# ELECTRON BACKSCATTER ANALYSES OF OMPHACITE TO CONSTRAIN ECLOGITE EXHUMATION IN THE BLUE RIDGE OF WESTERN NORTH CAROLINA

Kara Anne Syvertsen

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Approved by:

Dr. Kevin Stewart, Advisor

Dr. James Hibbard

Dr. Brent Miller

# ABSTRACT

Kara Anne Syvertsen**:** Electron backscatter analyses of omphacite to constrain eclogite exhumation in the Blue Ridge of western North Carolina

(Under the direction of Dr. Kevin Stewart)

The Lick Ridge eclogite is mapped as large bodies surrounded by accretionary wedge sediments in the Eastern Blue Ridge. The exhumation process of the Lick Ridge eclogite cannot be determined by analogy to other eclogite localities. Elsewhere, large bodies of eclogite are typically enclosed in continental rocks. Eclogite contained within accretionary wedge sediments do not exceed 25 meters in size. The orientation of the eclogite facies fabric can provide insight into the exhumation process.

Two eclogite lineation directions are present, but one is dominant. Compositional and petrographic data show the two lineations were found contemporaneous and most likely reflect a strain heterogeneity during eclogite facies deformation. The pervasive lineation indicates that the different Lick Ridge eclogite blocks were exhumed within a coherent terrane rather than as large blocks within a flowing mélange.

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# LIST OF ABBREVIATIONS

Å ........................................................................................Angstrom

Ae ........................................................................................Aegirine

AMS ........................................................................ Ashe Metamorphic Suite

Ca ........................................................................................Calcium

CPX ........................................................................................Clinopyroxene

EBSD ........................................................................Electron Backscatter Diffraction

$\varepsilon_1$ ........................................................................Primary Strain Direction

$\varepsilon_2$ ........................................................................Intermediate Strain Direction

Fe ........................................................................................Iron

FEG ........................................................................................Field-emission gun

Kbar ........................................................................................Kilobar

Km ........................................................................................Kilometer

Kv ........................................................................................Kilovolt

L-type ........................................................................................Lineation Dominant

$L_A$ ........................................................................................Lineation A

$L_B$ ........................................................................................Lineation B

LPO ........................................................................Lattice-Preferred Orientation

Jd ........................................................................................Jadeite

Ma ........................................................................................Million years ago

Mg ........................................................................................Magnesium

mm ........................................................................................millimeter

msec ........................................................................................Millisecond nA ....................................................................................................................nano-amp

Na ..........................................................................................................................Sodium

Pb ..............................................................................................................................Lead

S-Type ..................................................................................................Foliation Dominant

SEM ..................................................................................Scanning Electron Microscope

SPO ......................................................................................Shape-Preferred Orientation

U ..........................................................................................................................Uranium

## INTRODUCTION

The Lick Ridge eclogite outcrops in the eastern Blue Ridge Mountains of North Carolina. Eclogite forms at depths of greater than 30 kilometers by subduction of mafic rocks (Ernst, 1975; Maruyama et al., 1996). Therefore the occurrence of eclogite at the earth's surface provides geologists with a unique opportunity to gain insight into processes occurring deep within subduction zones including the conditions during deformation as revealed by the phase assemblage and mechanics of high pressure rock exhumation. The mapped bodies in the Blue Ridge are up to a kilometer in length and are surrounded by lower grade amphibolite, gneiss and pelitic schist of the Ashe Metamorphic Suite (AMS) (Figures 1 and 2) (Willard and Adams, 1994; Adams et al, 1995).

The modes of eclogite exhumation fall into three categories (Platt,1987; Mayutama et al., 1996; and Kurtz and Froitzhein, 2002); 1) eclogite blocks can be carried to the surface in flowing accretionary wedge sediments (Cloos, 1982) or serpentinite diapirs (Okay and Monié, 1997), 2) buoyancy driven exhumation of subducted continental crust (Chemenda et al., 1995; Ernst 2001) and 3) overburden removal by crustal doming (Platt, 1993; Leech and Ernst, 2000; Burov et al., 2001; McClelland and Gilotti, 2003) or over-thickening of the accretionary wedge due to underplating (Platt, 1986), in both cases causing extensional normal faulting. Erosion by itself, or as a dominant exhumation mechanism, has been discounted because large sedimentary deposits are not found in association with high pressure rocks (Platt, 1987; Maruyama et al., 1996; Burov et al., 2001). The normal faults necessary to unload material from above the Lick Ridge eclogite as well as serpentinite are

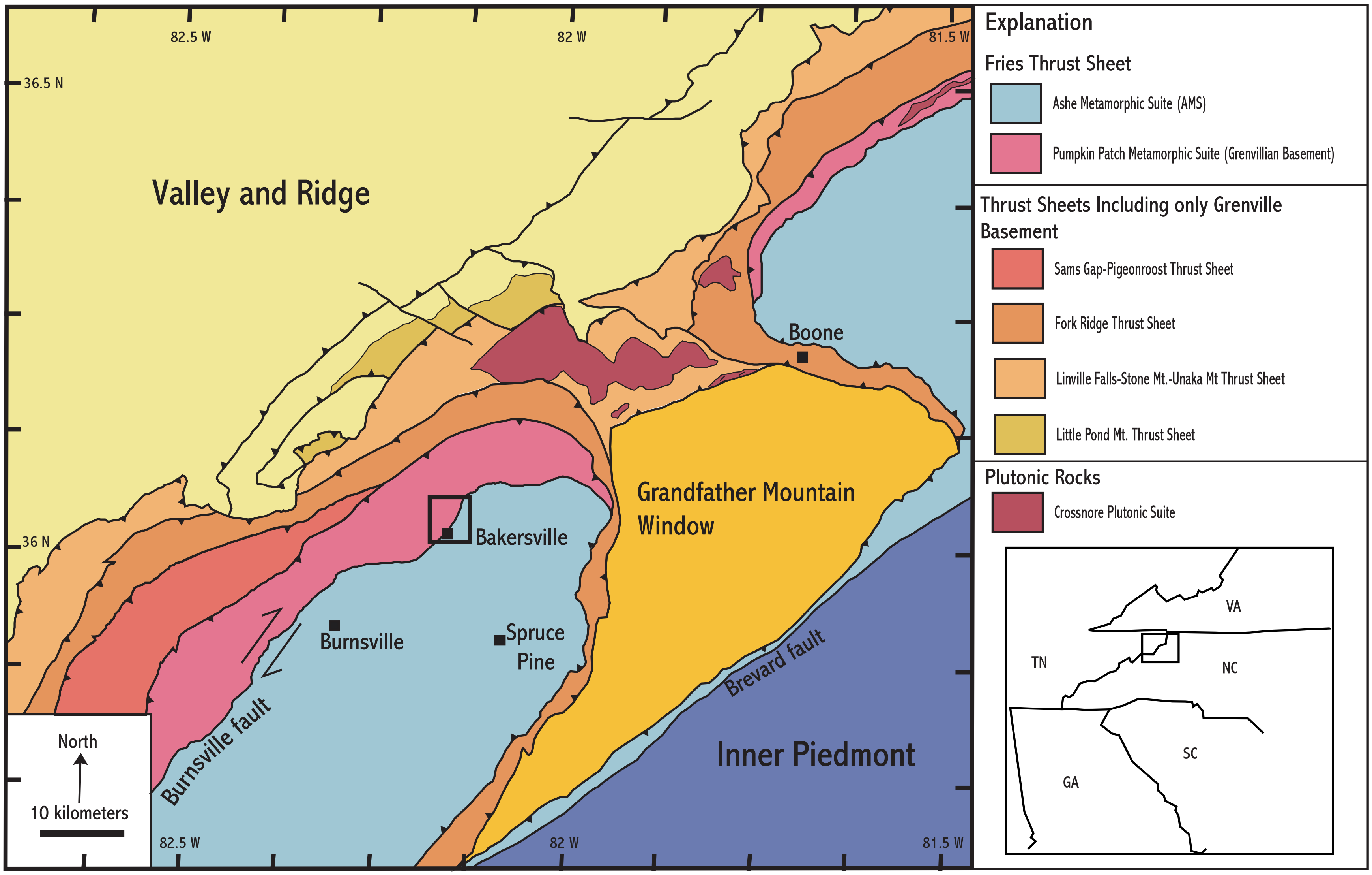


Figure 1: Generalized geological map of the Blue Ridge Mountains of North Carolina and Tennessee. The Lick Ridge eclogite is located within the box indicated (area of Figure 2). The Burnsville fault lies to the west of the eclogite and Bakersville is located to the south. (Modified from Adams et al., 1995).

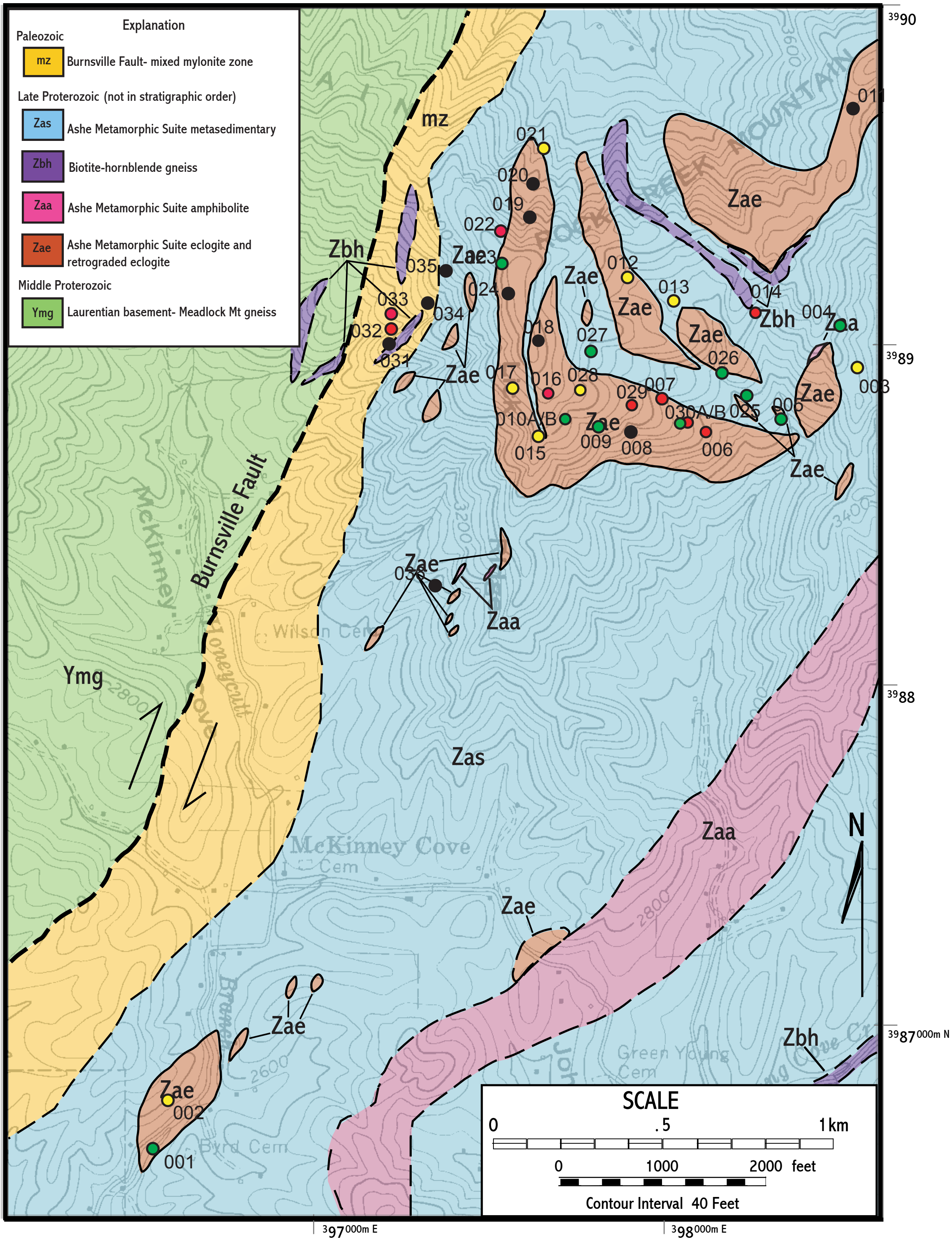


Figure 2: Geological map showing the locations of the Lick Ridge eclogite outcrops surrounded by the AMS. The filled circles show the locations of each sample collected and the relative amount of cpx preserved in the sample based on thin section analysis. Green- well preserved; Yellow- moderately preserved; Red- poorly preserved; Black- unusable. Map modified from Adams et al., (1995).

both absent in the Eastern Blue Ridge. The remaining two mechanisms, entrainment in upward-flowing accretionary wedge sediments and buoyancy-driven exhumation are the most likely for exhuming the Lick Ridge eclogite.

The buoyancy-driven exhumation mechanism as discussed by Platt (1987) and modeled by Chemenda et al. (1995; Figure 3a), can explain the uplift of subducted continental crust from depths of 30 kilometers or more and has been used to explain the exhumation of large slabs of high and ultra-high pressure rock (e.g. Maruyama et al., 1996; Faure et al., 2003). This model involves subduction of continental crust containing mafic rocks to eclogite-facies depths. At these depths the continental crust is less dense than the surrounding mantle and therefore feels an upward pull. If a slab of this down-going plate detaches it will return to the surface rapidly enough to preserve the high-pressure mineral assemblage within the mafic rocks. The eclogite has a mid-ocean ridge basalt geochemistry (Miller et al., 2000) and is not found in association with continental crustal rocks. The Lick Ridge eclogite experienced eclogite facies pressures and temperatures as the result of ocean crust subduction, not continental crust. Therefore Chemenda et al's model of exhumation cannot be applied to the Lick Ridge eclogite without modification.

In contrast, the small eclogite bodies of the Franciscan in California were likely exhumed within flowing accretionary pelites. Blocks, including eclogite, were able to be plucked from the walls of the accretionary wedge and carried to the surface according to a model developed by Cloos, (1982; Figure 3b). In this model an upward flow of sediment is created due to compaction of material in the sharp corner at the deepest part of an accretionary wedge as the subducting plate pulls sediment down. The additional material added to this corner forces material to flow out and up, thus forcing sediments to the surface.

One of the constraints of this model, however, is that the mafic blocks cannot be greater than about 25 meters in diameter. Blocks larger than this will sink through the flow rather than be entrained in it (Cloos, 1982). This model is not applicable to the Lick Ridge eclogite because the mapped bodies are substantially greater than 25 meters (Figure 2).

This study uses the preserved eclogite fabric within the Lick Ridge eclogite to better understand the nature of the exhumation process. In hand sample, the foliation is defined by alternating garnet-rich and clinopyroxene-rich layers (Figure 4). The clinopyroxene also have a shape-preferred orientation (SPO) that tends to be parallel with the cleavage direction. The c-axes are parallel with the clinopyroxene cleavage and in most cases with the SPO of the grains. Therefore, this SPO indicates that the c-axes are aligned, forming a lattice-preferred orientation (LPO), which is common within eclogites around the world (Helmstaedt et al., 1972; Boundy et al., 1992; Godard and van Roermund, 1995; Ábalos, 1997; Mauler et al., 2000, 2001; Piepenbreier and Stöckhert, 2001; Bascou et al., 2001, 2002; Brenker, 2002; Kurz et al., 2004).

The composition of several samples was determined by microprobe analysis. Additionally characteristics of the samples such as garnet concentration and size, and foliation were compared between samples. These variations, and the possible causes, may provide insight into the conditions during and after peak metamorphic conditions as clinopyroxene LPOs may be linked to the strain regime at the time of deformation (Bouchez et al., 1983; Boundy et al., 1992; Godard and van Roermund, 1995; Ábalos, 1997; Mauler et al., 2000, 2001; Piepenbreier and Stöckhert, 2001; Bascou et al., 2002; Kurz et al., 2004).

The high pressure fabric can be used to constrain the exhumation mechanism of the Lick Ridge eclogite. If the omphacite c-axes are parallel with the separately mapped eclogite bodies it would indicate that the Lick Ridge eclogite has been exhumed as a large terrane several kilometers long and a kilometer or more thick. Consequently the exhumation mechanism must bring a coherent slab of eclogite to the surface. Conversely, if the omphacite c-axes from the eclogite bodies are not parallel than the bodies are disconnected and the mechanism must exhume kilometer-scale eclogite blocks within an accretionary mélange.

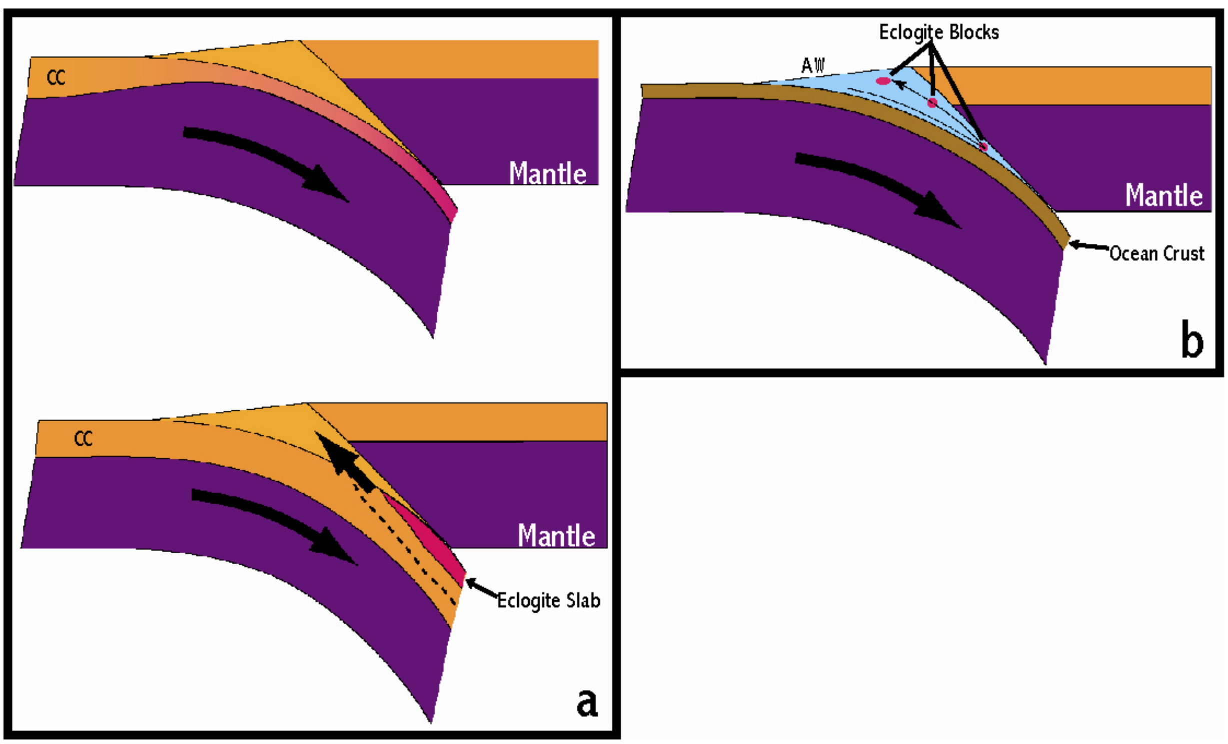


Figure 3: Two models for the exhumation of high pressure rock; a) Continental crust (CC) is subducted into the mantle. A slab detaches from the down-going plate and bobs up to the surface due its buoyancy. (Chemenda, 1995) b) Small (<25m) blocks of eclogite incorporated into the upward flowing accretionary wedge (AW) sediments. (Cloos, 1982)

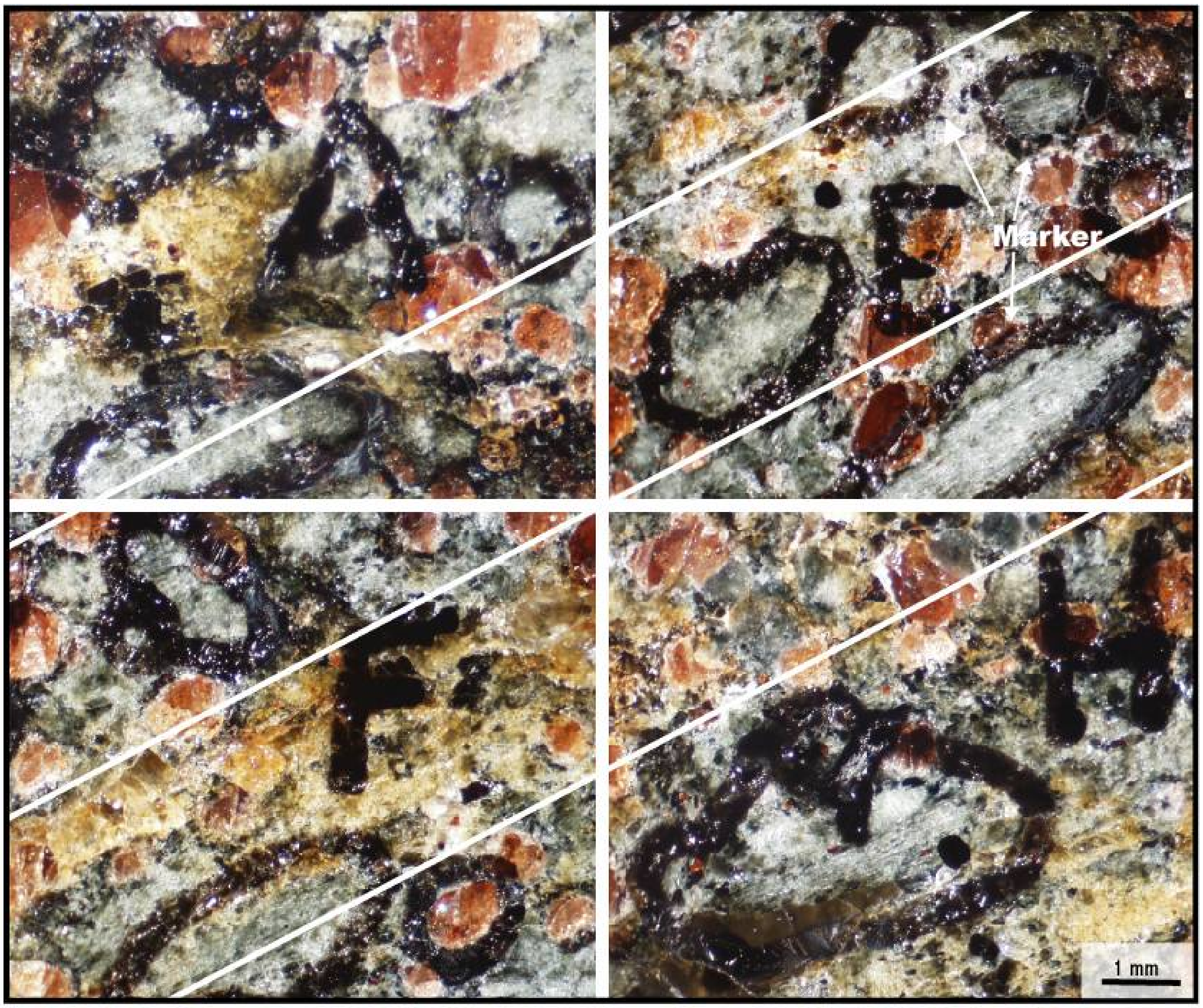


Figure 4: The cpx shape preferred orientation of BAK-03-015 as evident in four photomicrographs of a polished slab. Several of the larger cpx grains have been circled with black marker. The diagonal white lines show the direction of the bulk foliation in the sample.

## GEOLOGICAL SETTING

The Lick Ridge eclogite is located near the base of the Fries thrust sheet, the structurally highest in a series of Alleghanian thrusts that define the Blue Ridge thrust complex (Figure 1; Stewart and Trupe, 1997; Trupe et al., 2004). The Fries thrust sheet contains the Devonian dextral strike-slip Burnsville fault (Adams et al, 1995; Trupe et al, 2003). To the west of this fault lie Laurentian basement rocks. To the east are the rocks of the AMS. The AMS is, in part, a Taconic accretionary wedge complex of unknown provenance (Willard and Adams, 1994; Adams et al., 1995) It consists of interlayered pelitic schists, mica gneiss and amphibolite with bodies of ultramafic rocks and eclogite and is crosscut by 377 Ma pegmatites and leucogranites of the Spruce Pine Plutonic Suite (McSween et al., 1991; Adams et al. 1995; Trupe et al., 2003). This wedge formed east of the Laurentian continental margin during the Ordovician Taconian orogeny.

Miller et al. (2000) have demonstrated that the Lick Ridge eclogite is most likely metamorphosed mid-ocean ridge basalt based on the eclogite's geochemical signature. The peak eclogite assemblage is omphacite, garnet, quartz and rutile. The rutile is present as inclusions in garnet and within the matrix. U-Pb ages from zircon dates peak eclogite conditions at 459.4 ± 2.6 Ma (Miller et al., 2000). Quartz, rutile, zircon and clinopyroxene are concentrated in the cores of garnet grains. This "zoned" inclusion pattern is present in other high pressure rocks; e.g. the ultrahigh pressure eclogite of the Western Gneiss region, Norwegian Caledonides (Cuthbert et al., 1998). The garnets range from compositional zoned patterns to homogeneous (Dubé, 2001, Watcher, 2002).

The peak jadeite content of the clinopyroxene is approximately 30%, with many grains showing a more sodic core as the clinopyroxene reacted to diopside, either during decompression or a later prograde metamorphic event (Willard & Adams, 1994; Dubé, 2001; this study). Figure 5a shows the omphacite composition of the more pristine sample locations on a jadeite-aegirine-quadrilateral pyroxene ternary diagram. The highest jadeite component that I found was $Jd_{25}$. The rim compositions cluster within the diopside field (Figure 5b). A useful representation of all the data is the plot of Q-J (Figure 5c) (Morimoto et al., 1988) where Q = Ca + Mg + $Fe^{2+}$ (the quadrilateral cations) and J = 2Na (the Jd and Ae cations). This diagram includes all the data points and shows the gradation from omphacite (Ca-Na field) to diopside.

The most jadeite-rich pyroxene grains are light green under plain-polarized light and are euhedral with moderately to well-developed cleavage. Amphibolite alteration of the clinopyroxene tends to occur in, although is not confined to localized areas around the margins of the eclogite bodies and adjacent to fractures. Petrographically this is evident by an increase in pyroxene birefringence, green to brown pleochroism and an increase in the abundance of plagioclase lamellae and blebs within the clinopyroxene grains. Additionally the omphacite loses sharp grain boundaries due to growth of retrograde minerals, mainly amphibole and plagioclase. Amphibolitization is further evident by growth of hornblende grains that overprint the surrounding eclogite facies phases (Dubé, 2001) and hornblende-plagioclase symplectite surrounding garnets and occupying embayments along the garnet rims.

