Xl = crystal

Table 3 continued

Location	Hanging Wall			Wall Zone (HWZ)			
Sample	M1	M2	M3	M4	M5	M6	M7
Mica Type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Si	6.046	6.073	6.057	6.013	6.000	5.999	6.068
^{IV}Al	1.954	1.927	1.943	1.987	2.000	2.001	1.932
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.825	3.830	3.818	3.806	3.797	3.772	3.788
Ti	0.001	0.001	0.001	0.001	0.001	bd	0.002
Fe^{2+}	0.064	0.053	0.076	0.104	0.114	0.123	0.194
Mn	0.012	0.016	0.016	0.013	0.020	0.010	0.012
Mg	bd	bd	bd	bd	0.002	0.002	bd
Li*	0.507	0.516	0.539	0.517	0.543	0.555	0.252
Σ Octahedral	4.409	4.416	4.450	4.441	4.478	4.462	4.248
K	1.677	1.638	1.587	1.662	1.624	1.688	1.747
Ca	0.002	0.003	0.002	0.002	0.003	0.004	0.002
Na	0.130	0.132	0.165	0.143	0.155	0.153	0.136
Rb	0.013	0.011	0.012	0.010	0.010	0.016	0.012
Cs	0.001	0.001	0.001	0.001	0.001	0.001	0.003
Σ X-site	1.823	1.784	1.768	1.819	1.792	1.861	1.900
F	0.812	0.822	0.850	0.825	0.857	0.870	0.450
OH*	3.179	3.170	3.142	3.167	3.135	3.123	3.543

Structural formula on the basis of 24 (O, OH, F) atoms
* Calculated, bd = below detection level
Li-musc. = lithian muscovite, Xl = crystal

Table 3 continued

	Core Zone									
Sample	M18-1	m17-3b	M58	M8	M2 Xtal	M2 Rim	M14	M27- Xtal	M27- Xtal	M27-Rim
Mica Type	Li-Musc.	Li-Musc.	*Lepidolite*	*Lepidolite*	Li-Musc.	*Lepidolite*	*Lepidolite*	Li-Musc.	Mixed Form	*Lepidolite*
Wt. %										
SiO_2	46.34	46.56	51.12	50.73	45.67	50.32	50.99	45.32	50.11	49.87
TiO_2	0.11	0.01	bd	0.01	0.03	0.03	bd	0.02	bd	bd
Al_2O_3	35.87	36.74	26.51	26.60	37.24	26.04	26.56	36.92	29.32	26.22
FeO	1.43	0.64	0.09	0.89	1.21	1.07	0.37	1.11	0.68	1.36
MnO	0.09	0.04	0.53	0.04	0.12	0.35	0.26	0.29	0.26	0.77
MgO	0.17	0.03	bd	0.01	bd	bd	bd	bd	bd	bd
CaO	0.02	0.04	bd	0.01	0.05	bd	bd	bd	bd	bd
Na_2O	0.39	0.33	0.19	0.33	0.58	0.21	0.28	0.52	0.32	0.33
K_2O	9.54	9.59	10.00	10.15	9.56	9.64	10.03	9.99	9.93	9.91
Rb_2O	0.75	0.90	1.03	0.73	0.51	1.31	0.71	0.56	0.58	0.90
Cs_2O	0.00	0.00	0.14	0.06	0.10	0.77	0.14	0.15	0.44	0.18
Li_2O *	0.57	0.54	5.03	5.09	0.42	5.11	5.62	0.69	3.39	5.62
F	1.32	1.24	6.83	6.89	1.04	6.92	7.77	1.53	5.08	7.77
H_2O *	3.89	3.95	1.30	1.27	4.03	1.22	0.90	3.79	2.13	0.84
O=F	0.56	0.52	2.88	2.90	0.44	2.91	3.27	0.64	2.14	3.27
Total	99.94	100.08	99.92	99.91	100.10	100.09	100.35	100.24	100.10	100.51

Structural formula on the basis of 24 (O, OH, F) atoms
* Calculated, bd = below detection level
Li-musc. = lithian muscovite, Xl = crystal

Table 3 continued

	Core Zone									
Sample	M18-1	m17-3b	M58	M8	M2 Xtal	M2 Rim	M14	M27- Xtal	M27- Xtal	M27-Rim
Mica Type	Li-Musc.	Li-Musc.	*Lepidolite*	*Lepidolite*	Li-Musc.	*Lepidolite*	*Lepidolite*	Li-Musc.	Mixed Form	*Lepidolite*
Si	6.154	6.150	6.748	6.701	6.051	6.704	6.687	6.021	6.618	6.601
^{IV}Al	1.846	1.850	1.252	1.299	1.949	1.296	1.313	1.979	1.382	1.399
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.768	3.870	2.871	2.841	3.865	2.792	2.792	3.802	3.181	2.691
Ti	0.011	0.001	bd	0.001	0.003	0.003	bd	0.002	bd	bd
Fe^{2+}	0.159	0.070	0.010	0.099	0.134	0.120	0.041	0.124	0.075	0.150
Mn	0.010	5	0.060	0.004	0.013	0.039	0.028	0.033	0.029	0.087
Mg	0.033	0.006	bd	0.002	bd	bd	bd	bd	bd	bd
Li*	0.305	0.285	2.670	2.703	0.222	2.738	2.965	0.368	1.802	2.992
Σ Octahedral	4.287	4.237	5.611	5.648	4.237	5.693	5.826	4.328	5.087	5.920
K	1.616	1.615	1.684	1.709	1.615	1.638	1.679	1.694	1.673	1.673
Ca	0.003	0.006	bd	0.001	0.007	0.001	bd	bd	0.001	bd
Na	0.101	0.086	0.049	0.086	0.148	0.055	0.072	0.135	0.081	0.085
Rb	0.064	0.076	0.088	0.062	0.043	0.112	0.060	0.047	0.049	0.076
Cs	bd	bd	0.008	0.003	0.005	0.044	0.008	0.008	0.025	0.010
Σ X-site	1.783	1.783	1.828	1.861	1.819	1.850	1.818	1.885	1.829	1.845
F	0.555	0.517	2.852	2.878	0.437	2.913	3.224	0.641	2.120	3.253
OH*	3.445	3.483	1.148	1.122	3.563	1.087	0.775	3.360	1.880	0.746

Structural formula on the basis of 24 (O, OH, F) atoms
* Calculated, bd = below detection level
Li-musc. = lithian muscovite, Xl = crystal

Table 3 continued

	Core Zone									
Sample	M18-1	m17-3b	M58	M8	M2 Xtal	M2 Rim	M14	M27- Xtal	M27- Xtal	M27-Rim
Mica Type	Li-Musc.	Li-Musc.	*Lepidolite*	*Lepidolite*	Li-Musc.	*Lepidolite*	*Lepidolite*	Li-Musc.	Mixed Form	*Lepidolite*
Si	6.154	6.150	6.748	6.701	6.051	6.704	6.687	6.021	6.618	6.601
^{IV}Al	1.846	1.850	1.252	1.299	1.949	1.296	1.313	1.979	1.382	1.399
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.768	3.870	2.871	2.841	3.865	2.792	2.792	3.802	3.181	2.691
Ti	0.011	0.001	bd	0.001	0.003	0.003	bd	0.002	bd	bd
Fe^{2+}	0.159	0.070	0.010	0.099	0.134	0.120	0.041	0.124	0.075	0.150
Mn	0.010	0.005	0.060	0.004	0.013	0.039	0.028	0.033	0.029	0.087
Mg	0.033	0.006	bd	0.002	bd	bd	bd	bd	bd	bd
Li*	0.305	0.285	2.670	2.703	0.222	2.738	2.965	0.368	1.802	2.992
Σ Octahedral	4.287	4.237	5.611	5.648	4.237	5.693	5.826	4.328	5.087	5.920
K	1.616	1.615	1.684	1.709	1.615	1.638	1.679	1.694	1.673	1.673
Ca	0.003	0.006	bd	0.001	0.007	0.001	bd	bd	0.001	bd
Na	0.101	0.086	0.049	0.086	0.148	0.055	0.072	0.135	0.081	0.085
Rb	0.064	0.076	0.088	0.062	0.043	0.112	0.060	0.047	0.049	0.076
Cs	bd	bd	0.008	0.003	0.005	0.044	0.008	0.008	0.025	0.010
Σ X-site	1.783	1.783	1.828	1.861	1.819	1.850	1.818	1.885	1.829	1.845
F	0.555	0.517	2.852	2.878	0.437	2.913	3.224	0.641	2.120	3.253
OH*	3.445	3.483	1.148	1.122	3.563	1.087	0.775	3.360	1.880	0.746

Structural formula on the basis of 24 (O, OH, F) atoms
* Calculated, bd = below detection level
Li-musc. = lithian muscovite, Xl = crystal

Table 3 continued

	Core Zone								
Sample	M60	M62	M54	M20	M61	M52-Xtal	M52-Rim	M57-Xtal	M57-Rim
Mica Type	*Lepidolite*	Mixed Form	*Lepidolite*	*Lepidolite*	*Lepidolite*	Li-Musc.	*Lepidolite*	Li-Musc.	*Lepidolite*
Si	6.677	6.726	6.596	6.717	6.626	6.051	6.686	6.235	6.679
^{IV}Al	1.323	1.274	1.404	1.283	1.374	1.949	1.314	1.765	1.321
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	2.914	3.189	3.105	2.700	2.824	3.865	2.778	3.844	2.778
Ti	bd	bd	bd	bd	bd	0.003	bd	0.001	bd
Fe^{2+}	0.004	0.004	0.024	0.011	0.001	0.134	0.002	0.010	0.040
Mn	0.025	0.025	0.015	0.012	0.012	0.013	0.005	0.005	0.010
Mg	0.035	bd	bd	bd	bd	bd	bd	bd	bd
Li*	2.654	1.841	2.192	3.245	2.953	0.222	3.032	0.353	3.032
Σ Octahedral	5.631	5.059	5.336	5.967	5.790	4.237	5.816	4.214	5.860
K	1.647	1.638	1.618	1.660	1.698	1.615	1.654	1.693	1.633
Ca	bd	bd	0.001	bd	bd	0.007	bd	bd	bd
Na	0.088	0.097	0.141	0.149	0.089	0.148	0.138	0.147	0.152
Rb	0.063	0.067	0.053	0.068	0.122	0.043	0.133	0.004	0.066
Cs	0.001	0.004	0.005	0.005	0.015	0.005	0.010	0.001	0.003
Σ X-site	1.799	1.806	1.818	1.881	1.924	1.819	1.935	1.845	1.854
F	2.842	2.157	2.466	3.421	3.071	0.437	3.133	0.623	3.133
OH*	1.158	1.844	1.534	0.578	0.929	3.563	0.867	3.377	0.867

Structural formula on the basis of 24 (O, OH, F) atoms
* Calculated, bd = below detection level
Li-musc. = lithian muscovite, Xl = crystal

Table 3 continued

	Wall Zone (FWZ)								Footwall
Sample	M8	M9	M10	M11	M12	M13	M14	M15	M16
Mica Type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %									
SiO_2	45.49	45.96	46.34	46.02	46.33	45.92	45.66	45.93	46.53
TiO_2	0.00	0.03	0.04	0.02	0.01	0.00	0.02	0.01	0.01
Al_2O_3	37.56	34.05	37.88	37.81	35.46	37.27	37.46	35.96	35.90
FeO	1.39	3.82	0.69	0.95	0.10	0.20	1.47	1.73	2.29
MnO	0.01	0.26	0.05	0.05	0.08	0.13	0.09	0.14	0.14
MgO	bd	bd	bd	bd	bd	bd	0.01	0.02	0.02
CaO	bd	0.02	0.03	bd	bd	0.02	0.03	0.03	0.02
Na_2O	0.65	0.29	0.57	0.61	0.57	0.55	0.53	0.52	0.59
K_2O	10.26	10.75	10.33	10.59	9.76	10.04	10.08	9.91	9.81
Rb_2O	0.20	0.12	0.03	bd	0.06	0.11	0.10	0.02	0.01
Cs_2O	bd	0.14	0.09	0.02	0.01	bd	bd	bd	bd
Li_2O *	0.59	0.15	0.10	0.03	0.96	1.12	0.76	0.73	0.58
F	1.36	0.49	0.35	0.13	1.96	2.21	1.64	1.60	1.35
H_2O *	3.89	4.20	4.40	4.49	3.55	3.50	3.77	3.74	3.89
O=F	0.57	0.21	0.15	0.06	0.82	0.93	0.69	0.67	0.57
Total	100.84	100.08	100.75	100.67	98.02	100.14	100.93	99.66	100.57

Structural formula on the basis of 24 (O, OH, F) atoms
* Calculated, bd = below detection level
Li-musc. = lithian muscovite, Xl = crystal

Table 3 continued

	Wall Zone (FWZ)								Footwall
Sample	M8	M9	M10	M11	M12	M13	M14	M15	M16
Mica Type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Si	5.995	6.200	6.079	6.057	6.206	6.041	6.057	6.001	6.111
^{IV}Al	2.005	1.800	1.921	1.943	1.794	1.959	1.943	1.999	1.889
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.828	3.613	3.935	3.922	3.805	3.819	3.922	3.804	3.750
Ti	bd	0.003	0.004	0.002	0.001	bd	0.002	0.002	0.001
Fe^{2+}	0.153	0.430	0.076	0.105	0.011	0.021	0.105	0.161	0.193
Mn	0.002	0.030	0.005	0.005	0.009	0.014	0.005	0.010	0.016
Mg	bd	bd	bd	bd	bd	bd	bd	0.003	0.003
Li*	0.312	0.084	0.052	0.015	0.517	0.595	0.015	0.402	0.392
Σ Octahedral	4.295	4.161	4.072	4.049	4.341	4.450	4.049	4.382	4.355
K	1.725	1.850	1.728	1.777	1.667	1.685	1.777	1.689	1.681
Ca	bd	0.002	0.004	bd	bd	0.002	bd	0.004	0.005
Na	0.167	0.076	0.146	0.156	0.149	0.141	0.156	0.134	0.134
Rb	0.017	0.011	0.002	bd	0.005	0.009	bd	0.009	0.002
Cs	bd	0.008	0.005	0.001	0.001	bd	0.001	bd	bd
Σ X-site	1.909	1.947	1.885	1.935	1.822	1.838	1.935	1.836	1.821
F	0.565	0.211	0.146	0.056	0.829	0.918	0.056	0.683	0.672
OH*	3.424	3.782	3.849	3.943	3.171	3.075	3.943	3.308	3.319

Structural formula on the basis of 24 (O, OH, F) atoms
* Calculated, bd = below detection level
Li-musc. = lithian muscovite, Xl = crystal

FELDSPARS

Plagioclase is the primary feldspar at Mount Mica. K-feldspar is virtually absent except in the core zone where large masses of microcline, up to a meter in maximum dimension, are located in close proximity to larger pockets and rare pollucite masses. This suggests a sodium-dominant pegmatitic melt where micas are the dominant potassium minerals.

Representative chemical compositions of albite from the hanging-wall contact across the entire pegmatite and K-feldspar from the core zone are given in Table 4. Feldspars throughout the pegmatite are dominantly sodic-rich plagioclase with the highest An content ($An_{14.45}$) occurring at the hanging-wall contact with the country rock (Table 4, Fig. 24). The sodic plagioclase from the wall zones ($An_{0.05}$ - $An_{05.71}$) and core zone ($An_{0.13}$ - $An_{0.88}$) corresponds to nearly pure albite (Table 4).

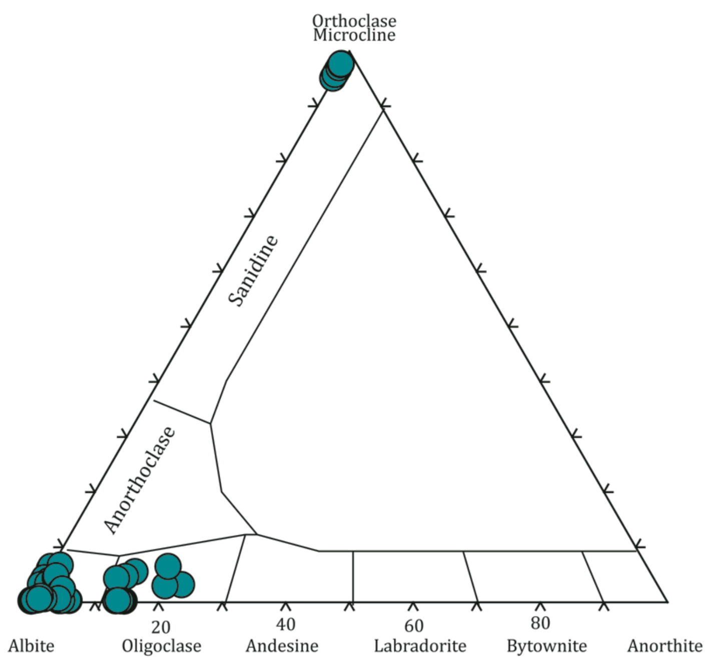

Figure 24 Feldspar classification plot shows sodic-rich plagioclase and microcline.

The composition of the K-feldspar shows that the Ab content ranges between 2.37% near the pocket, to 4.79% next to a pollucite mass (Table 4) and is confirmed by X-ray diffraction to be near maximum microcline (Fig. 25). The Rb content ranges from 0.001 *apfu* to 0.023 *apfu*, and Cs content ranges from 0 to 0.005 *apfu* (Fig. 26). Overall, *K*-feldspar is not very enriched in either Rb or Cs, but there is a population of microcline spatially associated with miarolitic cavities and pollucite masses that has higher Rb and Cs. The K/Rb (*apfu*) ratio of microcline ranges from about 40 to 730.

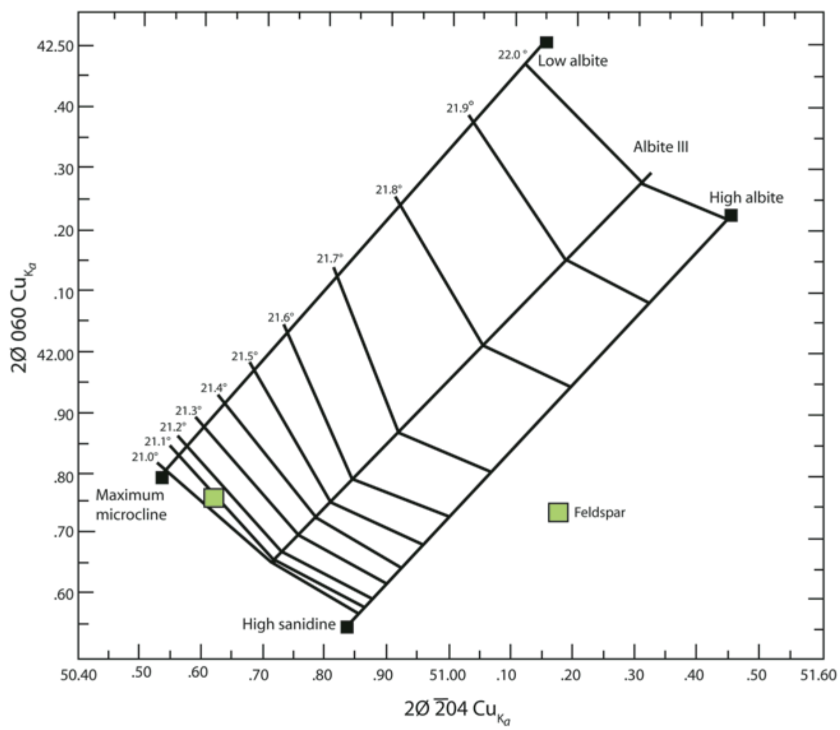

Figure 25 Alkali feldspar structural state according to Wright (1968).

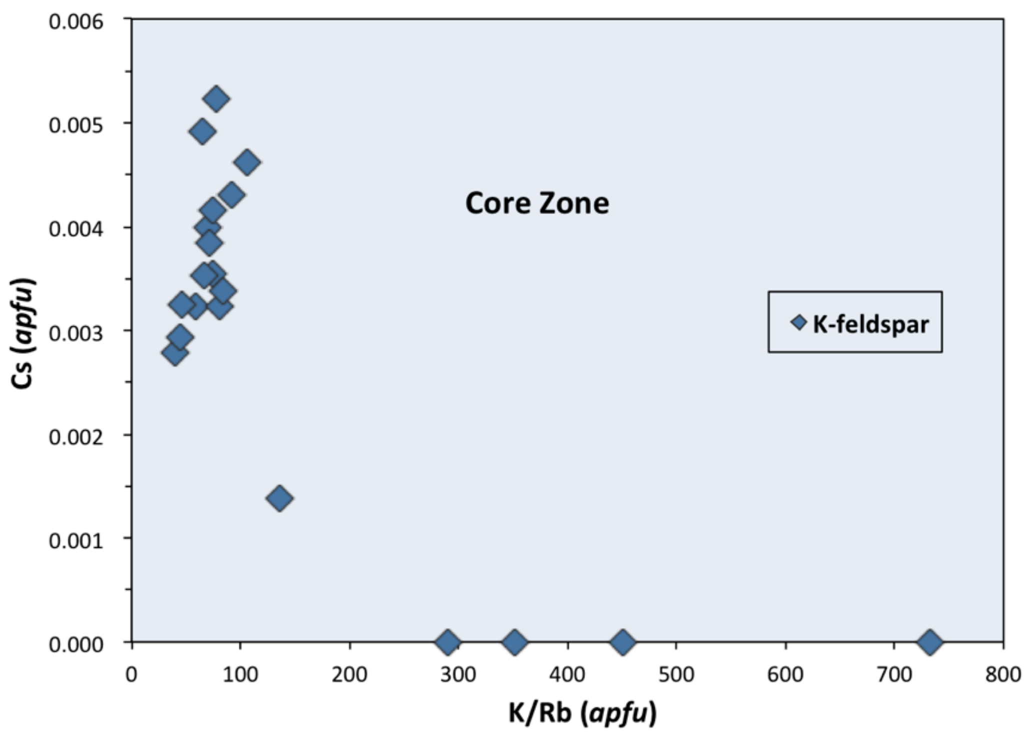

Figure 26 K-feldspars in close proximity to pockets and pollucite mass are higher in Cs, and Rb content. The K/Rb ratio ranges between 40 and 730.

Table 4 Chemical compositions of representative feldspar in the Mount Mica pegmatite

	HW contact	Wall Zone					
Feldspar	Pl	Pl	Pl	Pl	Pl	Pl	Pl
Sample	F26	F1	F6	F27	F28	F29	F30
Wt. %							
SiO_2	64.41	67.82	67.86	67.37	67.43	67.50	68.46
TiO_2	bd	0.01	bd	bd	bd	bd	0.03
Al_2O_3	22.58	19.50	19.31	20.04	20.00	20.58	20.40
CaO	3.07	0.17	0.01	1.17	0.94	0.38	0.11
Na_2O	10.02	11.57	11.82	10.67	10.70	11.07	11.65
K_2O	0.03	0.03	0.03	0.05	0.04	0.10	0.07
$P2O_5$	0.01	0.03	0.03	0.02	0.02	n.a.	n.a.
Rb_2O	bd	bd	bd	bd	bd	bd	bd
Cs_2O	bd	bd	bd	bd	bd	bd	bd
Total	100.11	99.10	99.03	99.30	99.10	99.63	100.73

The cation proportions are based on 8 atoms of oxygen per formula unit.
n.a. = not analyzed, bd = below detection level, HW contact = Hanging-wall contact
Pl = plagioclase, Kfs. = K-feldspar, Or = orthoclase, Ab = albite, An = anorthite
Fe, Mg & Mn were analyzed but below detection level

Table 4 continued

	HW contact	Wall Zone					
Feldspar	Pl	Pl	Pl	Pl	Pl	Pl	Pl
Sample	F26	F1	F6	F27	F28	F29	F30
apfu							
Si	2.835	2.988	2.993	2.964	2.970	2.957	2.968
Ti	bd	bd	bd	bd	bd	bd	0.001
Al	1.172	1.013	1.004	1.040	1.038	1.063	1.043
Ca	0.145	0.008	bd	0.055	0.044	0.018	0.005
Na	0.855	0.988	1.011	0.910	0.914	0.941	0.980
K	0.002	0.002	0.001	0.003	0.002	0.005	0.004
P	0.001	0.005	0.004	0.003	0.003	n.a.	n.a.
Rb	bd	bd	bd	bd	bd	bd	bd
Cs	bd	bd	bd	bd	bd	bd	bd
moles %							
An	14.45	0.81	0.05	5.71	4.62	1.84	0.53
Ab	85.36	99.02	99.81	94.03	95.16	97.60	99.06
Or	0.18	0.17	0.14	0.27	0.22	0.56	0.40

The cation proportions are based on 8 atoms of oxygen per formula unit.
bd = below detection level, HW contact = Hanging-wall contact
Pl = plagioclase, Kfs. = K-feldspar, Or = orthoclase, Ab = albite, An = anorthite
Fe, Mg & Mn were analyzed but below detection level

Table 4 continued

	Core Zone									
Feldspar	Pl	Pl	Pl	Kfs	Kfs	Kfs	Kfs	Kfs	Kfs	Kfs
Sample	F16	F24	F25	F17	F19	F20	F21	F22	F23	F24
Wt. %										
SiO_2	67.73	68.01	68.20	64.48	65.33	65.40	65.37	65.48	65.44	65.38
TiO_2	bd	bd	bd	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Al_2O_3	19.55	19.33	19.36	18.34	18.12	18.21	18.09	18.11	18.09	18.14
CaO	0.03	0.09	0.19	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Na_2O	11.68	11.78	11.55	0.53	0.33	0.44	0.39	0.45	0.26	0.34
K_2O	0.04	0.06	0.06	16.12	16.01	15.85	15.88	15.89	16.02	15.86
$P2O_5$	0.02	n.a.	n.a.	0.12	0.09	n.a.	n.a.	n.a.	n.a.	n.a.
Rb_2O	0.00	0.00	0.00	0.79	0.54	0.44	0.40	0.48	0.23	0.03
Cs_2O	0.00	0.00	0.00	0.02	0.02	0.03	0.03	0.02	0.01	0.00
Total	99.02	99.26	99.36	100.29	100.37	100.38	100.18	100.44	100.06	99.78

The cation proportions are based on 8 atoms of oxygen per formula unit.
n.a. = not analyzed, bd = below detection level, HW contact = Hanging-wall contact
Pl = plagioclase, Kfs. = K-feldspar, Or = orthoclase, Ab = albite, An = anorthite
Fe, Mg & Mn were analyzed but below detection level

Table 4 continued

Core Zone										
Feldspar Sample	Pl F16	Pl F24	Pl F25	Kfs F17	Kfs F19	Kfs F20	Kfs F21	Kfs F22	Kfs F23	Kfs F24
apfu										
Si	2.987	2.993	2.997	2.991	3.013	3.011	3.015	3.015	3.018	3.018
Ti	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Al	1.016	1.003	1.003	1.003	0.985	0.988	0.984	0.983	0.984	0.987
Ca	0.001	0.004	0.009	bd	bd	bd	bd	bd	bd	bd
Na	0.999	1.005	0.984	0.048	0.029	0.040	0.035	0.040	0.023	0.031
K	0.002	0.003	0.003	0.954	0.942	0.931	0.934	0.933	0.943	0.934
P	0.004	n.a.	n.a.	0.019	0.014	n.a.	n.a.	n.a.	n.a.	n.a.
Rb	bd	bd	bd	0.023	0.016	0.013	0.012	0.014	0.007	0.001
Cs	bd	bd	bd	0.003	0.003	0.004	0.005	0.004	0.001	bd
moles %										
An	0.13	0.41	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Ab	99.67	99.28	98.77	4.79	3.00	4.08	3.59	4.14	2.37	3.19
Or	0.20	0.31	0.35	95.21	97.00	95.92	96.41	95.86	97.63	96.77

The cation proportions are based on 8 atoms of oxygen per formula unit.
n.a. = not analyzed, bd = below detection level, HW contact = Hanging-wall contact
Pl = plagioclase, Kfs. = K-feldspar, Or = orthoclase, Ab = albite, An = anorthite
Fe, Mg & Mn were analyzed but below detection level

Discussion and Conclusion

The micas in Mount Mica reflect changes in melt chemistry during crystallization. The Al-Li micas belong to the muscovite-*lepidolite* series. Analyses show a well-defined trend from muscovite with 0.0 *apfu* Li, to just beyond trilithionite 3.4 *apfu* Li, with a gap between 0.8 and 1.5 *apfu* Li. The analyses plotted as mixed form on Fig. 16 are inferred to be the result of sub-macroscopic interlayering of muscovite and *lepidolite* within the crystal. Coarse-grained *lepidolite* associated with a pollucite mass and some *lepidolite* rims are the most evolved micas with compositions extending beyond that of trilithionite. Analyses show that Li positively correlates with F and Si, and negatively correlates with Al in all micas. Based on the Li *vs.* ^{VI}(Al + □) trend shown in Fig. 16, the principal mechanism for the incorporation of Li into the mica structure appears to be $Li_3Al_{-1}□_{-2}$.