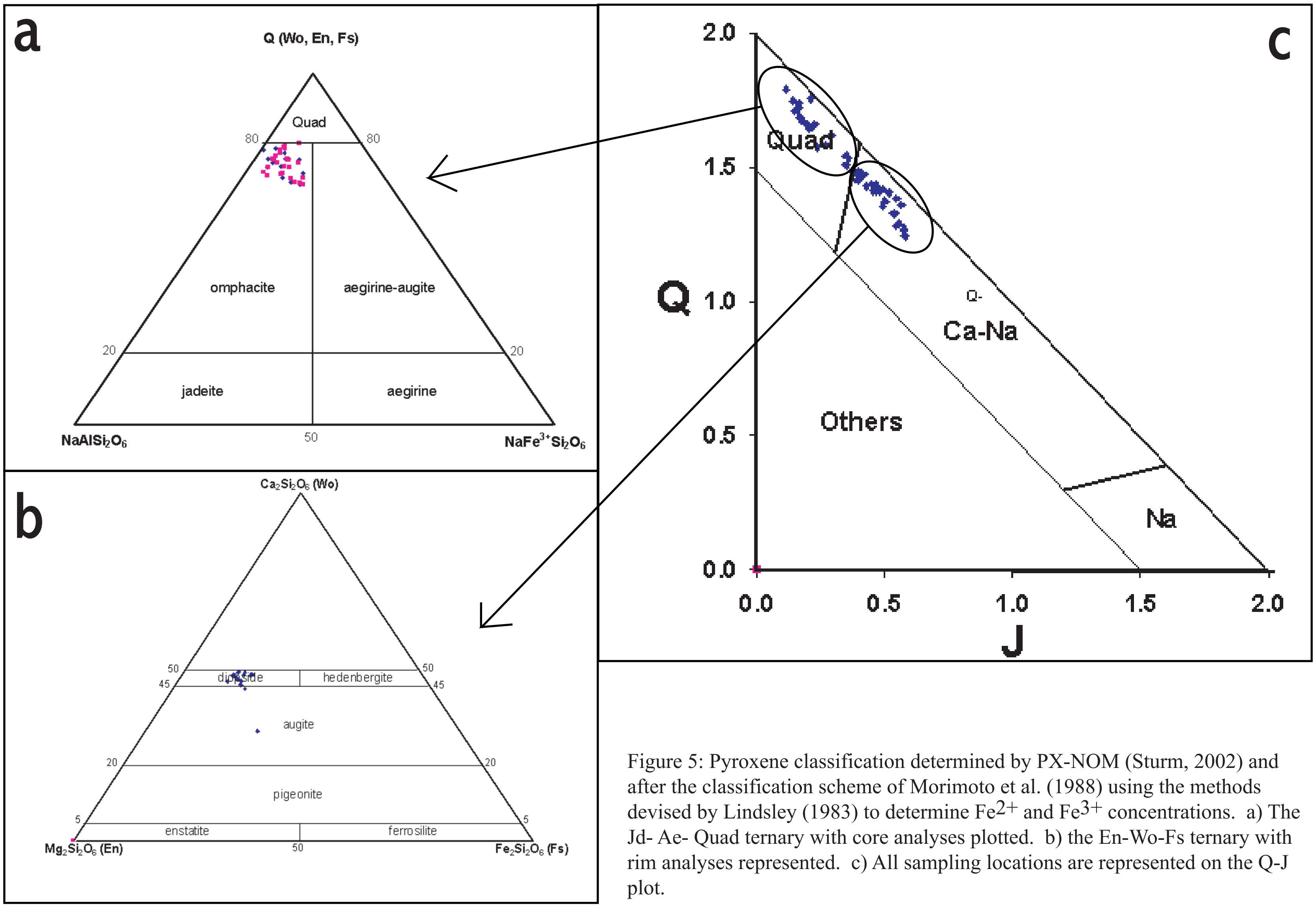


Figure 5: Pyroxene classification determined by PX-NOM (Sturm, 2002) and after the classification scheme of Morimoto et al. (1988) using the methods devised by Lindsley (1983) to determine $Fe^{2+}$ and $Fe^{3+}$ concentrations. a) The Jd- Ae- Quad ternary with core analyses plotted. b) the En-Wo-Fs ternary with rim analyses represented. c) All sampling locations are represented on the Q-J plot.

## METHODS

### Sample Preparation

Thirty-eight oriented eclogite hand samples were collected from the six large outcrops as well as several of the smaller bodies (Figure 2). No lineation is visible in the hand samples therefore two cuts were made normal to each other and to the foliation. A thin section was then prepared from the face that contained the most omphacite based on visual inspection. These sections were cut such that the long sides of the slide are parallel to the strike of the cut face. They were then polished with grit sizes stepping down to a ¼ micron diamond paste followed by SYTON colloidal silica polish for 10-12 hours to minimize the relief on the surface. Any roughness on the surface of the slide results in a poorer quality electron diffraction pattern. A thin (10-50 Å) carbon coat was applied to the surface.

### Electron Backscatter Diffraction

In eclogite, garnet porphyroblasts act as rigid bodies while the clinopyroxene deforms plastically and preserves the high-pressure flow fabric (Godard et al., 1995; Ábalos, 1996; Mauler et al., 2001). Therefore previous studies focused on the lattice preferred orientation (LPO) of clinopyroxene as an indication of the strain experienced at peak conditions (Helmstaedt et al., 1972; Boundy et al., 1992; Godard and van Roermund, 1995; Ábalos, 1997; Mauler et al., 2000, 2001; Piepenbreier and Stöckhert, 2001; Bascou et al., 2001, 2002; Brenker, 2002). Groundwork on cpx LPO of eclogite was lain by Helmstaedt et al. (1972) who described lineation (L-type) and foliation (S-type) omphacite fabrics. L-type eclogites contain a maximum of [001] poles (hereafter referred to only by the [hkl] plane the pole is normal to) and a [010] girdle normal to that maximum. This fabric is produced by constriction (Helmstaedt et al., 1972) or simple shear (Mauler et al., 2000). Foliation, or S-type, eclogite contain a [010] maximum and a perpendicular [001] girdle. This fabric is attributed to flattening (Helmstaedt et al., 1972) or pure shear (Mauler et al., 2000).

Few clinopyroxene LPO studies were conducted between the early 1970's and the late 1990's because the only way to analyze the LPO of clinopyroxene was to use a five-axis universal stage. Not only is this technique extremely time consuming, it is not as accurate as Electron Backscatter Diffraction (EBSD). EBSD utilizes the electron beam from a scanning electron microscope. As the beam enters a grain the electrons are diffracted around the nuclei of the atoms within the lattice of a mineral (Figure 6). The electrons leave the sample in two cones of intensity. Within the EBSD detector a phosphor screen intersects these diffracted electrons and a bright band is produced on the screen, called a Kikuchi band. Using a selected database of crystallographic structure files for each phase, Channel5 software compares the pattern of the Kikuchi bands produced by the sample to the predictable patterns calculated from the database to determine the orientation of the lattice to an accuracy of one degree.

Helmstaedt et al.'s (1972) early work has been expanded using EBSD to recognize intermediate fabrics such as LS and SL LPO patterns (Godard and van Roermund, 1995; Mauler et al., 2001; Brenker et al. 2002). Most subsequent attention has been given to the determination of the omphacite slip system(s) operating during plastic deformation and the possible controls of temperature, pressure and strain regime (Boundy et al., 1992; Godard and van Roermund, 1995; Mauler et al., 2000, 2001; Bascou et al., 2001, 2002; Brenker et al., 2002). Most important to this study are these authors' observations that omphacite LPO is controlled by the strain regime during eclogite-facies metamorphism and a c-axis obliquity to the foliation is indicative of non-coaxial deformation.

Also, the LPO of clinopyroxene has been studied recently because the orientation of a major phase in eclogite has direct consequences on the seismic properties of these rocks at depth. Therefore eclogite may be detectable within active subduction zones as an area of high velocity identified in seismic tomography models or bright reflectors on deep seismic reflection profiles (Mainprice and Micolas, 1989; Bascou et al., 2001).

The EBSD analysis was done at the University of Minnesota using a JEOL 6500 field-emission gun (FEG) scanning electron microscope (SEM) with an EBSD attachment at 20Kv, a working distance of 25.1mm and a sample angle of 70° to the beam. Although automatic acquisition is possible either by defining a mapping grid, line or set of points, spots were manually determined. This was done for two reasons; 1) the nature of this study does not call for mapping within a single grain and 2) the LPO of clinopyroxene from many different, geographically isolated sample locations is required. The locations for analyses on each grain were determined manually based on sample surface and carbon coat quality to ensure the most accurate measurements possible. Anywhere from seven to seventy-three spots were analyzed per grain. Two to nineteen grains were analyzed per sample.

The Channel5 software provides the LPO data using the edges of the thin section as the reference axes. The E-W axis of the lower hemisphere projection is initially parallel to the long axis of the 2 inch by 1 inch slide. Therefore each orientation data point must be rotated according to the strike and dip of the surface of each thin section to permit comparison of the data in geographic space. Furthermore, there is a broad post-Taconic synform present in the area as evident in the foliation data collected during this and previous studies (Figure 7). To compare the Taconian eclogite fabric orientation prior to this folding event the data were rotated to horizontal along the strike of the foliation. For a detailed explanation of the geographic and structural corrections see Appendix 4.

### Microprobe

The microprobe work was done by Dr. Donna L. Whitney at the University of Minnesota. Operating conditions for qualitative analysis were 15 kV accelerating voltage, 25 nA beam current, and a focused beam. X-ray maps were determined for Ca, Fe, Mg, and Na using a beam current of 100 nA and a 50 msec dwelltime. Microprobe analyses of Ca, Fe, Mg and Na were done on grains K and R of BAK-03-001, grain F of BAK-03-026 and grains J and L of BAK-03-030A also by Dr. Whitney at the University of Minnesota. The results are given in Appendix 3. Natural mineral standards and the ZAF matrix correction routine were used for quantitative analyses.

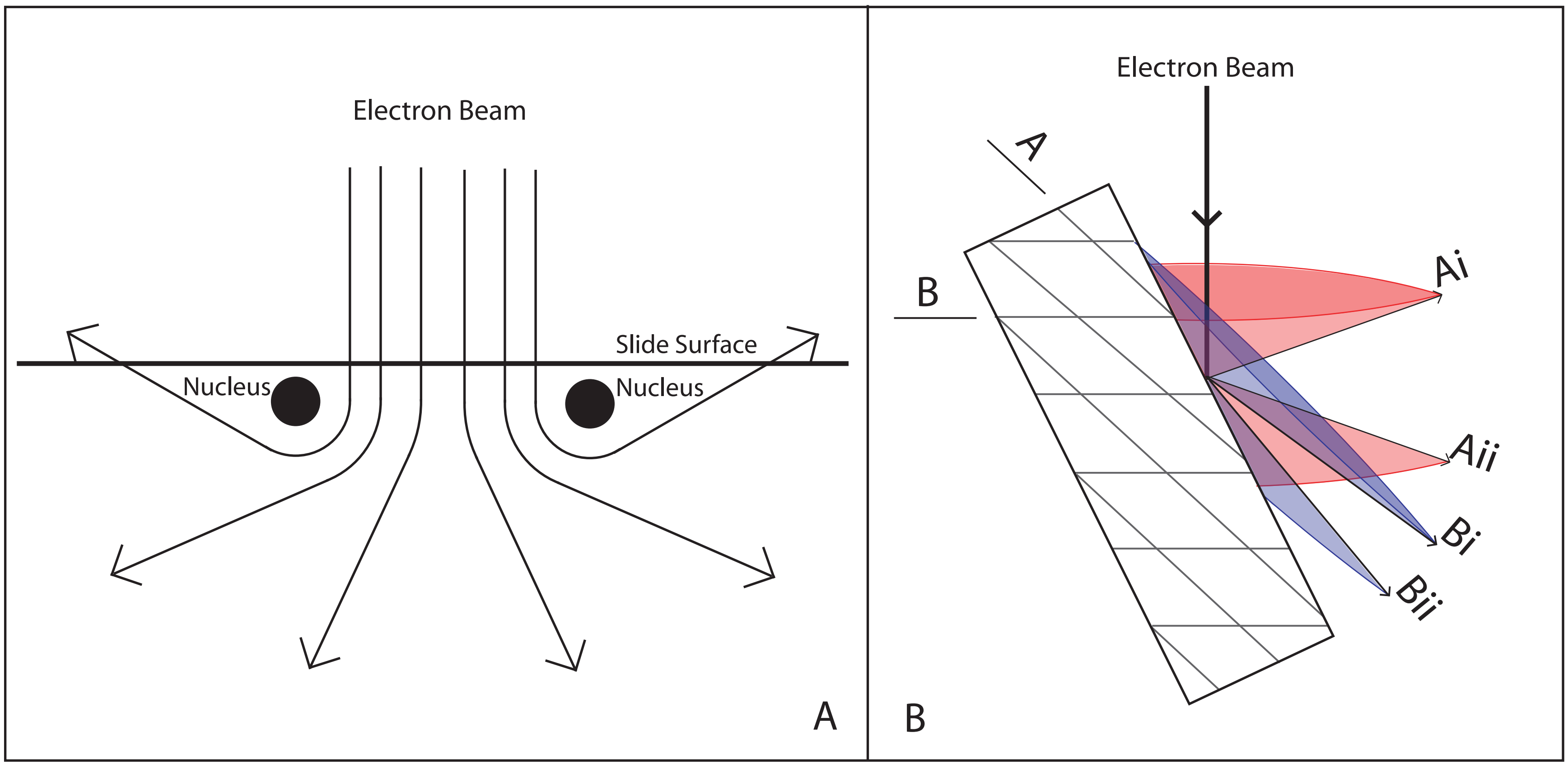


Figure 6: EBSD uses the electron beam from an SEM. A) As the beam enters the surface the electrons are diffracted around the nuclei of the atoms within the grain and leave the the surface in two cones of intensity. B) Each lattice plane produces two unique cones, e.g.. lattice plane A and lattice plane B produced cones Ai and Aii, Bi and Bii respectively. The phosphor screen detector would be located to the right of figure 5B and intersect the four cones. The bands produced by this intersection are unique to the lattice planes present and their orientation with respect to the phosphor screen.

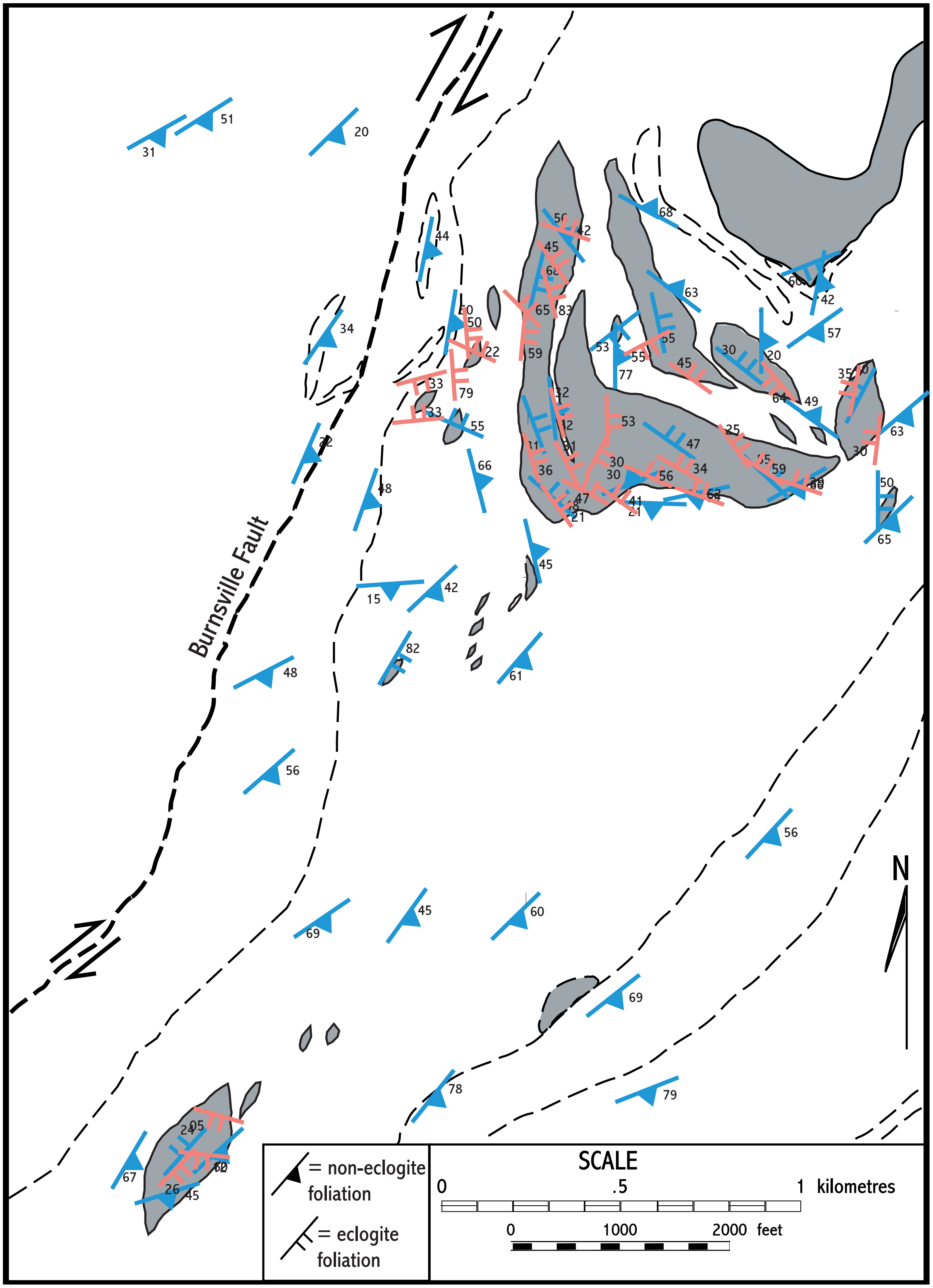


Figure 7: Foliation strike and dip collected during this study (red symbols) and by Adams et al., (1995) (blue symbols). The geology is the same as that in Figure 2. The synform is evident in the eclogite foliation in the northern half of the map

## RESULTS

### Clinopyroxene LPO

Two to nineteen grains were analyzed from ten samples; the "tilt-corrected" [001] orientations are presented on the geologic map with sample locations (Figure 8). Two lineation directions are evident and designated lineation A ($L_A$) and lineation B ($L_B$). $L_A$ is oriented SSW-NNE and once corrected for the dip of foliation, plunges anywhere from 0° to ~50° from foliation, usually to the SSW. $L_B$ trends NE-SW and is less oblique to the foliation with only a few grains plunging more than 15° from the foliation either to the northwest or southeast. While many samples contain both $L_A$ and $L_B$, usually one is more dominant than the other. One sample, BAK-03-017, contains equally strong $L_A$ and $L_B$ lineations and therefore is best described as a transitional fabric. Additional information can be extracted from the [010] axes and a*(100) pole orientations. For an explanation of the meaning and use of the a*(100) notation see Appendix 4. Thus far such information has been used to describe the fabric type and attempt to deduce the strain regime (Boundy et al., 1992; Godard and van Roermund, 1995; Mauler et al., 2000, 2001; Bascou et al., 2001, 2002; Brenker et al., 2002). In this study, however the LPO of the [010] and a*(100) are useful to identify further similarities and differences between the LPO of the samples.

#### Lineation A

The samples that are dominated by $L_A$ are located throughout the field area (Figure 8). Sample BAK-03-001 is the southernmost sample while BAK-03-021 is 3 km to the north and BAK-03-003 is 3 km to the northeast. The [001] axes of samples BAK-03-012, BAK-

03-014, BAK-03-015 and BAK-03-023 are also parallel to the $L_A$ direction. Commonly there is an obliquity between the [001] axes and the foliation plane. Obliquity between the foliation plane and the c-axis is well-documented in quartz (e.g. Lister and Hobbs, 1980; Mainprice and Nicolas, 1989; Mainprice et al, 1993; Llana-Fúnez, S., 2002), olivine (e.g. Bouchez et al., 1983; Mainprice and Nicolas, 1989; Lee et al., 2002), calcite (Erskine et al., 1993) and pyroxene (e.g. Boundy and Fountian, 1992; Ábalos, 1997, Bascou, J., et al., 2002; Brenker, F. E., et al., 2002). While it is not unusual for quartz lineations to lie up to 40° out of the plane of foliation, few eclogite studies report an angle of greater than 15° between foliation and the clinopyroxene [001] maximum. This may indicate that the Lick Ridge eclogite experienced a small shear component during deformation. To produce low angles of obliquity the rock experienced a large simple shear (Means et al., 1980; Ábalos, 1997; Bascou et al., 2001). The clinopyroxene LPO the Lick Ridge eclogite are commonly oriented more than 15° from the foliation plane. Therefore the Lick Ridge eclogite most likely experienced minimal to moderate amounts of simple shear.

Sample BAK-01-001, from the most southerly outcrop, is an L-type fabric with [001] axes trending southwest ($L_A$) and oblique to the foliation (Figure 9). At this location the [010] axes and a*(100) poles form maxima subnormal to, and lying within, the plane of foliation respectively. A true L (or LS) type fabric as presented by Helmstaedt et al. (1972) contains a [010] girdle in a plane normal to foliation and lineation. Perhaps a greater number of measurements would reveal a stronger girdle. However 84 data points were taken for sample BAK-03-001 and there is little scatter in the three plots. This three maxima configuration has not been previously documented in any clinopyroxene LPO study to date.

BAK-03-021 is the most northern in the field area, located 3km from BAK-03-001. This sample also displays an L-type fabric. The [001] LPO pattern of this sample, also $L_A$ parallel, is oriented SSW-NNE and oblique to the foliation plane and the a*(100) is also oriented in a maximum oriented east-west (Figure 9). The [010], however, exhibits a more pronounced girdle than does sample BAK-03-001.

BAK-03-015 is located in the southwest corner of the same large eclogite body as BAK-03-021. This sample's LPO pattern is similar to BAK-03-001 with [001], [010] and a*(100) maxima at right angles to each other. A few clinopyroxene grains are oriented NW-SE, parallel to the $L_B$ direction (Figure 9). The majority of the [001] are oriented parallel to $L_A$ but are not at as high an angle to the foliation as the other $L_A$ samples.

The L-type fabric of sample BAK-03-003 contains $L_A$-parallel [001] axes. The [010] and a*(100) form girdles although perpendicular maxima do exist reminiscent of BAK-03-001 (Figure 9). Bak-03-003 was sampled from a third, 25 meter long outcrop located on the east side of the field area (Figure 8).

Three additional samples that contain $L_A$ [001] axes are Bak-03-014, BAK-03-023 and BAK-03-012. These samples have few analyses which decrease my confidence in accurately interpreting their fabrics. The analyses of a few grains may show a maximum, but the analysis of many may have revealed that those few grains were merely closely spaced points within a girdle. However, these three samples should not be dismissed entirely.

BAK-03-014 is from a 30 meter-long body between BAJ-03-003 and BAK-03-12. The LPO of this sample is intermediate between L and S, and may be most accurately labeled an SL due to the apparent [001] axis girdle. However, the points in the north-east quadrant are the [001] axes of one cpx grain located within an amphibole-rich region of the slide.

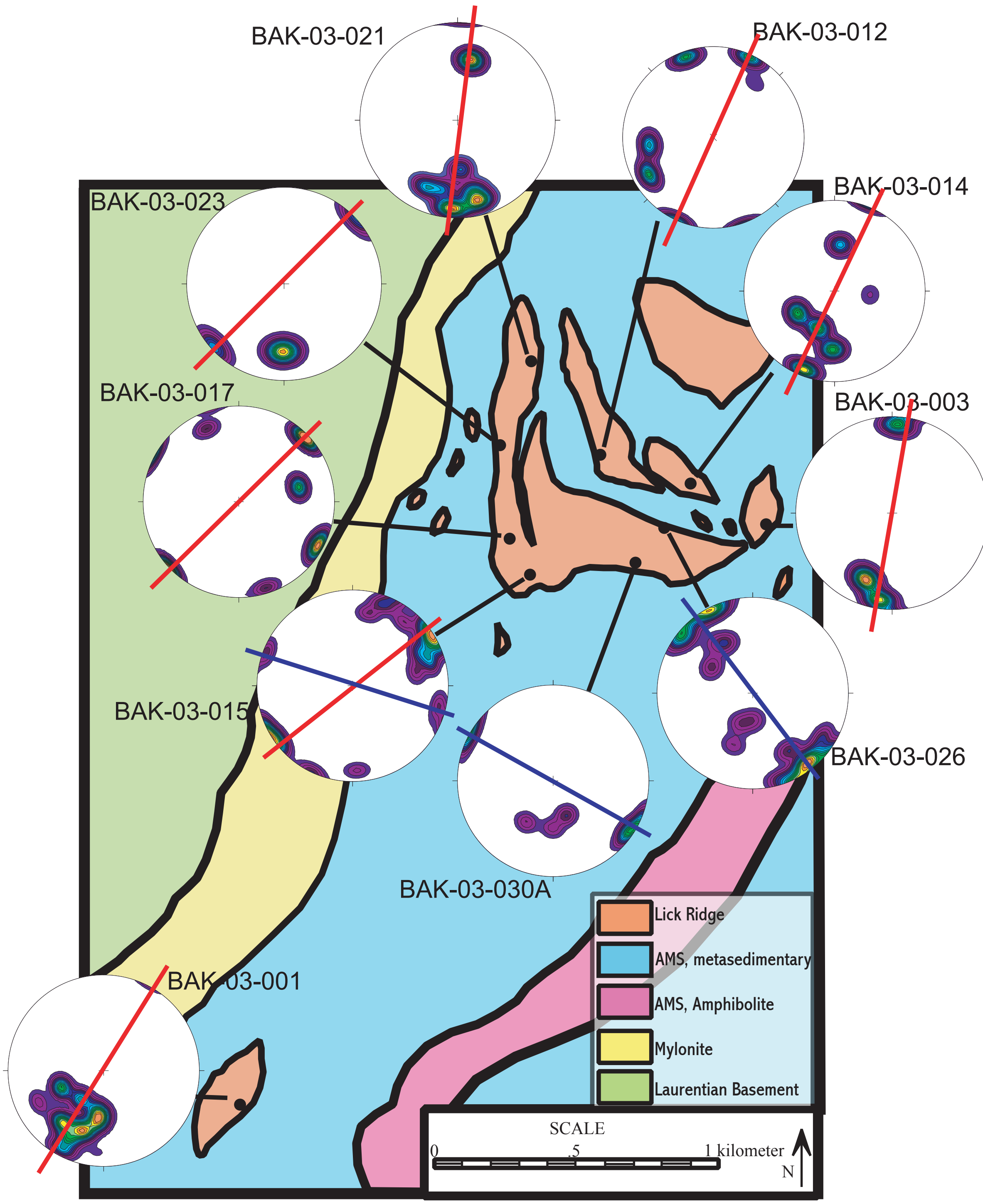


Figure 8: Lower hemisphere contoured plots of cpx [001] axes with sample locations. See the following three figures for contour intervals for each plot. The red lines indicate the $L_A$ orientation and the blue lines indicate the $L_B$ orientation.

Therefore, those data may not accurately depict an eclogite LPO. The plot of this sample, disregarding the incompatible grain, includes a [001] maximum parallel to $L_A$, an a*(100) maximum parallel to foliation but perpendicular to the $L_A$ and a weak [010] maximum, out of the foliation plane and perpendicular to the [001] maximum (Figure 9).

Thirty meters south of BAK-03-021, BAK-03-023 was collected from the same mapped body (Figure 8). This sample also contains $L_A$ parallel [001] maximum and an a*(100) maximum oriented east-west (Figure 9). The [010] maximum is sub-parallel to foliation. BAK-03-012 was taken from an outcrop that is about 700 meters long in map view. The LPO of BAK-03-012 displays [001] axes oriented similarly to the samples previously discussed $L_A$ samples. The [010] and a*(100) may possibly define girdles oriented in a great circle perpendicular to the lineation and foliation, oriented E-W.

**Lineation A Obliquity**

Through qualitative element maps and quantitative microprobe Ca, Fe, Mg and Na analyses of several $L_A$-oriented omphacite grains within BAK-03-001 and BAK-03-021, a possible compositional dependence on the degree of [001] obliquity can be determined. Previous studies did not discuss specific omphacite compositions of the grains they analyzed. Rather a general omphacite composition is assumed for all the samples taken from a location. (Boundy and Fountain, 1992; Ábalos, 1997; Mauler et al., 2001; Piepenbreier and Stöckhert, 2001; Brenker et al, 2002; Kurz et al, 2004). As a result, if the composition of the clinopyroxene does affect the grain's LPO the previous studies could not have established this relationship.

The elemental grain maps for several $L_A$ representative samples are provided in Figure 10. The angle between [001] and foliation of the grains mapped in Figure 10 increases from left to right. Therefore a dependence on omphacite composition is reflected as a shift in map colors across the figure. The lack of color change indicates that the [001] angle is not dependent on omphacite composition. The jadeite compositions $J_{21}$ and $J_{18}$ of grains BAK-03-001 R and BAK-03-001 K respectively are consistent with this conclusion as well.

Garnets surrounding an omphacite may affect the degree of [001] obliquity. Previous clinopyroxene LPO studies have either ignored the garnet porphyroblasts in natural samples (Bascou et al, 2001; Piepenbrier and Stöckhert, 2001; Brenker et al, 2002), omitted them in synthetic pyroxene aggregates or computer models (Mauler, 2000; Bascou et al, 2002;) or briefly mentioned that they act as rigid bodies during deformation (Boundy and Fountain, 1992; Godard et al., 1995; Ábalos, 1996; Mauler et al., 2001). Garnets are a major component of the Lick Ridge eclogite, in some cases more abundant than clinopyroxene, and therefore should not be overlooked. The grains to the left on Figure 10 show a marked lack of garnets surrounding the pyroxene as opposed to those on the right. The grains on the right, BAK-03-001 K1 and H2, are smaller and are surrounded on more sides by garnet than the two grains on the left of Figure 10. The surrounding garnets seem to shield the encompassed clinopyroxene grain from experiencing as high a simple shear strain as those clinopyroxene less enclosed by rigid garnets. A similar phenomenon was observed in clinopyroxene that was bordered on three sides by a single hollow garnet (Mauler et al., 2001). In that study the LPO of clinopyroxene within the garnet show a less well developed strain-induced lineation than clinopyroxene outside the garnet. This clinopyroxene was protected from the strain during deformation (Mauler et al., 2001).

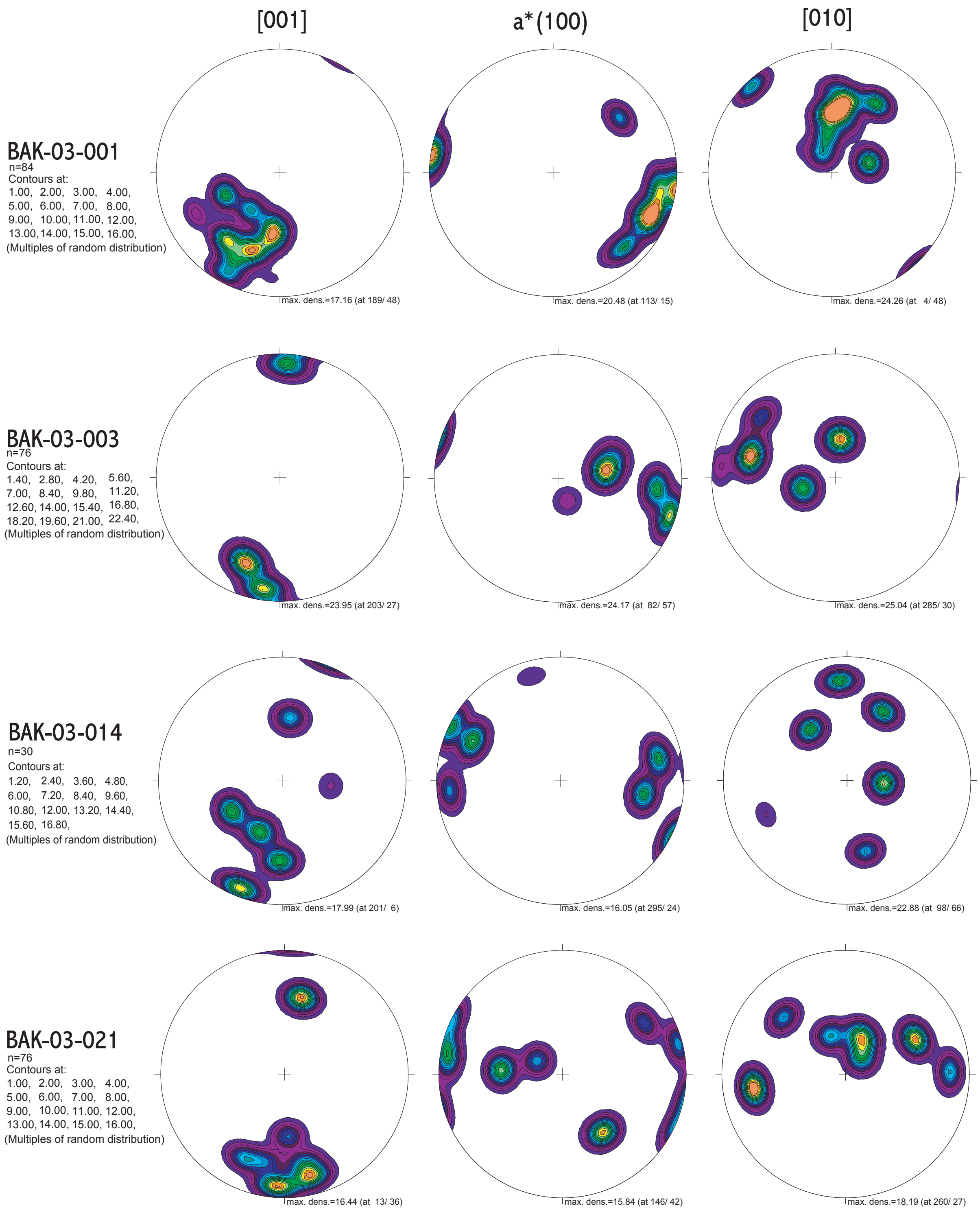


**Figure 9 continued on following page**

Figure 9: Lower hemisphere contoured plots for all samples analyzed by the EBSD technique that exhibit the $L_A$ direction. Column 1: [001] axes, column 2: a*(100) and column 3: [010]. The sample amounts ("n" numbers) indicated are the same for each axis of the same sample, but differ between samples. The contour intervals are lists for each sample on the left.

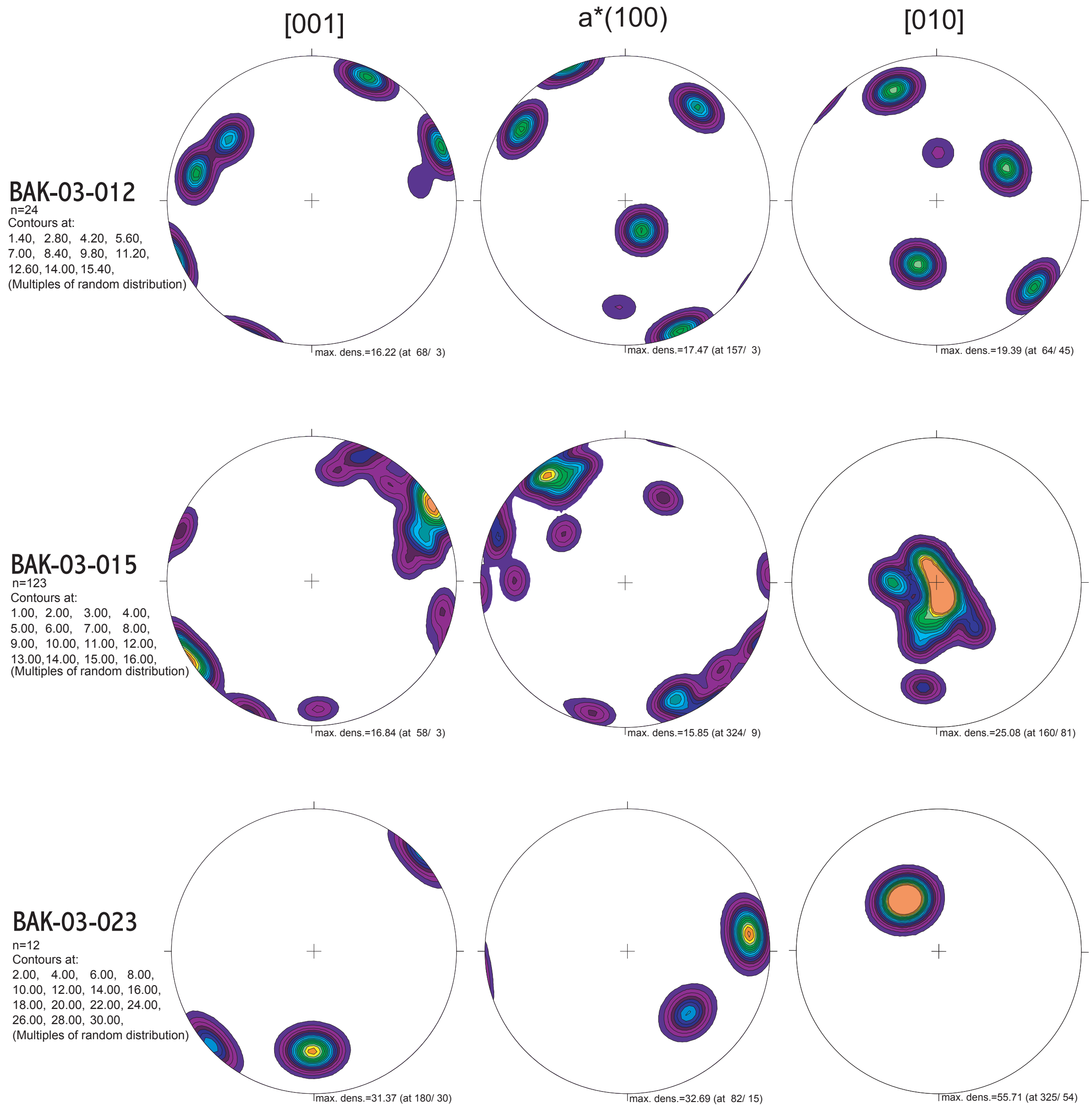


Figure 9: continued

While garnet porphyroblasts seem to have a direct effect on [001] obliquity another major factor may be the amount of shear strain experienced by the eclogite. Several other EBSD studies used highly strained eclogite such as the eclogite facies shear zone of the Bergen Arcs in Western Norway (Boundy & Fountain, 1992, Bascou et al. 2001), eclogite boudins included within subducted continental crust and mylonitic eclogite-facies ophiolites of the Alps. The Gourma eclogites of Mali and the Sulu eclogite of eastern China both experienced pressures of 27-28 kbars, higher than the Lick Ridge eclogite (13-17kbars) (Bascou et al. 2001). Therefore the high angle between the [001] and the foliation may simply be a result of lower strains acting on the Lick Ridge eclogite than that of previously studied eclogite.

**Lineation B**

The clinopyroxene LPO of two centrally located samples, BAK-03-030A and BAK-03-026, display a fabric that is in contrast in several ways to that described above (Figure 11). The $L_B$-oriented [001] axes are nearly perpendicular to $L_A$. The LPO of these samples lay at an angle of <10° to foliation in nearly all cases. The only grains in these samples with a plunge greater than 25° are also oriented parallel to $L_A$ and account for six grains out of twenty seven.

BAK-03-026 was collected from the eastern edge of the largest eclogite body. Of all the samples investigated, BAK-03-026 has the strongest L-type fabric. The [001] axes forms a SE-NW $L_B$ lineation within the foliation plane. The a*(100) pole and [010] form two girdles parallel to each other and perpendicular to the [001] lineation (Figure 11). Several grains produce a weak lineation trending to the south and plunging between 40° and 60°.

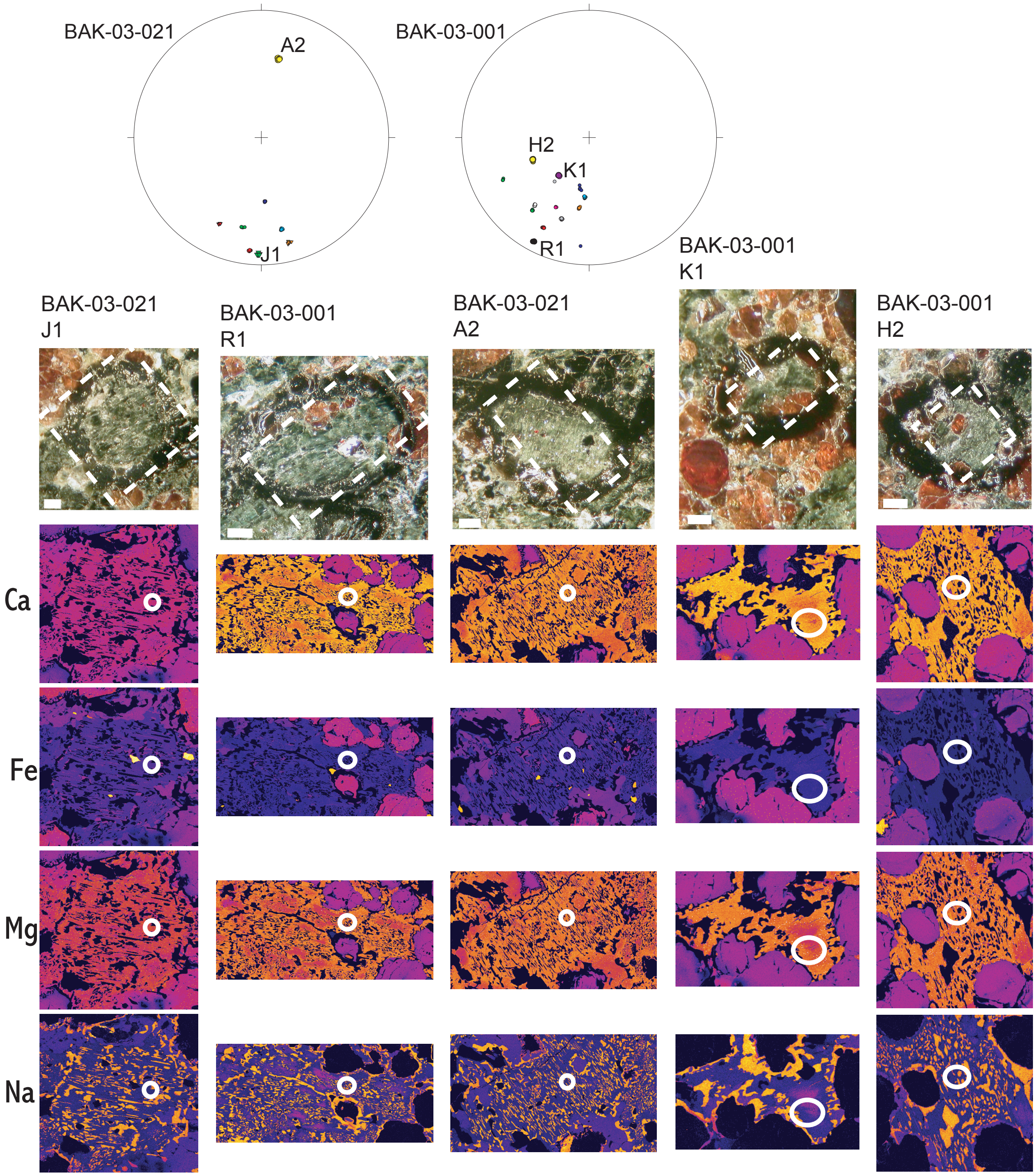


Figure 10: Lower hemisphere equal- area plots of the [001] axes for samples BAK-03-021 and BAK-03-001 ($L_A$ parallel LPO). The five grains labeled correspond to five grains mapped below. Photomicrographs are provided at the top of each column with the orientation of the maps indicated (white box) and a 0.2mm scale bar, lower left. Below are the maps of Ca, Fe, Mg and Na in that order with the location of the EBSD analyses.

Sample BAK-03-030A was taken less than 20 meters from BAK-03-026 within the same outcrop (Figure 8). Two foliation directions, defined by garnet concentration are evident in the thin section. While both are present in the [001] LPO the foliation containing $L_B$-parallel omphacite appears to be the most prevalent and was used for the fold correcting rotations. The [001] pole figure is similar to BAK-03-026 with a maximum in the $L_B$ direction and a cluster steeply plunging to the south. The a*(100) and [010] plots differ significantly (Figure 11). Instead of a girdle, the a*(100) poles tend to mimic the [001] maxima but with inversed intensities. The [010] concentrate into a maximum rather than define a girdle as in the previously discussed sample.

**Comparison of Lineations**

The $L_A$ direction may be distinguished from $L_B$ in hand sample and thin section by comparing the two lineations with garnet size, qualitative distinctness of foliation and degree of retrogression (Table 1). The $L_A$ samples have also been arranged by the relative amount of scatter of the LPO data in Table 1. The foliation and garnet porphyroblasts were observed on the hand sample and thin section scale and the degree of relative retrogression was determined by thin section. The garnet size is a measure of the largest garnet present, but all samples include a range from ≤0.5 mm to the largest garnet measured. Also, the largest garnets in well-foliated samples are located within cpx-rich layers. Those garnets contained within the garnet-rich layers generally range from ~0.5-1.0 mm in diameter.

The data in Table 1 suggests a correlation between peak garnet size, foliation development and the scatter of the $L_A$ lineation but not between the scatter and retrogression. The decrease in foliation development corresponds with a decrease in garnet size. When the foliation is more poorly defined the [001] LPO data are more scattered. Retrogression does not have an effect on the foliation or data scatter which implies that the eclogite fabrics are preserved during amphibolization. There may also be a correlation between the how well the samples are foliated and the sample's lineation type. Both $L_B$ samples are weakly foliated while most of the $L_A$ samples have well-developed foliation.

The development of two lineation directions may be the result of either a heterogeneous strain field or a second lineation could have developed during a second eclogite-facies deformation event. If the two lineations do represent two generations of eclogite-facies deformation then the $L_A$ omphacite may have a different composition than the omphacite parallel to $L_B$. A comparison of the elemental grain maps for $L_A$ and $L_B$ clinopyroxene (Figures 10 and 12) reveals no noticeable difference. The peak and median jadeite component of $L_A$-parallel omphacite is $J_{21}$ and $J_{17}$ respectively. The same for the $L_B$-parallel grains are $J_{25}$ and $J_{20}$ respectively. The $L_B$ grains are slightly more jadeite-rich. However, the difference is not significant enough to indicate a difference in the relative ages of the two fabrics.

This comparison can also be made using the data presented in Figure 12 alone. Grain J1 of BAK-03-030A is $L_A$-parallel and grain L3 is $L_B$-parallel but there is no difference in colors or zoning. Table 2 presents analyses for grains J and L of BAK-03-030A. The maximum jadeite compositions of these two grains differ by 4% (L = $Jd_{25}$ and J = $Jd_{21}$). These two grains have different LPOs, but similar compositions. This also indicates that there is not difference in the ages of these fabrics.

Finally, to the left of the large F2/3 grain of BAK-03-026 in Figure 12 is a smaller omphacite grain distinguished by a different cleavage angle and shape-preferred orientation which corresponds to a different LPO than grain F2/3. However this smaller grain has a

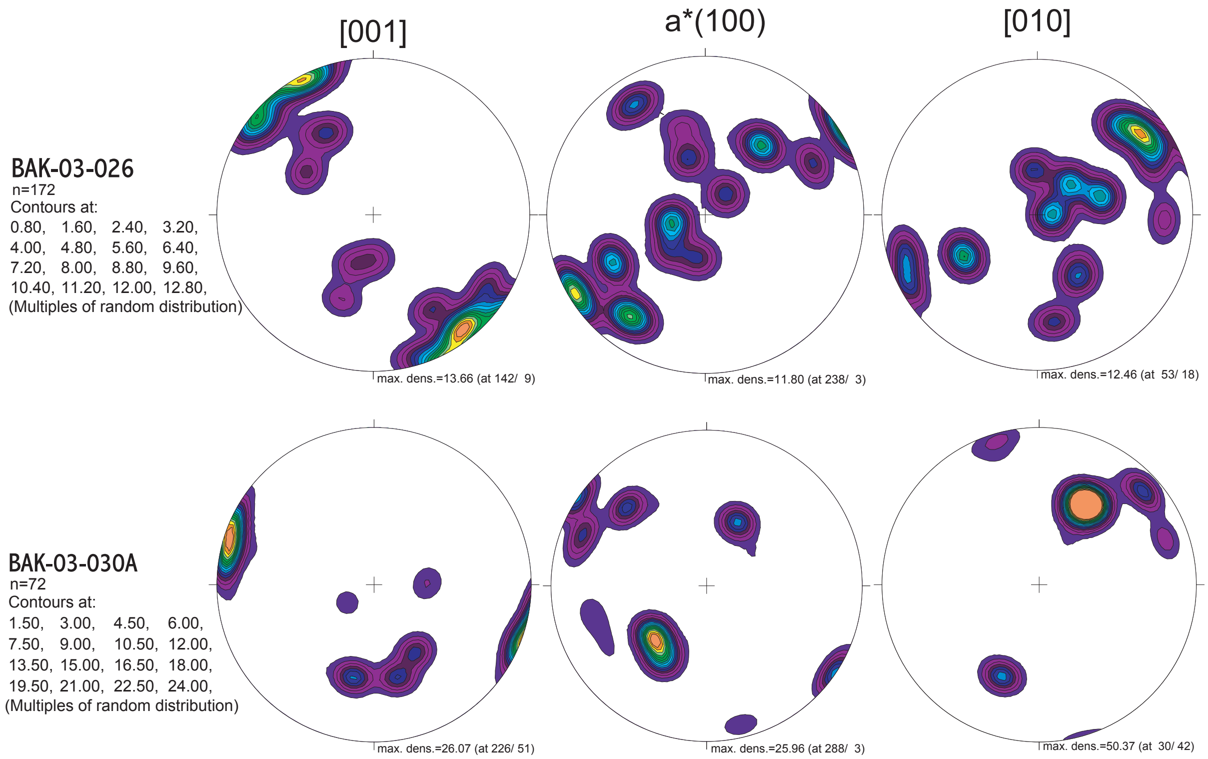


Figure 11: Lower hemisphere, equal area contoured plots for all samples analyzed by the EBSD technique that exhibit the $L_B$ direction. Column 1: [001] axes, column 2: a*(100) and column 3: [010]. The sample amounts ("n" numbers) indicated are the same for each axis of the same sample, but differ between samples. The contour intervals are listed for each sample on the left.

**Table 1: A comparison of garnet size, foliation development and degree of retrogression with cpx LPO orientation and relative scatter**

| | Largest Garnet | Foliation | Retrogression | Scatter |
|---|---|---|---|---|
| Lineation A | | | | |
| BAK001 | 3mm | well defined | minor | low |
| BAK021 | 3.5mm | well defined | moderate | ↓ |
| BAK003 | 1.5mm | well defined | moderate | ↓ |
| BAK015 | 3mm | well defined | minor | ↓ |
| BAK023 | 2.5mm | well to moderately defined | moderate | ↓ |
| BAK014 | 1mm | moderately to poorly defined | moderate | ↓ |
| BAK012 | 1mm | poorly defined | moderate | high |

| | | | |
|---|---|---|---|
| Lineation B | | | |
| BAK026 | 2mm | poorly defined | minor |
| BAK030A | 1.5mm | moderately to poorly defined | moderate |

| | | | |
|---|---|---|---|
| Transitional | | | |
| BAK017 | 1mm | poorly defined | moderate |

similar composition, zoning and quantity of plagioclase inclusions to the larger F2/3 grain. Petrographically there are no indications, such as grain overgrowth or replacement, that either LPO predates the other in this, or any other sample. Therefore it is probable that all the omphacite, regardless of LPO, grew concurrently. Clinopyroxene LPO is indicative of the strain regime experienced during deformation (Bouchez, 1983; Godard, and van Roermund, 1995; Brenker, 2002; Ábalos, B., 1997; Mauler et al., 2000, 2001; Bascou et al., 2001, 2002). The Lick Ridge eclogite must have experienced a heterogeneous strain regime during eclogite-facies conditions.

**Transitional Fabric**

The LPO of BAK-03-017 is not dominated by either $L_A$ or $L_B$ lineation directions (Figure 8), but rather, each lineation is equally represented. Therefore the sample is classified as transitional rather than $L_A$ or $L_B$. The [010] axes of this sample define a girdle in a plane normal to the foliation and trending NW-SE. The a*(100) poles define a small circle with a center sub-perpendicular to the foliation plane (Figure 13).