Lithian muscovite is the primary mica in the HWZ and FWZ, whereas, both lithian muscovite, and *lepidolite* occur in the core zone. There is a distinct increase in Rb and Cs in all micas from the core zone. Lithian muscovite is relatively homogeneous in Rb and Cs from the HWZ and FWZ (Fig. 19), whereas, F behaves significantly differently in the HWZ *vs*. the FWZ. Fluorine is very uniform in the HWZ averaging about 0.83 *apfu* (Fig. 20). The FWZ micas show a gradual increase in F from the footwall contact to the garnet line where the composition abruptly decreases to nearly pure muscovite. Between the garnet line and the core zone, F increases steeply. It appears likely that the abrupt decrease in F close to the garnet line is the result of F being incorporated into other mineral phases associated with the garnet, such as tourmaline and fluorapatite. The F content of lithian muscovite samples in the core zone is lower than the average content in the wall zones (FWZ and HWZ) (Fig. 20). The lower F content of the core zone muscovite is likely related to the preferential partitioning of F into *lepidolite*, elbaite and fluorapatite.

The garnet line is a common phenomenon found in many Oxford Co., Maine pegmatites. The line occurs about 1 m above the base of the pegmatite and is roughly parallel to the pegmatite-country rock contact. The line consists of an undulating, irregular concentration of 1 to 5 cm garnet crystals in a matrix of quartz and feldspar. The most evolved portion of the pegmatite is always above this horizon in the more incompatible-rich core zone of the pegmatite, where the pockets occur. Thus, this line is an important marker that the miners interpret to be the bottom of the productive zone below which no pockets occur. It is inferred to form as a result of boundary layer crystallization from an early stage of undercooled and rapidly crystallizing pegmatitic melt in a manner similar to that describe by Webber *et al*. (1999) for line rock in the Pala, CA. pegmatite district. The garnet line is the topic of continuing research to be published soon.

X-ray maps document compositional interlayering of muscovite and *lepidolite* in crystals with *lepidolite* rims that occur adjacent to or in pockets or *lepidolite* rimmed crystals that occur adjacent to *lepidolite* pods. The compositional interlayering of *lepidolite* and muscovite is inferred to be the result of rapid crystallization caused by loss of fluxing ions Li and B that are being incorporated into *lepidolite* and tourmaline. This produces an undercooled melt and initiates rapid crystallization (Simmons *et al*. 2012). The interlayering is interpreted to be a product of the oscillatory availability of Li at the crystal liquid interface of the rapidly crystallizing mica. This interlayering phenomenon suggests rapid crystallization along a diffusion controlled crystal-liquid interface or boundary layer with oscillatory availability of Li, F, and Mn.

Mount Mica feldspar is dominantly sodic-rich plagioclase ($An_{1.6}$), with micas as the dominant potassium minerals. Microcline is virtually absent except in the core zone where it is enriched in Rb and Cs. The K/Rb ratio (*apfu*) ranges from 40 to 730 which corresponds to values higher than other complex rare element pegmatites such as the Tanco pegmatite in Manitoba, Canada, with a range of 4.0 to 14.2 (Černý 2005). Based solely on this range, it would appear that Mount Mica is not very evolved. However, the K/Rb ratio (*apfu*) (median 76.54) of the microcline, in close proximity to miarolitic cavities or pollucite, is low, suggesting that Mount Mica reaches a moderate degree of evolution within the core zone (Černý 1991).

The abrupt increase of Cs and Rb in K-feldspar, lithian muscovite and *lepidolite*, along with the occurrence of highly evolved species such as F-rich *lepidolite*, pollucite pods, elbaite tourmaline, Cs-rich beryl and spodumene in miarolitic cavities in the core zone suggest that incompatible elements were retained in residual fluid until their concentration was high enough to initiate crystallization of incompatible-rich mineral phases. The relatively low abundance of incompatible elements in the HWZ and FWZ suggest that the fractionation process was very efficient in sweeping the incompatibles into the core-zone of the pegmatite, producing proportionally small volumes inside the pegmatite with very high enrichment in incompatible elements.

REFERENCES

APPLEMAN, D.E., AND EVANS, H.T., JR. (1973) Job 9214: Indexing and least-squares refinement of powder diffraction data. U.S. Geological Survey, Computer Contribution 20, *U.S. National Technical Information Service, Document* PB2-16188.

BAILEY, S. W., (1984) Appendix. X-ray powder patterns of micas. *In* Reviews in Mineralogy **13**, (S. W. Bailey, ed.) *Mineralogical Society of America* 573-584.

BOUDREAUX, A, GRASSI, L., SIMMONS, W., FALSTER, A., WEBBER, K., FREEMAN, G., (2013) Cartography to chemistry: Estimating the bulk composition of the Mount Mica Pegmatite via map analysis, Maine, USA. **Abs.** *PEG 2013: The 6th International Symposium on Granitic Pegmatites,* 24-25.

ČERNÝ, P. & ERCIT, T. S. (1991) The classification of granitic pegmatites revisited. *The Canadian Mineralogist* **43,** 2005-2026.

ČERNÝ, P. (2005) The Tanco rare-element pegmatite deposit, Manitoba: Regional context, internal anatomy, and global comparisons. *Geological Association of Canada, GAC Short Course* **17**, 127-158.

ČERNÝ P., MEINTZER, R. E., & ANDERSON, A. J. (1985) Extreme fractionation in rare-element granitic pegmatites: selected examples of data a mechanisms. *The Canadian Mineralogist* **23**, 381-421.

ČERNÝ, P., LONDON, D., & NOVAK, M., (2012) Granitic pegmatites as reflections of their sources. *Elements* **8**(4), 289-294.

CLARKE, D. B., & BOGUTYN, P. A. (2003) Oscillatory epitactic-growth zoning in Biotite and muscovite from the Lake Lewis leucogranite, South Mountain batholith, Nova Scotia, Canada. *The Canadian Mineralogist,* **41,** 1027-1047.

DONOVAN, JJ & TINGLE, TN (1996). An improved mean atomic number background correction for quantitative microanalysis. *Journal of the Microscopy Soc Am*, 2: 1-7.

Foord, E. E., ČERNÝ, P., Jackson, L. L., Sherman, D. M. & Eby, R. K. (1995) Mineralogy and geochemical evolution of micas from miarolitic pegmatites of anorogenic Pikes Peak batholith, Colorado. *Mineralogy and Petrology* **55**, 1-26.

FOSTER, M. (1960) Interpretation of the composition of lithium micas. *U.S. Geological Survey Professional Paper* **354-E**, 115-147.

HAWTHORNE, F. C., & ČERNÝ, P., (1982) The mica group. *MAC Short Course Handbook* **8**, 63-98**.**

KILE, D. E., AND FOORD, E. E. (1998) Micas from the Pikes Peak Batholith and its cogenetic granitic pegmatites, Colorado: optical properties, composition, and correlation with pegmatite evolution. *The Canadian Mineralogist* **36,** 463-482.

MARTINS, T., RODA-ROBLES, E., LIMA, A., & DEPARSEVAL, P. (2012) Geochemistry and evolution of micas in the Barroso-Alvão Pegmatite Fiead, Northern Portugal. *The Canadian Mineralogist* **50**, 1117-1129.

MONIER, G. & ROBERT, J. L. (1986) Evolution of the miscibility gap between muscovite and biotite solid solutions with increasing lithium content: an experimental study in the system K2O-Li2O-MgO-FeO-Al2O3-SiO2-H2O-HF at 600 ^{O}C, 2 kbar P_{H2O}: comparison with natural lithium micas. *Mineralogical Magazine* **30**, 641-651.

POUCHOU, J. L., & PICHOIR, F. (1991) Quantitative analysis of homogeneous or stratified microvolumes applying the model "PAP" in microprobe analysis. *In* Electron Probe

Quantitation (K.F.J. Heinrich & D.E. Newbury, eds.). Plenum Press, New York, N.Y. 31-75.

RIEDER, M., CAVAZZINI, G., D'YAKONOV, Y. S., GOTTARDI, G., GUGGENHEIM, S., KOVAL, P. V., MÜLLER, G., NEIVA, A., RADOSLOVICH, E. W., ROBERT, J., SASSI, F. P., TAKEDA, H., WEISS, Z. & WONES, D. R. (1998). Nomenclature of the micas. *The Canadian Mineralogist* **36,** 905-912.

RODA, E., PESQUERA, A. & VELASCO, F. (1995) Micas of the muscovite-lepidolite series from the Fregeneda pegmatites (Salamanca, Spain). *Mineralogy & Petrology* **55,** 145-157.

RODA-ROBLES, E., PESQUERA, A., GIL-CRESPO, P. P., TORRES-RUIZ, J., & DEPARSEVAL, P. (2006) Mineralogy and geochemistry of micas from the Pinilla de Fermoselle pegmatite (Zamora Spain). *European Journal of Mineralogy* **18,** 369-377.

SIMMONS, W. B., FALSTER, A. U., WEBBER, K. L., & RODA-ROBLES E. (2013) Mount Mica pegmatite, Maine, USA **Abs.** *PEG 2013: The 6th International Symposium on Granitic Pegmatites* 135-136.

SIMMONS, W. B., FREEMAN, G., FALSTER, A. U., LAURS, B. M., & WEBBER, K. L. (2005a) New Tourmaline Production from Mount Mica, Maine. *Rocks & Minerals* **80,** 396-408.

SIMMONS, W. B., LAURS, B. M., FALSTER, A. U., KOIVULA, J. I., & WEBBER, K. L. (2005b) Mt Mica: A renaissance in Maine's gem tourmaline production. *Gem & Geology* **41**, 2-15.

SIMMONS, W. B., PEZZOTTA, F., SHIGLEY, J. E., BEURLEN, H. (2012) Granitic pegmatites as sources of colored gemstones. *Elements* **8**, 281-287.

SIMMONS, W. B., WEBBER, K. L., FALSTER, A. U., AND NIZAMOFF, J. W. (2003) *Pegmatology Pegmatite Mineralogy Petrology and Petrogenesis*. Rubelite Press, New Orleans. U.S.A.

SOLAR, G. S., & BROWN, M. (2001) Deformation partitioning during transpression in response to Early Devonian oblique convergence, northern Appalachian orogeny, USA. *Journal of Structural Geology* ***23*****,** 1043-1065.

SOLAR, G. S., & TOMASCAK, P. B. (2009) The Sebago pluton and the Sebago Migmatite Domain, Southern Maine: results from new studies. *2009 Annual Meeting of Northeastern Section, Geological Society of America, Field Trip 2* 1-24.

TINDLE, A. G. & WEBB, P. C. (1990) Estimation of lithium contents in trioctahedral micas using microprobe data: application to micas from granitic rocks. *European Journal Mineralogy* 595-610.

TISCHENDORF, G., GOTTESMANN, B, FÖRSTER, H., & TRUMBULL, R. B. (1997) On Li-bearing micas: estimating Li from electron microprobe analyses and an improved diagram for graphical representation. *Mineralogical Magazine* **61**, 809-834.

VIEIRA, R., RODA-ROBLES, E., PESQUERA, A. & LIMA, A. (2011): Chemical variation and significance of micas from the Fregeneda-Almendra pegmatitic field (Central-Iberian Zone, Spain and Portugal). *American Minerologist* **96**, 637-645.

WEBBER, K. L., SIMMONS, W. B., FALSTER, A. U. & FOORD, E. E. (1999) Cooling rates and crystallization dynamics of shallow level pegmatite-aplite dikes, San Diego County, California. *American Mineralogist* **84,** 708-717.

WISE, M. A. (1995) Trace element chemistry of lithium-rich micas from rare-element granitic pegmatites. *Mineralogy and Petrology* **55,** 203-215.

Wise, M. A., Francis, C. A., & ČERNÝ, P. (2012) Compositional and structural variations in columbite-group minerals from granitic pegmatites of the Brunswick and Oxford Fields, Maine: Differential trends in F-poor and F-rich environments. *The Canadian Mineralogist*, **50**, 1515-1530.

Wright, T. (1968) X-ray and optical study of alkali feldspar: II An X-ray method for determining the composition and structural state from measurement of 2Ø values for three reflections. *The American Mineralogist* **53**, 88-107.

APPENDIX

Mica analyses

Table 5 Chemical compositions of all micas analyzed from Mount Mica Pegmatite

Sample	M2-2a Xl	M2-2b Xl	M2-2c Xl	M4-1a Xl	M4-1b Xl	M4-1c Xl	m4-2a Xl	M4-2b Xl	M4-2c Xl	M4-3a Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %										
SiO_2	46.34	46.40	46.34	46.89	46.70	46.72	47.10	47.10	46.97	45.88
TiO_2	bd	bd	bd	0.01	0.01	0.01	0.01	0.01	bd	0.03
Al_2O_3	36.09	36.10	36.09	36.33	36.27	36.40	37.01	36.96	36.89	36.45
FeO	1.64	1.56	1.59	0.93	0.83	0.91	1.00	0.97	0.96	0.93
MnO	0.11	0.11	0.11	0.57	0.56	0.49	0.05	0.03	0.04	0.07
MgO	0.03	0.03	0.03	bd	bd	bd	bd	bd	0.01	0.41
CaO	0.02	0.02	0.02	0.04	0.03	0.04	0.42	0.10	0.04	bd
Na_2O	0.40	0.41	0.42	0.12	0.13	0.14	0.35	0.39	0.43	1.06
K_2O	9.55	9.68	9.56	9.77	9.56	9.44	9.76	9.57	9.56	9.34
Rb_2O	0.80	0.80	0.80	1.56	1.56	1.56	0.60	0.60	0.60	0.62
Cs_2O	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Li_2O*	0.92	0.84	0.78	0.52	0.45	0.35	0.63	0.51	0.45	0.36
F	1.90	1.78	1.67	1.23	1.11	0.91	1.43	1.22	1.10	0.93
H_2O*	3.64	3.70	3.74	3.98	4.01	4.10	3.93	4.00	4.05	4.07
O=F	0.80	0.75	0.70	0.52	0.47	0.38	0.60	0.52	0.46	0.39
Total	100.65	100.68	100.46	101.41	100.75	100.69	101.69	100.94	100.63	99.76

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M2-2a Xl	M2-2b Xl	M2-2c Xl	M4-1a Xl	M4-1b Xl	M4-1c Xl	M4-2a Xl	M4-2b Xl	M4-2c Xl	M4-3a Xl	M4-3b Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.119	6.127	6.130	6.170	6.176	6.178	6.132	6.161	6.163	6.096	6.106
^{IV}Al	1.881	1.873	1.870	1.830	1.824	1.822	1.868	1.839	1.837	1.904	1.894
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.736	3.745	3.757	3.804	3.828	3.850	3.810	3.858	3.868	3.802	3.799
Ti	bd	bd	bd	bd	0.001	0.001	0.001	0.001	bd	0.003	0.003
Fe2+	0.181	0.173	0.176	0.102	0.092	0.101	0.109	0.106	0.105	0.103	0.099
Mn	0.012	0.012	0.013	0.064	0.062	0.055	0.006	0.004	0.005	0.008	0.008
Mg	0.006	0.006	0.007	bd	bd	bd	bd	bd	bd1	0.080	0.088
Li*	0.489	0.448	0.414	0.273	0.241	0.185	0.332	0.271	0.235	0.192	0.160
Σ Octahedral	4.424	4.383	4.365	4.243	4.224	4.192	4.256	4.239	4.215	4.189	4.156
K	1.609	1.630	1.612	1.639	1.613	1.593	1.621	1.596	1.601	1.583	1.598
Ca	0.003	0.003	0.003	0.005	0.005	0.005	0.059	0.014	0.006	bd	bd
Na	0.102	0.105	0.108	0.031	0.034	0.036	0.087	0.098	0.110	0.273	0.285
Rb	0.068	0.068	0.068	0.132	0.133	0.133	0.050	0.050	0.051	0.053	0.053
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Σ x-site	1.782	1.806	1.792	1.807	1.784	1.767	1.818	1.759	1.768	1.909	1.936
F	0.792	0.742	0.699	0.510	0.465	0.381	0.590	0.506	0.456	0.392	0.341
OH*	3.208	3.258	3.301	3.490	3.535	3.619	3.411	3.494	3.544	3.608	3.659
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M4-3c Xl	M6-1a	M6-1b	M6-1c	M6-2a	M6-2b	M6-2c	M7-1a Xl	M7-1b Xl	M7-1c Xl	M7-2a Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.33	45.78	45.68	45.72	46.51	46.30	45.99	45.99	46.00	46.02	46.32
TiO_2	0.03	0.09	0.09	0.10	bd	bd	0.01	0.01	0.01	0.01	bd
Al_2O_3	36.53	35.33	35.43	35.71	37.98	37.77	37.80	37.22	37.10	37.03	36.89
FeO	0.98	1.08	1.11	1.22	0.03	0.02	0.03	0.86	0.91	0.87	0.28
MnO	0.07	0.05	0.04	0.05	0.12	0.11	0.11	0.22	0.25	0.26	bd
MgO	0.43	0.46	0.44	0.32	bd	bd	bd	bd	bd	0.01	bd
CaO	0.01	bd	0.01	bd	0.10	0.10	0.11	bd	0.01	0.01	bd
Na_2O	1.09	0.49	0.45	0.39	0.17	0.22	0.24	0.79	0.66	0.56	0.10
K_2O	9.33	9.81	9.67	9.70	9.40	9.34	9.21	9.88	9.78	9.70	9.78
Rb_2O	0.62	0.07	0.07	0.07	bd	bd	bd	1.28	1.28	1.28	0.80
Cs_2O	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Li_2O*	0.37	0.46	0.54	0.56	0.32	0.34	0.44	0.84	0.78	0.86	0.70
F	0.95	1.12	1.28	1.31	0.86	0.90	1.08	1.78	1.68	1.80	1.55
H_2O*	4.10	3.92	3.85	3.85	4.15	4.11	4.01	3.73	3.77	3.71	3.79
O=F	0.40	0.47	0.54	0.55	0.36	0.38	0.45	0.75	0.71	0.76	0.65
Total	100.44	98.17	98.13	98.44	99.27	98.83	98.57	101.84	101.52	101.35	99.55

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M4-3c Xl	M6-1a	M6-1b	M6-1c	M6-2a	M6-2b	M6-2c	M7-1a Xl	M7-1b Xl	M7-1c Xl	M7-2a Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.112	6.162	6.147	6.134	6.120	6.120	6.094	6.027	6.045	6.050	6.136
^{IV}Al	1.888	1.838	1.853	1.866	1.880	1.880	1.906	1.973	1.955	1.950	1.864
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.792	3.767	3.766	3.781	4.010	4.003	3.997	3.776	3.789	3.788	3.894
Ti	0.003	0.009	0.009	0.010	bd	bd	0.001	0.001	0.001	0.001	bd
Fe2+	0.108	0.122	0.125	0.137	0.003	0.002	0.003	0.094	0.100	0.096	0.031
Mn	0.007	0.005	0.005	0.005	0.013	0.013	0.012	0.025	0.028	0.029	bd
Mg	0.085	0.091	0.089	0.064	bd	bd	bd	bd	bd	0.001	bd
Li*	0.194	0.246	0.295	0.304	0.169	0.182	0.232	0.444	0.412	0.454	0.375
Σ Octahedral	4.189	4.241	4.289	4.301	4.195	4.200	4.245	4.340	4.330	4.368	4.300
K	1.571	1.685	1.659	1.660	1.578	1.574	1.557	1.651	1.640	1.627	1.652
Ca	0.001	bd	0.001	bd	0.014	0.014	0.016	bd	0.001	0.001	bd
Na	0.279	0.127	0.118	0.100	0.044	0.057	0.062	0.200	0.167	0.141	0.024
Rb	0.053	0.006	0.006	0.006	bd	bd	bd	0.108	0.108	0.108	0.068
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Σ x-site	1.904	1.817	1.785	1.766	1.636	1.645	1.635	1.959	1.916	1.877	1.744
F	0.394	0.475	0.544	0.556	0.356	0.376	0.453	0.736	0.696	0.748	0.649
OH*	3.606	3.525	3.456	3.444	3.644	3.624	3.547	3.264	3.304	3.252	3.351
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyze; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M7-2b Xl	M7-2c Xl	M7-2aR Xl	M7-2bR Xl	M7-2c Xl	m7-3a Xl	m7-3b Xl	m7-3c Xl	m7-4a Xl	m7-4b Xl	m7-4c Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.44	46.29	46.62	46.55	46.71	46.34	46.40	46.32	46.43	46.39	46.40
TiO_2	bd	bd	0.01	bd	0.01	bd	bd	bd	0.01	0.01	0.01
Al_2O_3	36.68	36.63	37.22	37.32	37.06	36.44	36.51	36.43	36.33	36.26	36.25
FeO	0.27	0.30	0.30	0.29	0.31	0.45	0.43	0.44	1.64	1.59	1.61
MnO	bd	bd	0.01	0.02	0.02	0.04	0.03	0.03	0.10	0.09	0.11
MgO	bd	bd	0.01	bd	bd	bd	bd	bd	0.06	0.07	0.05
CaO	bd	bd	bd	bd	0.01	bd	bd	bd	0.14	0.13	0.14
Na_2O	0.72	0.65	0.23	0.45	0.19	0.10	0.09	0.09	0.39	0.41	0.38
K_2O	9.68	9.75	10.00	9.98	10.10	9.75	9.81	9.78	9.56	9.61	9.46
Rb_2O	0.80	0.80	0.04	0.04	0.03	0.59	0.59	0.59	0.48	0.48	0.48
Cs_2O	n.a.	n.a.	bd	bd	bd	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Li_2O*	0.78	0.70	0.69	0.80	0.77	0.58	0.45	0.54	0.39	0.40	0.39
F	1.68	1.55	1.52	1.71	1.65	1.34	1.11	1.27	0.99	1.01	1.00
H_2O*	3.75	3.79	3.84	3.76	3.78	3.86	3.97	3.89	4.06	4.04	4.05
O=F	0.71	0.65	0.64	0.72	0.70	0.57	0.47	0.54	0.42	0.43	0.42
Total	100.09	99.81	99.86	100.20	99.94	98.95	98.93	98.84	100.15	100.07	99.92