Sample BAK-03-017 is located about 15 meters to the north of BAK-03-15. Sample BAK-03-017 is nearly equally as amphibolitized although the hornblende present does not overprint the clinopyroxene as much as it does in BAK-03-015. Most of the clinopyroxene grains grade to diopside at the edge but remain green and non-pleochroic at the core.

**Rutile LPO**

Rutile is a minor, though common, mineral in eclogite. As a result its behavior during deformation is not well understood due to a lack of attention. Mauler et al. (2001) demonstrated the possibility that the LPO of rutile may be similar to clinopyroxene but less oblique to foliation. The two minerals' LPOs may be similar because the [001] of clinopyroxene and rutile tend to grow most readily in the primary strain direction.

The rutile represented in Figures 14 a and b includes only those rutile that were presumably affected by the same strain as the clinopyroxene during eclogite-facies deformation. Therefore only those rutile grains contained entirely within, or sharing three sides with, an omphacite grain are plotted in Figures 14 a and b. Figure 14c gives the lower-hemisphere, equal area plots for rutile grains that are included within garnet. Rutile is tetragonal, therefore the [100] and [010] are indistinguishable since a = b and all angles are 90°. The distinction between the two axes in Figure 14 is based on the axes initial location in relation to the [001] prior to the three Euler rotations as described in Appendix 4. The Euler angles describe the rotation of the three axes from an arbitrary starting orientation to their measured orientations in relation to the surface of the slide. The starting orientation places the [001] axis perpendicular to the slide, the [100] axis parallel to the long side of the slide and [010] parallel to the short side of the slide prior to the Euler rotations.

**Lineation A**

A poorly developed foliation-parallel, NW-SE trending [001] maximum is present in those rutile contained within $L_A$ parallel and BAK-03-017 clinopyroxene (Figure 14a). An additional cluster is present in the southwest and lies oblique to the foliation plane. It is tempting to equate these two fabrics to the A and B lineation directions of in the clinopyroxene data, however, a closer examination shows that the $L_B$-like lineation is rotated about 50° to a more southern orientation. The oblique cluster is rotated about 30° in the same sense. Therefore the clinopyroxene LPO and the rutile LPO are not similar.

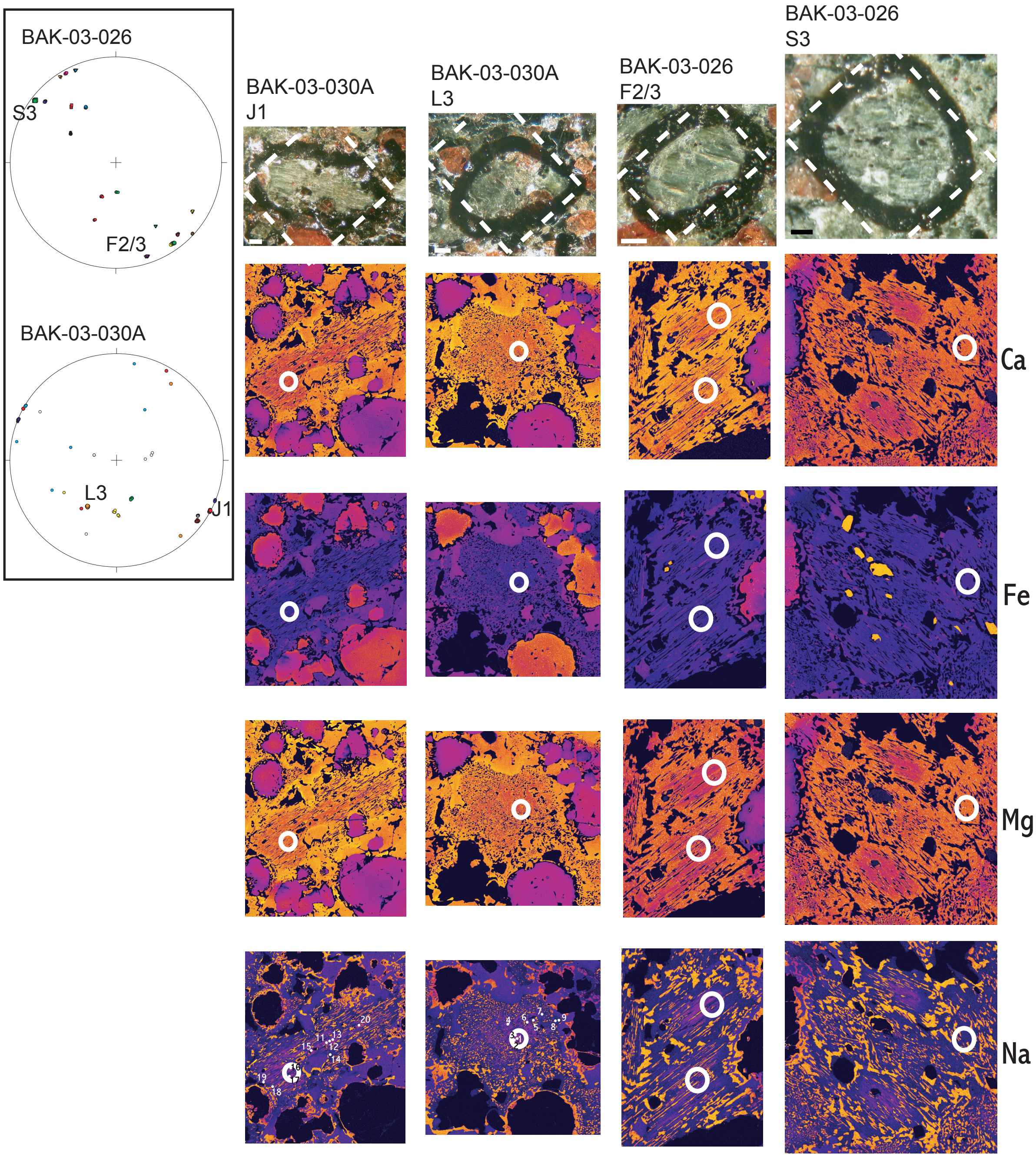


Figure 12: Lower hemisphere equal- area plots of the [001] axes for samples BAK-03-026 and BAK-03-030A ($L_B$ parallel LPO). The four grains labeled correspond to four grains mapped on the left. Photomicrographs are provided at the top of each column with the orientation of the maps indicated (white box) and a 0.2mm scale bar, lower left. Below are the maps of Ca, Fe, Mg and Na in that order with the location of the EBSD analyses.

Table 2: Representative mircoprobe analyses, sample BAK-03-030A grains J and L.

| | BAK-03-030A J | | | | | | | | | | BAK-03-030A L | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **No.** | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| $SiO_2$ | 51.56 | 50.98 | 51.184 | 50.192 | 51.987 | 52.037 | 52.252 | 51.152 | 50.109 | 50.164 | 53.10 | 53.24 | 52.895 | 51.968 | 44.604 | 52.21 | 50.25 | 44.782 | 51.479 | 51.71 |
| $TiO_2$ | 0.23 | 0.19 | 0.225 | 0.305 | 0.241 | 0.175 | 0.13 | 0.146 | 0.212 | 0.345 | 0.15 | 0.15 | 0.142 | 0.227 | 1.726 | 0.18 | 0.17 | 0.773 | 0.184 | 0.142 |
| $Al_2O_3$ | 9.14 | 8.97 | 8.752 | 5.496 | 8.916 | 9.105 | 8.886 | 4.225 | 6.579 | 6.237 | 8.64 | 8.67 | 8.681 | 8.574 | 11.371 | 8.76 | 5.44 | 11.795 | 3.263 | 8.437 |
| FeO | 5.76 | 5.59 | 6.028 | 7.07 | 5.668 | 5.471 | 5.328 | 6.646 | 6.655 | 6.655 | 4.72 | 4.72 | 4.99 | 5.508 | 11.049 | 5.07 | 6.49 | 10.999 | 6.574 | 5.575 |
| MnO | 0.06 | 0.00 | 0.033 | 0.043 | 0.059 | 0.001 | 0.033 | 0.059 | 0.043 | 0.059 | 0.00 | 0.00 | 0 | 0.031 | 0.054 | 0.05 | 0.06 | 0.019 | 0.031 | 0.055 |
| MgO | 10.82 | 11.29 | 11.129 | 13.548 | 10.85 | 11.047 | 11.217 | 13.931 | 12.679 | 12.657 | 11.05 | 11.26 | 11.228 | 11.48 | 14.105 | 11.14 | 13.60 | 14.429 | 14.922 | 11.52 |
| CaO | 18.66 | 19.45 | 19.254 | 21.595 | 18.487 | 18.526 | 18.421 | 22.318 | 21.495 | 21.686 | 17.60 | 17.51 | 17.991 | 19.116 | 11.745 | 18.72 | 22.11 | 11.805 | 21.948 | 19.38 |
| $K_2O$ | 0.00 | 0.00 | 0 | 0.025 | 0 | 0 | 0 | 0 | 0 | 0.014 | 0.00 | 0.00 | 0 | 0 | 0.286 | 0.00 | 0.01 | 0.267 | 0.039 | 0 |
| $Na_2O$ | 3.16 | 2.77 | 2.858 | 1.166 | 3.291 | 3.314 | 3.429 | 0.996 | 1.448 | 1.422 | 4.03 | 3.89 | 3.653 | 2.961 | 2.049 | 3.31 | 1.04 | 1.967 | 0.787 | 2.825 |
| $Li_2O$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ZnO | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| NiO | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| $Cr_2O_3$ | 0.07 | 0.07 | 0.07 | 0.12 | 0.11 | 0.01 | 0.03 | 0.02 | 0.04 | 0.09 | 0.11 | 0.07 | 0.06 | 0.10 | 0.22 | 0.06 | 0.15 | 0.26 | 0.13 | 0.03 |
| $Sc_2O_3$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 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** | **99.455** | **99.319** | **99.536** | **99.562** | **99.607** | **99.683** | **99.721** | **99.491** | **99.264** | **99.328** | **99.388** | **99.514** | **99.641** | **99.968** | **97.212** | **99.503** | **99.317** | **97.091** | **99.356** | **99.673** |
| Si | 1.880 | 1.863 | 1.869 | 1.849 | 1.892 | 1.888 | 1.893 | 1.886 | 1.849 | 1.852 | 1.921 | 1.924 | 1.914 | 1.885 | 1.672 | 1.897 | 1.855 | 1.674 | 1.899 | 1.882 |
| Ti | 0.006 | 0.005 | 0.006 | 0.008 | 0.007 | 0.005 | 0.004 | 0.004 | 0.006 | 0.010 | 0.004 | 0.004 | 0.004 | 0.006 | 0.049 | 0.005 | 0.005 | 0.022 | 0.005 | 0.004 |
| Al (T) | 0.120 | 0.137 | 0.131 | 0.151 | 0.108 | 0.112 | 0.107 | 0.114 | 0.151 | 0.148 | 0.079 | 0.076 | 0.086 | 0.115 | 0.328 | 0.103 | 0.145 | 0.326 | 0.101 | 0.118 |
| Al (M1) | 0.273 | 0.249 | 0.245 | 0.088 | 0.274 | 0.278 | 0.272 | 0.070 | 0.135 | 0.124 | 0.290 | 0.294 | 0.284 | 0.251 | 0.174 | 0.272 | 0.091 | 0.194 | 0.041 | 0.244 |
| $Fe^{3+}$ (T) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| $Fe^{3+}$ (M1) | 0.055 | 0.071 | 0.074 | 0.126 | 0.050 | 0.057 | 0.068 | 0.107 | 0.106 | 0.104 | 0.060 | 0.045 | 0.049 | 0.057 | 0.199 | 0.052 | 0.114 | 0.223 | 0.102 | 0.065 |
| $Fe^{2+}$ | 0.120 | 0.099 | 0.110 | 0.092 | 0.123 | 0.109 | 0.093 | 0.098 | 0.099 | 0.101 | 0.082 | 0.098 | 0.102 | 0.110 | 0.147 | 0.102 | 0.086 | 0.120 | 0.101 | 0.105 |
| Mn | 0.002 | 0.000 | 0.001 | 0.001 | 0.002 | 0.000 | 0.001 | 0.002 | 0.001 | 0.002 | 0.000 | 0.000 | 0.000 | 0.001 | 0.002 | 0.002 | 0.002 | 0.001 | 0.001 | 0.002 |
| Mg | 0.588 | 0.615 | 0.606 | 0.744 | 0.589 | 0.598 | 0.606 | 0.766 | 0.697 | 0.697 | 0.596 | 0.607 | 0.606 | 0.621 | 0.788 | 0.603 | 0.748 | 0.804 | 0.821 | 0.625 |
| Ca | 0.729 | 0.761 | 0.753 | 0.852 | 0.721 | 0.720 | 0.715 | 0.882 | 0.850 | 0.858 | 0.682 | 0.678 | 0.697 | 0.743 | 0.472 | 0.729 | 0.874 | 0.473 | 0.868 | 0.756 |
| K | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.014 | 0.000 | 0.000 | 0.013 | 0.002 | 0.000 |
| Na | 0.223 | 0.196 | 0.202 | 0.083 | 0.232 | 0.233 | 0.241 | 0.071 | 0.104 | 0.102 | 0.282 | 0.273 | 0.256 | 0.208 | 0.149 | 0.233 | 0.074 | 0.143 | 0.056 | 0.199 |
| Li | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ni | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.002 | 0.002 | 0.002 | 0.004 | 0.003 | 0.000 | 0.001 | 0.001 | 0.001 | 0.003 | 0.003 | 0.002 | 0.002 | 0.003 | 0.007 | 0.002 | 0.004 | 0.008 | 0.004 | 0.001 |
| Sc | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Total** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** |
| **group** | **Ca-Na** | **Ca-Na** | **Ca-Na** | **Quad** | **Ca-Na** | **Ca-Na** | **Ca-Na** | **Quad** | **Quad** | **Quad** | **Ca-Na** | **Ca-Na** | **Ca-Na** | **Ca-Na** | **Quad** | **Ca-Na** | **Quad** | **Quad** | **Quad** | **Ca-Na** |
| **pyroxene** | **omph** | **omph** | **omph** | **diop** | **omph** | **omph** | **omph** | **diop** | **diop** | **diop** | **omph** | **omph** | **omph** | **omph** | **augite** | **omph** | **diop** | **augite** | **diop** | **omph** |
| enstatite | ---------- | ---------- | ---------- | 40.98 | ---------- | ---------- | ---------- | 41.30 | 39.76 | 39.54 | ---------- | ---------- | ---------- | ---------- | 49.02 | ---------- | 41.02 | 49.59 | 43.38 | ---------- |
| ferrosillite | ---------- | ---------- | ---------- | 12.07 | ---------- | ---------- | ---------- | 11.15 | 11.79 | 11.77 | ---------- | ---------- | ---------- | ---------- | 21.65 | ---------- | 11.08 | 21.24 | 10.77 | ---------- |
| wollastonite | ---------- | ---------- | ---------- | 46.95 | ---------- | ---------- | ---------- | 47.55 | 48.45 | 48.69 | ---------- | ---------- | ---------- | ---------- | 29.33 | ---------- | 47.91 | 29.16 | 45.85 | ---------- |
| jadeite | 19.71 | 16.33 | 16.61 | ---------- | 20.73 | 20.43 | 20.30 | ---------- | ---------- | ---------- | 24.28 | 24.54 | 22.80 | 17.96 | ---------- | 20.61 | ---------- | ---------- | ---------- | 16.71 |
| aegirine | 4.00 | 4.67 | 4.99 | ---------- | 3.76 | 4.21 | 5.11 | ---------- | ---------- | ---------- | 5.06 | 3.74 | 3.92 | 4.07 | ---------- | 3.94 | ---------- | ---------- | ---------- | 4.45 |
| Quad | 76.29 | 79.01 | 78.41 | ---------- | 75.51 | 75.37 | 74.59 | ---------- | ---------- | ---------- | 70.66 | 71.72 | 73.27 | 77.97 | ---------- | 75.45 | ---------- | ---------- | ---------- | 78.84 |

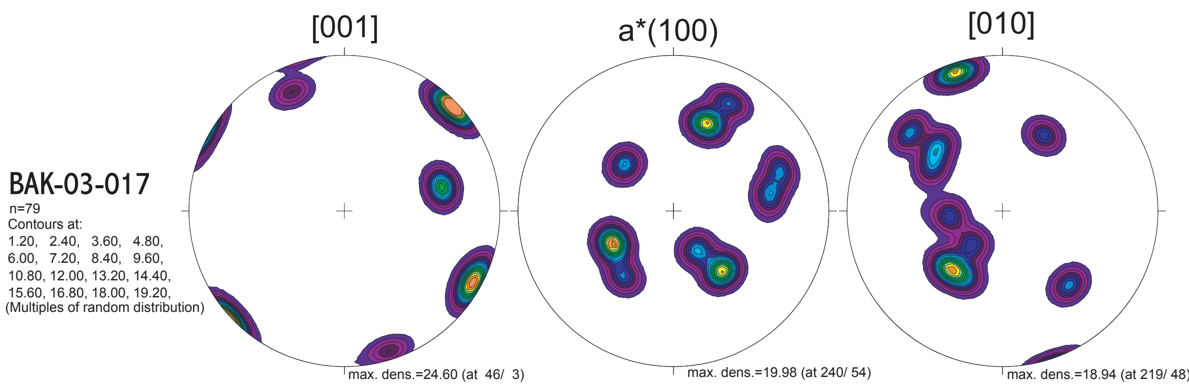


Figure 13: Lower hemisphere, equal area contoured plots for all samples analyzed by the EBSD technique for transitional sample BAK-03-017. Column 1: [001] axes, column 2: a*(100) and column 3: [010]. The contour intervals are listed are the same for each plot.

The LPO of the {100 and {010} axes are alike. This is expected because of the tetragonal symmetry of rutile. They both form a weakly defined girdle parallel to the SW-NE trending [001] axes and perpendicular to foliation. The grains contained with these girdles are the same as those that form the [001] maximum. Conversely the grains included in the [001] girdle form a weak NW-SE [100] and [010] lineation.

**Lineation B**

The most prominent feature of the [001] LPO plot of rutile within samples BAK-03-030A and BAK-03-026 (Figure 14b) is the cluster of axes that appear to mirror the cluster in the SW quadrant in Figure 14a. A merger of these two plots would form a girdle that mimics that of the [100] and [010] rutile axes previously discussed. Another, weaker girdle would also form oriented nearly north-south. This girdle would contain a maximum in the plane of foliation.

The [100] and [010] LPO patterns are not as alike as in the rutile contained within the $L_A$ samples (Figure 14a). The [100] in Figure 14b are more concentrated into a NNW-SSE trending girdle with a few grains hinting at a perpendicular girdle. The [010] axes better display this latter girdle with only a few grains oriented in the southeast quadrant. Superimposing the $L_A$ [100] and [010] plots over those from the $L_B$ samples would produce a pattern similar to that produced by the [001] axes without any obvious maxima within the girdles.

**Rutile included in garnet**

An LPO was not expected for the rutile contained within the garnet grains (Figure 14c). The [001] axes are much more scattered than the matrix rutile and, by itself; it is probably implausible that any fabric is present. However, there is a weak SW-NE girdle is present that is similar to the matrix rutile LPO pattern. This correlation between the matrix and garnet rutile has implications for the formation of the foliation relative to the garnets. In order for the garnets to capture the fabric of the rutile, the fabric, and consequently the omphacite and rutile, must predate the growth of the garnets. This is consistent with the fact that the garnet includes peak eclogite phases (rutile, quartz and omphacite).

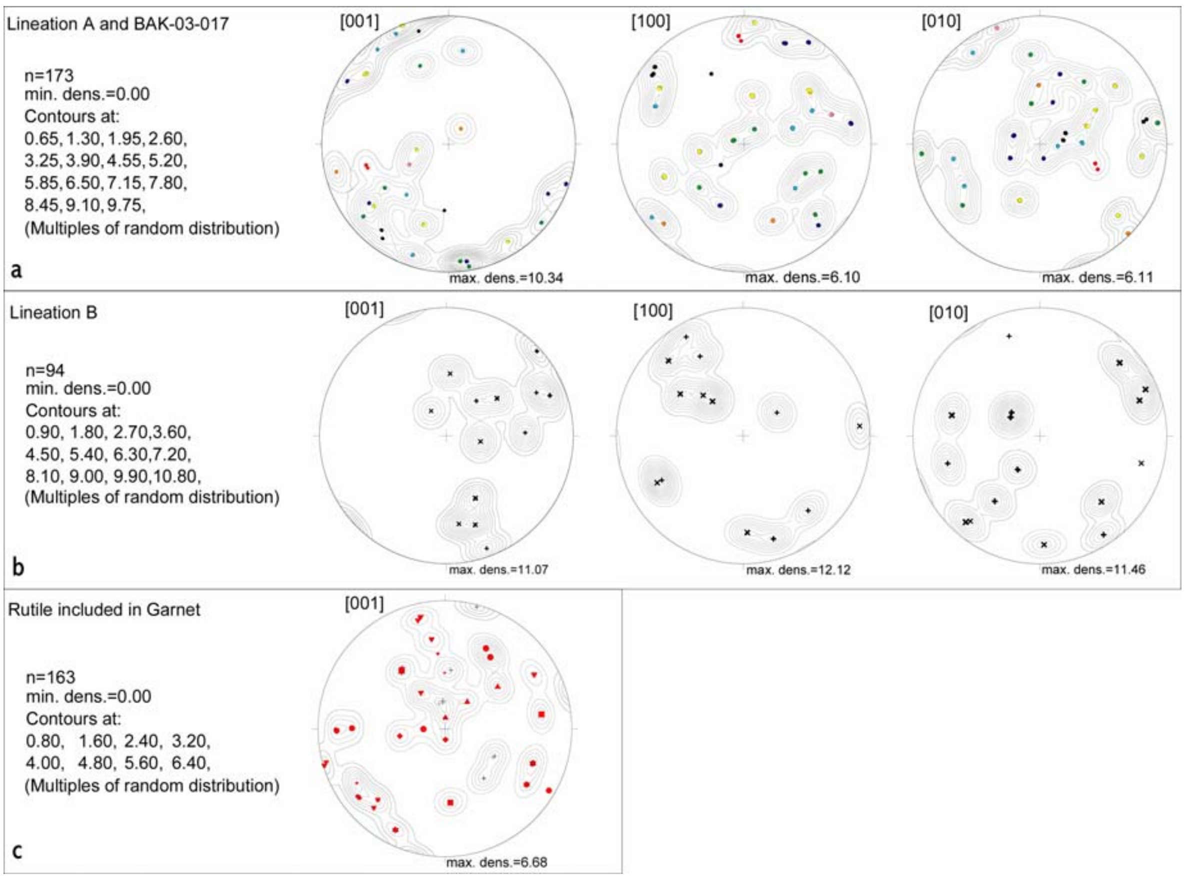


Figure 14: Rutile LPO lower hemisphere contour plots. Contour values and n numbers are different for a, b and c and are given of the left for each. a) All rutile within $L_A$ and intermediate samples. b) the rutile LPO from $L_B$ samples. c) Rutile LPO for all rutile that is included within a garnet porphyroblast. Red symbols are $L_A$ and intermediate samples and the + are from BAK-03-026 ($L_B$)

## IMPLICATIONS FOR THE BURIAL AND EXHUMATION OF THE LICK RIDGE ECLOGITE AND SURROUNDING ASHE METAMORPHIC SUITE

### LPO development during Eclogite Facies Metamorphism and the Onset of Uplift

The LPO of clinopyroxene and rutile records the fabric produced in the eclogite during eclogite facies deformation (e.g. Helmstaedt et al., 1972; Godard and van Roermund, 1995; Abalos, 1997) and during decompression. The compositional analyses of the clinopyroxene exhibit a typical retrograde compositional zoning from a jadeite-rich core to a more diopside-rich rim. This pattern is present regardless of omphacite lineation direction. This implies that the cpx LPO development occurred not only during peak eclogite conditions, but remained undisturbed during decompression or a subsequent metamorphic event.

Two distinct lineation directions ($L_A$ and $L_B$) are preserved in the omphacite and rutile of the Lick Ridge eclogite. Growth of c-axes in the maximum ($\varepsilon_1$) and intermediate strain ($\varepsilon_2$) directions, during deformation has been discussed by Mauler et al. (2001). The authors found that clinopyroxene diffusion rates are higher in the [001] direction. Therefore grains initially oriented with the [001] axis parallel to $\varepsilon_1$ will grow faster and with the most ease than those grains in any other orientation. The $L_B$ [001] maximum is stronger than expected if the $L_B$ parallel [001] axes grew in the $\varepsilon_2$ direction while experiencing the same deformation as the $L_A$ samples. Additionally, the lack of variation in the omphacite composition implies that the $L_A$ and $L_B$ cpx do not represent two generations of omphacite growth, or episodes of eclogite facies deformation.

Two alternate ways of producing the two distinct LPOs are; 1) rigid rotation of the east limb of the largest mapped body after fabric development or, 2) a coherent slab experienced a heterogeneous strain field at depth. Although rigid body rotation is possible the latter is more likely since the Ashe Metamorphic Suite surrounding the eastern eclogite body does not show any evidence such as foliation deflection.

**Exhumation Mechanism**

The geographic distribution of the $L_A$ samples provides some information on possible exhumation mechanisms. Of the five bodies sampled, all five contains omphacite with $L_A$-parallel LPOs. The rutile LPOs also suggest that the preserved eclogite fabric is comparably oriented throughout the field area. The dispersed locations of the $L_A$-parallel clinopyroxene and the rutile fabric suggests that the Lick Ridge eclogite bodies did not tumble to the surface as blocks in an accretionary wedge, but were exhumed coherently within a large terrane that included the surrounding accretionary wedge sediments. With concepts from both the continental slab detachment and the upward flowing mélange mechanisms a new model has been developed to explain the emplacement of the Lick Ridge eclogite (Figure 15). Oceanic crust is subducted to eclogite facies depths where the clinopyroxene and the rutile gain their LPO fabric. The eclogite is adjacent to the wedge sediments at the bottom of the accretionary prism and the two become fused. The pelites provide the buoyancy force to exhume the Lick Ridge eclogite. The implication that the AMS also experienced eclogite facies conditions, but did not preserve the high pressure assemblage, is consistent with the findings of Proyer (2003). He suggests that metagranites and metapelites have a more difficult time maintaining peak assemblages during exhumation in the presence of either internal or external water.