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M7-2b Xl	M7-2c Xl	M7-2aR Xl	M7-2bR Xl	M7-2c Xl	m7-3a Xl	m7-3b Xl	m7-3c Xl	m7-4a Xl	m7-4b Xl	m7-4c Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.131	6.131	6.130	6.105	6.138	6.172	6.180	6.175	6.147	6.147	6.152
^{IV}Al	1.869	1.869	1.870	1.895	1.862	1.828	1.820	1.825	1.853	1.853	1.848
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.837	3.849	3.897	3.872	3.878	3.891	3.911	3.898	3.815	3.809	3.818
Ti	bd	bd	0.001	bd	0.001	bd	bd	bd	0.001	0.001	0.001
Fe2+	0.030	0.033	0.033	0.032	0.034	0.051	0.048	0.048	0.181	0.176	0.179
Mn	bd	bd	0.001	0.003	0.002	0.005	0.004	0.003	0.011	0.010	0.013
Mg	bd	bd	0.002	bd	bd	bd	bd	bd	0.011	0.014	0.009
Li*	0.414	0.375	0.363	0.423	0.405	0.312	0.243	0.290	0.206	0.213	0.210
Σ Octahedral	4.281	4.257	4.297	4.330	4.320	4.259	4.205	4.240	4.224	4.223	4.229
K	1.629	1.647	1.678	1.670	1.693	1.657	1.667	1.663	1.614	1.624	1.599
Ca	bd	bd	bd	bd	0.001	bd	bd	bd	0.020	0.019	0.020
Na	0.185	0.166	0.059	0.113	0.049	0.025	0.024	0.023	0.099	0.106	0.098
Rb	0.068	0.068	0.004	0.003	0.003	0.050	0.051	0.051	0.041	0.041	0.041
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Σ x-site	1.882	1.881	1.741	1.786	1.746	1.732	1.741	1.736	1.774	1.790	1.759
F	0.699	0.649	0.633	0.710	0.687	0.566	0.468	0.536	0.413	0.424	0.420
OH*	3.301	3.351	3.367	3.290	3.313	3.434	3.532	3.464	3.587	3.576	3.580
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M9-1-1	M9-1-2	M9-1-3	M9-2-1	M9-2-2	M9-2-3	M10-1a	M10-1b	M10-1c	M11-a-a	M11-a-b
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.35	46.40	46.29	46.43	46.34	46.22	45.88	45.91	45.82	46.09	46.01
TiO_2	0.05	0.05	0.05	0.06	0.04	0.05	0.33	0.35	0.30	0.01	0.01
Al_2O_3	36.57	36.28	36.34	36.28	36.41	36.69	35.10	34.97	35.10	36.98	36.97
FeO	1.46	1.63	1.71	1.45	1.45	1.45	1.37	1.41	1.37	0.77	0.87
MnO	0.31	0.28	0.31	0.29	0.29	0.28	0.05	0.04	0.05	0.09	0.07
MgO	0.02	0.03	0.03	0.04	0.03	0.03	0.67	0.71	0.68	0.19	0.22
CaO	0.01	0.02	0.02	0.02	0.03	0.03	0.18	0.17	0.18	0.06	0.07
Na_2O	0.22	0.19	0.20	0.19	0.23	0.23	0.84	0.80	0.84	0.46	0.44
K_2O	9.93	10.10	10.03	10.21	10.00	10.03	9.01	9.21	9.12	9.78	9.88
Rb_2O	0.02	0.01	0.02	bd	0.01	0.01	0.06	0.06	0.06	0.11	0.11
Cs_2O	bd	bd	bd	bd	bd	bd	n.a.	n.a.	n.a.	n.a.	n.a.
Li_2O*	0.45	0.39	0.34	0.26	0.24	0.25	0.36	0.33	0.38	0.29	0.33
F	1.11	0.98	0.89	0.73	0.68	0.70	0.93	0.88	0.98	0.79	0.88
H_2O*	4.01	4.06	4.10	4.17	4.19	4.19	4.03	4.05	4.00	4.15	4.11
O=F	0.47	0.41	0.38	0.31	0.29	0.29	0.39	0.37	0.41	0.33	0.37
Total	100.04	100.01	99.95	99.84	99.64	99.87	98.40	98.52	98.46	99.41	99.59

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M9-1-1	M9-1-2	M9-1-3	M9-2-1	M9-2-2	M9-2-3	M10-1a	M10-1b	M10-1c	M11-a-a	M11-a-b
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.127	6.146	6.138	6.159	6.152	6.125	6.155	6.161	6.149	6.112	6.097
^{IV}Al	1.873	1.854	1.862	1.841	1.848	1.875	1.845	1.839	1.851	1.888	1.903
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.824	3.810	3.815	3.830	3.849	3.854	3.705	3.691	3.700	3.890	3.872
Ti	0.005	0.005	0.005	0.006	0.004	0.005	0.033	0.035	0.030	0.001	0.001
Fe2+	0.161	0.181	0.190	0.161	0.161	0.161	0.154	0.158	0.153	0.085	0.096
Mn	0.035	0.032	0.035	0.033	0.032	0.032	0.006	0.005	0.005	0.010	0.008
Mg	0.004	0.006	0.006	0.008	0.007	0.006	0.134	0.142	0.135	0.038	0.043
Li*	0.241	0.205	0.181	0.139	0.127	0.131	0.194	0.178	0.208	0.153	0.176
Σ Octahedral	4.271	4.239	4.231	4.177	4.179	4.188	4.225	4.210	4.231	4.176	4.197
K	1.675	1.707	1.697	1.728	1.693	1.696	1.542	1.577	1.561	1.654	1.670
Ca	0.002	0.003	0.003	0.003	0.004	0.004	0.026	0.024	0.025	0.009	0.009
Na	0.057	0.049	0.051	0.050	0.058	0.060	0.217	0.208	0.220	0.117	0.114
Rb	0.002	0.001	0.001	bd	0.001	0.001	0.005	0.005	0.005	0.009	0.009
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Σ x-site	1.735	1.759	1.752	1.780	1.756	1.761	1.790	1.813	1.811	1.789	1.802
F	0.466	0.412	0.374	0.308	0.287	0.293	0.396	0.372	0.417	0.330	0.367
OH*	3.534	3.588	3.626	3.692	3.713	3.707	3.604	3.628	3.583	3.670	3.633
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M11-a-c	M11b-a	M11b-b	M11b-c	M12-2a	M12-2b	M12-2c	M13-1a	M13-1b	M13-1c	M13-1 CS
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.32	46.22	46.19	46.33	45.87	45.89	46.02	46.78	46.83	46.64	46.30
TiO_2	0.02	0.01	0.01	0.01	bd	bd	bd	0.20	0.21	0.17	0.01
Al_2O_3	36.89	36.87	37.02	36.98	37.00	36.83	36.88	36.24	36.20	36.15	35.44
FeO	0.78	0.86	0.73	0.68	0.05	0.05	0.06	1.78	1.88	1.79	0.11
MnO	0.09	0.09	0.10	0.09	0.02	0.03	0.02	0.06	0.07	0.07	0.08
MgO	0.18	0.21	0.10	0.14	bd	bd	bd	0.25	0.23	0.22	bd
CaO	0.05	0.10	0.08	0.05	0.02	0.02	0.02	bd	0.01	bd	bd
Na_2O	0.40	0.39	0.41	0.40	0.06	0.09	0.12	0.13	0.22	0.16	0.55
K_2O	9.69	9.83	9.57	9.47	9.67	9.57	9.38	9.88	9.68	9.85	9.78
Rb_2O	0.11	0.01	0.01	0.01	0.93	0.93	0.93	0.06	0.06	0.06	0.06
Cs_2O	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	0.01
Li_2O*	0.32	0.31	0.31	0.34	0.66	0.64	0.54	0.58	0.39	0.37	0.99
F	0.86	0.84	0.83	0.89	1.48	1.45	1.27	1.33	0.99	0.96	2.00
H_2O*	4.12	4.13	4.13	4.10	3.80	3.80	3.89	3.93	4.09	4.08	3.53
O=F	0.36	0.35	0.35	0.38	0.62	0.61	0.54	0.56	0.42	0.40	0.84
Total	99.46	99.51	99.14	99.12	98.94	98.68	98.59	100.66	100.44	100.10	98.01

* calculated

n.a. = not analyzed; bd = below detection level

Li-musc. = lithian muscovite

Table 5 continued

Sample	M11-a-c	M11b-a	M11b-b	M11b-c	M12-2a	M12-2b	M12-2c	M13-1a	M13-1b	M13-1c	M13-1 CS
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.133	6.121	6.126	6.138	6.113	6.128	6.143	6.146	6.164	6.163	6.203
^{IV}Al	1.867	1.879	1.874	1.862	1.887	1.872	1.857	1.854	1.836	1.837	1.797
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.888	3.875	3.912	3.912	3.923	3.925	3.944	3.758	3.780	3.791	3.800
Ti	0.002	0.001	bd	0.001	bd	bd	bd	0.020	0.021	0.016	0.001
Fe2+	0.087	0.095	0.081	0.075	0.006	0.005	0.006	0.195	0.207	0.197	0.012
Mn	0.010	0.010	0.011	0.010	0.002	0.004	0.003	0.007	0.007	0.008	0.009
Mg	0.035	0.041	0.019	0.028	bd	bd	bd	0.048	0.046	0.043	bd
Li*	0.170	0.167	0.165	0.180	0.356	0.344	0.291	0.305	0.205	0.198	0.531
Σ Octahedral	4.192	4.189	4.189	4.206	4.287	4.278	4.244	4.333	4.265	4.254	4.353
K	1.636	1.661	1.618	1.600	1.643	1.629	1.596	1.655	1.625	1.659	1.671
Ca	0.007	0.014	0.012	0.006	0.003	0.002	0.003	bd	0.001	bd	bd
Na	0.102	0.100	0.106	0.103	0.017	0.023	0.031	0.033	0.057	0.040	0.144
Rb	0.009	0.001	0.001	0.001	0.080	0.080	0.080	0.005	0.005	0.005	0.005
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	0.001
Σ x-site	1.754	1.776	1.737	1.710	1.742	1.734	1.711	1.694	1.688	1.704	1.821
F	0.358	0.353	0.349	0.374	0.625	0.610	0.538	0.554	0.411	0.401	0.847
OH*	3.642	3.647	3.651	3.626	3.375	3.390	3.462	3.446	3.589	3.599	3.153
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M13-2 CS	M13-3 CS	M16A-1R	M16A-2R	M16A-3R	M16A-1-1	M16A-1-2	M16A-1-3	M16b-b-1a	M16b-b-1b	M16b-b-1c
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.41	46.28	45.57	45.61	45.56	45.74	45.64	45.45	46.86	46.75	46.59
TiO_2	bd	0.01	0.04	0.03	0.03	0.05	0.04	0.04	0.23	0.21	0.21
Al_2O_3	35.41	35.54	35.44	35.53	35.50	35.38	35.66	35.31	36.33	36.34	36.36
FeO	0.09	0.10	2.33	2.19	2.98	2.21	2.31	2.43	1.44	1.37	1.46
MnO	0.07	0.08	0.08	0.09	0.08	0.09	0.09	0.11	0.01	0.01	0.01
MgO	bd	bd	0.04	0.05	0.05	0.03	0.02	0.04	0.32	0.33	0.32
CaO	bd	bd	0.02	0.03	0.03	0.01	0.02	0.03	bd	bd	bd
Na_2O	0.54	0.62	0.18	0.13	0.16	0.22	0.31	0.33	0.26	0.25	0.23
K_2O	9.82	9.67	9.79	9.87	9.55	9.93	9.82	9.83	9.61	9.56	9.61
Rb_2O	0.06	0.06	0.01	0.02	0.01	0.02	0.03	0.02	0.04	0.04	0.04
Cs_2O	0.02	0.01	bd	bd	bd	bd	bd	bd	n.a.	n.a.	n.a.
Li_2O*	0.92	0.98	0.51	0.44	0.47	0.78	0.71	0.75	0.31	0.33	0.32
F	1.89	1.98	1.22	1.09	1.14	1.67	1.56	1.62	0.83	0.87	0.86
H_2O*	3.58	3.54	3.87	3.94	3.92	3.68	3.74	3.69	4.16	4.13	4.13
O=F	0.80	0.83	0.51	0.46	0.48	0.70	0.66	0.68	0.35	0.37	0.36
Total	98.01	98.03	98.60	98.56	99.00	99.12	99.31	98.97	100.04	99.84	99.78

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M13-2 CS	M13-3 CS	M16A-1R	M16A-2R	M16A-3R	M16A-1-1	M16A-1-2	M16A-1-3	M16b-b-1a	M16b-b-1b	M16b-b-1c
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.218	6.197	6.135	6.141	6.120	6.129	6.106	6.108	6.173	6.169	6.157
^{IV}Al	1.782	1.803	1.865	1.859	1.880	1.871	1.894	1.892	1.827	1.831	1.843
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.809	3.805	3.758	3.778	3.740	3.715	3.729	3.701	3.814	3.820	3.820
Ti	bd	0.001	0.004	0.003	0.003	0.005	0.004	0.004	0.023	0.021	0.021
Fe2+	0.010	0.011	0.263	0.247	0.335	0.248	0.259	0.273	0.159	0.151	0.161
Mn	0.008	0.009	0.009	0.010	0.009	0.010	0.010	0.013	0.001	0.001	0.001
Mg	bd	bd	0.009	0.009	0.010	0.007	0.004	0.008	0.064	0.066	0.062
Li*	0.493	0.525	0.278	0.240	0.254	0.419	0.380	0.404	0.163	0.174	0.170
Σ Octahedral	4.321	4.351	4.321	4.287	4.351	4.403	4.386	4.403	4.223	4.233	4.234
K	1.678	1.652	1.680	1.694	1.637	1.697	1.676	1.685	1.615	1.608	1.621
Ca	bd	bd	0.003	0.004	0.004	0.002	0.003	0.004	bd	bd	bd
Na	0.141	0.161	0.048	0.035	0.040	0.058	0.081	0.087	0.065	0.065	0.060
Rb	0.005	0.005	0.001	0.001	0.001	0.002	0.003	0.002	0.003	0.003	0.003
Cs	0.001	0.001	bd	bd	bd	bd	bd	bd	bd	bd	bd
Σ x-site	1.825	1.819	1.733	1.735	1.682	1.759	1.763	1.777	1.684	1.677	1.684
F	0.801	0.840	0.521	0.465	0.486	0.708	0.658	0.690	0.347	0.363	0.357
OH*	3.199	3.160	3.479	3.535	3.514	3.292	3.342	3.310	3.653	3.637	3.643
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M16b-b-a	M16b-b-b	M16b-b-c	M16Ba-1-1	M16Ba-1-2	m16-ba-a	m16-ba-b	m16-ba-c	m16-Ba-1 CS	m16-Ba-2 CS	m16-Ba-3 CS
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.19	46.31	46.21	45.75	45.66	46.23	46.44	46.29	45.57	45.49	45.57
TiO_2	0.16	0.15	0.16	0.27	0.28	0.31	0.29	0.29	0.26	0.24	0.22
Al_2O_3	36.51	36.38	36.44	35.02	35.14	36.28	36.16	36.22	36.00	36.62	36.72
FeO	1.02	1.10	0.98	1.61	1.57	1.62	1.57	1.57	1.62	1.54	1.34
MnO	bd	bd	bd	0.12	0.11	0.08	0.10	0.08	0.14	0.15	0.14
MgO	0.30	0.24	0.26	0.45	0.47	0.50	0.48	0.48	0.44	0.43	0.39
CaO	bd	bd	bd	0.09	0.10	0.13	0.13	0.18	0.17	0.18	0.19
Na_2O	0.26	0.25	0.27	0.31	0.33	0.33	0.29	0.28	0.24	0.26	0.27
K_2O	9.66	9.61	9.55	9.57	9.54	9.45	9.48	9.50	9.74	9.68	9.77
Rb_2O	0.02	0.02	0.02	0.01	0.02	0.08	0.08	0.08	0.31	0.30	0.31
Cs_2O	n.a.	n.a.	n.a.	bd	bd	n.a.	n.a.	n.a.	bd	bd	bd
Li_2O*	0.34	0.41	0.45	0.52	0.52	0.45	0.38	0.42	0.58	0.62	0.60
F	0.89	1.03	1.11	1.23	1.24	1.10	0.98	1.05	1.34	1.41	1.38
H_2O*	4.09	4.02	3.99	3.87	3.87	4.02	4.08	4.04	3.87	3.86	3.88
O=F	0.38	0.44	0.47	0.52	0.52	0.46	0.41	0.44	0.57	0.59	0.58
Total	99.06	99.10	98.97	98.31	98.33	100.11	100.05	100.04	99.71	100.18	100.19

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M16b-b-a	M16b-b-b	M16b-b-c	M16Ba-1-1	M16Ba-1-2	m16-ba-a	m16-ba-b	m16-ba-c	m16-Ba-1 CS	m16-Ba-2 CS	m16-Ba-3 CS
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.138	6.151	6.141	6.157	6.142	6.104	6.132	6.115	6.069	6.025	6.032
^{IV}Al	1.862	1.849	1.859	1.843	1.858	1.896	1.868	1.885	1.931	1.975	1.968
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.855	3.846	3.849	3.711	3.713	3.748	3.758	3.754	3.719	3.742	3.760
Ti	0.016	0.014	0.016	0.027	0.029	0.030	0.029	0.029	0.026	0.024	0.022
Fe2+	0.113	0.122	0.109	0.181	0.176	0.179	0.173	0.173	0.181	0.171	0.149
Mn	bd	bd	bd	0.014	0.012	0.008	0.011	0.009	0.016	0.016	0.015
Mg	0.059	0.047	0.051	0.091	0.095	0.099	0.095	0.095	0.088	0.084	0.077
Li*	0.181	0.220	0.242	0.279	0.283	0.238	0.204	0.222	0.312	0.331	0.320
Σ Octahedral	4.225	4.249	4.265	4.303	4.308	4.303	4.271	4.282	4.341	4.369	4.343
K	1.637	1.628	1.620	1.642	1.638	1.591	1.596	1.601	1.655	1.635	1.650
Ca	bd	bd	bd	0.013	0.015	0.019	0.019	0.026	0.024	0.026	0.027
Na	0.068	0.065	0.069	0.081	0.087	0.085	0.074	0.073	0.062	0.065	0.069
Rb	0.002	0.002	0.002	0.001	0.001	0.007	0.007	0.007	0.027	0.025	0.026
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Σ x-site	1.706	1.696	1.690	1.738	1.741	1.701	1.695	1.706	1.767	1.752	1.771
F	0.375	0.434	0.466	0.522	0.528	0.460	0.410	0.437	0.566	0.591	0.576
OH*	3.625	3.566	3.534	3.478	3.472	3.540	3.590	3.563	3.434	3.409	3.424
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M16-Ba-4 CS	M17-1a Xl	M17-1b Xl	M17-1c Xl	M17-2a Xl	M17-2b Xl	M17-2c Xl	M17-1 Xl	M17-2 Xl	M17-3 Xl	M17-3b Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Muscovite	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.50	46.14	45.98	46.22	46.70	46.66	46.79	46.83	46.98	46.88	46.69
TiO_2	0.20	bd	bd	0.01	bd	bd	bd	0.01	0.01	0.01	0.01
Al_2O_3	36.41	36.54	36.61	36.81	37.30	37.21	37.11	36.73	36.72	36.89	36.59
FeO	1.22	0.72	0.67	0.56	0.32	0.22	0.22	0.21	0.23	0.24	1.31
MnO	0.14	0.03	0.03	0.03	bd	bd	bd	0.01	0.02	0.02	0.12
MgO	0.37	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	0.18	bd	bd	bd	0.02	0.02	0.02	0.01	0.01	0.01	bd
Na_2O	0.26	0.21	0.23	0.26	0.12	0.10	0.12	0.15	0.15	0.02	0.45
K_2O	9.74	8.98	9.33	9.12	9.58	9.70	9.46	10.01	10.14	10.11	9.68
Rb_2O	0.31	1.31	1.31	1.31	1.10	1.10	1.10	0.02	0.03	0.03	1.09
Cs_2O	0.01	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	bd	bd	bd	n.a.
Li_2O*	0.55	0.60	0.62	0.58	0.39	0.38	0.01	0.40	0.41	0.38	0.98
F	1.28	1.38	1.41	1.33	0.99	0.97	0.06	1.01	1.03	0.98	1.99
H_2O*	3.95	3.85	3.83	3.88	4.08	4.09	4.49	4.05	4.05	4.07	3.64
O=F	0.54	0.58	0.59	0.56	0.42	0.41	0.02	0.43	0.44	0.41	0.84
Total	100.57	99.19	99.44	99.55	100.18	100.03	99.34	99.01	99.36	99.24	101.71

* calculated
n.a. = not analyze; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M16-Ba-4 CS	M17-1a Xl	M17-1b Xl	M17-1c Xl	M17-2a Xl	M17-2b Xl	M17-2c Xl	M17-1 Xl	M17-2 Xl	M17-3 Xl	M17-3b Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Muscovite	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.118	6.149	6.127	6.138	6.153	6.158	6.205	6.201	6.205	6.195	6.107
^{IV}Al	1.882	1.851	1.873	1.862	1.847	1.842	1.795	1.799	1.795	1.805	1.893
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.764	3.889	3.875	3.899	3.944	3.945	4.005	3.934	3.921	3.941	3.747
Ti	0.020	bd	bd	0.001	bd	bd	bd	0.001	0.001	0.001	0.001
Fe2+	0.135	0.080	0.075	0.063	0.035	0.025	0.024	0.024	0.025	0.026	0.144
Mn	0.015	0.003	0.003	0.004	bd	bd	bd	0.001	0.002	0.002	0.013
Mg	0.072	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	0.289	0.322	0.333	0.308	0.205	0.199	0.005	0.213	0.218	0.204	0.515
Σ Octahedral	4.295	4.295	4.286	4.274	4.185	4.169	4.034	4.172	4.168	4.175	4.419
K	1.635	1.527	1.586	1.545	1.609	1.633	1.599	1.690	1.709	1.704	1.614
Ca	0.025	bd	bd	bd	0.003	0.003	0.002	0.001	0.002	0.002	bd
Na	0.065	0.055	0.060	0.066	0.031	0.025	0.030	0.037	0.039	0.005	0.115
Rb	0.026	0.112	0.112	0.112	0.093	0.093	0.094	0.002	0.002	0.002	0.092
Cs	0.001	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Σ x-site (alkali)	1.752	1.695	1.758	1.723	1.737	1.755	1.725	1.731	1.752	1.714	1.821
F	0.533	0.580	0.594	0.560	0.412	0.403	0.025	0.423	0.432	0.411	0.822
OH*	3.467	3.420	3.406	3.440	3.588	3.597	3.975	3.577	3.568	3.589	3.178
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M17-3c Xl	M17-4a Xl	M17-4b Xl	M17-4c Xl	M17-5a Xl	M17-5b Xl	M17-5c Xl	M18-1 Xl	M18-2 Xl	M18-3 Xl	M18-2a Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.78	46.66	46.60	46.55	46.42	46.32	46.29	46.90	46.85	46.92	45.56
TiO_2	0.01	0.01	0.02	0.02	bd	bd	bd	0.02	0.01	bd	0.35
Al_2O_3	36.70	36.28	36.69	36.65	36.63	36.61	36.51	36.79	36.90	36.81	34.13
FeO	1.46	1.32	1.27	1.25	0.30	0.23	0.27	1.33	1.41	1.30	1.74
MnO	0.15	0.10	0.10	0.12	bd	bd	bd	0.17	0.17	0.19	0.04
MgO	bd	0.18	0.16	0.17	bd	bd	bd	0.03	0.02	0.03	0.51
CaO	0.01	0.19	0.21	0.19	bd	bd	bd	0.01	0.01	0.01	bd
Na_2O	0.48	0.48	0.45	0.47	0.65	0.66	0.71	0.51	0.48	0.47	0.33
K_2O	9.53	9.43	9.33	9.54	9.75	9.57	9.70	9.88	9.91	9.89	8.98
Rb_2O	1.09	0.86	0.86	0.86	1.08	1.08	1.08	0.02	0.02	0.02	1.36
Cs_2O	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	bd	bd	bd	n.a.
Li_2O*	0.91	0.57	0.52	0.52	0.70	0.63	0.52	0.70	0.68	0.74	0.57
F	1.88	1.32	1.23	1.24	1.55	1.43	1.23	1.54	1.51	1.61	1.32
H_2O*	3.70	3.92	3.98	3.98	3.80	3.84	3.93	3.86	3.87	3.83	3.79
O=F	0.79	0.56	0.52	0.52	0.65	0.60	0.52	0.65	0.64	0.68	0.55
Total	101.90	100.76	100.89	101.04	100.23	99.77	99.73	101.10	101.22	101.14	98.10