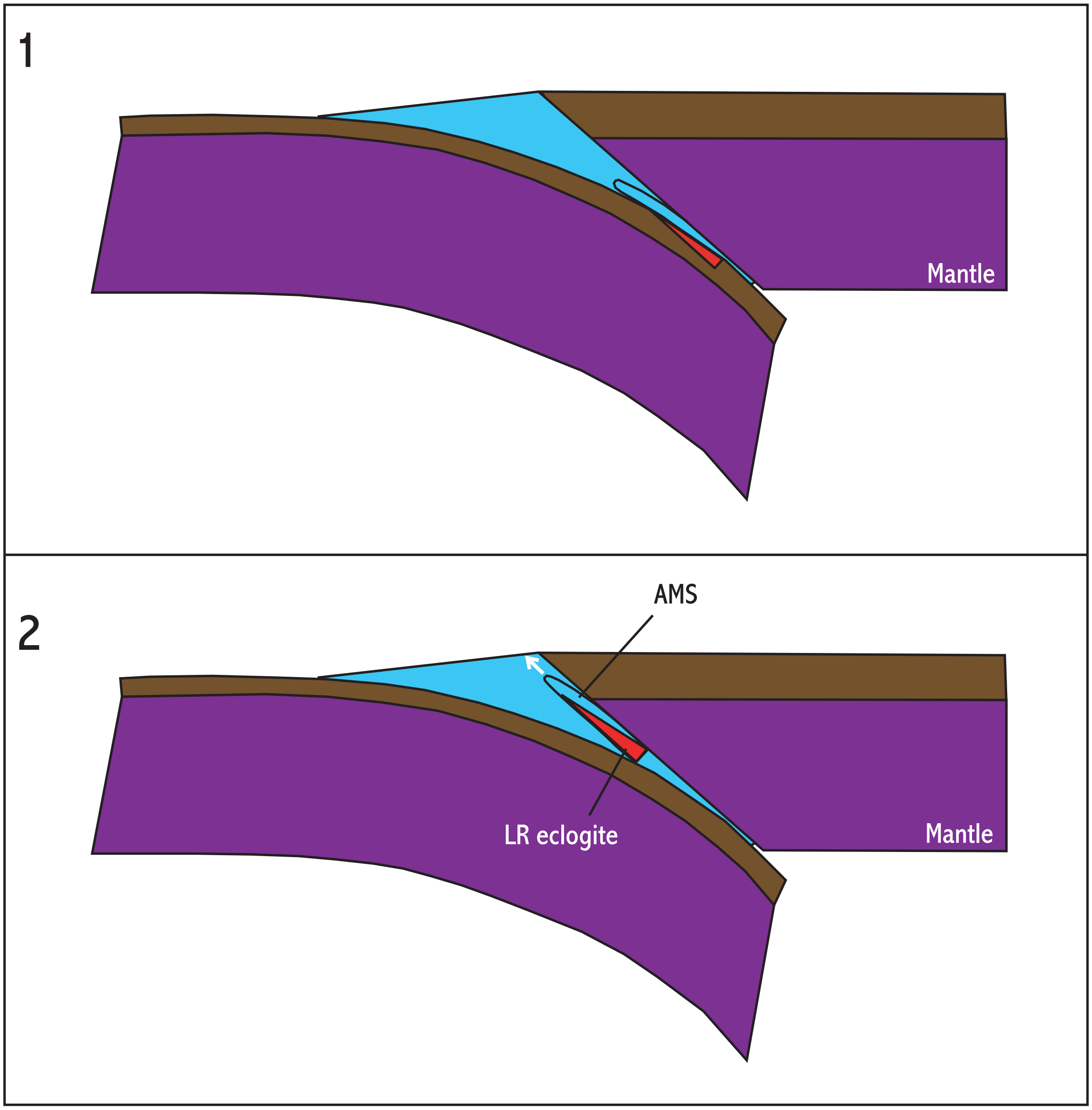


Figure 15: A new model for the exhumation of the LR eclogite and the AMS. 1) The AMS and the subducting ocean crust become fused at the bottom of the wedge. 2) The slab of LR eclogite is exhumed along with the AMS.

## CONCLUSIONS

Oceanic crustal rocks were subducted and metamorphosed at eclogite facies about 460 Ma during the Taconian orogeny. This produced the high-pressure assemblage of omphacite, garnet and rutile of the Lick Ridge eclogite. An accretionary wedge formed between the down-going oceanic plate and the overriding plate.

The application of the upward flowing mélange model (Cloos, 1982) to explain the exhumation of the Lick Ridge eclogite would be a convenient way to account for the surrounding metapelites of the AMS, however several of the discretely mapped outcrops are too large to be carried upwards in flowing pelites according to the Cloos model. Many other large terranes of high-pressure rocks are believed to have been exhumed due to the buoyancy of the subducting slab resulting from the large density difference between continental rocks and the mantle (Chemenda et al., 1995). This model in its entirety is not applicable because it specifically requires the subduction of continental crust which is not found in association with the Lick Ridge eclogite. However, the AMS is of significantly lower density than the mantle and may have taken the role of the continental crust in providing the necessary buoyancy.

The LPO of clinopyroxene and rutile from five separate eclogite bodies demonstrate a parallel c-axis lineation oriented NNE-SSW. The [001] axes from several samples from the largest body deviate from this trend and most likely were formed as the result of heterogeneity in the strain field during eclogite-facies deformation. Despite this, the LPO data imply that the entire area surrounding the eclogite is a now-retrograded eclogite-facies terrane. If the AMS sediments were fused to the Lick Ridge eclogite at the apex of the accretionary wedge, the lower density AMS would provide the buoyancy to drive it and the Lick Ridge eclogite to the surface as one coherent slab.

# APPENDIX A
## CPX EBSD Analyses including Euler rotations and trend and plunge for [001], a*(100) and [010]

SAMPLE BAK-03-001 Chip

| | | | | [001] | | a*(100) | | [010] | |
|---|---|---|---|---|---|---|---|---|---|
| index | Euler1 | Euler2 | Euler 3 | Trend | Plunge | Trend | Plunge | Trend | Plunge |
| cpxH1 | | | | | | | | | |
| 1 | 120.383 | 105.873 | 100.422 | 59.6 | 15.9 | 273.5 | 71 | 152.496 | 10.0575 |
| 2 | 120.093 | 105.605 | 100.985 | 59.907 | 15.6048 | 275.7 | 71 | 152.894 | 10.5674 |
| 5 | 120.088 | 106.337 | 100.475 | 59.9123 | 16.3373 | 273.2 | 70.7 | 152.883 | 10.0249 |
| 6 | 120.184 | 106.226 | 100.649 | 59.8164 | 16.2258 | 273.8 | 70.7 | 152.823 | 10.2174 |
| 7 | 120.328 | 106.066 | 100.231 | 59.6716 | 16.0657 | 272.8 | 71 | 152.536 | 9.84478 |
| 8 | 120.104 | 105.864 | 101.532 | 59.8964 | 15.8643 | 276.6 | 70.5 | 153.082 | 11.0642 |
| 9 | 120.168 | 106.139 | 100.265 | 59.8319 | 16.1389 | 272.9 | 70.9 | 152.719 | 9.87536 |
| 11 | 120.184 | 106.226 | 100.649 | 59.8164 | 16.2258 | 273.8 | 70.7 | 152.823 | 10.2174 |
| 13 | 120.411 | 105.857 | 100.516 | 59.5886 | 15.8567 | 273.8 | 71 | 152.501 | 10.1418 |
| 14 | 120.665 | 106.427 | 100.84 | 59.3351 | 16.4271 | 273.4 | 70.4 | 152.432 | 10.383 |
| 15 | 120.478 | 106.631 | 100.902 | 59.5223 | 16.6308 | 273.5 | 70.2 | 152.681 | 10.4508 |
| 17 | 120.289 | 106.51 | 101.272 | 59.7112 | 16.5101 | 274.8 | 70.1 | 152.956 | 10.8127 |
| n=12 | | | | | | | | | |
| cpxH2 | | | | | | | | | |
| 1 | 155.411 | 79.5139 | 272.426 | 204.6 | 10.5 | 11.5 | 79.2 | 114.156 | 2.39331 |
| 2 | 155.107 | 80.0004 | 271.926 | 204.8932 | 9.99963 | 13.9 | 79.8 | 114.557 | 1.90577 |
| 3 | 155.303 | 79.8372 | 272.17 | 204.6974 | 10.1628 | 12.6 | 79.6 | 114.315 | 2.13411 |
| 4 | 155.204 | 79.7418 | 272.454 | 204.7958 | 10.25816 | 11.3 | 79.4 | 114.357 | 2.42108 |
| 7 | 155.51 | 80.0032 | 272.111 | 204.4904 | 9.99679 | 12.5 | 79.8 | 114.124 | 2.0763 |
| 8 | 154.586 | 80.5067 | 272.52 | 205.4139 | 9.49328 | 10.5 | 80.2 | 115 | 2.47632 |
| 9 | 155.104 | 79.9911 | 272.086 | 204.8964 | 10.00894 | 13.1 | 79.8 | 114.536 | 2.0431 |
| 11 | 154.943 | 80.268 | 271.706 | 205.0569 | 9.73201 | 15.1 | 80.1 | 114.769 | 1.67901 |
| 14 | 154.871 | 80.1742 | 271.5 | 205.129 | 9.82576 | 16.4 | 80.1 | 114.874 | 1.4732 |
| 16 | 155.118 | 79.912 | 271.57 | 204.8825 | 10.08797 | 16 | 79.8 | 114.608 | 1.54263 |
| 17 | 155.004 | 79.526 | 272.006 | 204.9956 | 10.47397 | 14.1 | 79.3 | 114.63 | 1.97767 |
| 22 | 155.734 | 79.6819 | 272.1 | 204.2659 | 10.3181 | 12.7 | 79.5 | 113.891 | 2.06002 |
| 27 | 155.581 | 79.8232 | 271.901 | 204.4194 | 10.17685 | 13.8 | 79.6 | 114.082 | 1.8764 |
| 28 | 155.443 | 79.9337 | 272.271 | 204.5575 | 10.06634 | 11.8 | 79.7 | 114.162 | 2.228 |
| 29 | 155.278 | 79.9077 | 272.514 | 204.7225 | 10.09235 | 10.7 | 79.6 | 114.283 | 2.46812 |
| n=15 | | | | | | | | | |
| cpxH3 | | | | | | | | | |
| 1 | 146.098 | 119.469 | 107.439 | 33.9 | 29.5 | 246.4 | 56.1 | 132.693 | 15.119 |
| 4 | 145.53 | 119.621 | 107.374 | 34.4696 | 29.6211 | 246.8 | 56.1 | 133.25 | 15.0286 |
| 5 | 145.562 | 119.638 | 107.169 | 34.4382 | 29.6378 | 246.4 | 56.1 | 133.127 | 14.8694 |
| 6 | 145.039 | 119.504 | 106.137 | 34.9614 | 29.5037 | 245.4 | 56.7 | 133.077 | 14.009 |
| 7 | 145.428 | 119.382 | 106.928 | 34.5716 | 29.3818 | 246.4 | 56.5 | 133.062 | 14.6929 |
| 8 | 144.971 | 119.443 | 107.433 | 35.0286 | 29.4428 | 247.6 | 56.2 | 133.8 | 15.1177 |
| 11 | 145.767 | 119.49 | 106.033 | 34.2328 | 29.4896 | 244.5 | 56.8 | 132.278 | 13.9004 |
| 12 | 145.991 | 119.247 | 106.915 | 34.0087 | 29.2473 | 245.9 | 56.6 | 132.456 | 14.6995 |
| 23 | 146.84 | 119.464 | 106.762 | 33.16 | 29.4637 | 244.6 | 56.5 | 131.571 | 14.5165 |
| 24 | 145.555 | 119.396 | 106.487 | 34.4455 | 29.3955 | 245.5 | 56.7 | 132.693 | 14.2854 |
| 25 | 145.683 | 119.086 | 106.274 | 34.3173 | 29.0861 | 245.3 | 57 | 132.399 | 14.1825 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 145.795 | 119.533 | 106.826 | 34.2047 | 29.5328 | 245.7 | 56.4 | 132.672 | 14.5689 |
| n=12 | | | | | | | | | |
| cpxI1 | | | | | | | | | |
| 1 | 130.808 | 73.207 | 274.041 | 229.2 | 16.8 | 35.4 | 72.7 | 138.023 | 3.89374 |
| 2 | 129.555 | 73.5182 | 275.088 | 230.4453 | 16.48181 | 33 | 72.8 | 138.999 | 4.87655 |
| 3 | 129.917 | 73.6309 | 274.659 | 230.0833 | 16.36913 | 34 | 73 | 138.771 | 4.45717 |
| 4 | 129.97 | 73.5861 | 274.846 | 230.0301 | 16.41386 | 33.3 | 72.9 | 138.655 | 4.6572 |
| 5 | 127.975 | 97.0288 | 292.19 | 52.0249 | 7 | 305.4 | 66.8 | 144.869 | 22.0034 |
| 6 | 128.418 | 96.4018 | 292.305 | 51.5824 | 6.40181 | 306.4 | 66.8 | 144.207 | 22.1988 |
| 7 | 127.708 | 96.4751 | 292.032 | 52.2925 | 6.47505 | 306.7 | 67.1 | 144.903 | 21.8645 |
| 8 | 127.561 | 96.5415 | 291.249 | 52.4389 | 6.54146 | 306.1 | 67.8 | 144.977 | 21.1138 |
| 9 | 127.714 | 96.8624 | 291.705 | 52.2862 | 6.86242 | 305.6 | 67.3 | 145.008 | 21.5312 |
| 10 | 127.541 | 96.7205 | 292.081 | 52.459 | 6.72054 | 306.4 | 67 | 145.173 | 21.8948 |
| 11 | 129.91 | 73.6285 | 275.473 | 230.0904 | 16.37154 | 31.3 | 72.8 | 138.546 | 5.24344 |
| 12 | 129.673 | 73.5614 | 274.584 | 230.3271 | 16.43861 | 34.5 | 73 | 139.03 | 4.3863 |
| n=12 | | | | | | | | | |
| cpxI2 | | | | | | | | | |
| 1 | 158.487 | 113.685 | 299.467 | 21.5 | 23.7 | 256.1 | 52.9 | 124.288 | 26.758 |
| 2* | 113.32 | 127.342 | 291.286 | 66.6797 | 37.3421 | 279.4 | 47.8 | 169.979 | 16.7782 |
| 3 | 160.758 | 112.289 | 299.124 | 19.2416 | 22.2892 | 255 | 53.9 | 121.185 | 26.7872 |
| 4 | 159.088 | 113.513 | 299.59 | 20.912 | 23.5129 | 255.8 | 52.9 | 123.665 | 26.9024 |
| 5 | 158.968 | 113.63 | 298.586 | 21.0318 | 23.6295 | 254.7 | 53.6 | 123.339 | 25.9748 |
| 6 | 158.427 | 114.944 | 298.257 | 21.5735 | 24.9435 | 253.5 | 53 | 124.356 | 25.4403 |
| n=6 | | | | | | | | | |
| cpxI3 | | | | | | | | | |
| 1 | 154.158 | 119.329 | 106.941 | 25.8 | 29.3 | 237.7 | 56.5 | 124.287 | 14.7352 |
| 2 | 155.494 | 119.421 | 108.096 | 24.5056 | 29.4207 | 238.1 | 55.9 | 123.612 | 15.6763 |
| 3 | 154.767 | 119.226 | 108.315 | 25.2326 | 29.2258 | 239.4 | 55.9 | 124.433 | 15.949 |
| 4 | 155.03 | 119.223 | 108.315 | 24.9703 | 29.2231 | 239.1 | 55.9 | 124.16 | 15.9335 |
| 5 | 154.83 | 119.225 | 107.944 | 25.1697 | 29.2247 | 238.7 | 56.1 | 124.154 | 15.5971 |
| 11 | 154.97 | 119.072 | 108.083 | 25.03 | 29.0722 | 238.9 | 56.2 | 124.034 | 15.7219 |
| 14 | 154.476 | 119.312 | 106.774 | 25.5244 | 29.3118 | 237.1 | 56.5 | 123.932 | 14.5962 |
| 16 | 155.199 | 119.063 | 108.178 | 24.8009 | 29.0628 | 238.9 | 56.1 | 123.886 | 15.8616 |
| 17 | 155.021 | 119.166 | 108.235 | 24.9793 | 29.1658 | 239 | 56 | 124.099 | 15.8546 |
| 19 | 154.922 | 119.229 | 107.387 | 25.0779 | 29.2294 | 237.7 | 56.4 | 123.756 | 15.0905 |
| 20 | 154.811 | 119.132 | 107.9 | 25.1891 | 29.1322 | 238.8 | 56.2 | 124.144 | 15.6038 |
| 22 | 155.36 | 119.28 | 108.55 | 24.6404 | 29.2802 | 239.1 | 55.8 | 123.958 | 16.1055 |
| 24 | 155.423 | 118.425 | 108.666 | 24.577 | 28.4247 | 239.9 | 56.4 | 123.709 | 16.3431 |
| 28 | 155.019 | 118.883 | 108.573 | 24.9812 | 28.8834 | 239.8 | 56.1 | 124.199 | 16.1914 |
| 29 | 155.673 | 118.501 | 109.064 | 24.3267 | 28.5012 | 240.2 | 56.2 | 123.671 | 16.6473 |
| n=15 | | | | | | | | | |
| cpxI4 | | | | | | | | | |
| 17 | 138.945 | 107.065 | 289.384 | 41.1 | 17.1 | 271.1 | 64.4 | 136.989 | 18.4432 |
| 19 | 138.944 | 107.494 | 288.803 | 41.0561 | 17.494 | 269.6 | 64.5 | 136.907 | 17.9224 |
| 20 | 138.486 | 107.223 | 288.963 | 41.5139 | 17.2226 | 270.8 | 64.6 | 137.326 | 18.0921 |
| n=3 | | | | | | | | | |
| cpxK1 | | | | | | | | | |
| 1 | 158.344 | 98.3547 | 167.586 | 21.7 | 8.4 | 289.9 | 12.3 | 145.238 | 75.0358 |
| 2 | 158.59 | 98.7573 | 167.085 | 21.4099 | 8.75728 | 289.4 | 12.8 | 144.909 | 74.4055 |
| 3 | 158.2 | 98.9383 | 167.498 | 21.8 | 8.93825 | 289.8 | 12.3 | 146.915 | 74.7077 |
| 4 | 158.42 | 98.3321 | 167.788 | 21.5804 | 8.33206 | 289.8 | 12.1 | 145.348 | 75.2387 |
| 5 | 158.688 | 98.1388 | 167.591 | 21.3119 | 8.13875 | 289.5 | 12.3 | 144.023 | 75.1771 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 158.673 | 98.1609 | 167.547 | 21.3272 | 8.16087 | 289.5 | 12.3 | 144.104 | 75.1633 |
| 7 | 158.069 | 98.0337 | 167.793 | 21.931 | 8.03373 | 290.2 | 12.1 | 144.762 | 75.4082 |
| 8 | 158.156 | 98.1153 | 167.744 | 21.8445 | 8.11531 | 290.1 | 12.1 | 144.934 | 75.3623 |
| 9 | 158.675 | 98.1126 | 167.422 | 21.3249 | 8.1126 | 289.5 | 12.4 | 143.736 | 75.1071 |
| 10 | 158.387 | 98.2835 | 167.978 | 21.6126 | 8.28349 | 289.9 | 11.9 | 145.695 | 75.4361 |
| n=10 | | | | | | | | | |
| cpxK2 | | | | | | | | | |
| 1 | 132.255 | 113.352 | 113.784 | 47.7 | 23.4 | 275.6 | 57.1 | 147.62 | 21.7079 |
| 2 | 132.456 | 113.209 | 114.227 | 47.5437 | 23.209 | 276.3 | 56.9 | 147.607 | 22.1721 |
| 3 | 132.702 | 112.827 | 113.938 | 47.2985 | 22.8267 | 276.1 | 57.4 | 147.06 | 21.9402 |
| 4 | 132.502 | 112.924 | 114.124 | 47.4978 | 22.9237 | 276.5 | 57.2 | 147.396 | 22.1206 |
| 5 | 132.74 | 112.982 | 113.818 | 47.26 | 22.982 | 275.8 | 57.4 | 147.037 | 21.8215 |
| 6 | 132.505 | 113.146 | 114.077 | 47.4946 | 23.1458 | 276.2 | 57.1 | 147.46 | 22.0399 |
| 7 | 133.003 | 113.297 | 114.545 | 46.9971 | 23.297 | 276.1 | 56.7 | 147.223 | 22.4057 |
| 8 | 133.06 | 113.222 | 113.329 | 46.9397 | 23.2219 | 274.5 | 57.5 | 146.605 | 21.3704 |
| 9 | 132.192 | 113.485 | 113.873 | 47.8085 | 23.4851 | 275.8 | 57 | 147.81 | 21.7877 |
| 10 | 132.044 | 113.358 | 113.773 | 47.9562 | 23.3578 | 276 | 57.2 | 147.855 | 21.7051 |
| 11 | 132.13 | 113.546 | 113.436 | 47.8701 | 23.5455 | 275.2 | 57.3 | 147.68 | 21.3553 |
| 15* | 153.441 | 98.4067 | 311.463 | 26.5586 | 8.40667 | 287.2 | 47.8 | 123.932 | 40.9696 |
| 17 | 132.33 | 112.702 | 113.647 | 47.6696 | 22.7018 | 276.3 | 57.7 | 147.259 | 21.7121 |
| 18 | 132.226 | 113.488 | 113.552 | 47.774 | 23.4875 | 275.3 | 57.2 | 147.629 | 21.4969 |
| 19 | 132.709 | 113.79 | 113.848 | 47.2913 | 23.7898 | 274.9 | 56.8 | 147.405 | 21.7184 |
| 21 | 132.451 | 113.47 | 113.835 | 47.5494 | 23.4701 | 275.5 | 57 | 147.538 | 21.7756 |
| 22 | 132.826 | 113.148 | 114.302 | 47.1741 | 23.1476 | 276.1 | 56.9 | 147.244 | 22.2434 |
| n=17 | | | | | | | | | |
| cpxR1 | | | | | | | | | |
| 1 | 106.376 | 103.624 | 274.502 | 73.6 | 13.6 | 272.2 | 75.7 | 164.665 | 4.39165 |
| 2 | 106.854 | 104.126 | 274.591 | 73.1464 | 14.1255 | 271.4 | 75.2 | 164.269 | 4.45019 |
| 3 | 106.71 | 104.24 | 274.601 | 73.2897 | 14.24 | 271.4 | 75 | 164.427 | 4.47253 |
| 4 | 106.906 | 104.155 | 274.53 | 73.0941 | 14.1546 | 271 | 75.2 | 164.198 | 4.3675 |
| 5 | 106.497 | 103.658 | 274.255 | 73.5032 | 13.6579 | 271 | 75.7 | 164.511 | 4.13812 |
| 6 | 106.71 | 104.24 | 274.601 | 73.2897 | 14.24 | 271.4 | 75 | 164.427 | 4.47253 |
| 7 | 106.861 | 104.217 | 274.718 | 73.139 | 14.2173 | 271.7 | 75 | 164.302 | 4.58066 |
| n=7 | | | | | | | | | |
| cpxR2 | | | | | | | | | |
| 1 | 132.28 | 96.4111 | 108.069 | 47.7 | 6.4 | 298.8 | 70.9 | 139.778 | 17.9175 |
| 2 | 132.245 | 96.1604 | 108.289 | 47.7553 | 6.16043 | 299.8 | 70.7 | 139.791 | 18.2161 |
| 4 | 132.513 | 95.9544 | 108.19 | 47.4874 | 5.95443 | 300 | 70.9 | 139.439 | 18.084 |
| 11 | 132.534 | 96.5005 | 107.529 | 47.4663 | 6.50051 | 297.7 | 71.3 | 139.518 | 17.4445 |
| 14 | 131.563 | 96.6539 | 107.227 | 48.4369 | 6.65391 | 297.9 | 71.6 | 140.49 | 17.0734 |
| 15 | 131.223 | 96.266 | 106.707 | 48.7772 | 6.26596 | 298.8 | 72.2 | 140.652 | 16.5938 |
| 18 | 131.776 | 96.188 | 107.822 | 48.2244 | 6.18801 | 299.7 | 71.2 | 140.206 | 17.6853 |
| 20 | 131.632 | 96.5209 | 107.712 | 48.3685 | 6.52094 | 298.8 | 71.2 | 140.441 | 17.559 |
| 22 | 132.559 | 96.418 | 107.936 | 47.4411 | 6.41798 | 298.4 | 71 | 139.512 | 17.8079 |
| n=9 | | | | | | | | | |
| total n = 118 | | | | | | | | | |

SAMPLE BAK-03-001 Thin Section

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| cpx1 | | | | | | | | | |
| 1 | 53.8256 | 95.1818 | 68.9927 | 126.2 | 5.2 | 229.4 | 68.4 | 34.2072 | 20.9114 |
| 2 | 53.9799 | 94.7672 | 68.5853 | 126.0201 | 4.76718 | 228 | 68.1 | 34.1548 | 21.3216 |
| 3 | 54.0744 | 94.7698 | 68.584 | 125.9256 | 4.76983 | 227.9 | 68.1 | 34.0592 | 21.3219 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 54.0845 | 95.0425 | 69.478 | 125.9156 | 5.04245 | 229.1 | 68.9 | 34.0315 | 20.4354 |
| 5 | 53.5553 | 95.5854 | 68.6617 | 126.4447 | 5.58536 | 230.4 | 68 | 34.2695 | 21.2122 |
| n=5 | | | | | | | | | |
| cpx2 | | | | | | | | | |
| 1 | 74.9132 | 70.9398 | 245.037 | 285.1 | 19.1 | 160 | 59 | 23.745 | 23.4645 |
| 2 | 75.0639 | 70.8701 | 245.127 | 284.9361 | 19.12988 | 159.7 | 59 | 23.5766 | 23.4184 |
| 3 | 75.2997 | 70.9677 | 244.893 | 284.7003 | 19.03228 | 159.9 | 58.9 | 23.3843 | 23.6384 |
| 4 | 74.5681 | 71.1788 | 245.142 | 285.4319 | 18.82116 | 160.6 | 59.2 | 23.931 | 23.4424 |
| 5 | 74.9037 | 71.3834 | 244.364 | 285.0963 | 18.61657 | 161.5 | 58.7 | 23.8083 | 24.2108 |
| n=5 | | | | | | | | | |
| total n = 10 | | | | | | | | | |