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M17-3c Xl	M17-4a Xl	M17-4b Xl	M17-4c Xl	M17-5a Xl	M17-5b Xl	M17-5c Xl	M18-1 Xl	M18-2 Xl	M18-3 Xl	M18-2a Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.107	6.146	6.124	6.118	6.135	6.142	6.149	6.128	6.118	6.127	6.193
^{IV}Al	1.893	1.854	1.876	1.882	1.865	1.858	1.851	1.872	1.882	1.873	1.807
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.753	3.777	3.807	3.796	3.841	3.863	3.865	3.793	3.796	3.792	3.661
Ti	0.001	0.001	0.002	0.002	bd	bd	bd	0.001	0.001	bd	0.036
Fe2+	0.160	0.146	0.139	0.138	0.033	0.026	0.030	0.146	0.154	0.142	0.197
Mn	0.017	0.011	0.011	0.013	bd	bd	bd	0.018	0.019	0.021	0.004
Mg	bd	0.035	0.030	0.033	bd	bd	bd	0.005	0.004	0.005	0.104
Li*	0.476	0.302	0.274	0.276	0.374	0.338	0.277	0.368	0.358	0.390	0.310
Σ Octahedral	4.407	4.272	4.264	4.257	4.248	4.228	4.172	4.331	4.332	4.350	4.311
K	1.587	1.585	1.565	1.600	1.644	1.618	1.644	1.648	1.651	1.647	1.557
Ca	0.001	0.027	0.030	0.026	bd	bd	bd	0.001	0.002	0.002	bd
Na	0.120	0.122	0.115	0.119	0.165	0.168	0.183	0.130	0.123	0.118	0.087
Rb	0.091	0.073	0.073	0.073	0.092	0.092	0.092	0.002	0.002	0.002	0.119
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Σ x-site	1.800	1.806	1.782	1.818	1.901	1.878	1.919	1.780	1.777	1.769	1.763
F	0.775	0.551	0.512	0.514	0.648	0.601	0.518	0.638	0.624	0.666	0.566
OH*	3.225	3.449	3.488	3.486	3.352	3.399	3.482	3.362	3.376	3.334	3.434
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M18-2b Xl	M18-2c Xl	M18-3a Xl	M18-3b Xl	M18-3c Xl	KK1-1-1	KK1-1-2	KK1-1-3	KK1-3a	KK1-3b	KK1-3c
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	45.66	45.67	46.56	46.42	46.50	45.52	45.45	45.48	45.90	45.83	46.00
TiO_2	0.34	0.29	0.01	0.01	bd	0.01	0.01	0.01	0.31	0.32	0.32
Al_2O_3	34.23	34.26	36.58	36.46	36.70	35.33	35.24	35.30	35.44	35.38	35.33
FeO	1.68	1.71	1.18	1.23	1.33	1.45	1.45	1.55	1.21	1.19	1.22
MnO	0.03	0.03	0.07	0.06	0.06	0.11	0.09	0.13	0.01	0.01	0.01
MgO	0.46	0.45	bd	bd	0.01	0.03	0.02	0.02	0.67	0.65	0.67
CaO	bd	bd	0.07	0.04	0.03	0.02	0.03	0.03	0.11	0.10	0.11
Na_2O	0.29	0.31	0.38	0.41	0.34	0.45	0.44	0.46	0.47	0.46	0.48
K_2O	9.11	9.00	9.57	9.65	9.85	9.56	9.55	9.60	9.70	9.65	9.55
Rb_2O	1.36	1.36	0.87	0.87	0.87	0.76	0.75	0.77	0.01	0.01	0.01
Cs_2O	n.a.	n.a.	n.a.	n.a.	n.a.	0.01	bd	bd	n.a.	n.a.	n.a.
Li_2O*	0.46	0.38	0.59	0.51	0.51	0.92	0.84	0.90	0.31	0.30	0.29
F	1.12	0.98	1.37	1.22	1.21	1.89	1.77	1.87	0.83	0.81	0.80
H_2O*	3.88	3.94	3.90	3.95	3.98	3.56	3.60	3.57	4.08	4.08	4.10
O=F	0.47	0.41	0.57	0.51	0.51	0.80	0.75	0.79	0.35	0.34	0.34
Total	98.14	97.97	100.55	100.33	100.86	98.82	98.48	98.90	98.69	98.45	98.57

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M18-2b XI	M18-2c XI	M18-3a XI	M18-3b XI	M18-3c XI	KK1-1-1	KK1-1-2	KK1-1-3	KK1-3a	KK1-3b	KK1-3c
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.204	6.214	6.139	6.141	6.126	6.125	6.134	6.121	6.146	6.149	6.162
^{IV}Al	1.796	1.786	1.861	1.859	1.874	1.875	1.866	1.879	1.854	1.851	1.838
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.686	3.706	3.823	3.826	3.824	3.727	3.739	3.719	3.738	3.744	3.739
Ti	0.035	0.030	0.001	0.001	bd	0.001	0.001	0.001	0.032	0.032	0.032
Fe2+	0.191	0.195	0.130	0.136	0.147	0.163	0.164	0.175	0.135	0.134	0.137
Mn	0.004	0.003	0.007	0.007	0.007	0.013	0.011	0.015	0.001	0.001	0.001
Mg	0.092	0.090	bd	bd	0.002	0.006	0.004	0.005	0.133	0.131	0.134
Li*	0.250	0.210	0.315	0.273	0.268	0.496	0.456	0.489	0.166	0.161	0.157
Σ Octahedral	4.258	4.234	4.277	4.242	4.248	4.406	4.375	4.403	4.205	4.202	4.201
K	1.579	1.562	1.609	1.629	1.654	1.640	1.643	1.648	1.657	1.651	1.632
Ca	bd	bd	0.009	0.006	0.004	0.003	0.004	0.004	0.015	0.015	0.015
Na	0.076	0.082	0.096	0.105	0.086	0.117	0.114	0.119	0.121	0.119	0.125
Rb	0.119	0.119	0.074	0.074	0.074	0.066	0.065	0.067	0.001	0.001	0.001
Cs	bd	bd	bd	bd	bd	0.001	bd	bd	bd	bd	bd
Σ x-site	1.774	1.763	1.788	1.814	1.818	1.826	1.826	1.837	1.794	1.785	1.774
F	0.482	0.422	0.569	0.511	0.504	0.805	0.756	0.796	0.351	0.344	0.338
OH*	3.518	3.578	3.431	3.489	3.496	3.195	3.244	3.204	3.649	3.656	3.662
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	KK1-4a	KK1-4b	KK1-4c	M19-1b Xl	M19-1c	M19-1R XL	M19-2R Xl	M19-3R Xl	M21-1	M21-2	M21-3
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	45.99	46.09	46.12	46.71	46.81	46.83	46.78	46.79	45.42	45.61	45.48
TiO_2	0.25	0.27	0.30	0.01	0.01	0.01	0.01	0.02	0.01	0.02	0.02
Al_2O_3	36.16	36.09	36.22	37.23	37.52	35.57	35.59	35.50	35.36	35.45	35.42
FeO	1.57	1.46	1.52	0.20	0.19	0.25	0.25	0.28	1.55	1.44	1.29
MnO	0.10	0.09	0.12	0.02	0.01	0.02	0.03	0.04	0.09	0.11	0.08
MgO	0.48	0.43	0.45	bd	bd	bd	bd	bd	0.03	0.03	0.03
CaO	0.13	0.09	0.12	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.02
Na_2O	0.29	0.31	0.29	0.07	0.04	0.57	0.61	0.60	0.41	0.46	0.39
K_2O	9.48	9.22	9.32	9.78	9.83	10.01	10.15	10.22	10.00	9.88	9.78
Rb_2O	bd	bd	bd	2.39	2.39	0.01	0.02	0.02	0.43	0.38	0.39
Cs_2O	n.a.	n.a.	n.a.	n.a.	n.a.	bd	bd	bd	0.01	0.01	bd
Li_2O*	0.40	0.45	0.51	0.51	0.44	0.39	0.39	0.38	1.07	0.98	1.20
F	1.00	1.11	1.21	1.22	1.09	0.99	0.99	0.97	2.13	1.98	2.32
H_2O*	4.04	3.98	3.95	3.99	4.06	4.02	4.02	4.02	3.46	3.53	3.37
O=F	0.42	0.47	0.51	0.51	0.46	0.42	0.42	0.41	0.90	0.83	0.98
Total	99.45	99.14	99.63	101.63	101.96	98.26	98.43	98.43	99.10	99.04	98.82

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	KK1-4a	KK1-4b	KK1-4c	M19-1b Xl	M19-1c	M19-1R XL	M19-2R Xl	M19-3R Xl	M21-1	M21-2	M21-3
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.108	6.126	6.106	6.133	6.126	6.263	6.252	6.258	6.098	6.115	6.102
^{IV}Al	1.892	1.874	1.894	1.867	1.874	1.737	1.748	1.742	1.902	1.885	1.898
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.768	3.779	3.758	3.894	3.913	3.868	3.859	3.853	3.692	3.716	3.702
Ti	0.024	0.027	0.030	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.002
Fe2+	0.174	0.162	0.169	0.022	0.021	0.028	0.028	0.032	0.174	0.161	0.144
Mn	0.011	0.010	0.014	0.002	0.002	0.003	0.004	0.004	0.011	0.013	0.009
Mg	0.096	0.085	0.090	bd	bd	bd	bd	bd	0.005	0.006	0.006
Li*	0.211	0.242	0.270	0.271	0.232	0.208	0.208	0.202	0.580	0.526	0.648
Σ Octahedral	4.285	4.306	4.331	4.190	4.168	4.108	4.099	4.093	4.463	4.423	4.512
K	1.606	1.564	1.575	1.638	1.642	1.707	1.731	1.743	1.713	1.690	1.674
Ca	0.019	0.013	0.017	0.001	0.002	0.001	0.002	0.001	0.002	0.001	0.003
Na	0.074	0.080	0.075	0.018	0.010	0.147	0.159	0.155	0.107	0.118	0.102
Rb	bd	bd	bd	0.202	0.201	0.001	0.002	0.002	0.037	0.033	0.034
Cs	bd	bd	bd	bd	bd	bd	bd	bd	0.001	bd	bd
Σ x-site	1.699	1.657	1.667	1.860	1.854	1.857	1.894	1.901	1.860	1.843	1.814
F	0.422	0.467	0.507	0.507	0.451	0.417	0.417	0.409	0.905	0.841	0.985
OH*	3.578	3.533	3.493	3.493	3.549	3.583	3.583	3.591	3.095	3.159	3.015
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M26-A-1 Xl	M26-A-2 Xl	M26-B-1 Xl	M26-B-2 Xl	M26-B-3 Xl	M33-1 Xl	M33-2 Xl	M33-3 Xl	M33-4 Xl	M33-5 Xl	M33-6 Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.33	46.41	46.50	46.41	46.22	46.86	46.85	46.78	46.80	46.81	46.76
TiO_2	0.01	bd	bd	bd	bd	bd	0.01	0.01	bd	0.01	bd
Al_2O_3	37.65	37.44	37.33	37.50	37.42	36.70	36.69	36.78	36.45	36.61	36.44
FeO	0.65	0.67	0.11	0.09	0.09	0.75	0.69	0.61	0.43	0.34	0.35
MnO	0.21	0.18	0.04	0.05	0.04	0.11	0.10	0.09	0.19	0.22	0.15
MgO	0.01	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	0.02	0.03	0.01	bd	bd	0.01	0.02	0.01	0.03	0.04	0.04
Na_2O	0.63	0.60	0.54	0.50	0.52	0.46	0.42	0.38	0.55	0.56	0.56
K_2O	9.98	10.00	9.88	9.97	9.80	9.88	9.74	9.95	9.78	9.69	9.83
Rb_2O	0.18	0.18	0.18	0.18	0.17	1.23	1.40	1.22	1.45	1.50	1.46
Cs_2O	0.01	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.03
Li_2O*	0.92	1.21	0.92	1.05	0.90	0.65	0.65	0.80	0.90	1.00	0.78
F	1.89	2.33	1.89	2.09	1.87	1.46	1.46	1.71	1.87	2.02	1.67
H_2O*	3.71	3.51	3.68	3.59	3.67	3.88	3.88	3.76	3.68	3.62	3.77
O=F	0.80	0.98	0.80	0.88	0.79	0.61	0.61	0.72	0.79	0.85	0.70
Total	101.40	101.60	100.30	100.57	99.95	101.39	101.31	101.40	101.38	101.60	101.14

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M26-A-1 Xl	M26-A-2 Xl	M26-B-1 Xl	M26-B-2 Xl	M26-B-3 Xl	M33-1 Xl	M33-2 Xl	M33-3 Xl	M33-4 Xl	M33-5 Xl	M33-6 Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.036	6.034	6.094	6.069	6.077	6.145	6.149	6.129	6.141	6.126	6.151
^{IV}Al	1.964	1.966	1.906	1.931	1.923	1.855	1.851	1.871	1.859	1.874	1.849
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.817	3.771	3.860	3.848	3.875	3.816	3.823	3.808	3.779	3.774	3.800
Ti	0.001	bd	bd	bd	bd	bd	0.001	0.001	bd	0.001	bd
Fe2+	0.070	0.073	0.012	0.010	0.010	0.082	0.075	0.067	0.048	0.038	0.038
Mn	0.023	0.020	0.005	0.006	0.005	0.012	0.011	0.010	0.021	0.025	0.017
Mg	0.001	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	0.480	0.633	0.483	0.551	0.477	0.341	0.342	0.422	0.477	0.527	0.411
Σ Octahedral	4.392	4.497	4.360	4.415	4.367	4.252	4.252	4.309	4.324	4.363	4.266
K	1.659	1.659	1.652	1.662	1.643	1.653	1.631	1.662	1.637	1.618	1.650
Ca	0.003	0.004	0.001	bd	bd	0.002	0.003	0.002	0.005	0.006	0.005
Na	0.160	0.151	0.138	0.126	0.133	0.116	0.108	0.097	0.139	0.141	0.144
Rb	0.015	0.015	0.015	0.015	0.014	0.104	0.118	0.102	0.122	0.126	0.123
Cs	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002
Σ x-site	1.838	1.830	1.807	1.805	1.792	1.876	1.861	1.865	1.904	1.892	1.923
F	0.779	0.960	0.784	0.865	0.778	0.603	0.604	0.709	0.776	0.836	0.695
OH*	3.221	3.040	3.216	3.135	3.222	3.396	3.395	3.291	3.223	3.163	3.305
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M39-1	M39-2	M39-3	M40-1	M40-2	M40-3	M41-1	M41-2	M41-3	1-T-10	1-T -10a
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.54	46.55	46.48	45.89	46.01	45.88	45.60	45.70	45.67	46.75	46.50
TiO_2	0.01	0.01	0.01	0.02	0.02	0.01	0.02	0.02	0.02	bd	bd
Al_2O_3	35.93	35.88	35.88	36.00	35.98	35.90	37.43	37.51	37.44	37.90	37.30
FeO	2.21	2.30	2.34	1.67	1.71	1.81	1.46	1.44	1.50	1.20	1.29
MnO	0.13	0.14	0.13	0.14	0.16	0.14	0.08	0.09	0.11	0.02	0.08
MgO	0.02	0.03	0.02	0.01	0.01	0.03	0.01	0.02	0.01	bd	bd
CaO	0.02	0.02	0.02	0.03	0.03	0.03	0.02	0.02	0.03	bd	bd
Na_2O	0.56	0.61	0.61	0.48	0.51	0.56	0.56	0.49	0.53	0.65	0.51
K_2O	9.78	9.98	9.67	9.89	10.00	9.82	10.10	10.10	10.03	10.12	10.28
Rb_2O	0.01	0.01	0.02	0.02	0.02	0.02	0.10	0.09	0.11	0.20	0.17
Cs_2O	bd	bd	bd	bd	bd	bd	bd	0.01	bd	0.02	0.06
Li_2O*	0.58	0.55	0.62	0.78	0.70	0.71	0.84	0.78	0.67	0.31	0.23
F	1.33	1.29	1.41	1.68	1.55	1.56	1.77	1.67	1.49	0.83	0.67
H_2O*	3.91	3.93	3.87	3.71	3.78	3.76	3.72	3.78	3.85	4.22	4.25
O=F	0.56	0.54	0.59	0.71	0.65	0.66	0.75	0.70	0.63	0.35	0.28
Total	100.49	100.77	100.49	99.62	99.83	99.57	100.96	101.01	100.84	101.89	101.07

* calculated

n.a. = not analyzed; bd = below detection level

Li-musc. = lithian muscovite

Table 5 continued

Sample	M39-1	M39-2	M39-3	M40-1	M40-2	M40-3	M41-1	M41-2	M41-3	1-T-10	1-T -10a
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.147	6.143	6.140	6.105	6.114	6.110	5.992	5.999	6.008	6.074	6.101
^{IV}Al	1.853	1.857	1.860	1.895	1.886	1.890	2.008	2.001	1.992	1.926	1.899
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.739	3.721	3.726	3.750	3.748	3.745	3.788	3.803	3.812	3.879	3.869
Ti	0.001	0.001	0.001	0.002	0.002	0.001	0.002	0.002	0.002	bd	bd
Fe2+	0.244	0.254	0.259	0.186	0.190	0.202	0.160	0.158	0.165	0.130	0.142
Mn	0.015	0.016	0.014	0.016	0.017	0.015	0.009	0.010	0.012	0.002	0.009
Mg	0.004	0.006	0.005	0.002	0.002	0.006	0.002	0.003	0.002	bd	bd
Li*	0.306	0.293	0.330	0.417	0.377	0.381	0.444	0.410	0.353	0.161	0.122
Σ Octahedral	4.310	4.291	4.335	4.372	4.336	4.350	4.405	4.387	4.346	4.172	4.141
K	1.647	1.680	1.629	1.679	1.695	1.669	1.693	1.691	1.683	1.677	1.720
Ca	0.003	0.003	0.003	0.004	0.005	0.004	0.003	0.003	0.005	bd	bd
Na	0.144	0.156	0.157	0.125	0.132	0.145	0.143	0.124	0.136	0.165	0.131
Rb	0.001	0.001	0.002	0.001	0.002	0.002	0.008	0.008	0.009	0.017	0.014
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	0.001	0.003
Σ x-site	1.795	1.841	1.790	1.809	1.833	1.821	1.847	1.827	1.833	1.860	1.869
F	0.557	0.539	0.590	0.705	0.652	0.658	0.736	0.694	0.619	0.342	0.277
OH*	3.443	3.461	3.410	3.295	3.348	3.342	3.264	3.306	3.381	3.661	3.723
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.003	4.000

* calculated

n.a. = not analyzed; bd = below detection level

Li-musc. = lithian muscovite

Table 5 continued

Sample	1-T-8	1-T -8a	M43-1	M43-2	M43-3	2T-G-1a	2T-G-1b	2T-G-1c	2T-T-6a	2T-T-6b	2T-T-6c
Mica type	Muscovite	Muscovite	Li-Musc.	Li-Musc.	Li-Musc.	Muscovite	Muscovite	Muscovite	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.02	46.78	45.79	45.85	45.83	46.24	46.38	46.30	45.49	46.78	46.44
TiO_2	0.02	bd	0.01	bd	bd	bd	bd	0.09	bd	0.05	0.09
Al_2O_3	37.81	37.74	37.43	37.39	37.41	37.87	37.96	37.80	37.56	37.35	36.11
FeO	0.95	0.96	1.13	1.09	1.14	0.51	0.54	0.84	1.39	1.37	1.25
MnO	0.05	bd	0.09	0.09	0.08	0.15	0.05	0.05	0.01	0.11	0.05
MgO	bd	bd	0.01	0.01	0.01	bd	bd	bd	bd	bd	bd
CaO	bd	0.03	0.02	0.03	0.03	0.02	0.06	bd	bd	0.02	0.04
Na_2O	0.61	0.55	0.60	0.60	0.61	0.51	0.54	0.61	0.65	0.72	0.73
K_2O	10.59	10.54	10.12	10.09	10.11	10.31	10.13	10.52	10.26	9.98	10.40
Rb_2O	bd	0.09	0.16	0.21	0.20	0.12	bd	0.06	0.20	0.10	0.14
Cs_2O	0.02	bd	0.01	0.01	0.01	bd	0.13	0.05	bd	bd	bd
Li_2O*	0.03	0.01	1.05	1.07	1.05	0.08	0.14	0.06	0.59	0.31	0.29
F	0.13	0.07	2.09	2.12	2.09	0.30	0.47	0.24	1.36	0.83	0.80
H_2O*	4.49	4.56	3.59	3.57	3.59	4.42	4.35	4.46	3.91	4.20	4.14
O=F	0.06	0.03	0.88	0.89	0.88	0.13	0.20	0.10	0.57	0.35	0.34
Total	100.67	101.29	101.22	101.24	101.28	100.41	100.55	100.98	100.86	101.49	100.15

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	1-T-8	1-T -8a	M43-1	M43-2	M43-3	2T-G-1a	2T-G-1b	2T-G-1c	2T-T-6a	2T-T-6b	2T-T-6c
Mica type	Muscovite	Muscovite	Li-Musc.	Li-Musc.	Li-Musc.	Muscovite	Muscovite	Muscovite	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.057	6.111	5.995	6.001	5.999	6.081	6.084	6.072	5.993	6.102	6.157
^{IV}Al	1.943	1.889	2.005	1.999	2.001	1.919	1.916	1.928	2.007	1.898	1.843
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.922	3.921	3.772	3.770	3.770	3.951	3.952	3.915	3.826	3.844	3.798
Ti	0.002	bd	0.001	bd	bd	bd	bd	0.009	bd	0.005	0.009
Fe2+	0.105	0.105	0.124	0.120	0.125	0.056	0.059	0.092	0.153	0.149	0.139
Mn	0.005	bd	0.010	0.010	0.009	0.017	0.005	0.005	0.002	0.012	0.005
Mg	bd	bd	0.002	0.003	0.002	bd	bd	bd	bd	bd	bd
Li*	0.015	0.006	0.551	0.561	0.551	0.043	0.076	0.031	0.312	0.162	0.157
Σ Octahedral	4.048	4.032	4.460	4.464	4.457	4.067	4.093	4.051	4.292	4.173	4.108
K	1.777	1.756	1.691	1.685	1.688	1.729	1.696	1.759	1.725	1.661	1.758
Ca	bd	0.004	0.003	0.004	0.004	0.003	0.008	bd	bd	0.003	0.005
Na	0.156	0.139	0.152	0.151	0.155	0.131	0.137	0.155	0.167	0.183	0.187
Rb	bd	0.008	0.013	0.018	0.017	0.010	bd	0.005	0.017	0.008	0.012
Cs	0.001	bd	0.001	0.001	0.001	bd	0.007	0.003	bd	bd	bd
Σ x-site	1.934	1.906	1.860	1.858	1.864	1.873	1.847	1.923	1.909	1.855	1.962
F	0.056	0.028	0.866	0.878	0.866	0.126	0.195	0.098	0.565	0.344	0.337
OH*	3.945	3.972	3.134	3.122	3.134	3.875	3.805	3.903	3.435	3.659	3.664
Σ w-site	4.001	4.000	4.000	4.000	4.000	4.001	4.000	4.001	4.000	4.002	4.001

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	2T-T-2	M44-2	M44-3	M45-1	M45-2	M45-3	M45-1 CS	M45-2 CS	M45-3 CS	M46-1	M46-2
Mica type	Muscovite	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.28	45.95	45.89	45.71	45.69	45.71	45.68	45.62	45.63	46.09	45.89
TiO_2	bd	bd	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01
Al_2O_3	37.44	37.22	37.31	37.36	37.22	37.45	37.53	37.49	37.64	37.53	37.61
FeO	1.09	0.21	0.18	1.01	1.10	1.03	1.11	1.01	0.98	0.89	0.90
MnO	0.20	0.13	0.12	0.16	0.18	0.18	0.18	0.21	0.19	0.13	0.13
MgO	bd	bd	bd	0.01	bd	0.01	0.01	0.01	0.02	bd	0.01
CaO	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Na_2O	0.47	0.57	0.54	0.61	0.63	0.61	0.64	0.56	0.60	0.56	0.51
K_2O	10.89	10.10	9.98	9.77	9.67	9.50	9.77	9.65	9.78	9.89	10.06
Rb_2O	bd	0.11	0.10	0.08	0.09	0.10	0.12	0.14	0.16	0.12	0.11
Cs_2O	bd	0.01	bd	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02
Li_2O*	0.01	1.13	1.11	0.92	1.05	1.05	1.13	1.05	0.98	0.98	1.06
F	0.07	2.22	2.19	1.89	2.09	2.10	2.22	2.09	1.99	1.99	2.10
H_2O*	4.53	3.51	3.52	3.66	3.57	3.57	3.53	3.57	3.63	3.64	3.59
O=F	0.03	0.94	0.92	0.80	0.88	0.88	0.93	0.88	0.84	0.84	0.89
Total	100.97	100.24	100.06	100.42	100.46	100.48	101.04	100.58	100.82	101.03	101.11

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	2T-T-2	M44-2	M44-3	M45-1	M45-2	M45-3	M45-1 CS	M45-2 CS	M45-3 CS	M46-1	M46-2
Mica type	Muscovite	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.087	6.042	6.039	6.015	6.012	6.004	5.981	5.994	5.986	6.026	6.001
^{IV}Al	1.913	1.958	1.961	1.985	1.988	1.996	2.019	2.006	2.014	1.974	1.999
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.890	3.810	3.825	3.808	3.783	3.801	3.773	3.799	3.806	3.808	3.797
Ti	bd	bd	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Fe2+	0.120	0.023	0.020	0.111	0.121	0.114	0.122	0.111	0.108	0.097	0.099
Mn	0.022	0.015	0.014	0.017	0.020	0.020	0.020	0.023	0.021	0.015	0.014
Mg	bd	bd	bd	0.002	bd	0.002	0.002	0.003	0.003	bd	0.002
Li*	0.006	0.600	0.589	0.485	0.554	0.556	0.597	0.553	0.517	0.516	0.555
Σ Octahedral	4.038	4.448	4.448	4.425	4.480	4.493	4.514	4.490	4.456	4.437	4.468
K	1.828	1.694	1.675	1.640	1.623	1.592	1.633	1.617	1.637	1.649	1.677
Ca	0.001	0.002	0.003	0.003	0.002	0.003	0.003	0.003	0.003	0.002	0.002
Na	0.120	0.144	0.139	0.156	0.161	0.156	0.163	0.142	0.153	0.141	0.129
Rb	bd	0.009	0.008	0.007	0.008	0.009	0.010	0.012	0.013	0.010	0.009
Cs	bd	0.001	bd	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Σ x-site	1.949	1.850	1.825	1.806	1.795	1.760	1.810	1.775	1.807	1.803	1.818
F	0.028	0.924	0.912	0.787	0.870	0.872	0.919	0.869	0.826	0.823	0.870
OH*	3.974	3.076	3.088	3.213	3.130	3.128	3.081	3.131	3.174	3.177	3.130
Σ w-site	4.002	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M46-3	M46-1 CS	M46-2 CS	M46-3 CS	M47-1	M47-2	M47-3	M48-1	M48-2	M48-3	M49-1
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.02	45.86	45.89	45.78	46.56	46.73	46.53	46.44	46.51	46.72	46.00
TiO_2	0.01	0.01	0.01	0.01	0.01	0.01	0.01	bd	0.01	0.01	0.01
Al_2O_3	37.58	37.45	37.55	37.49	37.54	37.34	37.55	37.62	37.67	37.58	37.50
FeO	0.87	0.98	1.09	0.98	0.68	0.63	0.70	0.56	0.51	0.49	0.56
MnO	0.11	0.09	0.11	0.13	0.16	0.17	0.15	0.13	0.17	0.15	0.11
MgO	bd	bd	bd	bd	0.01	bd	bd	bd	bd	bd	0.01
CaO	0.02	0.02	0.02	0.02	0.01	0.01	0.02	0.01	0.02	0.02	0.02
Na_2O	0.56	0.61	0.58	0.57	0.60	0.60	0.65	0.56	0.56	0.52	0.48
K_2O	10.10	9.92	9.82	9.92	9.67	9.90	9.56	10.10	10.09	9.88	10.02
Rb_2O	0.11	0.12	0.11	0.12	0.16	0.14	0.15	0.13	0.14	0.13	0.16
Cs_2O	0.02	0.02	0.02	0.02	0.02	0.03	0.02	0.02	0.02	0.01	0.02
Li_2O*	1.05	0.92	0.98	0.90	1.07	1.05	1.03	0.97	0.97	0.99	0.92
F	2.10	1.89	1.99	1.87	2.12	2.09	2.07	1.98	1.97	2.00	1.89
H_2O*	3.60	3.67	3.64	3.68	3.61	3.62	3.63	3.67	3.68	3.67	3.67
O=F	0.88	0.80	0.84	0.79	0.89	0.88	0.87	0.83	0.83	0.84	0.80
Total	101.26	100.76	100.97	100.69	101.30	101.44	101.18	101.35	101.48	101.32	100.56

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M46-3	M46-1 CS	M46-2 CS	M46-3 CS	M47-1	M47-2	M47-3	M48-1	M48-2	M48-3	M49-1
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.010	6.018	6.008	6.011	6.055	6.076	6.056	6.047	6.048	6.072	6.036
^{IV}Al	1.990	1.982	1.992	1.989	1.945	1.924	1.944	1.953	1.952	1.928	1.964
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.794	3.808	3.802	3.814	3.810	3.796	3.816	3.820	3.821	3.828	3.835
Ti	0.001	0.001	0.001	0.001	0.001	0.001	0.001	bd	0.001	0.001	0.001
Fe2+	0.095	0.108	0.119	0.107	0.073	0.069	0.076	0.060	0.055	0.053	0.061
Mn	0.012	0.010	0.013	0.015	0.017	0.019	0.016	0.015	0.019	0.016	0.012
Mg	bd	bd	bd	bd	0.002	bd	bd	bd	bd	bd	0.002
Li*	0.553	0.483	0.516	0.477	0.557	0.548	0.539	0.510	0.505	0.516	0.483
Σ Octahedral	4.454	4.411	4.451	4.414	4.459	4.433	4.448	4.405	4.400	4.414	4.395
K	1.682	1.661	1.640	1.662	1.604	1.642	1.586	1.677	1.674	1.638	1.677
Ca	0.002	0.003	0.002	0.003	0.002	0.002	0.002	0.002	0.003	0.003	0.002
Na	0.143	0.156	0.147	0.144	0.151	0.150	0.165	0.140	0.142	0.132	0.123
Rb	0.010	0.010	0.009	0.010	0.013	0.012	0.012	0.011	0.012	0.011	0.013
Cs	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Σ x-site	1.837	1.831	1.800	1.820	1.771	1.807	1.767	1.831	1.831	1.784	1.817
F	0.867	0.785	0.824	0.777	0.871	0.861	0.850	0.816	0.809	0.822	0.785
OH*	3.133	3.215	3.176	3.223	3.129	3.139	3.150	3.184	3.191	3.178	3.215
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M49-2	M49-3	M50-1	M50-2	M50-3	M52-4-Perp	M52-5-Perp	M52-6-Perp	M52-9-Par	M52-10-Par	M53-1
Mica type	Li-Musc.	Li-Musc.	Muscovite	Muscovite	Muscovite	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.52	46.33	46.96	46.95	46.96	46.68	46.60	46.60	46.46	46.39	46.36
TiO_2	0.01	0.01	0.01	bd	bd	bd	bd	bd	bd	bd	bd
Al_2O_3	37.63	37.48	36.41	36.56	36.50	37.29	37.40	37.38	37.44	37.46	36.96
FeO	0.61	0.58	0.06	0.06	0.05	0.03	0.03	0.03	0.04	0.03	bd
MnO	0.11	0.11	0.01	0.01	0.01	0.06	0.05	0.04	0.03	0.02	0.01
MgO	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	0.01	0.02	0.02	0.02	0.02	bd	bd	bd	bd	bd	bd
Na_2O	0.53	0.52	0.68	0.71	0.71	0.67	0.65	0.60	0.62	0.60	0.56
K_2O	10.05	10.12	10.01	10.10	10.04	9.78	9.91	9.78	9.67	9.44	9.71
Rb_2O	0.15	0.16	0.66	0.70	0.68	0.76	0.76	0.70	0.62	0.57	0.06
Cs_2O	0.02	0.02	bd	0.01	bd	0.07	0.06	0.06	0.06	0.06	0.01
Li_2O*	0.93	1.05	0.14	0.11	0.13	1.52	1.54	1.45	1.37	1.29	0.52
F	1.91	2.10	0.45	0.38	0.44	2.77	2.80	2.67	2.56	2.45	1.23
H_2O*	3.70	3.60	4.31	4.35	4.32	3.31	3.30	3.35	3.39	3.43	3.94
O=F	0.80	0.88	0.19	0.16	0.19	1.17	1.18	1.12	1.08	1.03	0.52
Total	101.38	101.20	99.51	99.79	99.69	101.77	101.92	101.53	101.17	100.70	98.82

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M49-2	M49-3	M50-1	M50-2	M50-3	M52-4-Perp	M52-5-Perp	M52-6-Perp	M52-9-Par	M52-10-Par	M53-1
Mica type	Li-Musc.	Li-Musc.	Muscovite	Muscovite	Muscovite	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.055	6.043	6.227	6.216	6.220	6.056	6.041	6.055	6.052	6.060	6.149
^{IV}Al	1.945	1.957	1.773	1.784	1.780	1.944	1.959	1.945	1.948	1.940	1.851
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.827	3.806	3.917	3.920	3.918	3.759	3.756	3.780	3.800	3.826	3.927
Ti	0.001	0.001	0.001	bd	bd	bd	bd	bd	bd	bd	bd
Fe2+	0.067	0.063	0.007	0.006	0.006	0.003	0.003	0.003	0.005	0.004	bd
Mn	0.012	0.012	0.001	0.001	0.001	0.006	0.005	0.005	0.003	0.002	0.001
Mg	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	0.486	0.551	0.074	0.057	0.071	0.794	0.804	0.757	0.715	0.676	0.276
Σ Octahedral	4.392	4.432	3.999	3.985	3.996	4.562	4.568	4.545	4.522	4.508	4.204
K	1.668	1.684	1.694	1.706	1.697	1.619	1.639	1.621	1.606	1.574	1.643
Ca	0.002	0.002	0.003	0.003	0.002	bd	bd	bd	bd	bd	bd
Na	0.135	0.132	0.174	0.181	0.183	0.169	0.163	0.150	0.157	0.151	0.143
Rb	0.012	0.013	0.056	0.060	0.058	0.064	0.064	0.058	0.052	0.048	0.005
Cs	0.001	0.001	bd	0.001	bd	0.004	0.003	0.004	0.003	0.003	0.001
Σ x-site	1.817	1.833	1.927	1.950	1.940	1.855	1.870	1.832	1.819	1.775	1.791
F	0.787	0.865	0.190	0.158	0.186	1.138	1.148	1.098	1.052	1.010	0.516
OH*	3.213	3.135	3.810	3.842	3.814	2.862	2.852	2.902	2.948	2.990	3.484
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M53-2	M57-1 Xl	M57-2 Xl	M57-3 Xl	M64-C-1 Xl	M64-C-2 Xl	M64-RP-1 Xl	M64-RP-2 Xl	M64-RP-3 Xl	M64 RB-1 Xl	M64-RB-2 Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Musc.	Musc.	Musc.	Musc.	Musc.	Musc.	Musc.
Wt. %											
SiO_2	46.40	46.56	46.55	46.59	46.09	46.10	46.33	46.41	46.50	46.60	46.48
TiO_2	bd	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01
Al_2O_3	36.85	35.46	35.62	35.56	33.52	33.48	33.70	33.75	33.68	33.56	33.62
FeO	0.01	0.09	0.10	0.07	4.54	4.63	3.42	3.36	3.51	3.65	3.51
MnO	0.01	0.04	0.05	0.05	0.44	0.40	0.75	0.79	0.73	0.69	0.78
MgO	bd	bd	bd	bd	bd	bd	0.01	0.03	0.03	0.02	0.02
CaO	bd	0.01	bd	bd	0.01	0.02	0.01	0.01	0.01	0.02	0.01
Na_2O	0.61	0.51	0.58	0.61	0.11	0.09	0.34	0.43	0.49	0.66	0.62
K_2O	9.57	10.00	9.82	9.92	9.92	10.01	9.77	9.67	9.60	9.46	9.55
Rb_2O	0.06	0.04	0.04	0.04	0.34	0.29	0.31	0.27	0.26	0.22	0.25
Cs_2O	0.01	0.01	0.01	0.02	bd	bd	bd	0.01	0.01	0.01	0.01
Li_2O*	0.57	0.65	0.61	0.71	0.09	0.07	0.06	0.07	0.06	0.06	0.06
F	1.32	1.46	1.39	1.57	0.32	0.28	0.23	0.26	0.23	0.23	0.24
H_2O*	3.89	3.78	3.82	3.74	4.27	4.29	4.32	4.31	4.33	4.34	4.33
O=F	0.56	0.61	0.59	0.66	0.14	0.12	0.10	0.11	0.10	0.10	0.10
Total	98.74	98.01	98.01	98.24	99.54	99.57	99.17	99.28	99.36	99.40	99.41

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite, Musc. = muscovite

Table 5 continued

Sample	M53-2	M57-1 Xl	M57-2 Xl	M57-3 Xl	M64-C-1 Xl	M64-C-2 Xl	M64-RP-1 Xl	M64-RP-2 Xl	M64-RP-3 Xl	M64 RB-1 Xl	M64-RB-2 Xl
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Musc.	Musc.	Musc.	Musc.	Musc.	Musc.	Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.157	6.241	6.234	6.230	6.245	6.246	6.271	6.270	6.277	6.287	6.275
^{IV}Al	1.843	1.759	1.766	1.770	1.755	1.754	1.729	1.730	1.723	1.713	1.725
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.918	3.842	3.856	3.833	3.598	3.593	3.646	3.644	3.636	3.623	3.624
Ti	bd	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001
Fe2+	0.001	0.010	0.011	0.008	0.514	0.525	0.387	0.379	0.396	0.412	0.396
Mn	0.001	0.005	0.005	0.006	0.051	0.046	0.086	0.091	0.084	0.078	0.089
Mg	bd	bd	bd	bd	bd	bd	0.002	0.007	0.005	0.003	0.005
Li*	0.303	0.349	0.329	0.383	0.048	0.040	0.031	0.036	0.031	0.030	0.033
Σ Octahedral	4.223	4.207	4.203	4.232	4.212	4.205	4.153	4.157	4.154	4.147	4.149
K	1.619	1.710	1.678	1.692	1.714	1.730	1.687	1.667	1.653	1.627	1.644
Ca	bd	0.001	bd	bd	0.002	0.003	0.001	0.001	0.002	0.003	0.002
Na	0.157	0.133	0.149	0.159	0.029	0.023	0.090	0.113	0.127	0.171	0.163
Rb	0.005	0.004	0.003	0.004	0.030	0.025	0.027	0.024	0.022	0.019	0.022
Cs	0.001	0.001	0.001	0.001	bd	bd	bd	0.001	0.001	0.001	0.001
Σ x-site	1.782	1.849	1.831	1.855	1.775	1.783	1.806	1.805	1.805	1.822	1.831
F	0.554	0.617	0.590	0.662	0.138	0.121	0.099	0.112	0.100	0.097	0.104
OH*	3.446	3.383	3.410	3.338	3.862	3.879	3.901	3.888	3.900	3.903	3.896
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite, Musc. = muscovite

Table 5 continued

Sample	M64-RB-3 Xl	M2-1C Xl	M2-2C Xl	M2-3C Xl	M2-4C Rim	M4-1C Xl	M4-2C Xl	M-32-1C Xl	M-32-2C Xl	M2-1C Xl	M2-2C Xl
Mica type	Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	46.52	45.88	45.61	45.79	46.75	46.89	46.55	45.44	45.49	45.62	45.71
TiO_2	0.01	0.02	0.06	0.03	0.02	0.01	0.02	0.01	0.01	0.03	0.02
Al_2O_3	33.71	36.98	36.81	36.89	36.39	37.42	37.51	36.55	37.02	37.55	36.92
FeO	3.45	1.32	1.45	1.71	1.32	0.96	0.98	1.01	0.93	1.14	1.28
MnO	0.72	0.33	0.21	0.16	0.12	0.11	0.09	0.17	0.17	0.12	0.12
MgO	0.02	bd	0.06	0.02	bd	bd	bd	bd	bd	bd	bd
CaO	0.01	0.04	bd	0.01	bd	0.05	0.01	0.01	0.01	0.06	0.04
Na_2O	0.72	0.32	0.27	0.36	0.31	0.57	0.60	0.65	0.60	0.56	0.60
K_2O	9.51	9.76	9.78	9.55	9.68	9.88	9.93	9.90	9.77	9.57	9.54
Rb_2O	0.23	1.56	1.39	1.45	0.63	0.35	0.41	0.51	0.55	0.51	0.50
Cs_2O	bd	0.07	0.04	0.06	0.07	bd	bd	0.07	0.08	0.10	0.09
Li_2O*	0.06	0.34	0.34	0.38	0.83	0.67	0.64	0.51	0.55	0.39	0.44
F	0.24	0.89	0.90	0.97	1.76	1.49	1.45	1.21	1.28	0.99	1.09
H_2O*	4.33	4.11	4.08	4.07	3.73	3.90	3.91	3.91	3.90	4.06	4.00
O=F	0.10	0.37	0.38	0.41	0.74	0.63	0.61	0.51	0.54	0.42	0.46
Total	99.44	101.23	100.63	101.01	100.88	101.67	101.50	99.44	99.82	100.28	99.91

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite; Musc. = muscovite

Table 5 continued

Sample	M64-RB-3 Xl	M2-1C Xl	M2-2C Xl	M2-3C Xl	M2-4C Rim	M4-1C Xl	M4-2C Xl	M-32-1C Xl	M-32-2C Xl	M2-1C Xl	M2-2C Xl
Mica type	Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.274	6.070	6.063	6.065	6.143	6.096	6.071	6.072	6.048	6.032	6.070
^{IV}Al	1.726	1.930	1.937	1.935	1.857	1.904	1.929	1.928	1.952	1.968	1.930
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.631	3.834	3.830	3.823	3.778	3.831	3.836	3.827	3.848	3.883	3.848
Ti	0.001	0.001	0.006	0.003	0.002	0.001	0.002	0.001	0.001	0.003	0.002
Fe2+	0.389	0.146	0.162	0.190	0.145	0.104	0.107	0.112	0.104	0.126	0.142
Mn	0.083	0.037	0.024	0.017	0.013	0.012	0.010	0.019	0.019	0.013	0.014
Mg	0.004	bd	0.011	0.004	bd	bd	bd	bd	bd	bd	bd
Li*	0.032	0.179	0.184	0.200	0.440	0.350	0.337	0.272	0.292	0.208	0.236
Σ Octahedral	4.139	4.198	4.216	4.237	4.378	4.298	4.292	4.232	4.265	4.232	4.242
K	1.636	1.647	1.658	1.613	1.622	1.639	1.653	1.687	1.657	1.615	1.616
Ca	0.001	0.005	bd	0.001	bd	0.008	0.001	0.001	0.002	0.008	0.006
Na	0.189	0.083	0.068	0.091	0.079	0.143	0.152	0.168	0.154	0.143	0.154
Rb	0.020	0.133	0.119	0.123	0.053	0.029	0.034	0.044	0.047	0.044	0.042
Cs	bd	0.004	0.002	0.003	0.004	bd	bd	0.004	0.004	0.006	0.005
Σ x-site	1.847	1.871	1.848	1.831	1.758	1.818	1.841	1.905	1.864	1.814	1.824
F	0.101	0.371	0.380	0.405	0.732	0.614	0.596	0.511	0.539	0.416	0.458
OH*	3.899	3.629	3.620	3.595	3.268	3.386	3.404	3.489	3.461	3.584	3.542
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite; Musc. = muscovite

Table 5 continued

Sample	M4-1C Xl	M4-2C Xl	M27-1C Xl	M27-2C Xl	M27-E-1-1	M27-E-1-2	M27-E-2-1	M27-E-2-2	M27-E-3-1	M27-E-3-2	M27-E-4-1
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Wt. %											
SiO_2	45.90	45.70	45.93	45.93	45.28	45.34	45.41	45.39	45.32	45.28	45.30
TiO_2	bd	bd	0.02	0.03	0.08	0.07	bd	bd	bd	bd	bd
Al_2O_3	36.52	36.90	35.88	36.00	36.33	36.32	37.19	37.22	37.20	37.41	37.09
FeO	0.95	0.89	1.17	0.98	1.14	0.98	0.93	1.22	0.75	0.82	1.09
MnO	0.05	0.09	0.11	0.15	0.33	0.34	0.10	0.12	0.11	0.11	0.14
MgO	0.01	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	0.04	0.02	bd	bd	bd	0.01	bd	bd	0.01	bd	bd
Na_2O	0.44	0.41	0.56	0.58	0.31	0.34	0.66	0.57	0.66	0.62	0.67
K_2O	9.70	9.69	9.89	10.01	10.14	9.88	10.05	10.03	10.09	10.11	10.10
Rb_2O	0.35	0.38	0.51	0.53	0.70	0.71	0.43	0.44	0.37	0.34	0.46
Cs_2O	bd	bd	0.07	0.06	0.30	0.29	0.08	0.08	0.08	0.06	0.14
Li_2O*	0.56	0.63	0.92	0.93	0.99	1.06	0.47	0.48	0.40	0.40	0.92
F	1.31	1.43	1.89	1.91	2.00	2.11	1.14	1.17	1.01	1.01	1.89
H_2O*	3.88	3.83	3.61	3.60	3.55	3.50	3.97	3.97	4.02	4.03	3.64
O=F	0.55	0.60	0.80	0.80	0.84	0.89	0.48	0.49	0.42	0.43	0.80
Total	99.16	99.38	99.76	99.91	100.31	100.06	99.95	100.19	99.59	99.78	100.65

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M4-1C Xl	M4-2C Xl	M27-1C Xl	M27-2C Xl	M27-E-1-1	M27-E-1-2	M27-E-2-1	M27-E-2-2	M27-E-3-1	M27-E-3-2	M27-E-4-1
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Li-Musc.
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.115	6.077	6.114	6.106	6.030	6.040	6.034	6.024	6.038	6.021	5.992
^{IV}Al	1.885	1.923	1.886	1.894	1.970	1.960	1.966	1.976	1.962	1.979	2.008
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.851	3.859	3.743	3.747	3.733	3.741	3.858	3.845	3.878	3.883	3.774
Ti	bd	bd	0.002	0.003	0.008	0.007	bd	bd	bd	bd	bd
Fe2+	0.105	0.099	0.130	0.109	0.127	0.109	0.104	0.135	0.084	0.091	0.121
Mn	0.006	0.010	0.013	0.016	0.038	0.039	0.011	0.014	0.013	0.012	0.016
Mg	0.002	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	0.302	0.339	0.490	0.496	0.529	0.567	0.251	0.257	0.213	0.214	0.487
Σ Octahedral	4.266	4.308	4.378	4.372	4.435	4.463	4.224	4.251	4.188	4.201	4.399
K	1.649	1.643	1.680	1.697	1.723	1.679	1.702	1.697	1.715	1.715	1.704
Ca	0.005	0.003	bd	bd	bd	0.001	bd	bd	0.001	bd	bd
Na	0.115	0.106	0.143	0.148	0.081	0.088	0.169	0.146	0.169	0.161	0.172
Rb	0.030	0.033	0.044	0.046	0.059	0.061	0.037	0.038	0.031	0.029	0.039
Cs	bd	bd	0.004	0.004	0.017	0.016	0.004	0.005	0.004	0.004	0.008
Σ x-site	1.799	1.785	1.871	1.894	1.880	1.845	1.912	1.886	1.921	1.908	1.923
F	0.552	0.603	0.796	0.803	0.844	0.889	0.480	0.489	0.425	0.425	0.791
OH*	3.448	3.397	3.204	3.197	3.156	3.111	3.520	3.511	3.575	3.575	3.209
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M27-E-4-2	M27-E-6-1	M27-E-6-2	M32-E-12-1	M32-E-12-2	M32-E-12-3	M32-E-12-4-a	M32-E-12-4-b	M32-E-12-4-c	M62-1	M62-2
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Musc.	Musc.	Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Mixed form	Mixed form
Wt. %											
SiO_2	45.27	45.13	45.46	45.11	45.23	45.44	45.48	45.61	45.55	50.45	50.73
TiO_2	bd	bd	0.01	0.01	0.01	0.01	0.02	0.01	0.01	bd	bd
Al_2O_3	37.38	36.28	36.73	37.32	36.85	37.00	37.16	37.10	37.21	28.77	28.56
FeO	0.93	1.68	1.57	1.35	1.51	1.23	1.54	1.49	1.50	0.02	0.03
MnO	0.18	0.78	0.70	0.08	0.08	0.09	0.08	0.08	0.09	0.19	0.23
MgO	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	bd	0.01	bd	bd	0.01	0.01	0.01	0.01	bd	0.01	bd
Na_2O	0.63	0.41	0.37	0.45	0.51	0.55	0.53	0.49	0.51	0.33	0.38
K_2O	9.98	9.57	9.99	9.99	10.05	9.78	10.15	10.09	10.09	9.73	9.69
Rb_2O	0.45	0.87	0.79	0.31	0.30	0.32	0.31	0.33	0.30	0.81	0.78
Cs_2O	0.15	0.13	0.14	0.01	0.02	0.02	0.01	0.01	0.01	0.10	0.07
Li_2O*	0.95	0.65	0.69	0.16	0.18	0.16	1.06	0.92	0.93	3.33	3.45
F	1.94	1.45	1.52	0.51	0.56	0.51	2.11	1.90	1.91	5.01	5.15
H_2O*	3.62	3.80	3.81	4.24	4.21	4.24	3.56	3.65	3.65	2.14	2.08
O=F	0.82	0.61	0.64	0.22	0.23	0.22	0.89	0.80	0.80	2.11	2.17
Total	100.67	100.15	101.12	99.34	99.29	99.17	101.14	100.91	100.96	98.79	98.98

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite; Musc. = muscovite

Table 5 continued

Sample	M27-E-4-2	M27-E-6-1	M27-E-6-2	M32-E-12-1	M32-E-12-2	M32-E-12-3	M32-E-12-4-a	M32-E-12-4-b	M32-E-12-4-c	M62-1	M62-2
Mica type	Li-Musc.	Li-Musc.	Li-Musc.	Musc.	Musc.	Musc.	Li-Musc.	Li-Musc.	Li-Musc.	Mixed form	Mixed form
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	5.978	6.033	6.019	6.028	6.055	6.072	5.982	6.008	5.996	6.707	6.726
^{IV}Al	2.022	1.967	1.981	1.972	1.945	1.928	2.018	1.992	2.004	1.293	1.274
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.794	3.748	3.751	3.905	3.869	3.899	3.741	3.767	3.769	3.216	3.189
Ti	bd	bd	0.001	0.001	0.001	0.001	0.002	0.001	0.001	bd	bd
Fe2+	0.103	0.187	0.173	0.151	0.169	0.138	0.170	0.164	0.165	0.002	0.004
Mn	0.020	0.089	0.078	0.009	0.009	0.011	0.009	0.009	0.010	0.022	0.025
Mg	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	0.504	0.347	0.366	0.087	0.098	0.087	0.561	0.489	0.491	1.781	1.841
Σ Octahedral	4.421	4.372	4.369	4.152	4.146	4.136	4.483	4.430	4.437	5.021	5.059
K	1.681	1.631	1.688	1.703	1.717	1.667	1.703	1.695	1.694	1.651	1.638
Ca	bd	0.002	bd	bd	0.002	0.001	0.001	0.001	bd	0.001	bd
Na	0.162	0.107	0.094	0.117	0.133	0.144	0.136	0.124	0.131	0.086	0.097
Rb	0.038	0.075	0.067	0.027	0.026	0.028	0.026	0.028	0.025	0.069	0.067
Cs	0.008	0.008	0.008	0.001	0.001	0.001	0.001	0.001	0.001	0.006	0.004
Σ x-site	1.890	1.822	1.857	1.848	1.878	1.841	1.867	1.849	1.850	1.813	1.806
F	0.811	0.615	0.637	0.216	0.236	0.216	0.878	0.792	0.795	2.105	2.157
OH*	3.189	3.385	3.363	3.784	3.764	3.784	3.122	3.208	3.205	1.896	1.844
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.001