SAMPLE BAK-03-003 Thin section

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| cpx1 | | | | | | | | | |
| 1 | 62.0871 | 91.3057 | 67.861 | 117.9 | 1.3 | 211.1 | 67.8 | 27.3705 | 22.1575 |
| 2 | 62.0871 | 91.3057 | 67.861 | 117.9129 | 1.30573 | 211.1 | 67.8 | 27.3811 | 22.1578 |
| 4 | 62.3714 | 90.0391 | 68.4722 | 117.6286 | 0.03905 | 207.7 | 68.5 | 27.6132 | 21.5 |
| 5 | 61.4259 | 91.1703 | 66.6795 | 118.5741 | 1.17028 | 211.3 | 66.7 | 28.0709 | 23.2669 |
| 6 | 61.9765 | 90.7202 | 67.2609 | 118.0235 | 0.72015 | 209.7 | 67.3 | 27.7224 | 22.6878 |
| 7 | 60.6111 | 91.9666 | 67.9285 | 119.3889 | 1.96661 | 214.2 | 67.8 | 28.5899 | 22.1039 |
| 8 | 63.6553 | 90.6967 | 68.4772 | 116.3447 | 0.69666 | 208.1 | 68.5 | 26.0704 | 21.4877 |
| 9 | 61.9678 | 91.2304 | 67.1023 | 118.0322 | 1.23044 | 210.9 | 67.1 | 27.5132 | 22.8641 |
| 10 | 60.3346 | 91.3454 | 66.7343 | 119.6654 | 1.34541 | 212.8 | 66.7 | 29.0871 | 23.2563 |
| 11 | 60.9666 | 90.5082 | 66.4382 | 119.0335 | 0.50818 | 210.2 | 66.4 | 28.8115 | 23.5938 |
| 12 | 60.9666 | 90.5082 | 66.4382 | 119.0335 | 0.50818 | 210.2 | 66.4 | 28.8115 | 23.5938 |
| 13 | 60.6988 | 91.4579 | 67.0132 | 119.3012 | 1.45794 | 212.7 | 67 | 28.6838 | 22.9494 |
| 14 | 62.0185 | 91.2343 | 64.8921 | 117.9815 | 1.23426 | 210.6 | 64.9 | 27.4042 | 25.0658 |
| 15 | 59.9502 | 91.4186 | 66.7548 | 120.0498 | 1.41859 | 213.3 | 66.7 | 29.4401 | 23.2528 |
| 16 | 60.2681 | 91.335 | 66.9132 | 119.7319 | 1.33499 | 212.9 | 66.9 | 29.1636 | 23.056 |
| 17 | 61.9055 | 91.4526 | 69.9427 | 118.0945 | 1.45261 | 212.1 | 69.9 | 27.5645 | 20.0421 |
| 18 | 61.9055 | 91.4526 | 69.9427 | 118.0945 | 1.45261 | 212.1 | 69.9 | 27.5645 | 20.0421 |
| 19 | 61.5357 | 90.6606 | 67.1356 | 118.4643 | 0.66059 | 210 | 67.1 | 28.1854 | 22.8897 |
| 22 | 60.6183 | 91.5578 | 67.8662 | 119.3817 | 1.55783 | 213.2 | 67.8 | 28.7477 | 22.1395 |
| 23 | 61.9717 | 89.8482 | 67.0687 | 298.0283 | 0.15181 | 207.7 | 67.1 | 28.0925 | 22.8995 |
| 25 | 62.4674 | 91.8914 | 65.3742 | 117.5326 | 1.89137 | 211.7 | 65.3 | 26.6656 | 24.616 |
| n=21 | | | | | | | | | |
| cpx2 | | | | | | | | | |
| 1 | 54.8519 | 89.0384 | 301.354 | 305.1 | 1 | 36.8 | 58.6 | 214.49 | 31.3793 |
| 2 | 55.2884 | 90.6983 | 303.337 | 124.7116 | 0.69832 | 33.7 | 56.7 | 215.17 | 33.2913 |
| 3* | 154.717 | 160.222 | 34.3899 | 25.3 | 70.2 | 148.1 | 11 | 241.344 | 16.2304 |
| 4 | 52.9674 | 91.1267 | 302.95 | 127.0326 | 1.12671 | 35.3 | 57 | 217.764 | 32.9758 |
| 5 | 55.6563 | 89.5889 | 301.368 | 304.3437 | 0.41106 | 35 | 58.6 | 214.093 | 31.3968 |
| 6 | 53.2694 | 91.3476 | 310.977 | 126.7306 | 1.3476 | 35.2 | 49 | 217.901 | 40.9685 |
| 7 | 54.154 | 90.042 | 300.373 | 125.846 | 0.04203 | 35.8 | 59.6 | 215.871 | 30.4 |
| 8 | 55.3924 | 90.3438 | 301.788 | 124.6077 | 0.34384 | 34.1 | 58.2 | 214.821 | 31.798 |
| 9 | 54.9976 | 90.1176 | 301.435 | 125.0024 | 0.11755 | 34.8 | 58.6 | 215.074 | 31.3997 |
| 10 | 55.2503 | 90.3473 | 301.778 | 124.7497 | 0.34726 | 34.2 | 58.2 | 214.965 | 31.7977 |
| 11* | 58.101 | 118.681 | 71.2324 | 121.899 | 28.6813 | 266.6 | 56.2 | 22.6455 | 16.3802 |
| n=11 | | | | | | | | | |
| cpx3 | | | | | | | | | |
| 1 | 102.92 | 95.7466 | 326.753 | 77.1 | 5.7 | 343.4 | 33.1 | 175.704 | 56.2881 |
| 3 | 102.293 | 96.2075 | 328.561 | 77.7075 | 6.20748 | 343.9 | 31.2 | 177.75 | 58.0459 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 102.486 | 96.2715 | 327.574 | 77.5136 | 6.27145 | 343.5 | 32.2 | 177.272 | 57.0416 |
| 5 | 102.578 | 97.7172 | 328.391 | 77.4221 | 7.71715 | 342.7 | 31.3 | 179.727 | 57.5485 |
| n=4 | | | | | | | | | |
| cpx4 | | | | | | | | | |
| 1 | 98.7587 | 88.9561 | 86.4039 | 261.2 | 1 | 156.3 | 86.3 | 351.262 | 3.57488 |
| 2 | 99.419 | 89.0105 | 85.8673 | 260.581 | 0.98948 | 157.1 | 85.8 | 350.652 | 4.08347 |
| 3 | 99.9511 | 89.5235 | 84.9793 | 260.0489 | 0.47654 | 164.6 | 85 | 350.09 | 4.97718 |
| 4 | 100.003 | 90.4642 | 85.2826 | 79.9969 | 0.46424 | 175.6 | 85.3 | 349.959 | 4.67734 |
| 5 | 99.9353 | 90.6244 | 84.1759 | 80.06474 | 0.6244 | 176.2 | 84.1 | 350.001 | 5.86574 |
| 6 | 100.15 | 89.3617 | 85.6873 | 259.8505 | 0.63827 | 161.4 | 85.6 | 349.899 | 4.35187 |
| 7 | 100.772 | 90.1811 | 85.0005 | 79.2284 | 0.18106 | 171.3 | 85 | 349.213 | 4.9967 |
| 8 | 100.301 | 90.1624 | 85.048 | 79.6989 | 0.16243 | 171.6 | 85 | 349.685 | 4.99722 |
| 9 | 98.5434 | 89.2047 | 86.0912 | 261.4566 | 0.79528 | 160 | 86 | 351.511 | 3.9198 |
| 10 | 98.8008 | 89.5928 | 86.278 | 261.1992 | 0.40716 | 165 | 86.3 | 351.225 | 3.67824 |
| 11 | 98.494 | 89.9547 | 85.956 | 261.506 | 0.04535 | 170.9 | 86 | 351.509 | 3.99977 |
| 12 | 99.1541 | 89.5132 | 86.2255 | 260.8459 | 0.48684 | 163.5 | 86.2 | 350.878 | 3.76863 |
| 13 | 98.6059 | 89.6712 | 86.0612 | 261.3941 | 0.32877 | 166.6 | 86 | 351.417 | 3.98592 |
| 14 | 98.813 | 89.745 | 85.8666 | 261.187 | 0.25499 | 167.7 | 85.9 | 351.205 | 4.09236 |
| 15 | 98.8753 | 89.7663 | 86.2062 | 261.1247 | 0.23371 | 167.6 | 86.2 | 351.14 | 3.79277 |
| 16 | 98.7119 | 89.7752 | 85.9513 | 261.2881 | 0.22483 | 168.1 | 85.9 | 351.304 | 4.09361 |
| 17 | 99.3421 | 89.9568 | 86.1593 | 260.6579 | 0.04317 | 170 | 86.2 | 350.661 | 3.79975 |
| n=17 | | | | | | | | | |
| cpx5 | | | | | | | | | |
| 1 | 80.0287 | 86.8614 | 304.813 | 280 | 3.1 | 14.4 | 55.1 | 187.849 | 34.7241 |
| 2 | 79.6948 | 87.0276 | 304.711 | 280.3053 | 2.97245 | 14.6 | 55.2 | 188.25 | 34.6349 |
| 3 | 80.6857 | 86.183 | 305.718 | 279.3143 | 3.81697 | 14.6 | 54.1 | 186.573 | 35.6325 |
| 4 | 80.0015 | 87.6814 | 303.48 | 279.9986 | 2.31856 | 13.5 | 56.4 | 188.463 | 33.4979 |
| 5 | 79.7464 | 87.5384 | 306.194 | 280.2536 | 2.46156 | 13.6 | 53.7 | 188.451 | 36.1895 |
| 6 | 80.0254 | 87.2463 | 305.456 | 279.9746 | 2.75366 | 13.8 | 54.5 | 188.019 | 35.362 |
| 7 | 80.3182 | 87.2413 | 304.017 | 279.6818 | 2.75871 | 13.8 | 55.9 | 187.822 | 33.9551 |
| 8 | 79.7143 | 87.1267 | 304.831 | 280.2857 | 2.87331 | 14.4 | 55.1 | 188.291 | 34.747 |
| 9 | 80.2545 | 86.8922 | 302.858 | 279.7455 | 3.10783 | 14.5 | 57 | 187.739 | 32.8176 |
| 11 | 80.0793 | 87.2824 | 304.371 | 279.9208 | 2.71756 | 13.9 | 55.5 | 188.061 | 34.361 |
| 12 | 80.2624 | 87.1263 | 305.014 | 279.7376 | 2.87368 | 13.8 | 54.9 | 187.727 | 34.9485 |
| 13 | 81.0696 | 86.771 | 304.375 | 278.9304 | 3.22897 | 13.6 | 55.5 | 186.724 | 34.3072 |
| 14 | 80.9421 | 87.1659 | 305.333 | 279.0579 | 2.83407 | 13 | 54.6 | 187.053 | 35.2541 |
| 15 | 80.7093 | 87.42 | 306.043 | 279.2907 | 2.57996 | 12.8 | 53.9 | 187.416 | 35.9795 |
| 16 | 80.7162 | 86.8785 | 305.898 | 279.2838 | 3.12155 | 13.6 | 54 | 187.028 | 35.8206 |
| 17 | 80.4217 | 86.6078 | 306.031 | 279.5783 | 3.39218 | 14.2 | 53.8 | 187.111 | 35.9907 |
| 18 | 80.5716 | 86.6559 | 304.288 | 279.4284 | 3.34406 | 14.3 | 55.6 | 187.153 | 34.192 |
| 19 | 80.1248 | 85.9709 | 303.562 | 279.8752 | 4.02908 | 15.9 | 56.2 | 187.204 | 33.4944 |
| 20 | 80.5397 | 86.7863 | 306.037 | 279.4603 | 3.21374 | 13.9 | 53.8 | 187.122 | 36.0087 |
| 21 | 80.378 | 87.182 | 304.287 | 279.622 | 2.81798 | 13.7 | 55.6 | 187.701 | 34.2535 |
| 22 | 80.6568 | 87.2673 | 304.981 | 279.3432 | 2.73272 | 13.2 | 54.9 | 187.431 | 34.9632 |
| 23 | 80.4981 | 86.8874 | 304.868 | 279.502 | 3.11257 | 14 | 55 | 187.335 | 34.8176 |
| 24 | 80.8185 | 87.5473 | 303.641 | 279.1815 | 2.45268 | 12.9 | 56.3 | 187.552 | 33.5847 |
| n=23 | | | | | | | | | |
| n total = 76 | | | | | | | | | |

SAMPLE BAK-03-012 Thin section

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| cpx1 | | | | | | | | | |
| 1 | 53.9704 | 86.8701 | 85.1861 | 306 | 3.1 | 183.6 | 84.3 | 36.2607 | 4.80333 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 54.5316 | 87.1171 | 85.0273 | 305.4684 | 2.88288 | 185.4 | 84.3 | 35.717 | 4.92463 |
| 3 | 54.2732 | 86.9015 | 85.44 | 305.7268 | 3.09852 | 181.6 | 84.5 | 35.9733 | 4.54402 |
| 4 | 54.3075 | 86.9339 | 85.0372 | 305.6925 | 3.06615 | 184.1 | 84.2 | 35.9573 | 4.93101 |
| 5 | 54.0305 | 86.9715 | 85.2369 | 305.9695 | 3.02849 | 183.6 | 84.4 | 36.2198 | 4.72105 |
| 6 | 54.1524 | 86.3727 | 85.0082 | 305.8476 | 3.62726 | 179.9 | 83.8 | 36.1657 | 5.00578 |
| n=6 | | | | | | | | | |
| cpx2 | | | | | | | | | |
| 1 | 95.7167 | 90.0469 | 15.4037 | 84.3 | 0 | 174.3 | 15.4 | 354.3 | 74.6 |
| 2 | 96.0102 | 89.8089 | 15.5425 | 263.9898 | 0.19107 | 173.9 | 15.5 | 354.679 | 74.4986 |
| 3 | 95.7697 | 90.3714 | 16.9562 | 84.23034 | 0.3714 | 174.3 | 17 | 353.016 | 72.9959 |
| 4 | 95.9063 | 90.8117 | 16.0711 | 84.09372 | 0.81172 | 174.3 | 16.1 | 351.284 | 73.8788 |
| 5 | 95.9372 | 90.3395 | 13.6975 | 84.06276 | 0.33951 | 174.1 | 13.7 | 352.67 | 76.2958 |
| 6 | 95.7306 | 90.2636 | 16.5672 | 84.26939 | 0.26362 | 174.3 | 16.6 | 353.385 | 73.3979 |
| n=6 | | | | | | | | | |
| cpx3 | | | | | | | | | |
| 1 | 30.6381 | 86.3669 | 329.74 | 329.4 | 3.6 | 61.5 | 30.2 | 233.259 | 59.5408 |
| 2 | 30.4189 | 86.1481 | 329.944 | 329.5811 | 3.85191 | 61.8 | 30 | 232.964 | 59.7029 |
| 3* | 100.451 | 65.3805 | 238.928 | 259.5492 | 24.61947 | 134.9 | 51.1 | 3.65782 | 28.0104 |
| 4 | 30.8666 | 86.6484 | 330.5 | 329.1334 | 3.35156 | 61 | 29.4 | 233.223 | 60.373 |
| 5 | 30.6432 | 86.6695 | 330.691 | 329.3568 | 3.33055 | 61.2 | 29.3 | 233.459 | 60.4756 |
| 6 | 30.5478 | 86.541 | 329.56 | 329.4522 | 3.45899 | 61.5 | 30.4 | 233.595 | 59.3607 |
| n=6 | | | | | | | | | |
| cpx4 | | | | | | | | | |
| 1 | 133.916 | 111.648 | 118.256 | 46.1 | 21.6 | 281.7 | 55 | 147.287 | 26.1059 |
| 2 | 134.373 | 111.424 | 117.937 | 45.6273 | 21.424 | 281.1 | 55.3 | 146.605 | 25.887 |
| 3 | 134.42 | 111.414 | 117.976 | 45.58 | 21.4135 | 281.1 | 55.3 | 146.56 | 25.9048 |
| 4 | 134.447 | 111.412 | 118.241 | 45.5531 | 21.4118 | 281.4 | 55.1 | 146.656 | 26.1546 |
| 5 | 134.017 | 111.874 | 117.637 | 45.983 | 21.8739 | 280.6 | 55.3 | 147.029 | 25.5132 |
| 6 | 134.015 | 111.553 | 117.612 | 45.9851 | 21.5533 | 280.9 | 55.5 | 146.862 | 25.5362 |
| n=6 | | | | | | | | | |
| n total = 24 | | | | | | | | | |

SAMPLE BAK-03-014 Chip

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| cpx1 | | | | | | | | | |
| 1 | 4.77073 | 74.4135 | 47.6255 | 355.2 | 15.6 | 248.8 | 45.4 | 98.9707 | 40.4491 |
| 2 | 4.9573 | 74.5427 | 48.4859 | 355.0427 | 15.45729 | 248.3 | 46.2 | 98.3168 | 39.7045 |
| 3 | 5.36488 | 75.1601 | 48.058 | 354.6351 | 14.83989 | 248.7 | 46 | 97.5816 | 40.2171 |
| 4 | 4.7029 | 74.6505 | 47.6832 | 355.2971 | 15.34946 | 249.1 | 45.5 | 98.8423 | 40.4722 |
| 5 | 5.37047 | 75.0078 | 47.581 | 354.6295 | 14.99219 | 248.8 | 45.5 | 97.9209 | 40.6454 |
| 6 | 4.28611 | 74.601 | 47.976 | 355.7139 | 15.39903 | 249.3 | 45.7 | 99.1893 | 40.2332 |
| n=6 | | | | | | | | | |
| cpx2 | | | | | | | | | |
| 1 | 18.528 | 93.3239 | 270.297 | 161.5 | 3.3 | 346.6 | 86.7 | 71.5169 | 0.2927 |
| 2 | 18.5874 | 93.2115 | 270.524 | 161.4127 | 3.21154 | 350.7 | 86.7 | 71.4424 | 0.53145 |
| 3 | 19.1113 | 93.3244 | 269.449 | 160.8887 | 3.32439 | 331.5 | 86.6 | 70.8565 | 0.5534 |
| 4 | 18.754 | 93.6177 | 269.443 | 161.246 | 3.61765 | 332.5 | 86.3 | 71.2105 | 0.5611 |
| 5 | 18.754 | 93.6177 | 269.443 | 161.246 | 3.61765 | 332.5 | 86.3 | 71.2105 | 0.5611 |
| 6 | 18.4741 | 93.4871 | 269.535 | 161.5259 | 3.48713 | 333.9 | 86.5 | 71.4976 | 0.46332 |
| n=6 | | | | | | | | | |
| cpx3 | | | | | | | | | |
| 1 | 98.1457 | 105.398 | 64.3229 | 81.9 | 15.4 | 200.7 | 60.3 | 344.606 | 24.7453 |
| 2 | 98.0499 | 105.561 | 64.437 | 81.95008 | 15.561 | 201.2 | 60.3 | 344.622 | 24.6101 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 3 | 98.2419 | 105.442 | 63.7226 | 81.75809 | 15.4423 | 200.1 | 59.8 | 344.268 | 25.2609 |
| 4 | 97.8753 | 105.26 | 63.0906 | 82.12467 | 15.2602 | 199.5 | 59.3 | 344.499 | 25.9371 |
| 5* | 66.821 | 64.2935 | 134.321 | 293.179 | 25.70649 | 47.1 | 40.1 | 179.81 | 39.0513 |
| n=5 | | | | | | | | | |
| cpx4 | | | | | | | | | |
| 1 | 20.6965 | 115.134 | 57.9466 | 159.3 | 25.1 | 283.4 | 50.1 | 54.4079 | 28.7508 |
| 2 | 20.6965 | 115.134 | 57.9466 | 159.3035 | 25.1343 | 283.4 | 50.1 | 54.3923 | 28.7433 |
| 3 | 20.5264 | 115.195 | 57.4104 | 159.4737 | 25.1946 | 283.1 | 49.7 | 54.2524 | 29.1649 |
| 4 | 20.8174 | 114.901 | 58.1176 | 159.1826 | 24.9007 | 283.3 | 50.4 | 54.5235 | 28.5979 |
| 5 | 20.7019 | 114.985 | 58.0578 | 159.2981 | 24.9851 | 283.4 | 50.3 | 54.5497 | 28.6481 |
| 6 | 20.7655 | 115.088 | 58.0088 | 159.2345 | 25.0881 | 283.4 | 50.2 | 54.4053 | 28.6639 |
| cpx5 | | | | | | | | | |
| 1 | 154.075 | 92.3978 | 72.6632 | 25.9 | 2.4 | 123.6 | 72.5 | 295.151 | 17.3215 |
| 2 | 154.075 | 92.3978 | 72.6632 | 25.9254 | 2.39778 | 123.6 | 72.5 | 295.177 | 17.3226 |
| 3 | 153.968 | 92.5589 | 72.7794 | 26.0321 | 2.55894 | 124.2 | 72.6 | 295.239 | 17.2002 |
| 4 | 153.511 | 92.4886 | 72.2448 | 26.4889 | 2.4886 | 124.2 | 72.1 | 295.693 | 17.7155 |
| 5 | 153.56 | 92.5523 | 71.9421 | 26.4399 | 2.55231 | 124.2 | 71.8 | 295.61 | 18.0091 |
| 6 | 153.96 | 92.6935 | 70.8547 | 26.0404 | 2.69351 | 123.7 | 70.7 | 295.107 | 19.0991 |
| 7 | 153.473 | 92.9694 | 71.3518 | 26.5275 | 2.96943 | 125.3 | 71.1 | 295.525 | 18.6447 |
| n=7 | | | | | | | | | |
| n total = 30 | | | | | | | | | |