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite; Musc. = muscovite

Table 5 continued

Sample	M62-3	M4-C-3 Xl	M36-C-1 Xl	M36-C-2 Xl	M27-E-1-3	M27-E-1-4	M27-E-2-3	M27-E-2-4	M32-E-12-5a	M32-E-12-5b	M32-E-12-5c
Mica type	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form
Wt. %											
SiO_2	50.96	50.11	48.57	48.41	50.11	50.01	50.12	50.11	51.01	51.23	51.22
TiO_2	0.01	bd	0.04	0.03	bd	bd	bd	bd	bd	bd	bd
Al_2O_3	28.34	29.46	30.73	30.68	30.12	29.51	29.01	28.83	27.78	27.87	27.88
FeO	0.04	0.54	0.81	0.67	0.51	0.49	0.73	0.78	0.31	0.28	0.30
MnO	0.20	0.10	0.31	0.33	0.31	0.35	0.21	0.24	0.33	0.34	0.35
MgO	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	bd	bd	bd	bd	0.01	0.01	bd	bd	bd	bd	bd
Na_2O	0.40	0.49	0.40	0.38	0.35	0.37	0.30	0.30	0.66	0.63	0.62
K_2O	9.58	10.04	9.89	9.88	9.79	9.92	9.98	10.02	10.09	10.10	10.09
Rb_2O	0.78	0.88	0.95	0.97	0.68	0.71	0.52	0.54	0.30	0.33	0.30
Cs_2O	0.07	0.10	0.17	0.16	0.40	0.41	0.47	0.45	0.02	0.02	0.02
Li_2O*	3.32	3.62	2.87	3.00	3.33	3.70	3.52	3.33	3.41	3.52	3.41
F	5.00	5.33	4.48	4.62	5.00	5.42	5.22	5.01	5.09	5.22	5.09
H_2O*	2.15	2.03	2.38	2.31	2.20	1.99	2.06	2.14	2.10	2.06	2.12
O=F	2.10	2.25	1.88	1.95	2.11	2.28	2.20	2.11	2.14	2.20	2.14
Total	98.72	100.46	99.71	99.49	100.71	100.62	99.95	99.66	98.95	99.41	99.26

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M62-3	M4-C-3 Xl	M36-C-1 Xl	M36-C-2 Xl	M27-E-1-3	M27-E-1-4	M27-E-2-3	M27-E-2-4	M32-E-12-5a	M32-E-12-5b	M32-E-12-5c
Mica type	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form	Mixed form
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.767	6.590	6.465	6.455	6.572	6.574	6.630	6.653	6.773	6.769	6.777
^{IV}Al	1.233	1.410	1.535	1.545	1.428	1.426	1.370	1.347	1.227	1.231	1.223
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.203	3.155	3.286	3.277	3.227	3.146	3.152	3.165	3.120	3.109	3.125
Ti	bd	bd	0.004	0.003	bd	bd	bd	bd	bd	bd	bd
Fe2+	0.004	0.060	0.090	0.075	0.056	0.054	0.081	0.087	0.035	0.031	0.033
Mn	0.022	0.011	0.035	0.037	0.035	0.039	0.024	0.027	0.037	0.038	0.039
Mg	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	1.775	1.916	1.537	1.607	1.755	1.958	1.874	1.778	1.819	1.871	1.813
Σ Octahedral	5.004	5.141	4.953	4.999	5.073	5.198	5.131	5.057	5.011	5.050	5.011
K	1.622	1.685	1.679	1.681	1.637	1.664	1.684	1.697	1.709	1.702	1.703
Ca	bd	bd	bd	bd	0.002	0.001	bd	bd	bd	bd	bd
Na	0.103	0.124	0.103	0.098	0.090	0.093	0.076	0.077	0.169	0.162	0.160
Rb	0.066	0.074	0.081	0.083	0.057	0.060	0.044	0.046	0.025	0.028	0.026
Cs	0.004	0.005	0.009	0.009	0.022	0.023	0.026	0.026	0.001	0.001	0.001
Σ x-site	1.795	1.889	1.873	1.870	1.808	1.841	1.832	1.847	1.904	1.894	1.890
F	2.099	2.218	1.884	1.949	2.075	2.254	2.185	2.101	2.138	2.182	2.131
OH*	1.902	1.782	2.116	2.051	1.925	1.746	1.815	1.899	1.862	1.818	1.869
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated

n.a. = not analyzed; bd = below detection level

Li-musc. = lithian muscovite

Table 5 continued

Sample	M32-E-12-6a	M32-E-12-6b	M32-E-12-6c	M8-1	M8-2	M8-3	M54-1	M54-2	M54-3	M32-C-3 Rim	M32-C-4 Rim
Mica type	Mixed form	Mixed form	Mixed form	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Wt. %											
SiO_2	51.36	50.89	51.10	50.67	50.70	50.73	49.24	49.31	49.12	49.88	49.91
TiO_2	bd	bd	bd	bd	0.02	0.01	bd	bd	bd	bd	bd
Al_2O_3	28.00	28.23	28.10	26.23	26.51	26.60	28.57	28.73	28.60	28.63	28.77
FeO	0.28	0.30	0.28	0.90	0.87	0.89	0.21	0.11	0.08	0.41	0.38
MnO	0.37	0.35	0.34	0.03	0.04	0.04	0.13	0.16	0.18	0.36	0.40
MgO	bd	bd	bd	0.01	bd	0.01	bd	bd	bd	bd	bd
CaO	bd	bd	bd	0.02	0.02	0.01	0.01	0.01	bd	bd	bd
Na_2O	0.66	0.63	0.63	0.35	0.36	0.33	0.54	0.44	0.45	0.51	0.56
K_2O	10.11	10.09	10.14	10.28	10.09	10.15	9.47	9.50	9.62	10.00	10.01
Rb_2O	0.32	0.31	0.30	0.78	0.80	0.73	0.61	0.55	0.57	0.51	0.48
Cs_2O	0.03	0.02	0.03	0.07	0.07	0.06	0.08	0.05	0.05	0.10	0.09
Li_2O*	3.51	3.41	3.40	4.93	4.89	5.09	4.07	4.03	4.15	4.24	3.93
F	5.21	5.09	5.08	6.73	6.69	6.89	5.82	5.78	5.91	6.01	5.67
H_2O*	2.08	2.12	2.13	1.32	1.35	1.27	1.72	1.74	1.67	1.69	1.85
O=F	2.19	2.14	2.14	2.84	2.82	2.90	2.45	2.43	2.49	2.53	2.39
Total	99.74	99.30	99.38	99.49	99.61	99.91	98.03	97.99	97.91	99.81	99.65

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M32-E-12-6a	M32-E-12-6b	M32-E-12-6c	M8-1	M8-2	M8-3	M54-1	M54-2	M54-3	M32-C-3 Rim	M32-C-4 Rim
Mica type	Mixed form	Mixed form	Mixed form	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.765	6.735	6.756	6.732	6.721	6.701	6.596	6.597	6.584	6.586	6.601
^{IV}Al	1.235	1.265	1.244	1.268	1.279	1.299	1.404	1.403	1.416	1.414	1.399
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.112	3.138	3.134	2.838	2.862	2.841	3.105	3.128	3.101	3.042	3.086
Ti	bd	bd	bd	bd	0.001	0.001	bd	bd	bd	bd	bd
Fe2+	0.031	0.034	0.031	0.100	0.097	0.099	0.024	0.013	0.009	0.045	0.042
Mn	0.041	0.039	0.038	0.004	0.005	0.004	0.015	0.018	0.021	0.040	0.045
Mg	bd	bd	bd	0.002	bd	0.002	bd	bd	bd	bd	bd
Li*	1.861	1.813	1.807	2.636	2.609	2.703	2.192	2.167	2.238	2.252	2.089
Σ Octahedral	5.044	5.023	5.009	5.580	5.574	5.648	5.336	5.326	5.369	5.380	5.263
K	1.699	1.704	1.711	1.742	1.706	1.709	1.618	1.621	1.645	1.684	1.689
Ca	bd	bd	bd	0.002	0.003	0.001	0.001	0.002	bd	bd	bd
Na	0.167	0.162	0.161	0.089	0.093	0.086	0.141	0.115	0.117	0.131	0.143
Rb	0.027	0.026	0.025	0.067	0.068	0.062	0.053	0.048	0.049	0.043	0.041
Cs	0.002	0.001	0.002	0.004	0.004	0.003	0.005	0.003	0.003	0.006	0.005
Σ x-site	1.895	1.893	1.899	1.904	1.874	1.861	1.818	1.788	1.814	1.864	1.877
F	2.171	2.131	2.125	2.829	2.805	2.878	2.466	2.444	2.506	2.508	2.371
OH*	1.829	1.869	1.875	1.171	1.195	1.122	1.534	1.556	1.495	1.492	1.629
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.001	4.001	4.001	4.000	4.000

* calculated

n.a. = not analyzed; bd = below detection level

Li-musc. = lithian muscovite

Table 5 continued

Sample	M4-4 Rim	M14a-1	M14a-2	M14a-3	M14B-1-1	M14B-1-2	M14B-1-3	M20-1-1	M20-1-2	M20-1-3	M20-1-1
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Wt. %											
SiO_2	50.32	50.93	50.78	50.58	51.02	50.99	51.22	50.42	50.36	50.40	51.09
TiO_2	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Al_2O_3	29.03	26.55	26.70	26.77	26.54	26.56	26.43	25.32	25.28	25.41	25.70
FeO	0.38	0.01	0.01	0.01	0.43	0.37	0.37	0.11	0.09	0.12	0.09
MnO	0.11	0.05	0.06	0.06	0.31	0.26	0.31	0.09	0.11	0.08	0.12
MgO	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	bd	0.01	0.01	0.01	bd	bd	bd	bd	bd	bd	bd
Na_2O	0.61	0.34	0.31	0.30	0.33	0.28	0.30	0.53	0.55	0.49	0.56
K_2O	9.88	10.11	10.12	10.12	9.89	10.03	10.11	9.78	9.85	9.93	10.00
Rb_2O	0.79	1.41	1.34	1.39	0.68	0.71	0.65	0.81	0.80	0.83	0.78
Cs_2O	0.06	0.13	0.11	0.11	0.12	0.14	0.13	0.09	0.09	0.12	0.09
Li_2O*	4.03	4.34	4.54	4.65	5.75	5.62	5.76	6.00	5.87	6.25	5.86
F	5.78	6.11	6.32	6.44	7.89	7.77	7.90	8.11	8.00	8.32	7.98
H_2O*	1.83	1.60	1.50	1.45	0.86	0.90	0.86	0.67	0.71	0.58	0.78
O=F	2.43	2.57	2.66	2.71	3.32	3.27	3.33	3.42	3.37	3.50	3.36
Total	100.37	99.01	99.12	99.18	100.52	100.37	100.72	98.52	98.35	99.04	99.69

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M4-4 Rim	M14a-1	M14a-2	M14a-3	M14B-1-1	M14B-1-2	M14B-1-3	M20-1-1	M20-1-2	M20-1-3	M20-1-1
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.604	6.798	6.764	6.739	6.678	6.687	6.694	6.726	6.734	6.696	6.738
^{IV}Al	1.396	1.202	1.236	1.261	1.322	1.313	1.306	1.274	1.266	1.304	1.262
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	3.095	2.973	2.956	2.943	2.772	2.792	2.764	2.706	2.718	2.674	2.733
Ti	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Fe2+	0.041	0.001	0.001	0.001	0.047	0.041	0.040	0.012	0.010	0.013	0.010
Mn	0.012	0.006	0.006	0.006	0.035	0.028	0.034	0.011	0.013	0.009	0.013
Mg	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	2.125	2.329	2.432	2.493	3.027	2.965	3.029	3.221	3.157	3.337	3.106
Σ Octahedral	5.273	5.309	5.395	5.443	5.881	5.826	5.867	5.949	5.897	6.033	5.862
K	1.654	1.721	1.719	1.719	1.652	1.679	1.685	1.664	1.679	1.683	1.683
Ca	bd	0.001	0.001	0.001	bd	bd	bd	bd	bd	bd	bd
Na	0.155	0.089	0.079	0.079	0.085	0.072	0.076	0.138	0.143	0.127	0.142
Rb	0.067	0.121	0.115	0.119	0.057	0.060	0.054	0.070	0.069	0.071	0.066
Cs	0.003	0.007	0.006	0.006	0.007	0.008	0.007	0.005	0.005	0.007	0.005
Σ x-site	1.879	1.939	1.919	1.924	1.800	1.818	1.823	1.876	1.896	1.888	1.896
F	2.397	2.579	2.663	2.714	3.265	3.224	3.264	3.422	3.380	3.496	3.329
OH*	1.603	1.421	1.337	1.286	0.750	0.791	0.750	0.592	0.634	0.517	0.685
Σ w-site	4.000	4.000	4.000	4.000	4.015	4.015	4.015	4.014	4.015	4.013	4.014

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M20-1-2	M20-1-3	M26-A-3 Rim	M52A-1 Rim	M52A-2 Rim	M52A-3 Rim	M52-1 Rim	M52-2 Rim	M52-3 Rim	M52-7 Rim	M52-8 Rim
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Wt. %											
SiO_2	51.07	50.82	49.55	51.14	51.08	50.99	50.90	51.00	51.05	50.93	50.89
TiO_2	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Al_2O_3	25.69	25.73	27.09	25.78	25.82	25.75	26.56	26.48	26.33	26.23	26.34
FeO	0.10	0.11	0.32	0.03	0.02	0.03	0.02	0.02	0.01	0.02	0.02
MnO	0.10	0.12	0.38	0.21	0.19	0.19	0.03	0.04	0.04	0.04	0.04
MgO	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	bd	bd	bd	0.01	bd	bd	bd	bd	bd	bd	bd
Na_2O	0.58	0.51	0.67	0.77	0.73	0.69	0.57	0.54	0.56	0.61	0.59
K_2O	9.89	10.10	10.20	9.76	9.75	9.56	10.00	9.89	9.79	9.67	9.83
Rb_2O	0.80	0.81	2.98	0.34	0.34	0.41	1.53	1.58	1.50	1.39	1.41
Cs_2O	0.09	0.10	0.03	0.03	0.03	0.03	0.18	0.18	0.19	0.21	0.19
Li_2O*	6.13	6.23	4.87	5.09	5.31	5.37	5.64	5.75	5.70	5.65	5.43
F	8.23	8.31	6.67	6.90	7.11	7.17	7.44	7.56	7.51	7.46	7.23
H_2O*	0.67	0.61	1.35	1.24	1.14	1.11	1.04	0.99	1.00	1.01	1.11
O=F	3.46	3.50	2.81	2.90	2.99	3.02	3.13	3.18	3.16	3.14	3.05
Total	99.91	99.97	101.31	98.40	98.53	98.27	100.76	100.85	100.53	100.09	100.02

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M20-1-2	M20-1-3	M26-A-3 Rim	M52A-1 Rim	M52A-2 Rim	M52A-3 Rim	M52-1 Rim	M52-2 Rim	M52-3 Rim	M52-7 Rim	M52-8 Rim
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.717	6.692	6.587	6.803	6.782	6.783	6.682	6.686	6.706	6.714	6.719
^{IV}Al	1.283	1.308	1.413	1.197	1.218	1.217	1.318	1.314	1.294	1.286	1.281
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	2.700	2.685	2.832	2.844	2.823	2.820	2.791	2.778	2.783	2.789	2.818
Ti	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Fe2+	0.011	0.012	0.036	0.004	0.002	0.003	0.002	0.002	0.001	0.002	0.002
Mn	0.012	0.014	0.042	0.024	0.021	0.022	0.004	0.005	0.004	0.005	0.004
Mg	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	3.245	3.300	2.602	2.723	2.833	2.870	2.976	3.032	3.014	2.993	2.880
Σ Octahedral	5.967	6.011	5.512	5.595	5.679	5.715	5.772	5.816	5.802	5.789	5.704
K	1.660	1.697	1.730	1.657	1.650	1.622	1.675	1.654	1.640	1.626	1.656
Ca	bd	bd	bd	0.001	bd	bd	bd	bd	bd	bd	bd
Na	0.149	0.131	0.172	0.197	0.189	0.178	0.144	0.138	0.143	0.156	0.150
Rb	0.068	0.069	0.255	0.029	0.029	0.035	0.129	0.133	0.127	0.118	0.120
Cs	0.005	0.005	0.002	0.002	0.002	0.002	0.010	0.010	0.011	0.012	0.011
Σ x-site	1.881	1.902	2.158	1.886	1.870	1.837	1.958	1.935	1.920	1.912	1.936
F	3.421	3.460	2.802	2.900	2.987	3.018	3.090	3.133	3.121	3.107	3.020
OH*	0.592	0.540	1.198	1.100	1.013	0.982	0.910	0.867	0.879	0.893	0.980
Σ w-site	4.013	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M57B-1 Rim	M57B-2 Rim	M57B-3 Rim	M57A-1 Rim	M57A-2 Rim	M57A-3 Rim	M58-1	M58-2	M58-3	M59-1	M59-2
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Wt. %											
SiO_2	51.10	50.99	51.00	50.80	50.78	51.00	51.01	51.43	51.12	49.80	50.03
TiO_2	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Al_2O_3	25.72	25.72	25.66	26.43	26.50	26.55	26.45	26.34	26.51	26.55	26.41
FeO	0.07	0.08	0.07	0.46	0.38	0.37	0.10	0.08	0.09	0.12	0.13
MnO	0.10	0.08	0.09	0.09	0.10	0.09	0.46	0.51	0.53	0.31	0.29
MgO	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	bd	bd	bd	0.01	bd	bd	bd	bd	bd	bd	0.01
Na_2O	0.63	0.73	0.74	0.56	0.63	0.60	0.18	0.20	0.19	0.22	0.21
K_2O	9.67	9.83	9.94	10.09	9.88	9.78	9.91	9.93	10.00	10.00	9.93
Rb_2O	0.69	0.70	0.67	0.99	0.89	0.78	0.95	1.00	1.03	1.35	1.28
Cs_2O	0.06	0.08	0.06	0.06	0.08	0.06	0.15	0.17	0.14	0.10	0.09
Li_2O*	5.75	5.64	5.58	5.56	5.40	5.76	4.97	4.98	5.03	5.20	5.08
F	7.55	7.45	7.39	7.37	7.20	7.57	6.77	6.79	6.83	7.01	6.88
H_2O*	0.95	1.00	1.02	1.07	1.13	0.99	1.32	1.33	1.30	1.16	1.22
O=F	3.18	3.14	3.11	3.10	3.03	3.18	2.85	2.86	2.88	2.95	2.90
Total	99.11	99.15	99.14	100.36	99.95	100.36	99.40	99.90	99.92	98.87	98.67

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M57B-1 Rim	M57B-2 Rim	M57B-3 Rim	M57A-1 Rim	M57A-2 Rim	M57A-3 Rim	M58-1	M58-2	M58-3	M59-1	M59-2
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.757	6.752	6.758	6.681	6.695	6.679	6.757	6.782	6.748	6.664	6.699
^{IV}Al	1.243	1.248	1.242	1.319	1.305	1.321	1.243	1.218	1.252	1.336	1.301
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	2.765	2.766	2.766	2.779	2.811	2.778	2.887	2.875	2.871	2.851	2.867
Ti	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Fe2+	0.007	0.009	0.008	0.050	0.042	0.040	0.011	0.009	0.010	0.013	0.014
Mn	0.011	0.009	0.010	0.010	0.011	0.010	0.051	0.057	0.060	0.035	0.033
Mg	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	3.056	3.003	2.976	2.940	2.860	3.032	2.648	2.644	2.670	2.800	2.734
Σ Octahedral	5.839	5.787	5.760	5.778	5.725	5.860	5.598	5.585	5.611	5.699	5.649
K	1.631	1.660	1.680	1.693	1.662	1.633	1.675	1.671	1.684	1.708	1.697
Ca	bd	bd	bd	0.001	bd	bd	bd	bd	bd	bd	0.001
Na	0.163	0.187	0.191	0.142	0.162	0.152	0.045	0.051	0.049	0.057	0.054
Rb	0.058	0.060	0.057	0.083	0.076	0.066	0.080	0.084	0.088	0.116	0.110
Cs	0.003	0.004	0.004	0.003	0.004	0.003	0.008	0.009	0.008	0.006	0.005
Σ x-site	1.855	1.912	1.932	1.922	1.904	1.854	1.809	1.816	1.828	1.887	1.868
F	3.158	3.118	3.098	3.063	3.003	3.133	2.837	2.830	2.852	2.966	2.913
OH*	0.842	0.882	0.902	0.937	0.997	0.867	1.163	1.170	1.148	1.034	1.087
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M59-3	M-60-1	M-60-2	M-60-3	M61-1	M61-2	M61-3	M61-1	M61-2	M61-3	M36- C-3 Rim
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Wt. %											
SiO_2	50.54	50.33	50.13	50.41	50.27	50.32	50.55	50.65	50.77	50.63	5bd
TiO_2	bd	bd	0.01	bd	bd	bd	bd	bd	bd	bd	0.02
Al_2O_3	25.77	27.10	27.10	27.26	27.01	26.90	26.23	27.33	27.41	27.21	25.87
FeO	0.11	0.03	0.02	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.89
MnO	0.32	0.22	0.19	0.18	0.07	0.12	0.09	0.13	0.12	0.11	0.62
MgO	bd	0.18	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	bd	bd	0.01	bd	bd	bd	bd	bd	bd	bd	bd
Na_2O	0.21	0.34	0.34	0.30	0.31	0.28	0.30	0.34	0.35	0.35	0.23
K_2O	9.84	9.73	9.82	9.77	8.79	9.01	9.07	10.11	10.09	10.17	9.98
Rb_2O	1.27	0.73	0.82	0.88	1.34	1.45	1.46	1.45	1.51	1.46	1.26
Cs_2O	0.09	0.02	0.03	0.03	0.20	0.22	0.22	0.23	0.31	0.26	0.22
Li_2O*	5.11	4.97	4.80	4.76	5.65	5.65	5.31	5.86	5.72	5.61	4.98
F	6.91	6.78	6.59	6.56	7.45	7.46	7.11	7.67	7.52	7.42	6.78
H_2O*	1.20	1.31	1.37	1.41	1.00	1.00	1.12	0.97	1.04	1.06	1.26
O=F	2.91	2.85	2.78	2.76	3.14	3.14	2.99	3.23	3.17	3.12	2.85
Total	98.46	98.90	98.45	98.84	98.95	99.26	98.48	101.53	101.68	101.17	99.27

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M59-3	M-60-1	M-60-2	M-60-3	M61-1	M61-2	M61-3	M61-1	M61-2	M61-3	M36- C-3 Rim
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.773	6.677	6.689	6.698	6.659	6.661	6.747	6.601	6.612	6.626	6.704
^{IV}Al	1.227	1.323	1.311	1.302	1.341	1.339	1.253	1.399	1.388	1.374	1.296
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	2.842	2.914	2.950	2.966	2.874	2.858	2.874	2.798	2.819	2.824	2.791
Ti	bd	bd	0.001	bd	bd	bd	bd	bd	bd	bd	0.002
Fe2+	0.012	0.004	0.002	0.004	0.001	0.001	0.001	0.001	0.001	0.001	0.100
Mn	0.036	0.025	0.022	0.021	0.008	0.013	0.010	0.014	0.013	0.012	0.071
Mg	bd	0.035	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	2.752	2.654	2.575	2.544	3.008	3.007	2.848	3.071	2.993	2.953	2.683
Σ Octahedral	5.643	5.631	5.550	5.535	5.891	5.879	5.733	5.885	5.827	5.790	5.648
K	1.683	1.647	1.672	1.656	1.485	1.521	1.544	1.681	1.676	1.698	1.707
Ca	bd	bd	0.001	bd	bd	bd	bd	bd	bd	bd	bd
Na	0.055	0.088	0.088	0.077	0.080	0.073	0.079	0.087	0.088	0.089	0.060
Rb	0.109	0.063	0.070	0.075	0.114	0.123	0.125	0.121	0.127	0.122	0.108
Cs	0.005	0.001	0.002	0.002	0.011	0.012	0.013	0.013	0.017	0.015	0.013
Σ x-site	1.851	1.799	1.834	1.810	1.690	1.729	1.760	1.902	1.908	1.924	1.888
F	2.928	2.842	2.782	2.754	3.122	3.121	3.002	3.159	3.098	3.071	2.873
OH*	1.072	1.158	1.218	1.246	0.879	0.880	1.000	0.841	0.902	0.929	1.127
Σ w-site	4.000	4.000	4.000	4.000	4.002	4.001	4.002	4.000	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M36-C-4 Rim	M2-C-3 Rim	M2-C-4-Rim	M4-C-3 Rim	M4-C-4 Rim	M27-C-3 Rim	M27-C-4 Rim	M27-E-3-3	M27-E-3-4	M27-E-4-3	M27-E-4-4
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Wt. %											
SiO_2	50.06	50.10	50.54	48.97	49.23	49.87	50.00	51.21	51.10	51.22	51.01
TiO_2	0.02	0.04	0.02	bd	bd	bd	bd	bd	bd	bd	bd
Al_2O_3	26.09	26.08	26.00	28.17	27.45	26.22	26.00	26.25	26.30	26.37	26.41
FeO	0.69	1.14	1.00	1.22	0.81	1.36	0.98	0.39	0.41	0.52	0.51
MnO	0.66	0.35	0.36	0.97	0.98	0.77	0.98	0.40	0.42	0.34	0.37
MgO	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
CaO	bd	bd	0.01	bd	bd	bd	bd	0.01	bd	bd	bd
Na_2O	0.31	0.22	0.21	0.31	0.34	0.33	0.43	0.20	0.18	0.31	0.28
K_2O	9.78	9.66	9.62	9.67	9.88	9.91	10.05	9.98	9.88	10.09	10.05
Rb_2O	1.18	1.32	1.29	0.95	1.11	0.90	0.95	0.72	0.70	0.97	0.98
Cs_2O	0.19	0.76	0.78	0.11	0.14	0.18	0.19	0.68	0.62	0.68	0.70
Li_2O*	4.32	4.96	5.26	4.87	5.51	5.62	5.56	5.29	5.07	5.07	4.76
F	6.09	6.77	7.07	6.66	7.32	7.77	7.72	7.09	6.87	6.88	6.56
H_2O*	1.56	1.28	1.17	1.37	1.07	0.86	0.88	1.19	1.28	1.30	1.42
O=F	2.57	2.85	2.97	2.81	3.08	3.27	3.25	2.99	2.89	2.89	2.76
Total	98.37	99.82	100.35	100.45	100.78	100.53	100.51	100.43	99.94	100.85	100.29

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M36-C-4 Rim	M2-C-3 Rim	M2-C-4-Rim	M4-C-3 Rim	M4-C-4 Rim	M27-C-3 Rim	M27-C-4 Rim	M27-E-3-3	M27-E-3-4	M27-E-4-3	M27-E-4-4
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Structural formula on the basis of 24 (O, OH, F) atoms											
apfu											
Si	6.754	6.698	6.710	6.484	6.501	6.601	6.625	6.743	6.755	6.741	6.753
^{IV}Al	1.246	1.302	1.290	1.516	1.499	1.399	1.375	1.257	1.245	1.259	1.247
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	2.904	2.807	2.777	2.880	2.772	2.691	2.686	2.818	2.853	2.830	2.874
Ti	0.002	0.004	0.002	bd	bd	bd	bd	bd	bd	bd	bd
Fe2+	0.077	0.128	0.111	0.135	0.090	0.150	0.109	0.043	0.045	0.058	0.056
Mn	0.075	0.039	0.040	0.108	0.110	0.087	0.110	0.044	0.047	0.038	0.041
Mg	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Li*	2.345	2.669	2.807	2.591	2.927	2.992	2.964	2.800	2.696	2.684	2.535
Σ Octahedral	5.403	5.648	5.738	5.714	5.899	5.920	5.868	5.705	5.640	5.610	5.507
K	1.683	1.647	1.630	1.633	1.665	1.673	1.698	1.676	1.666	1.695	1.698
Ca	bd	bd	0.001	bd	bd	bd	bd	0.001	bd	bd	bd
Na	0.081	0.056	0.054	0.080	0.088	0.085	0.111	0.051	0.046	0.080	0.073
Rb	0.102	0.114	0.110	0.080	0.094	0.076	0.080	0.061	0.059	0.082	0.083
Cs	0.011	0.043	0.044	0.006	0.008	0.010	0.011	0.038	0.035	0.038	0.039
Σ x-site	1.878	1.860	1.840	1.799	1.855	1.845	1.900	1.828	1.807	1.894	1.893
F	2.600	2.860	2.966	2.790	3.057	3.253	3.234	2.954	2.873	2.861	2.745
OH*	1.400	1.140	1.034	1.210	0.943	0.762	0.781	1.046	1.126	1.139	1.255
Σ w-site	4.000	4.000	4.000	4.000	4.000	4.015	4.016	4.000	4.000	4.000	4.000

* calculated

n.a. = not analyzed; bd = below detection level

Li-musc. = lithian muscovite

Table 5 continued

Sample	M27-E-5-1	M27-E-5-2	M27-E-5-3	M27-E-5-4	M27-E-6-3	M27-E-6-4	M27-E-7-4	M27-E-7-5
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Wt. %								
SiO_2	48.77	48.54	48.61	48.78	50.09	50.05	50.04	50.04
TiO_2	bd	bd	bd	bd	bd	bd	bd	bd
Al_2O_3	26.45	26.50	26.41	26.42	26.06	26.24	26.43	26.04
FeO	1.33	1.09	1.20	1.20	1.22	1.09	0.12	0.10
MnO	0.71	0.76	0.66	0.65	0.68	0.73	0.41	0.51
MgO	bd	bd	bd	bd	bd	bd	bd	bd
CaO	bd	bd	bd	bd	bd	bd	0.01	0.02
Na_2O	0.27	0.25	0.23	0.22	0.23	0.22	0.14	0.12
K_2O	10.10	9.99	10.06	9.88	10.01	10.03	9.77	9.93
Rb_2O	1.00	0.98	0.94	1.01	1.26	1.15	1.68	1.47
Cs_2O	0.24	0.19	0.21	0.23	0.23	0.22	0.87	0.91
Li_2O*	5.20	5.07	4.98	5.24	5.37	5.29	5.18	5.42
F	7.00	6.87	6.78	7.04	7.54	7.09	6.99	7.22
H_2O*	1.14	1.18	1.21	1.11	0.96	1.15	1.18	1.06
O=F	2.95	2.89	2.85	2.97	3.18	2.99	2.94	3.04
Total	99.25	98.52	98.44	98.81	100.46	100.27	99.89	99.81

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Table 5 continued

Sample	M27-E-5-1	M27-E-5-2	M27-E-5-3	M27-E-5-4	M27-E-6-3	M27-E-6-4	M27-E-7-4	M27-E-7-5
Mica type	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*	*Lepidolite*
Structural formula on the basis of 24 (O, OH, F) atoms								
apfu								
Si	6.561	6.566	6.583	6.574	6.648	6.646	6.681	6.686
^{IV}Al	1.439	1.434	1.417	1.426	1.352	1.354	1.319	1.314
Σ Tetrahedral	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000
^{VI}Al	2.754	2.791	2.797	2.770	2.724	2.753	2.840	2.786
Ti	bd	bd	bd	bd	bd	bd	bd	bd
Fe2+	0.149	0.123	0.136	0.135	0.136	0.121	0.013	0.011
Mn	0.081	0.087	0.075	0.074	0.076	0.083	0.047	0.058
Mg	bd	bd	bd	bd	bd	bd	bd	bd
Li*	2.813	2.756	2.711	2.838	2.865	2.824	2.781	2.909
Σ Octahedral	5.797	5.757	5.720	5.818	5.801	5.780	5.681	5.765
K	1.733	1.724	1.737	1.699	1.694	1.700	1.664	1.693
Ca	bd	bd	bd	bd	bd	bd	0.002	0.002
Na	0.069	0.064	0.061	0.058	0.060	0.056	0.037	0.032
Rb	0.086	0.085	0.082	0.088	0.107	0.098	0.144	0.126
Cs	0.014	0.011	0.012	0.013	0.013	0.012	0.050	0.052
Σ x-site	1.903	1.885	1.892	1.858	1.874	1.865	1.897	1.905
F	2.980	2.939	2.903	3.002	3.166	2.979	2.949	3.051
OH*	1.020	1.061	1.097	0.998	0.850	1.021	1.051	0.949
Σ w-site	4.000	4.000	4.000	4.000	4.016	4.000	4.000	4.000

* calculated
n.a. = not analyzed; bd = below detection level
Li-musc. = lithian muscovite

Feldspar analyses

Table 6 Chemical composition of all feldspar analyzed from Mount Mica pegmatite

Sample	F1-1	F1-2	F1-3	F2-1	F2-2	F2-3	F3-1	F3-2	F3-3	F4-1	F4-2	F4-3
Feldspar	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.
wt %												
SiO2	67.80	67.83	67.84	67.87	67.80	67.78	67.82	67.86	67.87	67.88	67.85	67.87
TiO2	0.01	0.01	0.01	0.10	0.01	0.01	bd	bd	0.01	0.01	0.01	0.01
Al2O3	19.51	19.48	19.49	19.48	19.54	19.49	19.26	19.28	19.28	19.31	19.30	19.34
CaO	0.19	0.17	0.15	0.17	0.16	0.14	bd	0.01	bd	bd	bd	0.01
Na2O	11.60	11.58	11.53	11.50	11.56	11.57	11.70	11.68	11.72	11.72	11.69	11.69
K2O	0.02	0.02	0.05	0.06	0.05	0.04	0.05	0.04	0.05	0.03	0.02	0.02
Rb2O	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Cs2O	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Total	99.13	99.11	99.08	99.18	99.13	99.05	98.82	98.87	98.93	98.95	98.86	98.94
apfu	Normalized to 8 oxygens											
Si	2.986	2.989	2.990	2.988	2.987	2.989	2.997	2.996	2.996	2.995	2.996	2.995
Ti	bd	bd	bd	0.003	bd	bd	bd	bd	bd	bd	bd	bd
Al	1.013	1.012	1.013	1.011	1.015	1.013	1.003	1.004	1.003	1.005	1.005	1.006
Ca	0.009	0.008	0.007	0.008	0.007	0.007	bd	bd	bd	bd	bd	bd
Na	0.990	0.989	0.985	0.981	0.987	0.989	1.002	1.000	1.003	1.003	1.001	1.000
K	0.001	0.001	0.003	0.003	0.003	0.002	0.003	0.002	0.003	0.002	0.001	0.001
Rb	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Moles %												
An	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Ab	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Or	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

bd = below detection level; Plag = plagioclase; Kfs. = K-feldspar; An = anorthite; Ab = albite; Or = orthoclase
Fe, Mg, Mn & P analyzed but below detection level

Table 6 continued

Sample	F5-1	F5-2	F5-3	F6-1	F6-2	F6-3	F7-1	F7-2	F7-3	F8-M13-1	F8-M13-2	F8-M13-3
Feldspar	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.
wt %												
SiO2	67.95	67.83	67.85	67.86	67.87	67.84	67.91	67.89	67.90	67.72	67.84	67.88
TiO2	bd	0.01	bd	0.01	bd	bd	0.01	bd	0.01	bd	bd	0.01
Al2O3	19.30	19.31	19.33	19.33	19.31	19.30	19.30	19.29	19.31	19.28	19.32	19.30
CaO	bd	0.01	bd	0.01	0.01	0.01	0.01	0.01	bd	0.01	0.01	0.01
Na2O	11.73	11.84	11.81	11.81	11.82	11.83	11.76	11.68	11.67	11.66	11.72	11.70
K2O	0.03	0.03	0.02	0.02	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.02
Rb2O	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Cs2O	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Total	99.01	99.02	99.01	99.04	99.05	99.02	99.02	98.89	98.92	98.70	98.93	98.91
apfu	Normalized to 8 oxygens											
Si	2.996	2.993	2.993	2.993	2.994	2.993	2.995	2.997	2.996	2.995	2.994	2.996
Ti	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Al	1.003	1.004	1.005	1.005	1.004	1.004	1.003	1.004	1.004	1.005	1.005	1.004
Ca	bd	bd	bd	bd	bd	0.001	bd	bd	bd	0.001	bd	bd
Na	1.003	1.013	1.010	1.010	1.011	1.012	1.006	1.000	0.999	1.000	1.003	1.001
K	0.002	0.002	0.001	0.001	0.002	0.001	0.002	0.001	0.002	0.002	0.002	0.001
Rb	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Moles %												
An	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ab	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Or	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

bd = below detection level; Plag = plagioclase; Kfs. = K-feldspar; An = anorthite; Ab = albite; Or = orthoclase
Fe, Mg, Mn & P analyzed but below detection level

Table 6 continued

Sample	F9-M11A-1	F9-M11A-2	F9-M11A-3	F10-1	F10-2	F10-3	F11-1	F11-2	F11-3	F15-1	F15-2	F15-3
Feldspar	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.
wt %												
SiO2	67.70	67.73	67.89	67.81	67.59	67.74	67.55	67.78	67.73	67.80	67.83	67.76
TiO2	bd	bd	bd	bd	bd	bd	0.01	bd	bd	0.01	bd	bd
Al2O3	19.29	19.34	19.39	19.32	19.34	19.39	19.32	19.33	19.29	19.41	19.33	19.30
CaO	0.01	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Na2O	11.67	11.80	11.76	11.78	11.77	11.78	11.78	11.80	11.79	11.81	11.78	11.75
K2O	0.04	0.06	0.05	0.06	0.04	0.03	0.05	0.04	0.05	0.04	0.03	0.04
Rb2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cs2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	98.71	98.93	99.10	99.00	98.76	98.96	98.71	98.98	98.89	99.08	99.00	98.86
apfu	Normalized to 8 oxygens											
Si	2.995	2.991	2.992	2.993	2.990	2.990	2.990	2.992	2.993	2.990	2.993	2.994
Ti	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Al	1.006	1.007	1.008	1.005	1.009	1.009	1.008	1.006	1.005	1.009	1.006	1.005
Ca	bd	bd	bd	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Na	1.001	1.010	1.005	1.008	1.010	1.008	1.011	1.010	1.010	1.010	1.008	1.006
K	0.002	0.003	0.003	0.003	0.002	0.002	0.003	0.002	0.003	0.002	0.002	0.002
Rb	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Moles %												
An	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ab	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Or	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

bd = below detection level; Plag = plagioclase; Kfs. = K-feldspar; An = anorthite; Ab = albite; Or = orthoclase
Fe, Mg, Mn & P analyzed but below detection level

Table 6 continued

Sample	F16-1	F16-2	F16-3	F17-Pl-1	F17-Pl-2	F17-Pl-3	F18-Pl-1	F18-Pl-2	F18-Pl-3	F19-Pl-1	F19-Pl-2	F19-Pl-3
Feldspar	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.
wt %												
SiO2	67.80	67.76	67.63	67.81	67.80	67.82	67.79	67.78	67.87	67.89	67.84	67.88
TiO2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Al2O3	19.51	19.52	19.60	19.34	19.37	19.32	19.25	19.25	19.24	19.29	19.30	19.29
CaO	0.02	0.03	0.03	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00
Na2O	11.69	11.71	11.65	11.78	11.81	11.81	11.66	11.67	11.63	11.80	11.78	11.78
K2O	0.04	0.03	0.03	0.05	0.05	0.05	0.04	0.04	0.04	0.03	0.04	0.03
Rb2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cs2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	99.07	99.06	98.95	98.98	99.03	99.01	98.73	98.74	98.79	99.01	98.96	98.99
apfu	Normalized to 8 oxygens											
Si	2.989	2.987	2.985	2.993	2.991	2.993	2.997	2.997	2.999	2.995	2.994	2.995
Ti	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Al	1.014	1.015	1.020	1.006	1.008	1.005	1.003	1.003	1.002	1.003	1.004	1.004
Ca	0.001	0.002	0.001	bd	bd	bd	bd	bd	bd	bd	bd	bd
Na	0.999	1.001	0.997	1.008	1.010	1.011	0.999	1.001	0.996	1.009	1.008	1.007
K	0.002	0.002	0.002	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.002
Rb	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Moles %												
An	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ab	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Or	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

bd = below detection level; Plag = plagioclase; Kfs. = K-feldspar; An = anorthite; Ab = albite; Or = orthoclase
Fe, Mg, Mn & P analyzed but below detection level

Table 6 continued

Sample	F23-3	F24-3	F25-1	F25-2	F25-3	KK1-1	KK1-2	KK1-3	M44-1	M44-2	M44-3	M46-1
Feldspar	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.
wt %												
SiO2	67.98	68.01	68.21	68.21	68.18	64.41	64.42	64.38	67.34	67.41	67.37	67.35
TiO2	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
Al2O3	19.71	19.33	19.23	19.41	19.42	22.59	22.60	22.55	20.03	20.06	20.04	19.97
CaO	0.00	0.09	0.22	0.16	0.19	3.11	3.09	3.00	1.21	1.11	1.19	0.89
Na2O	11.80	11.78	11.54	11.44	11.68	10.02	10.02	10.01	10.63	10.70	10.67	10.73
K2O	0.05	0.06	0.07	0.06	0.07	0.03	0.03	0.04	0.04	0.05	0.05	0.03
Rb2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cs2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	99.53	99.26	99.27	99.27	99.53	100.16	100.17	99.99	99.27	99.33	99.33	98.99
apfu	Normalized to 8 oxygens											
Si	2.983	2.993	3.000	2.998	2.992	2.834	2.834	2.836	2.964	2.965	2.964	2.970
Ti	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Al	1.020	1.003	0.997	1.006	1.005	1.171	1.172	1.171	1.040	1.040	1.040	1.038
Ca	bd	0.004	0.010	0.007	0.009	0.147	0.146	0.142	0.057	0.052	0.056	0.042
Na	1.004	1.005	0.984	0.975	0.994	0.855	0.854	0.855	0.907	0.913	0.910	0.918
K	0.003	0.003	0.004	0.003	0.004	0.002	0.002	0.002	0.002	0.003	0.003	0.002
Rb	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Moles %												
An	0.00	0.00	0.01	0.01	0.01	0.15	0.15	0.14	0.06	0.05	0.06	0.04
Ab	1.00	0.99	0.99	0.99	0.99	0.85	0.85	0.86	0.94	0.94	0.94	0.95
Or	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

bd = below detection level; Plag = plagioclase; Kfs. = K-feldspar; An = anorthite; Ab = albite; Or = orthoclase
Fe, Mg, Mn & P analyzed but below detection level

Table 6 continued

Sample	M46-2	M46-3	M11B-1	M11B-2	M11B-3	2T-G-2a	2T-G-2b	2T-T-2a	2T-T-2b	2T-T-2c	2-G-5a	2-G-5b
Feldspar	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.
wt %												
SiO2	67.42	67.50	64.55	64.49	64.50	67.73	68.28	68.42	68.35	67.72	68.82	67.76
TiO2	0.00	0.00	0.01	0.01	0.00	0.08	0.00	0.00	0.00	0.03	0.00	0.00
Al2O3	20.01	20.01	22.59	22.48	22.49	19.78	19.53	20.01	20.35	20.25	20.10	20.73
CaO	0.95	0.98	2.98	2.93	3.00	0.09	0.07	0.04	0.11	0.19	0.04	0.13
Na2O	10.72	10.66	10.04	10.56	10.51	11.19	11.29	11.47	11.06	11.09	11.69	11.27
K2O	0.04	0.04	0.03	0.03	0.04	0.07	0.07	0.04	0.06	0.07	0.05	0.10
Rb2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cs2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	99.14	99.19	100.21	100.52	100.55	98.95	99.25	100.02	99.93	99.41	100.79	100.04
apfu	Normalized to 8 oxygens											
Si	2.969	2.970	2.837	2.832	2.832	2.984	2.999	2.984	2.979	2.971	2.981	2.957
Ti	bd	bd	bd	bd	bd	0.003	bd	bd	bd	0.001	bd	bd
Al	1.039	1.038	1.170	1.164	1.164	1.027	1.011	1.029	1.045	1.047	1.026	1.066
Ca	0.045	0.046	0.140	0.138	0.141	0.004	0.003	0.002	0.005	0.009	0.002	0.006
Na	0.915	0.909	0.856	0.899	0.895	0.956	0.962	0.970	0.935	0.944	0.982	0.953
K	0.002	0.002	0.002	0.002	0.002	0.004	0.004	0.002	0.004	0.004	0.003	0.005
Rb	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Moles %												
An	0.05	0.05	0.14	0.13	0.14	0.00	0.00	0.00	0.01	0.01	0.00	0.01
Ab	0.95	0.95	0.86	0.87	0.86	0.99	0.99	1.00	0.99	0.99	1.00	0.99
Or	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01

bd = below detection level; Plag = plagioclase; Kfs. = K-feldspar; An = anorthite; Ab = albite; Or = orthoclase
Fe, Mg, Mn & P analyzed but below detection level

Table 6 continued

Sample	2-G-5c	1G-3a	1G-3b	1G-4a	1G-4b	1G-4c	1-T-11a	1-T-11b	1-T-3	F19-K-1	F19-Ksp-2	F19-Ksp-3
Feldspar	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Plag.	Ksp.	Ksp.	Ksp.
wt %												
SiO2	67.89	66.43	66.63	66.83	67.50	67.98	68.55	68.49	68.35	65.33	65.40	65.42
TiO2	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.01	0.01	0.01
Al2O3	20.36	21.63	21.58	20.88	20.58	20.33	20.46	20.11	20.63	18.12	18.18	18.16
CaO	0.15	0.74	0.77	0.83	0.38	0.22	0.03	0.08	0.23	0.00	0.01	0.00
Na2O	11.49	10.57	10.47	10.78	11.07	11.10	11.87	11.57	11.53	0.33	0.34	0.32
K2O	0.07	0.31	0.40	0.10	0.10	0.17	0.07	0.05	0.09	16.01	15.93	16.01
Rb2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.45	0.48
Cs2O	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.03
Total	100.05	99.69	99.89	99.43	99.64	99.85	100.98	100.29	101.00	100.38	100.37	100.45
apfu	Normalized to 8 oxygens											
Si	2.964	2.914	2.918	2.938	2.957	2.971	2.966	2.980	2.958	3.013	3.013	3.013
Ti	0.001	bd	bd	bd	bd	bd	bd	bd	0.003	bd	bd	bd
Al	1.048	1.119	1.114	1.082	1.063	1.047	1.044	1.032	1.052	0.985	0.987	0.986
Ca	0.007	0.035	0.036	0.039	0.018	0.010	0.002	0.004	0.011	bd	bd	bd
Na	0.973	0.899	0.889	0.919	0.941	0.941	0.996	0.976	0.967	0.029	0.031	0.029
K	0.004	0.017	0.022	0.006	0.005	0.010	0.004	0.003	0.005	0.942	0.936	0.941
Rb	bd	bd	bd	bd	bd	bd	bd	bd	bd	0.016	0.013	0.014
Cs	bd	bd	bd	bd	bd	bd	bd	bd	bd	0.003	0.004	0.005
Moles %												
An	0.01	0.04	0.04	0.04	0.02	0.01	0.00	0.00	0.01	0.00	0.00	0.00
Ab	0.99	0.94	0.94	0.95	0.98	0.98	0.99	0.99	0.98	0.03	0.03	0.03
Or	0.00	0.02	0.02	0.01	0.01	0.01	0.00	0.00	0.01	0.97	0.97	0.97

bd = below detection level; Plag = plagioclase; Kfs. = K-feldspar; An = anorthite; Ab = albite; Or = orthoclase
Fe, Mg, Mn & P analyzed but below detection level

Table 6 continued

Sample	F17-Ksp-1	F17-Ksp-2	F17-Ksp-3	F-20-1	F-20-2	F-20-3	F21-1	F21-2	F21-3	F22-1	F22-2	F22-3
Feldspar	Ksp.	Ksp.	Ksp.	Ksp.	Ksp.	Ksp.	Ksp.	Ksp.	Ksp.	Ksp.	Ksp.	Ksp.
wt %												
SiO2	64.48	64.51	64.46	65.39	65.40	65.43	65.45	65.42	65.37	65.38	65.46	65.48
TiO2	0.01	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.01	0.01	0.01	0.01
Al2O3	18.34	18.30	18.34	18.16	18.21	18.09	18.10	18.09	18.09	18.11	18.09	18.11
CaO	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Na2O	0.53	0.55	0.56	0.44	0.44	0.45	0.40	0.41	0.39	0.40	0.40	0.45
K2O	16.12	16.22	16.10	15.88	15.85	15.67	15.86	15.90	15.88	16.01	15.93	15.89
Rb2O	0.79	0.73	0.68	0.39	0.44	0.42	0.30	0.34	0.40	0.42	0.38	0.48
Cs2O	0.02	0.02	0.02	0.02	0.03	0.02	0.03	0.03	0.03	0.03	0.02	0.02
Total	100.29	100.33	100.15	100.29	100.39	100.10	100.15	100.21	100.18	100.36	100.30	100.45
apfu	Normalized to 8 oxygens											
Si	2.991	2.991	2.991	3.013	3.011	3.017	3.017	3.016	3.015	3.013	3.016	3.015
Ti	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Al	1.003	1.000	1.003	0.986	0.988	0.984	0.984	0.983	0.984	0.984	0.983	0.983
Ca	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd	bd
Na	0.048	0.049	0.050	0.039	0.040	0.040	0.036	0.037	0.035	0.036	0.036	0.040
K	0.954	0.959	0.953	0.934	0.931	0.922	0.932	0.935	0.934	0.941	0.937	0.933
Rb	0.023	0.022	0.020	0.012	0.013	0.012	0.009	0.010	0.012	0.013	0.011	0.014
Cs	0.003	0.003	0.003	0.003	0.004	0.004	0.005	0.004	0.005	0.004	0.003	0.004
Moles %												
An	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ab	0.05	0.05	0.05	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Or	0.95	0.95	0.95	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96

bd = below detection level; Plag = plagioclase; Kfs. = K-feldspar; An = anorthite; Ab = albite; Or = orthoclase
Fe, Mg, Mn & P analyzed but below detection level

Table 6 continued

Sample	F23-1	F23-2	F23-1	F23-2	F23-3
Feldspar	Ksp.	Ksp.	Ksp.	Ksp.	Ksp.
wt %					
SiO2	65.44	65.47	65.46	65.39	65.41
TiO2	0.01	0.00	0.01	0.01	0.01
Al2O3	18.09	18.10	18.06	18.11	18.08
CaO	0.00	0.00	0.00	0.00	0.00
Na2O	0.26	0.48	0.34	0.28	0.26
K2O	16.02	15.97	16.14	16.10	15.87
Rb2O	0.23	0.11	0.09	0.07	0.04
Cs2O	0.01	0.00	0.00	0.00	0.00
Total	100.07	100.14	100.12	99.97	99.68
apfu	Normalized to 8 oxygens				
Si	3.018	3.016	3.018	3.017	3.021
Ti	bd	bd	bd	bd	bd
Al	0.984	0.983	0.981	0.985	0.985
Ca	bd	bd	bd	bd	bd
Na	0.023	0.043	0.031	0.025	0.023
K	0.943	0.938	0.949	0.948	0.935
Rb	0.007	0.003	0.003	0.002	0.001
Cs	0.001	bd	bd	bd	bd
Moles %					
An	0.00	0.00	0.00	0.00	0.00
Ab	0.02	0.04	0.03	0.03	0.02
Or	0.98	0.96	0.97	0.97	0.98

bd = below detection level; Plag = plagioclase; Kfs. = K-feldspar; An = anorthite; Ab = albite; Or = orthoclase
Fe, Mg, Mn & P analyzed but below detection level

Mica unit cell dimensions

Unit Cell Dimensions (M8)

1 M8LEP kAREN M 12-3-2013

DIRECT CELL .90150000E+01 .51920000E+01 .20329000E+02 90 .000 100 19.000 90 .000 .93613360E+03

RECIPROCAL CELL .11274900E+00 .19260400E+00 .49999150E-01 90 .000 79 41.000 90 .000 .10682240E-02

01-THETA ANGLES THTMX = 23.0 NCYC = 9 TOLMN = .0250 TOLMX = .1250 THEMX = 23.0 DMIN = 1.971317 MONOC SYSTEM

0 0 CONDITIONS FOR NON-EXTINCTION CALLED FOR CLASS CONDITION(S)