SAMPLE BAK-03-015 Chip

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| cpxA1 | | | | | | | | | |
| 1 | 110.077 | 85.4755 | 110.557 | 249.9 | 4.5 | 351.7 | 69 | 158.217 | 20.4698 |
| 2 | 109.452 | 86.6663 | 109.544 | 250.5 | 3.3 | 349.6 | 70.2 | 159.33 | 19.5069 |
| 3 | 109.927 | 86.5596 | 111.232 | 250.1 | 3.4 | 348.9 | 68.5 | 158.78 | 21.1954 |
| 4 | 109.584 | 86.663 | 109.175 | 250.4 | 3.4 | 350 | 70.5 | 159.216 | 19.181 |
| 5 | 109.944 | 86.156 | 109.21 | 250.1 | 3.9 | 351.3 | 70.4 | 158.742 | 19.1657 |
| 6 | 109.971 | 85.9722 | 108.734 | 250 | 4 | 351.4 | 70.9 | 158.647 | 18.6618 |
| 7 | 110.246 | 86.7393 | 108.176 | 249.8 | 3.3 | 349.9 | 71.5 | 158.716 | 18.1719 |
| n=7 | | | | | | | | | |
| cpxA2+cpxA2a | | | | | | | | | |
| 1 | 110.76 | 97.9811 | 296.085 | 69.2403 | 7.98111 | 323.4 | 62.8 | 163.129 | 25.8159 |
| 4 | 110.858 | 97.9776 | 296.245 | 69.1424 | 7.9776 | 323.4 | 62.7 | 163.048 | 25.9237 |
| 18 | 110.292 | 98.168 | 295.663 | 69.708 | 8.16802 | 323.2 | 63.2 | 163.604 | 25.3348 |
| 19 | 109.454 | 98.8444 | 295.425 | 70.5462 | 8.84436 | 322.6 | 63.2 | 164.722 | 25.0773 |
| n=4 | | | | | | | | | |
| cpxE1 | | | | | | | | | |
| 1 | 121.217 | 81.7434 | 319.843 | 238.783 | 8.25659 | 335.7 | 39.7 | 139.138 | 49.1026 |
| 3 | 123.186 | 85.5014 | 314.6 | 236.8145 | 4.49864 | 331.4 | 45.2 | 142.389 | 44.4442 |
| 4 | 122.653 | 85.5946 | 314.332 | 237.347 | 4.40541 | 331.8 | 45.5 | 143.056 | 44.1651 |
| 6 | 123.585 | 85.8665 | 312.784 | 236.4147 | 4.1335 | 332.2 | 47 | 142.615 | 42.591 |
| 7 | 123.387 | 85.7683 | 313.157 | 236.6131 | 4.23166 | 331.1 | 46.7 | 142.658 | 42.9886 |
| 8 | 123.305 | 85.6191 | 313.175 | 236.6948 | 4.38086 | 331.3 | 46.6 | 142.588 | 43.0682 |
| 9 | 123.465 | 85.3886 | 313.021 | 236.5355 | 4.61136 | 331.5 | 46.8 | 142.248 | 42.8258 |
| 10 | 123.343 | 85.7665 | 313.243 | 236.6572 | 4.2335 | 331.1 | 46.6 | 142.686 | 43.0906 |
| n=8 | | | | | | | | | |
| cpxE2 | | | | | | | | | |
| 1 | 140.201 | 119.847 | 131.905 | 39.7993 | 29.8465 | 280.8 | 40.2 | 153.874 | 35.4104 |
| 2 | 139.856 | 120.088 | 131.497 | 40.1436 | 30.0881 | 280.6 | 40.4 | 154.057 | 34.9773 |
| 3 | 139.797 | 120.611 | 132.264 | 40.2031 | 30.6105 | 280.9 | 39.6 | 154.998 | 35.3302 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 4 | 139.866 | 119.891 | 133.69 | 40.134 | 29.8909 | 282.6 | 38.8 | 155.611 | 36.8083 |
| 5 | 139.708 | 120.3 | 133.011 | 40.2924 | 30.2996 | 281.9 | 39.1 | 155.53 | 36.1173 |
| 6 | 139.042 | 120.617 | 131.36 | 40.9576 | 30.6169 | 280.9 | 40.2 | 155.125 | 34.6751 |
| 7 | 139.041 | 120.646 | 131.805 | 40.9587 | 30.646 | 281.3 | 39.9 | 155.467 | 34.998 |
| 8 | 140.042 | 120.878 | 132.183 | 39.9584 | 30.878 | 280.4 | 39.5 | 154.882 | 35.1743 |
| n=8 | | | | | | | | | |
| cpxE3 | | | | | | | | | |
| 11 | 123.268 | 72.5319 | 124.359 | 236.7324 | 17.46812 | 350.4 | 51.9 | 135.113 | 32.6207 |
| 14 | 123.699 | 72.6239 | 122.817 | 236.3009 | 17.37611 | 351.1 | 53.3 | 135.384 | 31.1819 |
| 17 | 123.238 | 72.0263 | 122.842 | 236.7616 | 17.97375 | 352.3 | 53.1 | 135.513 | 31.0187 |
| 22 | 122.994 | 72.6109 | 123.62 | 237.0059 | 17.38913 | 351.2 | 52.6 | 135.757 | 31.918 |
| n=4 | | | | | | | | | |
| cpxE3a | | | | | | | | | |
| 1 | 122.502 | 72.5378 | 124.55 | 237.4981 | 17.46221 | 351 | 51.8 | 135.824 | 32.75 |
| 2 | 122.226 | 72.052 | 124.592 | 237.7744 | 17.94804 | 351.9 | 51.6 | 135.802 | 32.6363 |
| 3 | 122.518 | 72.4379 | 124.774 | 237.4824 | 17.56206 | 351 | 51.5 | 135.636 | 32.9702 |
| 5 | 122.892 | 73.0407 | 123.399 | 237.1085 | 16.95934 | 351 | 53 | 136.228 | 31.7571 |
| 9 | 122.693 | 72.5161 | 127.358 | 237.3066 | 17.48393 | 348.8 | 49.3 | 134.39 | 35.3606 |
| 12 | 122.819 | 73.0703 | 124.543 | 237.1807 | 16.92966 | 350.1 | 52 | 135.845 | 32.8528 |
| 19 | 122.271 | 72.0175 | 124.469 | 237.7288 | 17.98248 | 351.9 | 51.6 | 135.741 | 32.6161 |
| n=7 | | | | | | | | | |
| cpxE4 | | | | | | | | | |
| 1 | 107.996 | 95.6217 | 314.08 | 72.0037 | 5.62171 | 336.2 | 45.6 | 167.429 | 43.8465 |
| 4 | 108.057 | 95.401 | 313.669 | 71.9427 | 5.40099 | 336.3 | 46.1 | 167.071 | 43.3914 |
| 5 | 107.971 | 95.3023 | 313.443 | 72.0295 | 5.30233 | 336.5 | 46.3 | 167.032 | 43.214 |
| 6 | 107.862 | 94.9705 | 313.856 | 72.1377 | 4.97048 | 337 | 45.9 | 166.9 | 43.6705 |
| 8 | 117.561 | 90.278 | 122.553 | 62.4394 | 0.27799 | 332 | 57.4 | 152.617 | 32.5985 |
| 9 | 117.097 | 90.6642 | 122.032 | 62.9026 | 0.66422 | 331.8 | 58 | 153.318 | 31.991 |
| 10 | 117.531 | 90.4076 | 122.528 | 62.4686 | 0.40756 | 331.8 | 57.5 | 152.728 | 32.4966 |
| 11 | 117.425 | 90.6662 | 122.142 | 62.5748 | 0.6662 | 331.5 | 57.9 | 152.993 | 32.0912 |
| 12 | 118.063 | 90.6029 | 122.845 | 61.9366 | 0.60287 | 331 | 57.1 | 152.327 | 32.893 |
| 13 | 117.863 | 90.6846 | 122.085 | 62.1368 | 0.68457 | 331 | 57.9 | 152.566 | 32.0904 |
| 14 | 118.328 | 90.5739 | 121.748 | 61.6724 | 0.57393 | 330.7 | 58.2 | 152.028 | 31.7931 |
| 15 | 118.535 | 90.863 | 121.882 | 61.4653 | 0.86303 | 330.1 | 58.1 | 152.002 | 31.8858 |
| 19 | 118.468 | 90.8913 | 122.002 | 61.5319 | 0.89125 | 330.1 | 58 | 152.089 | 31.9845 |
| 20 | 106.943 | 95.6575 | 314.206 | 73.0566 | 5.65754 | 337.3 | 45.5 | 168.536 | 43.9458 |
| n=14 | | | | | | | | | |
| cpxF1 | | | | | | | | | |
| 1 | 82.323 | 45.0761 | 342.228 | 277.677 | 44.92389 | 20.4 | 12.5 | 122.079 | 42.399 |
| 2 | 82.4537 | 45.1808 | 341.877 | 277.5464 | 44.81919 | 20.5 | 12.7 | 122.378 | 42.4053 |
| 3 | 82.2583 | 44.8358 | 342.03 | 277.7417 | 45.16422 | 20.7 | 12.6 | 122.357 | 42.1113 |
| 4 | 81.4419 | 44.7534 | 344.746 | 278.5581 | 45.24658 | 19.5 | 10.7 | 119.571 | 42.7842 |
| 5 | 81.2441 | 44.5833 | 342.596 | 278.7559 | 45.4167 | 21.3 | 12.1 | 122.455 | 42.0645 |
| 6 | 82.8367 | 45.981 | 340.977 | 277.1634 | 44.01904 | 20.6 | 13.6 | 123.559 | 42.8291 |
| 7 | 81.5203 | 45.8305 | 342.778 | 278.4797 | 44.16954 | 20.7 | 12.3 | 122.528 | 43.2306 |
| n=7 | | | | | | | | | |
| cpxF2 | | | | | | | | | |
| 1 | 110.678 | 97.9007 | 121.352 | 69.3222 | 7.90065 | 326.6 | 57.8 | 164.103 | 30.9881 |
| 2 | 110.907 | 97.261 | 120.871 | 69.093 | 7.26102 | 327.2 | 58.4 | 163.41 | 30.5724 |
| 3 | 110.624 | 98.2813 | 120.649 | 69.3765 | 8.28131 | 325.7 | 58.4 | 164.246 | 30.2531 |
| 4 | 110.53 | 97.7204 | 120.907 | 69.4703 | 7.72036 | 326.8 | 58.2 | 164.074 | 30.6281 |
| 5* | 100.244 | 34.3599 | 284.48 | 259.7562 | 55.64009 | 62.4 | 33.1 | 157.729 | 8.10812 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 110.669 | 98.9125 | 121.036 | 69.3311 | 8.91249 | 324.9 | 57.8 | 164.664 | 30.6526 |
| n=6 | | | | | | | | | |
| cpxF3 | | | | | | | | | |
| 1 | 157.235 | 118.34 | 160.672 | 22.7655 | 28.3397 | 283.3 | 16.9 | 166.345 | 56.1679 |
| 2 | 156.137 | 118.282 | 160.873 | 23.8626 | 28.2822 | 284.5 | 16.8 | 167.599 | 56.285 |
| 3 | 156.323 | 118.455 | 160.82 | 23.6767 | 28.4545 | 284.3 | 16.8 | 167.555 | 56.1424 |
| 4 | 156.188 | 118.273 | 161.031 | 23.8125 | 28.273 | 284.6 | 16.6 | 167.919 | 56.4194 |
| 5 | 157.171 | 118.243 | 160.554 | 22.8288 | 28.2428 | 283.3 | 17.1 | 166.011 | 56.1387 |
| 6 | 157.352 | 118.133 | 160.68 | 22.6477 | 28.1328 | 283.3 | 17 | 165.995 | 56.3177 |
| n=6 | | | | | | | | | |
| cpxF4 | | | | | | | | | |
| 1 | 118.016 | 96.2425 | 120.141 | 61.9845 | 6.24252 | 321.4 | 59.3 | 155.595 | 29.926 |
| 2 | 117.801 | 96.2055 | 117.903 | 62.1987 | 6.20548 | 320.7 | 61.5 | 155.471 | 27.7 |
| 3 | 118.816 | 95.8515 | 116.694 | 61.1837 | 5.8515 | 319.7 | 62.7 | 154.12 | 26.5594 |
| 4 | 117.822 | 96.6591 | 119.188 | 62.1778 | 6.65906 | 320.5 | 60.1 | 155.889 | 29.0044 |
| 5 | 118.154 | 97.0801 | 119.548 | 61.846 | 7.08007 | 319.6 | 59.7 | 155.842 | 29.2938 |
| 6 | 118.035 | 96.5815 | 119.765 | 61.9652 | 6.58153 | 320.6 | 59.6 | 155.712 | 29.5275 |
| n=6 | | | | | | | | | |
| cpxH1 | | | | | | | | | |
| 1 | 104.072 | 46.5556 | 103.216 | 255.9276 | 43.44441 | 57.1 | 45 | 156.772 | 9.53684 |
| 2 | 103.078 | 46.3991 | 104.073 | 256.9225 | 43.60095 | 56.9 | 44.6 | 157.088 | 10.1685 |
| 3 | 103.586 | 46.4871 | 103.314 | 256.4141 | 43.51287 | 57.4 | 44.9 | 157.139 | 9.63462 |
| 4 | 103.421 | 46.7013 | 103.364 | 256.5786 | 43.29867 | 57.5 | 45.1 | 157.342 | 9.66684 |
| 5 | 103.603 | 46.8778 | 103.9 | 256.397 | 43.12224 | 56.5 | 45.1 | 156.795 | 10.0986 |
| 6 | 102.678 | 46.6929 | 104.588 | 257.3219 | 43.30707 | 56.5 | 44.8 | 157.185 | 10.5762 |
| n=6 | | | | | | | | | |
| cpxH2 | | | | | | | | | |
| 1 | 112.999 | 85.0319 | 93.4639 | 247.0007 | 4.96815 | 32 | 83.9 | 156.698 | 3.48129 |
| 2 | 112.95 | 85.0098 | 94.0224 | 247.0499 | 4.99021 | 28.1 | 83.6 | 156.7 | 4.00298 |
| 3 | 112.949 | 85.2075 | 94.4975 | 247.0515 | 4.79248 | 23.8 | 83.4 | 156.673 | 4.50119 |
| 4 | 112.874 | 85.6053 | 95.1763 | 247.1256 | 4.39468 | 17.4 | 83.2 | 156.727 | 5.16772 |
| 5 | 113.04 | 85.3168 | 94.8625 | 246.9599 | 4.68322 | 20.8 | 83.3 | 156.565 | 4.81109 |
| 6 | 112.382 | 84.7939 | 91.5536 | 247.6176 | 5.20611 | 51 | 84.6 | 157.478 | 1.53584 |
| 7 | 112.71 | 85.3396 | 94.5962 | 247.2903 | 4.6604 | 22.6 | 83.5 | 156.919 | 4.55119 |
| n=7 | | | | | | | | | |
| cpxJ1 | | | | | | | | | |
| 1 | 132.693 | 79.8212 | 275.81 | 227.3075 | 10.17885 | 17.4 | 78.3 | 136.279 | 5.71145 |
| 2 | 132.962 | 78.9912 | 276.058 | 227.0378 | 11.00883 | 18 | 77.5 | 135.882 | 5.91907 |
| 9 | 132.678 | 76.9466 | 274.387 | 227.3218 | 13.0534 | 28.6 | 76.2 | 136.328 | 4.27735 |
| 11 | 133.525 | 77.5215 | 275.774 | 226.4751 | 12.47852 | 21.4 | 76.3 | 135.226 | 5.62414 |
| 12 | 133.121 | 77.6462 | 276.257 | 226.8792 | 12.35384 | 19.7 | 76.2 | 135.536 | 6.10975 |
| 22 | 133.318 | 77.8227 | 275.218 | 226.6824 | 12.17726 | 23.3 | 76.8 | 135.583 | 5.08224 |
| 27 | 134.628 | 77.378 | 275.972 | 225.3719 | 12.62201 | 19.8 | 76.1 | 134.067 | 5.80752 |
| 29 | 133.203 | 77.6446 | 275.193 | 226.797 | 12.35536 | 23.8 | 76.6 | 135.683 | 5.07404 |
| 31 | 132.742 | 77.0618 | 274.389 | 227.2577 | 12.93824 | 28.3 | 76.3 | 136.268 | 4.30055 |
| n=9 | | | | | | | | | |
| cpxJ2 | | | | | | | | | |
| 1 | 126.339 | 151.64 | 112.539 | 53.6614 | 61.6403 | 258.9 | 26 | 163.719 | 10.4885 |
| 2 | 127 | 151.553 | 112.706 | 53.0001 | 61.5533 | 258.4 | 26.1 | 163.154 | 10.5727 |
| 3 | 126.756 | 151.733 | 112.69 | 53.2441 | 61.7331 | 258.6 | 25.9 | 163.431 | 10.5116 |
| 4 | 127.642 | 151.948 | 112.536 | 52.3584 | 61.9483 | 257.5 | 25.7 | 162.447 | 10.3716 |
| 5 | 127.002 | 152.346 | 112.086 | 52.9982 | 62.3459 | 257.6 | 25.5 | 162.754 | 10.0437 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| n=5 | | | | | | | | | |
| cpxK1 | | | | | | | | | |
| 1 | 138.62 | 63.5926 | 156.398 | 221.3796 | 26.40738 | 322.4 | 21 | 85.8681 | 55.1595 |
| 2 | 139.426 | 63.3318 | 156.749 | 220.5739 | 26.66816 | 321.5 | 20.7 | 84.3833 | 55.1628 |
| 3 | 138.421 | 62.9296 | 156.611 | 221.5793 | 27.07038 | 322.7 | 20.7 | 85.1128 | 54.8178 |
| 4 | 139.651 | 62.8131 | 156.84 | 220.3491 | 27.18692 | 321.4 | 20.5 | 83.4851 | 54.8592 |
| 5 | 138.213 | 63.6389 | 156.4 | 221.7875 | 26.36113 | 322.8 | 21 | 86.3175 | 55.1947 |
| 6 | 138.461 | 63.9028 | 156.625 | 221.5392 | 26.09717 | 322.3 | 20.9 | 86.0649 | 55.5083 |
| n=6 | | | | | | | | | |
| cpxL1 | | | | | | | | | |
| 1 | 126.092 | 120.824 | 114.009 | 53.9085 | 30.8235 | 274.9 | 51.7 | 156.753 | 20.4334 |
| 2 | 125.721 | 120.201 | 111.545 | 54.2789 | 30.2013 | 272.4 | 53.5 | 155.511 | 18.5032 |
| 3 | 124.672 | 121.519 | 114.926 | 55.3283 | 31.5187 | 277 | 50.6 | 159.005 | 21.0848 |
| 4 | 124.182 | 121.509 | 113.629 | 55.8181 | 31.0591 | 276.1 | 51.7 | 158.534 | 20.0762 |
| 5 | 124.188 | 121.325 | 113.9 | 55.8125 | 31.3248 | 276.3 | 51.4 | 158.784 | 20.2446 |
| 6 | 124.701 | 121.371 | 114.056 | 55.299 | 31.371 | 275.9 | 51.2 | 158.387 | 20.3756 |
| 7 | 124.925 | 121.036 | 113.168 | 55.075 | 31.0364 | 274.8 | 52 | 157.519 | 19.7028 |
| n=7 | | | | | | | | | |
| cpxL2 | | | | | | | | | |
| 1 | 134.658 | 102.083 | 104.681 | 45.3418 | 12.0827 | 276.7 | 71.1 | 138.475 | 14.3235 |
| 2 | 134.493 | 102.025 | 104.772 | 45.5073 | 12.0252 | 277.2 | 71 | 138.658 | 14.4696 |
| 3 | 134.979 | 102.389 | 104.628 | 45.0215 | 12.3886 | 275.6 | 70.9 | 138.23 | 14.2935 |
| 4 | 135.088 | 101.765 | 104.643 | 44.912 | 11.7651 | 276.9 | 71.3 | 137.959 | 14.3177 |
| 5 | 134.727 | 102.054 | 104.878 | 45.273 | 12.054 | 277.1 | 70.9 | 138.455 | 14.5704 |
| 6 | 134.718 | 101.92 | 104.721 | 45.2824 | 11.9196 | 277.1 | 71.1 | 138.395 | 14.4257 |
| n=6 | | | | | | | | | |
| n total = 123 | | | | | | | | | |

SAMPLE BAK-03-017 Chip

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| cpxH1 | | | | | | | | | |
| 1 | 45.8136 | 168.335 | 301.024 | 134.2 | 78.3 | 345.7 | 10 | 254.64 | 5.98951 |
| n=1 | | | | | | | | | |
| cpxH2 | | | | | | | | | |
| 1 | 51.7464 | 43.7841 | 315.05 | 308.3 | 46.2 | 74 | 29.3 | 182.396 | 29.3518 |
| 2 | 50.7159 | 44.0165 | 316.301 | 309.2842 | 45.98349 | 73.8 | 28.7 | 182.339 | 30.1462 |
| 3 | 50.5918 | 43.9933 | 316.535 | 309.4082 | 46.00667 | 73.7 | 28.5 | 182.187 | 30.2851 |
| 5 | 51.2239 | 44.2684 | 315.958 | 308.7761 | 45.7316 | 73.5 | 29 | 182.257 | 30.1176 |
| 6 | 51.1157 | 44.0946 | 316.371 | 308.8843 | 45.90542 | 73.3 | 28.7 | 181.907 | 30.2331 |
| 8 | 51.3662 | 44.1353 | 316.417 | 308.6338 | 45.86472 | 73 | 28.7 | 181.641 | 30.2774 |
| n=6 | | | | | | | | | |
| cpxH3 | | | | | | | | | |
| 1 | 51.8147 | 52.654 | 48.59 | 308.2 | 37.3 | 183.7 | 36.6 | 66.3333 | 31.756 |
| 2 | 51.5191 | 52.2887 | 48.5742 | 308.4809 | 37.71131 | 183.8 | 36.4 | 66.8549 | 31.5757 |
| 3 | 51.2502 | 52.3113 | 48.0245 | 308.7499 | 37.68872 | 184.6 | 36 | 67.6073 | 31.9933 |
| 4 | 51.6105 | 51.8379 | 48.9591 | 308.3895 | 38.16211 | 183 | 36.4 | 66.6382 | 31.0596 |
| 5 | 51.7527 | 51.5961 | 48.7095 | 308.2473 | 38.40393 | 183 | 36.1 | 66.8611 | 31.1379 |
| 6 | 51.7973 | 52.1688 | 48.3238 | 308.2027 | 37.83121 | 183.6 | 36.2 | 66.7919 | 31.6422 |
| n=6 | | | | | | | | | |
| cpxI1 | | | | | | | | | |
| 1 | 49.4196 | 47.2735 | 248.419 | 310.6 | 42.7 | 160.8 | 43.1 | 55.5918 | 15.6597 |
| 3 | 49.2704 | 47.244 | 248.288 | 310.7296 | 42.75603 | 161.1 | 43 | 55.8484 | 15.7535 |
| 5 | 49.8252 | 47.4706 | 247.327 | 310.1748 | 42.52941 | 161.9 | 42.8 | 55.9603 | 16.5187 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 50.2111 | 47.0982 | 247.59 | 309.7889 | 42.90181 | 161 | 42.6 | 55.479 | 16.2252 |
| 7 | 49.4906 | 47.4603 | 247.934 | 310.5094 | 42.5397 | 161.5 | 43.1 | 55.8489 | 16.0818 |
| 10 | 49.3559 | 47.1959 | 248.292 | 310.6441 | 42.80412 | 161 | 43 | 55.7687 | 15.734 |
| n=6 | | | | | | | | | |
| cpxI2 | | | | | | | | | |
| 1 | 50.0853 | 120.564 | 211.349 | 129.9 | 30.6 | 237.1 | 26.6 | 0.0012 | 47.3255 |
| 2 | 49.955 | 121.115 | 211.527 | 130.045 | 31.1147 | 237.7 | 26.5 | 0.11224 | 46.8945 |
| 4 | 49.9671 | 121.001 | 210.134 | 130.0329 | 31.001 | 236.7 | 25.5 | 1.52514 | 47.8299 |
| 5 | 50.0455 | 120.579 | 211.327 | 129.9545 | 30.5789 | 237.2 | 26.6 | 359.904 | 47.3238 |
| 6 | 49.6766 | 120.402 | 211.232 | 130.3234 | 30.4022 | 237.4 | 26.6 | 359.482 | 47.4937 |
| 7 | 50.2733 | 120.497 | 210.85 | 129.7267 | 30.4966 | 236.6 | 26.2 | 0.64032 | 47.7184 |
| 8 | 50.2736 | 120.912 | 210.479 | 129.7264 | 30.9123 | 236.5 | 25.8 | 1.41545 | 47.6946 |
| 9 | 50.3307 | 120.864 | 210.389 | 129.6693 | 30.8636 | 236.4 | 25.7 | 1.55049 | 47.794 |
| 10 | 50.0138 | 120.712 | 210.425 | 129.9862 | 30.7123 | 236.7 | 25.8 | 1.02425 | 47.8458 |
| 11 | 49.609 | 120.621 | 210.724 | 130.391 | 30.6212 | 237.2 | 26.1 | 0.20952 | 47.7129 |
| 12 | 50.2125 | 120.685 | 210.911 | 129.7876 | 30.6854 | 236.8 | 26.2 | 0.65764 | 47.5495 |
| 13 | 50.1926 | 120.657 | 210.948 | 129.8075 | 30.6568 | 236.8 | 26.3 | 0.53325 | 47.5208 |
| 14 | 50.5694 | 120.784 | 211.459 | 129.4306 | 30.7842 | 236.8 | 26.6 | 0.52761 | 47.1503 |
| 15 | 48.8955 | 120.446 | 211.777 | 131.1045 | 30.4462 | 238.5 | 27 | 358.197 | 47.1393 |
| n=14 | | | | | | | | | |
| cpxL1 | | | | | | | | | |
| 1 | 48.6344 | 119.068 | 133.825 | 131.4 | 29.1 | 14.5 | 39.1 | 246.399 | 37.2085 |
| 2 | 48.6307 | 118.956 | 133.51 | 131.3693 | 28.9564 | 14.3 | 39.4 | 246.029 | 37.0181 |
| 3 | 48.7341 | 118.994 | 133.678 | 131.2659 | 28.9941 | 14.4 | 39.2 | 246.145 | 37.2044 |
| 4 | 48.4909 | 118.677 | 133.726 | 131.5091 | 28.6768 | 14.9 | 39.3 | 246.204 | 37.3738 |
| 5 | 48.6718 | 119.147 | 133.835 | 131.3282 | 29.147 | 14.4 | 39 | 246.409 | 37.2394 |
| 6 | 49.0171 | 119.087 | 133.312 | 130.983 | 29.0866 | 13.7 | 39.5 | 245.594 | 36.8196 |
| 7 | 48.7005 | 119.19 | 133.79 | 131.2995 | 29.1903 | 14.3 | 39.1 | 246.324 | 37.1319 |
| n=7 | | | | | | | | | |
| cpxL2 | | | | | | | | | |
| 1 | 49.8633 | 118.736 | 133.32 | 130.1 | 28.7 | 13.1 | 39.6 | 249.218 | 26.2666 |
| 2 | 49.8294 | 118.736 | 133.461 | 130.1706 | 28.736 | 13.3 | 39.5 | 249.355 | 26.3598 |
| 3 | 50.2233 | 118.758 | 133.481 | 129.7767 | 28.7584 | 12.9 | 39.5 | 249.043 | 26.1266 |
| 4 | 48.3561 | 121.231 | 136.695 | 131.6439 | 31.2309 | 15.6 | 35.9 | 254.138 | 28.9217 |
| 5 | 49.9996 | 118.603 | 133.068 | 130.0004 | 28.603 | 12.9 | 39.9 | 248.835 | 26.0393 |
| 6 | 49.7933 | 118.878 | 133.535 | 130.2067 | 28.878 | 13.3 | 39.4 | 249.489 | 26.4127 |
| n=6 | | | | | | | | | |
| cpxL3 | | | | | | | | | |
| 1 | 43.8294 | 123.491 | 148.61 | 136.2 | 33.5 | 27.6 | 25.8 | 268.288 | 45.3611 |
| 2 | 43.8033 | 123.402 | 148.566 | 136.1967 | 33.4016 | 27.6 | 25.8 | 268.213 | 45.4282 |
| 3 | 44.0462 | 123.555 | 148.793 | 135.9538 | 33.5547 | 27.4 | 25.6 | 268.289 | 45.4377 |
| 4 | 43.6846 | 123.141 | 148.306 | 136.3154 | 33.1406 | 27.7 | 26.1 | 267.858 | 45.4474 |
| 5 | 43.777 | 122.951 | 148.738 | 136.223 | 32.9507 | 27.9 | 25.8 | 268.064 | 45.8228 |
| 6 | 43.8276 | 123.065 | 148.847 | 136.1724 | 33.0648 | 27.9 | 25.7 | 268.222 | 45.8134 |
| 7 | 43.6534 | 122.736 | 148.512 | 136.3466 | 32.7362 | 28 | 26.1 | 267.742 | 45.807 |
| n=7 | | | | | | | | | |
| cpxL4 | | | | | | | | | |
| 1 | 116.502 | 23.0729 | 349.773 | 243.5 | 66.9 | 342.9 | 4 | 74.5773 | 22.7137 |
| 2 | 117.067 | 23.0591 | 349.148 | 242.933 | 66.94095 | 342.9 | 4.2 | 74.654 | 22.6271 |
| 3 | 117.394 | 23.1241 | 348.829 | 242.6064 | 66.87594 | 342.9 | 4.4 | 74.7409 | 22.6601 |
| 4 | 116.921 | 23.0793 | 348.562 | 243.0791 | 66.92072 | 343.6 | 4.5 | 75.4769 | 22.5957 |
| 5 | 117.156 | 23.252 | 348.905 | 242.8444 | 66.74801 | 343.1 | 4.4 | 74.9525 | 22.7881 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 115.867 | 23.0239 | 350.45 | 244.1332 | 66.97612 | 342.9 | 3.7 | 74.4493 | 22.6897 |
| n=6 | | | | | | | | | |
| cpxM1 | | | | | | | | | |
| 1 | 18.1706 | 5.84852 | 278.439 | 341.8 | 84.2 | 153.3 | 5.7 | 243.385 | 0.85163 |
| 2 | 19.9118 | 5.54205 | 276.454 | 340.0882 | 84.45795 | 153.6 | 5.5 | 243.66 | 0.6224 |
| 3 | 21.3581 | 5.37285 | 275.35 | 338.6419 | 84.62715 | 153.3 | 5.3 | 243.346 | 0.49735 |
| 4 | 18.9949 | 5.565 | 277.749 | 341.0051 | 84.435 | 153.2 | 5.5 | 243.272 | 0.75111 |
| 5 | 19.0046 | 5.49818 | 277.365 | 340.9954 | 84.50183 | 153.6 | 5.5 | 243.668 | 0.70338 |
| 6 | 19.1659 | 5.77712 | 277.099 | 340.8341 | 84.22288 | 153.7 | 5.7 | 243.771 | 0.71273 |
| n=6 | | | | | | | | | |
| cpxM2 | | | | | | | | | |
| 1 | 43.6098 | 48.659 | 235.101 | 316.4 | 41.3 | 183 | 38 | 71.1452 | 25.4761 |
| 2 | 43.0668 | 48.4183 | 235.251 | 316.9332 | 41.58174 | 183.2 | 37.9 | 71.6649 | 25.245 |
| 3 | 43.3932 | 47.7952 | 235.14 | 316.6068 | 42.20484 | 182.6 | 37.4 | 71.6732 | 25.0403 |
| 4 | 43.4307 | 48.8376 | 234.884 | 316.5693 | 41.16239 | 183.5 | 38 | 71.4314 | 25.6827 |
| 6 | 42.6985 | 48.7407 | 235.845 | 317.3015 | 41.25932 | 183.1 | 38.5 | 71.3845 | 24.9455 |
| 7 | 42.8558 | 48.467 | 235.145 | 317.1442 | 41.533 | 183.6 | 37.9 | 71.9567 | 25.3506 |
| 8 | 43.1768 | 48.7706 | 235.066 | 316.8232 | 41.22936 | 183.5 | 38.1 | 71.5346 | 25.503 |
| n=7 | | | | | | | | | |
| cpxN1 | | | | | | | | | |
| 1 | 18.5225 | 88.5225 | 168.715 | 341.5 | 1.5 | 71.8 | 11.3 | 244.039 | 78.5983 |
| 2 | 18.5512 | 89.0262 | 168.36 | 341.4488 | 0.97378 | 71.6 | 11.6 | 246.715 | 78.3588 |
| 3 | 18.5751 | 88.9077 | 167.777 | 341.4249 | 1.09229 | 71.7 | 12.2 | 246.387 | 77.7489 |
| 4 | 18.3726 | 89.0909 | 167.766 | 341.6274 | 0.90913 | 71.8 | 12.2 | 247.43 | 77.7655 |
| 5 | 18.4027 | 89.3228 | 168.43 | 341.5973 | 0.67723 | 71.7 | 11.6 | 248.301 | 78.3801 |
| 6 | 18.309 | 88.7166 | 168.744 | 341.691 | 1.28336 | 71.9 | 11.3 | 245.296 | 78.6264 |
| 7 | 18.2965 | 88.8922 | 168.853 | 341.7035 | 1.10784 | 71.9 | 11.1 | 246.076 | 78.8438 |
| 8 | 19.1447 | 88.2019 | 168.286 | 340.8553 | 1.7981 | 71.2 | 11.7 | 242.243 | 78.1596 |
| 9 | 18.2982 | 88.9521 | 168.867 | 341.7018 | 1.04786 | 71.9 | 11.1 | 246.377 | 78.8495 |
| n=9 | | | | | | | | | |
| cpxN2 | | | | | | | | | |
| 1 | 18.524 | 88.6248 | 168.69 | 341.5 | 1.4 | 71.8 | 11.3 | 244.531 | 78.6108 |
| 2 | 19.0715 | 88.4751 | 168.502 | 340.9285 | 1.52488 | 71.2 | 11.5 | 243.478 | 78.3976 |
| 3 | 18.2404 | 88.8086 | 168.772 | 341.7596 | 1.19143 | 72 | 11.2 | 245.766 | 78.7351 |
| 4 | 18.6946 | 88.6319 | 168.418 | 341.3054 | 1.36811 | 71.6 | 11.6 | 244.673 | 78.317 |
| 5 | 18.2625 | 88.1407 | 168.737 | 341.7375 | 1.85926 | 72.1 | 11.3 | 242.52 | 78.5444 |
| 6 | 17.991 | 89.0313 | 169.203 | 342.009 | 0.96874 | 72.2 | 10.8 | 246.945 | 79.1555 |
| 7 | 18.3703 | 88.7503 | 168.569 | 341.6297 | 1.24968 | 71.9 | 11.4 | 245.458 | 78.5295 |
| n=7 | | | | | | | | | |
| n total = 87 | | | | | | | | | |