1CYCLE 1 M8LEP kAREN M 12-3-2013 2-THETA TOLERANCE = .25000 MONOC

0 N	H	K	L	D CALC	D OBS	LAMBDA	2-THETA CALC	2-THETA OBS	2-THETA DIFF	WEIGHT
1	0	0	2	1bd170	10.131880	1.540510	8.83507	8.72000	.11507	1.00000
2	1	0	0	8.869254	9.054460	1.540510	9.96432	9.76000	.20432	1.00000
3	-1	1	5	3.127893	3.101468	1.540510	28.51186	28.76000	-.24814	1.00000
4	3	0	2	2.706404	2.690624	1.540510	33.07043	33.27000	-.19957	1.00000

0 A B C ALPHA BETA GAMMA VOLUME

RECIPROCAL CELL .11044300E+00 .21684690E+00 .49349220E-01 90 .000 73 38.000 90 .000 .11339830E-02

R C CORRECTIONS -.23060670E-02 .24242880E-01 -.64992460E-03 .000 -363.000 .000 .65759640E-04

DIRECT CELL .94368460E+01 .46115490E+01 .21119550E+02 90 .000 106 22.000 90 .000 .88184720E+03

D C CORRECTIONS .42184540E+00 -.58045100E+00 .79055020E+00 .000 363.000 .000 -.54286380E+02

1CYCLE 2 M8LEP kAREN M 12-3-2013 2-THETA TOLERANCE = .12500 MONOC

0 N H K L D CALC D OBS LAMBDA 2-THETA CALC 2-THETA OBS 2-THETA DIFF WEIGHT

1	0	0	2	10.131870	10.131880	1.540510	8.72000	8.72000	.00000	1.00000
2	-1	0	1	9.300253	9.360662	1.540510	9.50146	9.44000	.06146	1.00000
3	1	0	0	9.054446	9.054460	1.540510	9.76002	9.76000	.00002	1.00000
4	2	0	0	4.527223	4.536796	1.540510	19.59175	19.55000	.04175	1.00000
5	3	0	2	2.692399	2.690624	1.540510	33.24743	33.27000	-.02257	1.00000
6	0	2	5	2.004117	2.002652	1.540510	45.20510	45.24000	-.03490	1.00000

0	A	B	C	ALPHA	BETA	GAMMA	VOLUME
RECIPROCAL CELL	.11024250E+00	.21706410E+00	.49344190E-01	90 .000	73 3.533	90 .000	.11295500E-02
R C CORRECTIONS	-.20047230E-03	.21716770E-03	-.50287700E-05	.000	-34.466	.000	-.44328630E-05
DIRECT CELL	.94824020E+01	.46069350E+01	.21185140E+02	90 .000	106 56.466	90 .000	.88530800E+03
D C CORRECTIONS	.45556070E-01	-.46138760E-02	.65591810E-01	.000	34.466	.000	.34607540E+01

LARGEST RESIDUAL REDUCED TO UNIT WEIGHT -.06146 OBS 2 STANDARD ERROR UNIT WT OBS .01335 DEGREES OF FREEDOM 2

1CYCLE 6 M8LEP kAREN M 12-3-2013 2-THETA TOLERANCE = .05000 MONOC

0 N	H	K	L	D CALC	D OBS	LAMBDA	2-THETA CALC	2-THETA OBS	2-THETA DIFF	WEIGHT
1	0	0	2	10.144310	10.131880	1.540510	8.70929	8.72000	-.01071	1.00000
2	-1	0	1	9.356463	9.360662	1.540510	9.44425	9.44000	.00425	1.00000
3	1	0	0	9.069602	9.054460	1.540510	9.74367	9.76000	-.01633	1.00000
4	2	0	0	4.534801	4.536796	1.540510	19.55869	19.55000	.00869	1.00000
5	1	0	5	3.357515	3.358129	1.540510	26.52494	26.52000	.00494	1.00000

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  6   3   0   2    2.690836    2.690624   1.540510      33.26731      33.27000       -.00269     1.00000
  7   0   2   5    2.002652    2.002652   1.540510      45.23999      45.24000       -.00001     1.00000
0                  A            B            C          ALPHA      BETA      GAMMA       VOLUME
 RECIPROCAL CELL   .11025840E+00  .21714280E+00  .49288700E-01   90  .000  73  4.759  90  .000   .11289750E-02
 R C CORRECTIONS  -.39576040E-08  .44668850E-07  .84672670E-09       .000      .000      .000   .11641530E-09
    DIRECT CELL   .94800050E+01  .46052640E+01  .21206690E+02   90  .000  106 55.240  90  .000   .88575930E+03
 D C CORRECTIONS   .19073490E-05 -.95367430E-06  .00000000E+00       .000      .000      .000  -.61035160E-04
 LARGEST RESIDUAL REDUCED TO UNIT WEIGHT  .01633   OBS   3   STANDARD ERROR UNIT WT OBS  .01300   DEGREES OF FREEDOM   3

1CYCLE 10   M8LEP   kAREN M      12-3-2013                              2-THETA TOLERANCE =   .05000    MONOC
0  N   H   K   L    D CALC      D OBS     LAMBDA    2-THETA CALC   2-THETA OBS   2-THETA DIFF     WEIGHT
  1   0   0   2   10.144310   10.131880   1.540510       8.70929       8.72000       -.01071     1.00000
  2  -1   0   1    9.356463    9.360662   1.540510       9.44425       9.44000        .00425     1.00000
  3   1   0   0    9.069602    9.054460   1.540510       9.74367       9.76000       -.01633     1.00000
  4   2   0   0    4.534801    4.536796   1.540510      19.55869      19.55000        .00869     1.00000
  5   1   0   5    3.357515    3.358129   1.540510      26.52494      26.52000        .00494     1.00000
  6   3   0   2    2.690836    2.690624   1.540510      33.26731      33.27000       -.00269     1.00000
  7   0   2   5    2.002652    2.002652   1.540510      45.23999      45.24000       -.00001     1.00000
0                  A            B            C          ALPHA      BETA      GAMMA       VOLUME
 RECIPROCAL CELL   .11025840E+00  .21714280E+00  .49288700E-01   90  .000  73  4.759  90  .000   .11289750E-02
 R C CORRECTIONS  -.39577430E-08  .44670340E-07  .84568070E-09       .000      .000      .000   .11641530E-09
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DIRECT CELL .94800050E+01 .46052640E+01 .21206690E+02 90 .000 106 55.241 90 .000 .88575930E+03

D C CORRECTIONS .95367430E-06 -.47683720E-06 .00000000E+00 .000 .000 .000 -.61035160E-04

LARGEST RESIDUAL REDUCED TO UNIT WEIGHT .01633 OBS 3 STANDARD ERROR UNIT WT OBS .01300 DEGREES OF FREEDOM 3

R C STNDRD ERRS .44233110E-04 .96930220E-04 .40434540E-04 .000 .000 .000

DIRECT CELL VARIANCE-COVARIANCE MATRIX

						ROW
.58958810E-04	-.49116720E-05	.14969190E-03	.00000000E+00	.12315880E-04	.00000000E+00	1
-.49116720E-05	.42260690E-05	-.30904310E-04	.00000000E+00	-.15096070E-05	.00000000E+00	2
.14969190E-03	-.30904310E-04	.71402320E-03	.00000000E+00	.42175510E-04	.00000000E+00	3
.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	4
.12315880E-04	-.15096070E-05	.42175510E-04	.00000000E+00	.31912540E-05	.00000000E+00	5
.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	6

D C STNDRD ERRS .76784640E-02 .20557400E-02 .26721210E-01 .000 6.141 .000 .11093550E+01

Unit Cell Dimensions (M27)

1 M27mat KM 12/04/2013

DIRECT CELL .51900000E+01 .90070000E+01 .20102000E+02 90 .000 96 15.000 90 .000 .93410950E+03

RECIPROCAL CELL .19383030E+00 .11102480E+00 .50043740E-01 90 .000 83 45.000 90 .000 .10705380E-02

01-THETA ANGLES THTMX = 23.0 NCYC = 9 TOLMN = .0250 TOLMX = .1250 THEMX = 23.0 DMIN = 1.971317 MONOC SYSTEM

0 0 CONDITIONS FOR NON-EXTINCTION CALLED FOR CLASS CONDITION(S)

1CYCLE 10 M27mat KM 12/04/2013 2-THETA TOLERANCE = .23115 MONOC

0 N H K L D CALC D OBS LAMBDA 2-THETA CALC 2-THETA OBS 2-THETA DIFF WEIGHT

1	0	0	2	10.057720	10.225510	1.540510	8.78442	8.64000	.14442	1.00000
2	0	0	4	5.028861	5.017842	1.540510	17.62099	17.66000	-.03901	1.00000
3	0	2	3	3.729223	3.729223	1.540510	23.84000	23.84000	.00000	1.00000
4	-1	1	4	3.481179	3.487405	1.540510	25.56642	25.52000	.04642	1.00000
5	1	1	4	3.210881	3.209745	1.540510	27.75998	27.77000	-.01002	1.00000
6	-1	1	6	2.791532	2.787664	1.540510	32.03436	32.08000	-.04564	1.00000

0	A	B	C	ALPHA	BETA	GAMMA	VOLUME
RECIPROCAL CELL	.19441870E+00	.11142620E+00	.49713050E-01	90 .000	84 37.683	90 .000	.10722210E-02
R C CORRECTIONS	-.29267500E-08	.59774090E-09	-.59062420E-09	.000	.000	.000	.00000000E+00
DIRECT CELL	.51662280E+01	.89745470E+01	.20204180E+02	90 .000	95 22.316	90 .000	.93264380E+03
D C CORRECTIONS	.00000000E+00	.00000000E+00	.00000000E+00	.000	.000	.000	.00000000E+00

LARGEST RESIDUAL REDUCED TO UNIT WEIGHT -.14442 OBS 1 STANDARD ERROR UNIT WT OBS .11558 DEGREES OF FREEDOM 2

R C STNDRD ERRS .17769420E-02 .81543560E-03 .26502210E-03 .000 .000 .000

DIRECT CELL VARIANCE-COVARIANCE MATRIX						ROW
.22375950E-02	-.69137780E-04	-.33175240E-02	.00000000E+00	.16212300E-04	.00000000E+00	1
-.69137790E-04	.43134980E-02	-.22628790E-02	.00000000E+00	.23721460E-04	.00000000E+00	2
-.33175240E-02	-.22628790E-02	.11012740E-01	.00000000E+00	-.12385810E-03	.00000000E+00	3
.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	4
.16212300E-04	.23721460E-04	-.12385810E-03	.00000000E+00	.32666830E-04	.00000000E+00	5
.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	6

D C STNDRD ERRS .47303230E-01 .65677230E-01 .10494160E+00 .000 19.648 .000 .79803140E+01

Unit Cell Dimensions (M43)

1 M43-Mus KM 12-06-2013

DIRECT CELL .51900000E+01 .90070000E+01 .20102000E+02 90 .000 96 15.000 90 .000 .93410950E+03

RECIPROCAL CELL .19383030E+00 .11102480E+00 .50043740E-01 90 .000 83 45.000 90 .000 .10705380E-02

01-THETA ANGLES THTMX = 23.0 NCYC = 9 TOLMN = .0250 TOLMX = .1250 THEMX = 23.0 DMIN = 1.971317 MONOC SYSTEM

0 0 CONDITIONS FOR NON-EXTINCTION CALLED FOR CLASS CONDITION(S)

1CYCLE 10 M43-Mus KM 12-06-2013 2-THETA TOLERANCE = .17424 MONOC

0 N	H	K	L	D CALC	D OBS	LAMBDA	2-THETA CALC	2-THETA OBS	2-THETA DIFF	WEIGHT
1	0	0	2	10.040920	10.039950	1.540510	8.79915	8.80000	-.00085	1.00000
2	1	0	0	9.224456	9.205006	1.540510	9.57971	9.60000	-.02029	1.00000
3	1	0	1	7.618768	7.674789	1.540510	11.60500	11.52000	.08500	1.00000
4	0	1	2	4.922689	4.945620	1.540510	18.00417	17.92000	.08417	1.00000
5	-2	0	3	4.412965	4.418230	1.540510	20.10421	20.08000	.02421	1.00000
6	0	1	3	4.316741	4.299603	1.540510	20.55716	20.64000	-.08284	1.00000
7	4	1	0	2.135005	2.133826	1.540510	42.29551	42.32000	-.02449	1.00000

0	A	B	C	ALPHA	BETA	GAMMA	VOLUME
RECIPROCAL CELL	.10840750E+00	.17705260E+00	.49796230E-01	90 .000	73 53.359	90 .000	.91824410E-03
R C CORRECTIONS	.68940970E-08	.70211570E-08	-.48649530E-08	.000	.000	.000	-.58207660E-10

DIRECT CELL .96015330E+01 .56480410E+01 .20902750E+02 90 .000 106 6.641 90 .000 .10890350E+04

D C CORRECTIONS .00000000E+00 .00000000E+00 .38146970E-05 .000 .000 .000 .00000000E+00

LARGEST RESIDUAL REDUCED TO UNIT WEIGHT -.08500 OBS 3 STANDARD ERROR UNIT WT OBS .08712 DEGREES OF FREEDOM 3

R C STNDRD ERRS .24229650E-03 .10650210E-02 .40692740E-03 .000 .000 .000

DIRECT CELL VARIANCE-COVARIANCE MATRIX

						ROW
.62931670E-03	-.33566800E-05	-.28530480E-03	.00000000E+00	.11345220E-03	.00000000E+00	1
-.33566890E-05	.11542710E-02	-.31327220E-02	.00000000E+00	.80947190E-04	.00000000E+00	2
-.28530480E-03	-.31327220E-02	.25099700E-01	.00000000E+00	-.15696490E-03	.00000000E+00	3
.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	4
.11345220E-03	.80947190E-04	-.15696490E-03	.00000000E+00	.59872200E-04	.00000000E+00	5
.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	6

D C STNDRD ERRS .25086190E-01 .33974560E-01 .15842880E+00 .000 26.600 .000 .67701720E+01

Unit Cell Dimensions (M54)

1 M54Ball KM 12-04-2013

DIRECT CELL .94800000E+01 .56050000E+01 .21207000E+02 90 .000 106 55.000 90 .000 .10780830E+04

RECIPROCAL CELL .11025610E+00 .17841210E+00 .49286940E-01 90 .000 73 5.000 90 .000 .92757250E-03

01-THETA ANGLES THTMX = 23.0 NCYC = 9 TOLMN = .0250 TOLMX = .1250 THEMX = 23.0 DMIN = 1.971317 MONOC SYSTEM

0 0 CONDITIONS FOR NON-EXTINCTION CALLED FOR CLASS CONDITION(S)

1CYCLE 6 M54Ball KM 12-04-2013 2-THETA TOLERANCE = .05000 MONOC

0 N	H	K	L	D CALC	D OBS	LAMBDA	2-THETA CALC	2-THETA OBS	2-THETA DIFF	WEIGHT
1	0	0	2	10.044540	10.039950	1.540510	8.79597	8.80000	-.00403	1.00000
2	-2	0	2	4.651173	4.652310	1.540510	19.06470	19.06000	.00470	1.00000
3	2	0	0	4.451526	4.453355	1.540510	19.92827	19.92000	.00827	1.00000
4	-2	0	6	3.207249	3.210879	1.540510	27.79205	27.76000	.03205	1.00000
5	-3	0	1	3.080075	3.080502	1.540510	28.96410	28.96000	.00410	1.00000
6	0	2	1	2.881298	2.878654	1.540510	31.01080	31.04000	-.02920	1.00000
7	-1	2	1	2.778496	2.780912	1.540510	32.18873	32.16000	.02873	1.00000
8	-1	2	3	2.651106	2.651159	1.540510	33.78070	33.78000	.00070	1.00000
9	0	1	7	2.574190	2.575035	1.540510	34.82179	34.81000	.01179	1.00000
10	-3	0	7	2.494793	2.492598	1.540510	35.96724	36.00000	-.03276	1.00000
11	2	1	7	1.996402	1.995965	1.540510	45.38952	45.40000	-.01048	1.00000

0	A	B	C	ALPHA	BETA	GAMMA	VOLUME
RECIPROCAL CELL	.11232100E+00	.17173880E+00	.49778280E-01	90 .000	71 33.403	90 .000	.91089770E-03
R C CORRECTIONS	.80587480E-08	.11947100E-07	-.27501590E-08	.000	.000	.000	.58207660E-10
DIRECT CELL	.93850960E+01	.58227960E+01	.21176780E+02	90 .000	108 26.597	90 .000	.10978180E+04
D C CORRECTIONS	-.95367430E-06	-.47683720E-06	.19073490E-05	.000	.000	.000	-.12207030E-03

LARGEST RESIDUAL REDUCED TO UNIT WEIGHT .03276 OBS 10 STANDARD ERROR UNIT WT OBS .02435 DEGREES OF FREEDOM 7

R C STNDRD ERRS .66623890E-04 .80713220E-04 .27041480E-04 .000 .000 .000

DIRECT CELL VARIANCE-COVARIANCE MATRIX ROW

.27400870E-04	-.15716790E-06	-.21204990E-04	.00000000E+00	.28807590E-06	.00000000E+00	1
-.15716780E-06	.74888610E-05	-.51771730E-05	.00000000E+00	.43208920E-07	.00000000E+00	2
-.21204990E-04	-.51771730E-05	.14327250E-03	.00000000E+00	.27174080E-05	.00000000E+00	3
.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	4
.28807580E-06	.43208920E-07	.27174080E-05	.00000000E+00	.55041660E-06	.00000000E+00	5
.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	6

D C STNDRD ERRS .52345840E-02 .27365780E-02 .11969650E-01 .000 2.550 .000 .77514260E+00

Unit Cell Dimensions (M62)

1 M62lep KM 12-3-2013

DIRECT CELL .90150000E+01 .51920000E+01 .20330000E+02 90 .000 100 19.000 90 .000 .93617960E+03

RECIPROCAL CELL .11274900E+00 .19260400E+00 .49996690E-01 90 .000 79 41.000 90 .000 .10681710E-02

01-THETA ANGLES THTMX = 23.0 NCYC = 9 TOLMN = .0250 TOLMX = .1250 THEMX = 23.0 DMIN = 1.971317 MONOC SYSTEM

0 0 CONDITIONS FOR NON-EXTINCTION CALLED FOR CLASS CONDITION(S)

1CYCLE 10 M62lep KM 12-3-2013 2-THETA TOLERANCE = .07862 MONOC

0 N	H	K	L	D CALC	D OBS	LAMBDA	2-THETA CALC	2-THETA OBS	2-THETA DIFF	WEIGHT
1	0	0	2	10.118970	10.108740	1.540510	8.73115	8.74000	-.00885	1.00000
2	1	0	0	8.976982	9.008423	1.540510	9.84444	9.81000	.03444	1.00000
3	1	0	3	5.042567	5.034812	1.540510	17.57272	17.60000	-.02728	1.00000
4	2	0	0	4.488491	4.489052	1.540510	19.76250	19.76000	.00250	1.00000

5	-2	0	4	3.638982	3.641947	1.540510	24.44021	24.42000	.02021	1.00000
6	-1	0	6	3.325647	3.323677	1.540510	26.78382	26.80000	-.01618	1.00000
7	1	1	4	3.217100	3.210879	1.540510	27.70524	27.76000	-.05476	1.00000
8	2	1	2	3.092711	3.091997	1.540510	28.84319	28.85000	-.00681	1.00000
9	-1	1	6	2.784546	2.787664	1.540510	32.11690	32.08000	.03690	1.00000
10	2	1	4	2.668417	2.672675	1.540510	33.55505	33.50000	.05505	1.00000
11	-4	1	4	2.000823	1.999720	1.540510	45.28364	45.31000	-.02636	1.00000

0 A B C ALPHA BETA GAMMA VOLUME

RECIPROCAL CELL .11139600E+00 .19635240E+00 .49412160E-01 90 .000 81 23.383 90 .000 .10686050E-02

R C CORRECTIONS -.26339060E-08 .31100460E-08 .22261940E-09 .000 .000 .000 .00000000E+00

DIRECT CELL .90793090E+01 .50928840E+01 .20468620E+02 90 .000 98 36.617 90 .000 .93579940E+03

D C CORRECTIONS .00000000E+00 .00000000E+00 .00000000E+00 .000 .000 .000 .00000000E+00

LARGEST RESIDUAL REDUCED TO UNIT WEIGHT -.05505 OBS 10 STANDARD ERROR UNIT WT OBS .03931 DEGREES OF FREEDOM 7

R C STNDRD ERRS .12328290E-03 .55832670E-03 .63706430E-04 .000 .000 .000

DIRECT CELL VARIANCE-COVARIANCE MATRIX ROW

						ROW
.84531940E-04	-.70694680E-04	.23124950E-05	.00000000E+00	-.41568710E-05	.00000000E+00	1
-.70694690E-04	.20971610E-03	-.18897370E-03	.00000000E+00	.11404170E-04	.00000000E+00	2
.23124950E-05	-.18897370E-03	.61193570E-03	.00000000E+00	-.95279880E-05	.00000000E+00	3
.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	.00000000E+00	4
-.41568720E-05	.11404170E-04	-.95279890E-05	.00000000E+00	.26474320E-05	.00000000E+00	5

.00000000E+00 .00000000E+00 .00000000E+00 .00000000E+00 .00000000E+00 .00000000E+00 6

D C STNDRD ERRS .91941250E-02 .14481580E-01 .24737330E-01 .000 5.594 .000 .17694390E+01

Unit Cell Dimensions (M67)

1 M67cook KM 12-06-2013

DIRECT CELL .51600000E+01 .89300000E+01 .14100000E+02 90 .000 97 .000 90 .000 .64486820E+03

RECIPROCAL CELL .19525380E+00 .11198210E+00 .71454600E-01 90 .000 83 .000 90 .000 .15507040E-02

01-THETA ANGLES THTMX = 23.0 NCYC = 9 TOLMN = .0250 TOLMX = .1250 THEMX = 25.2 DMIN = 1.808712 MONOC SYSTEM

0 0 CONDITIONS FOR NON-EXTINCTION CALLED FOR CLASS CONDITION(S)

1CYCLE 6 M67cook KM 12-06-2013 2-THETA TOLERANCE = .06295 MONOC

0 N	H	K	L	D CALC	D OBS	LAMBDA	2-THETA CALC	2-THETA OBS	2-THETA DIFF	WEIGHT
1	1	0	1	4.689124	4.696257	1.540510	18.90898	18.88000	.02898	1.00000
2	0	2	0	4.460495	4.453355	1.540510	19.88779	19.92000	-.03221	1.00000
3	0	2	1	4.248689	4.250721	1.540510	20.89009	20.88000	.01010	1.00000
4	0	0	4	3.488353	3.487405	1.540510	25.51295	25.52000	-.00705	1.00000
5	-1	2	1	3.341392	3.343274	1.540510	26.65528	26.64000	.01528	1.00000
6	0	1	4	3.248808	3.247592	1.540510	27.42953	27.44000	-.01047	1.00000
7	-1	3	1	2.561636	2.558658	1.540510	34.99795	35.04000	-.04205	1.00000
8	2	2	0	2.240070	2.239195	1.540510	40.22360	40.24000	-.01640	1.00000
9	0	4	2	2.124345	2.126159	1.540510	42.51804	42.48000	.03804	1.00000

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 10   -2    1    5     1.964483     1.964856    1.540510       46.16928       46.16000         .00928       1.00000

0                    A             B             C           ALPHA      BETA       GAMMA         VOLUME

RECIPROCAL CELL    .19301850E+00   .11209520E+00   .71667080E-01    90   .000   83 35.583   90   .000     .15409360E-02

R C CORRECTIONS   -.34693280E-07  -.30864210E-08   .80221950E-08        .000        .001        .000    -.11641530E-09

   DIRECT CELL    .52134110E+01   .89209900E+01   .14041100E+02    90   .000   96 24.417   90   .000     .64895610E+03

D C CORRECTIONS    .95367430E-06   .00000000E+00  -.95367430E-06        .000        .000        .000     .61035160E-04

LARGEST RESIDUAL REDUCED TO UNIT WEIGHT  .04205   OBS   7   STANDARD ERROR UNIT WT OBS  .03147   DEGREES OF FREEDOM   6

R C STNDRD ERRS    .16139210E-03   .62673360E-04   .62034250E-04        .000        .000        .000

DIRECT CELL VARIANCE-COVARIANCE MATRIX                                                          ROW

                .16501690E-04  -.53245590E-05  -.10076720E-04   .00000000E+00  -.15010650E-05   .00000000E+00   1

               -.53245590E-05   .24878150E-04  -.45462390E-05   .00000000E+00   .38057970E-06   .00000000E+00   2

               -.10076720E-04  -.45462390E-05   .13092410E-03   .00000000E+00  -.36150990E-05   .00000000E+00   3

                .00000000E+00   .00000000E+00   .00000000E+00   .00000000E+00   .00000000E+00   .00000000E+00   4

               -.15010650E-05   .38057970E-06  -.36150990E-05   .00000000E+00   .21688850E-05   .00000000E+00   5

                .00000000E+00   .00000000E+00   .00000000E+00   .00000000E+00   .00000000E+00   .00000000E+00   6

D C STNDRD ERRS    .40622270E-02   .49878000E-02   .11442210E-01        .000       5.063        .000     .69507760E+00
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VITA

Karen Marchal was born in New Orleans, Louisiana. She obtained her Bachelor's of Science degree in psychology from the University of New Orleans in 2005. She joined the University of New Orleans graduate program to pursue a Master's in geology with a focus in igneous petrology and became a member of Dr. William Simmon's MP^2 research group in 2011.