SAMPLE BAK-03-021 Chip

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| cpxA1 | | | | | | | | | |
| 1 | 119.26 | 87.5495 | 82.2935 | 240.7 | 2.5 | 133.1 | 81.9 | 331.039 | 7.71109 |
| 2 | 119.503 | 87.2156 | 81.5864 | 240.4971 | 2.7844 | 132.3 | 81.1 | 330.911 | 8.4415 |
| 3 | 120.467 | 87.2209 | 81.2474 | 239.5335 | 2.77915 | 132.1 | 80.8 | 329.962 | 8.76358 |
| 4 | 119.633 | 87.1029 | 81.3068 | 240.3672 | 2.89707 | 132.1 | 80.8 | 330.812 | 8.7214 |
| 5 | 120.342 | 87.0378 | 81.2143 | 239.6581 | 2.96217 | 131.2 | 80.7 | 330.117 | 8.80577 |
| 6 | 120.017 | 86.5849 | 81.7655 | 239.9832 | 3.41512 | 127.6 | 81.1 | 330.477 | 8.20991 |
| 7 | 120.122 | 86.8143 | 81.2862 | 239.8782 | 3.18567 | 129.9 | 80.7 | 330.367 | 8.72222 |
| 8 | 119.565 | 87.1573 | 81.8502 | 240.4352 | 2.84271 | 131.3 | 81.4 | 330.841 | 8.11146 |
| 9 | 119.318 | 86.9107 | 81.8233 | 240.6821 | 3.0893 | 130.1 | 81.3 | 331.124 | 8.12886 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| n=9 | | | | | | | | | |
| cpxA2 | | | | | | | | | |
| 1 | 168.538 | 96.0501 | 193.928 | 11.5 | 6.1 | 103 | 13.8 | 258.23 | 74.8631 |
| 2 | 168.818 | 95.9967 | 194.619 | 11.1819 | 5.99672 | 102.7 | 14.5 | 259.295 | 74.262 |
| 3 | 167.751 | 95.3478 | 195.31 | 12.249 | 5.34775 | 103.7 | 15.2 | 263.397 | 73.8441 |
| n=3 | | | | | | | | | |
| cpxA2map | | | | | | | | | |
| 14 | 167.928 | 95.4743 | 196.098 | 12.1 | 5.5 | 103.7 | 16 | 263.705 | 73.0311 |
| 16 | 167.371 | 96.4856 | 195.342 | 12.6287 | 6.48558 | 104.4 | 15.2 | 260.194 | 73.412 |
| 25 | 167.92 | 95.7362 | 195.641 | 12.0803 | 5.7362 | 103.7 | 15.6 | 262.484 | 73.3268 |
| 33 | 168.014 | 95.4224 | 195.343 | 11.9864 | 5.42244 | 103.5 | 15.3 | 263.018 | 73.7206 |
| 37 | 167.229 | 96.0731 | 194.878 | 12.7708 | 6.07312 | 104.4 | 14.8 | 261.07 | 73.9475 |
| 42 | 168.211 | 96.063 | 195.121 | 11.7889 | 6.06296 | 103.4 | 15 | 260.39 | 73.7691 |
| 58 | 168.643 | 96.0916 | 194.349 | 11.3569 | 6.09159 | 102.9 | 14.3 | 258.874 | 74.4069 |
| 68 | 167.723 | 95.6539 | 195.69 | 12.2774 | 5.65385 | 103.9 | 15.6 | 262.94 | 73.354 |
| 69 | 167.98 | 95.6619 | 195.539 | 12.0202 | 5.66186 | 103.6 | 15.5 | 262.533 | 73.4487 |
| 71 | 167.816 | 95.8009 | 195.818 | 12.1841 | 5.80089 | 103.8 | 15.7 | 262.505 | 73.2122 |
| 75 | 167.737 | 95.3153 | 195.366 | 12.2627 | 5.31526 | 103.7 | 15.3 | 263.633 | 73.7619 |
| 79 | 168.296 | 95.8784 | 195.047 | 11.7036 | 5.87841 | 103.3 | 15 | 260.895 | 73.837 |
| 90 | 168.628 | 96.3648 | 196.092 | 11.3716 | 6.36477 | 103.2 | 16 | 260.363 | 72.7173 |
| 98 | 168.581 | 96.1234 | 194.208 | 11.4188 | 6.12337 | 103 | 14.1 | 258.54 | 74.5732 |
| 99 | 168.718 | 96.0575 | 194.32 | 11.2819 | 6.05745 | 102.8 | 14.2 | 258.762 | 74.5137 |
| 103 | 168.136 | 95.6477 | 195.535 | 11.8642 | 5.64772 | 103.4 | 15.5 | 262.416 | 73.4574 |
| 106 | 168.059 | 95.8868 | 195.169 | 11.9409 | 5.88682 | 103.5 | 15.1 | 261.23 | 73.745 |
| 112 | 168.191 | 95.6239 | 195.646 | 11.8092 | 5.62392 | 103.4 | 15.6 | 262.563 | 73.3668 |
| 115 | 168.578 | 96.0812 | | 11.4223 | 6.08122 | | | | |
| n=18 | | | | | | | | | |
| cpxE1 | | | | | | | | | |
| 1 | 104.893 | 76.4759 | 79.0029 | 255.1 | 13.5 | 114.9 | 72.7 | 347.692 | 10.6666 |
| 2 | 104.941 | 76.6071 | 79.0472 | 255.0594 | 13.39294 | 114.9 | 72.8 | 347.618 | 10.62 |
| 3 | 104.668 | 77.3339 | 79.3734 | 255.3318 | 12.6661 | 115.9 | 73.5 | 347.692 | 10.3823 |
| 4 | 104.702 | 76.9181 | 79.4106 | 255.2984 | 13.08195 | 114.9 | 73.2 | 347.728 | 10.3383 |
| 5 | 104.697 | 76.409 | 79.3665 | 255.3031 | 13.59101 | 113.9 | 72.8 | 347.829 | 10.3295 |
| 6 | 103.891 | 78.1033 | 79.7941 | 256.1089 | 11.89668 | 117.2 | 74.4 | 348.229 | 9.95958 |
| n=6 | | | | | | | | | |
| cpxE2 | | | | | | | | | |
| 1 | 99.2199 | 98.3581 | 241.203 | 80.8 | 8.4 | 185.7 | 60.1 | 346.209 | 28.4609 |
| 2 | 99.0227 | 98.0475 | 241.266 | 80.97727 | 8.04752 | 185.3 | 60.3 | 346.596 | 28.3809 |
| 3 | 99.6118 | 97.9101 | 241.66 | 80.38818 | 7.91012 | 184.7 | 60.7 | 346.149 | 28.0137 |
| 4 | 98.4526 | 97.5996 | 241.181 | 81.54738 | 7.59957 | 185.1 | 60.3 | 347.39 | 28.5178 |
| 5 | 99.5125 | 97.696 | 241.568 | 80.4875 | 7.69603 | 184.4 | 60.6 | 346.336 | 28.1779 |
| 6 | 99.4935 | 98.058 | 241.404 | 80.5065 | 8.05803 | 184.9 | 60.4 | 346.139 | 28.2756 |
| 7 | 99.9549 | 97.6823 | 241.116 | 80.04515 | 7.6823 | 183.7 | 60.2 | 345.829 | 28.5935 |
| 8 | 99.3066 | 98.4673 | 240.512 | 80.69343 | 8.46734 | 185.3 | 59.4 | 345.929 | 29.158 |
| 9 | 99.2329 | 97.7671 | 241.014 | 80.76709 | 7.76705 | 184.5 | 60.1 | 346.49 | 28.672 |
| 10 | 99.4009 | 97.6749 | 241.721 | 80.59908 | 7.67486 | 184.5 | 60.8 | 346.492 | 27.9908 |
| 11 | 98.6797 | 98.2351 | 241.264 | 81.32029 | 8.23514 | 186 | 60.2 | 346.83 | 28.4111 |
| 12 | 99.8871 | 97.8592 | 241.901 | 80.11293 | 7.85922 | 184.5 | 60.9 | 345.936 | 27.8176 |
| 13 | 99.5023 | 97.8997 | 241.238 | 80.49769 | 7.89967 | 184.6 | 60.3 | 346.191 | 28.4223 |
| n=13 | | | | | | | | | |
| cpxF1 | | | | | | | | | |
| 1 | 82.4929 | 83.3088 | 34.9417 | 277.5 | 6.7 | 182.8 | 34.7 | 16.9677 | 54.4673 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 82.1687 | 83.3067 | 34.6786 | 277.8313 | 6.69334 | 183.2 | 34.4 | 17.3959 | 54.7671 |
| 3 | 82.4032 | 83.1674 | 35.0825 | 277.5968 | 6.83258 | 182.8 | 34.8 | 17.2088 | 54.3372 |
| 4 | 82.2308 | 82.9463 | 34.9296 | 277.7692 | 7.05374 | 182.9 | 34.6 | 17.7532 | 54.4845 |
| 5 | 82.1457 | 83.4165 | 35.052 | 277.8543 | 6.58351 | 183.3 | 34.8 | 17.1332 | 54.4057 |
| 6 | 82.7698 | 83.0562 | 35.0529 | 277.2302 | 6.94383 | 182.4 | 34.8 | 16.9935 | 54.3145 |
| 7 | 82.2706 | 83.2107 | 34.9536 | 277.7294 | 6.78934 | 183 | 34.7 | 17.3192 | 54.4491 |
| n=7 | | | | | | | | | |
| cpxF2 | | | | | | | | | |
| 1 | 110.274 | 65.6453 | 262.536 | 249.7 | 24.4 | 87.3 | 64.5 | 342.805 | 6.80825 |
| 2 | 111.054 | 65.1234 | 262.577 | 248.9456 | 24.87656 | 86.2 | 64.1 | 342.092 | 6.75019 |
| 3 | 110.312 | 65.4004 | 262.043 | 249.6882 | 24.59956 | 88.3 | 64.2 | 343.03 | 7.25576 |
| 4 | 109.989 | 66.0189 | 262.306 | 250.0111 | 23.9811 | 88.4 | 64.9 | 343.153 | 7.02306 |
| 5 | 110.243 | 65.4659 | 262.13 | 249.7572 | 24.53414 | 88.2 | 64.3 | 343.049 | 7.16949 |
| 6 | 111.321 | 65.2503 | 262.46 | 248.6794 | 24.74969 | 86.2 | 64.2 | 341.846 | 6.83384 |
| 7 | 111.271 | 65.5342 | 262.298 | 248.7294 | 24.46577 | 86.8 | 64.4 | 341.935 | 7.00717 |
| 8 | 110.363 | 65.493 | 262.335 | 249.6367 | 24.50699 | 87.6 | 64.4 | 342.829 | 6.96445 |
| 9 | 110.235 | 65.8785 | 263.074 | 249.7647 | 24.12148 | 86.3 | 65 | 342.599 | 6.30246 |
| n=9 | | | | | | | | | |
| cpxI1 | | | | | | | | | |
| 1 | 110.524 | 104.288 | 118.778 | 69.5 | 14.3 | 315.3 | 58.2 | 167.21 | 27.7591 |
| 2 | 110.001 | 104.234 | 118.774 | 69.9986 | 14.2343 | 315.9 | 58.2 | 167.682 | 27.7918 |
| 3 | 109.963 | 104.089 | 118.657 | 70.0373 | 14.089 | 316 | 58.3 | 167.622 | 27.7404 |
| 4 | 109.459 | 104.493 | 118.597 | 70.5411 | 14.4925 | 315.9 | 58.2 | 168.316 | 27.628 |
| 6 | 108.571 | 105.153 | 118.322 | 71.4291 | 15.1525 | 315.6 | 58.2 | 169.445 | 27.2466 |
| 7 | 109.402 | 104.849 | 118.031 | 70.5982 | 14.849 | 314.9 | 58.6 | 168.358 | 26.9877 |
| 8 | 109.561 | 104.809 | 118.523 | 70.439 | 14.809 | 315.3 | 58.2 | 168.337 | 27.4644 |
| 9 | 108.217 | 103.906 | 117.453 | 71.783 | 13.9061 | 317 | 59.5 | 168.896 | 26.5699 |
| n=8 | | | | | | | | | |
| cpxI2 | | | | | | | | | |
| 1 | 108.677 | 104.043 | 116.94 | 71.3 | 14 | 315.8 | 59.9 | 168.301 | 26.0535 |
| 2 | 109.668 | 104.827 | 117.968 | 70.3323 | 14.8267 | 314.6 | 58.6 | 168.078 | 26.9823 |
| 3 | 109.869 | 104.293 | 118.16 | 70.1314 | 14.293 | 315.4 | 58.7 | 167.658 | 27.2106 |
| 4 | 110.051 | 104.117 | 117.987 | 69.9488 | 14.1172 | 315.3 | 58.9 | 167.338 | 27.0835 |
| 5 | 109.102 | 104.296 | 117.739 | 70.8985 | 14.2958 | 315.7 | 59.1 | 168.282 | 26.7618 |
| 6 | 108.654 | 105.766 | 116.843 | 71.3462 | 15.7662 | 313.1 | 59.2 | 169.165 | 25.728 |
| n=6 | | | | | | | | | |
| cpxJ1 | | | | | | | | | |
| 1 | 121.621 | 92.1379 | 145.072 | 58.4 | 2.1 | 327 | 34.9 | 151.404 | 55.0204 |
| 2 | 121.463 | 92.0677 | 145.454 | 58.5368 | 2.06773 | 327.1 | 34.5 | 151.539 | 55.4196 |
| 3 | 121.625 | 92.0843 | 145.026 | 58.3749 | 2.08431 | 326.9 | 34.9 | 151.356 | 55.0186 |
| 4 | 120.946 | 92.6149 | 145.035 | 59.054 | 2.61489 | 327.2 | 34.9 | 152.79 | 54.9717 |
| 5 | 121.484 | 92.1016 | 145.065 | 58.5162 | 2.10162 | 327 | 34.9 | 151.522 | 55.0161 |
| 6 | 121.056 | 92.0532 | 144.146 | 58.9439 | 2.05317 | 327.5 | 35.8 | 151.785 | 54.1239 |
| 7 | 121.443 | 92.1728 | 145.111 | 58.5571 | 2.17277 | 327 | 34.9 | 151.664 | 55.0107 |
| 8 | 121.558 | 91.9893 | 144.957 | 58.4417 | 1.98931 | 327 | 35 | 151.277 | 54.9249 |
| 9 | 121.645 | 91.811 | 145.382 | 58.3546 | 1.81103 | 327.1 | 24.6 | 152.302 | 55.0361 |
| 10 | 121.217 | 92.5565 | 145.174 | 58.7831 | 2.55645 | 327 | 34.8 | 152.45 | 55.0783 |
| 11 | 120.161 | 91.8083 | 144.904 | 59.8389 | 1.80832 | 328.6 | 35.1 | 152.408 | 54.8404 |
| 12 | 121.067 | 92.4341 | 145.091 | 58.933 | 2.43405 | 327.2 | 34.9 | 152.412 | 54.9885 |
| 13 | 121.567 | 92.6196 | 144.633 | 58.4326 | 2.61958 | 326.6 | 35.3 | 152.12 | 54.5743 |
| n=13 | | | | | | | | | |
| n total = 92 | | | | | | | | | |

SAMPLE BAK-03-023 Thin section

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| cpx1 | | | | | | | | | |
| 1 | 154.231 | 90.287 | 278.723 | 25.8 | 0.3 | 293.6 | 81.3 | 115.846 | 8.69342 |
| 2 | 154.293 | 90.3393 | 278.734 | 25.7074 | 0.33925 | 293.5 | 81.3 | 115.759 | 8.69334 |
| 3 | 154.307 | 90.2098 | 278.828 | 25.6927 | 0.20977 | 294.3 | 81.2 | 115.725 | 8.79732 |
| 4 | 154.183 | 90.229 | 278.695 | 25.8175 | 0.22903 | 294.3 | 81.3 | 115.853 | 8.69686 |
| 5 | 154.236 | 90.2338 | 278.717 | 25.7644 | 0.23384 | 294.2 | 81.3 | 115.8 | 8.69666 |
| 6 | 154.722 | 90.1024 | 278.147 | 25.2781 | 0.1024 | 294.6 | 81.9 | 115.293 | 8.09942 |
| 7 | 154.48 | 90.1521 | 277.961 | 25.52 | 0.15211 | 294.4 | 82 | 115.541 | 7.99843 |
| 8 | 154.227 | 90.402 | 278.616 | 25.7728 | 0.402 | 293.1 | 81.4 | 115.834 | 8.59036 |
| n=8 | | | | | | | | | |
| cpx2 | | | | | | | | | |
| 1 | 136.86 | 40.4736 | 113.521 | 223.1 | 49.5 | 13.3 | 36.6 | 114.793 | 15.0176 |
| 2 | 136.902 | 40.4088 | 113.725 | 223.0981 | 49.59125 | 13.1 | 36.4 | 114.592 | 15.1214 |
| 3 | 136.852 | 39.9401 | 114.178 | 223.1484 | 50.05987 | 12.8 | 35.9 | 114.169 | 15.2334 |
| 4 | 136.062 | 40.2467 | 114.383 | 223.9377 | 49.7533 | 13.2 | 36 | 114.82 | 15.4948 |
| n=4 | | | | | | | | | |
| n total = 12 | | | | | | | | | |

SAMPLEBAK-03-026 Chip

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| cpxF1 | | | | | | | | | |
| 1 | 12.3656 | 69.8825 | 6.85492 | 347.6 | 20.1 | 255.3 | 6.4 | 148.467 | 68.8263 |
| 2 | 12.605 | 68.9478 | 8.07269 | 347.395 | 21.05217 | 254.5 | 7.5 | 145.938 | 67.5313 |
| 3 | 12.5655 | 69.7863 | 6.71425 | 347.4345 | 20.21374 | 255.1 | 6.3 | 148.613 | 68.7438 |
| 4 | 12.4244 | 69.2742 | 6.48325 | 347.5756 | 20.72577 | 255.3 | 6.1 | 149.706 | 68.3191 |
| 5 | 27.3812 | 54.3847 | 22.791 | 332.6188 | 35.61534 | 228.9 | 18.4 | 116.784 | 48.5365 |
| 6 | 27.2883 | 54.1709 | 22.93 | 332.7117 | 35.82911 | 228.8 | 18.4 | 116.869 | 48.3097 |
| 7 | 12.1733 | 69.4542 | 7.09077 | 347.8267 | 20.54585 | 255.3 | 6.6 | 148.377 | 68.3231 |
| 8 | 13.1615 | 69.7595 | 6.83742 | 346.8385 | 20.24046 | 254.5 | 6.4 | 147.789 | 68.6896 |
| 9 | 27.4209 | 53.9941 | 22.4459 | 332.5791 | 36.00592 | 228.9 | 18 | 117.451 | 48.3778 |
| 10 | 27.3323 | 54.1608 | 23.9684 | 332.6678 | 35.83916 | 228.1 | 19.2 | 115.504 | 47.8132 |
| 11 | 27.4329 | 54.3501 | 23.0898 | 332.5671 | 35.64987 | 228.6 | 18.6 | 116.355 | 48.364 |
| 12 | 13.353 | 69.7365 | 8.02093 | 346.647 | 20.26355 | 253.9 | 7.5 | 144.6 | 68.2818 |
| 13 | 27.3662 | 54.9391 | 23.02 | 332.6338 | 35.06095 | 228.9 | 18.7 | 116.099 | 48.8652 |
| n=13 | | | | | | | | | |
| cpxF2 | | | | | | | | | |
| 1 | 80.6236 | 87.2406 | 167.929 | 279.4 | 2.8 | 10 | 12.1 | 176.579 | 77.5707 |
| 4 | 80.6678 | 87.7609 | 167.812 | 279.3322 | 2.23914 | 9.8 | 12.2 | 179.096 | 77.5906 |
| 7 | 80.4291 | 88.0052 | 168.028 | 279.5709 | 1.99485 | 10 | 12 | 180.276 | 77.8303 |
| 8 | 80.6205 | 87.5482 | 168.126 | 279.3795 | 2.45182 | 9.9 | 11.9 | 177.915 | 77.8426 |
| 9 | 80.5136 | 87.1318 | 167.714 | 279.4864 | 2.86823 | 10.1 | 12.3 | 176.577 | 77.3604 |
| 15 | 80.4055 | 88.0619 | 167.811 | 279.5945 | 1.93808 | 10 | 12.2 | 180.709 | 77.6428 |
| 19 | 80.5482 | 88.0231 | 168.131 | 279.4519 | 1.97686 | 9.9 | 11.9 | 180.162 | 77.9311 |
| 20 | 80.4038 | 87.9988 | 167.945 | 279.5962 | 2.00122 | 10 | 12 | 180.272 | 77.8301 |
| 22 | 80.785 | 88.2444 | 168.044 | 279.2151 | 1.75556 | 9.6 | 12 | 181.018 | 77.8681 |
| 25 | 80.8086 | 87.8675 | 168.067 | 279.1914 | 2.13248 | 9.6 | 11.9 | 179.183 | 77.9064 |
| n-10 | | | | | | | | | |
| cpxF3 | | | | | | | | | |
| 1 | 80.9848 | 88.3852 | 168.435 | 279 | 1.6 | 9.3 | 11.6 | 181.257 | 78.2879 |
| 4 | 80.7348 | 88.7265 | 168.408 | 279.2652 | 1.27346 | 9.5 | 11.6 | 183.087 | 78.3289 |
| 6 | 81.2384 | 88.7248 | 168.599 | 278.7616 | 1.27519 | 9 | 11.4 | 182.465 | 78.5274 |
| 9 | 80.9314 | 88.9155 | 168.968 | 279.0686 | 1.08455 | 9.3 | 11 | 183.508 | 78.9449 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 16 | 81.317 | 88.5925 | 168.869 | 278.683 | 1.40753 | 9 | 11.1 | 181.549 | 78.8078 |
| 18 | 81.2094 | 89.0243 | 168.694 | 278.7906 | 0.97571 | 9 | 11.3 | 183.92 | 78.6566 |
| 20 | 81.2221 | 88.8315 | 168.517 | 278.7779 | 1.16846 | 9 | 11.5 | 183.055 | 78.4395 |
| 21 | 81.5163 | 89.0201 | 168.317 | 278.4837 | 0.97995 | 8.7 | 11.7 | 183.763 | 78.2576 |
| 24 | 81.2168 | 88.6382 | 168.538 | 278.7832 | 1.36177 | 9.1 | 11.5 | 182.123 | 78.4165 |
| 35 | 81.0608 | 88.9029 | 168.966 | 278.9392 | 1.09711 | 9.2 | 11 | 183.315 | 78.9431 |
| 43 | 81.277 | 88.8402 | 168.829 | 278.723 | 1.15977 | 9 | 11.2 | 182.888 | 78.7375 |
| 44 | 81.1683 | 89.1498 | 168.949 | 278.8317 | 0.85022 | 9 | 11 | 184.467 | 78.9663 |
| n-12 | | | | | | | | | |
| cpxF4 | | | | | | | | | |
| 1 | 128.18 | 80.5546 | 270.673 | 231.8 | 9.4 | 47.7 | 80.6 | 141.691 | 0.6601 |
| 2 | 128.198 | 80.5272 | 270.5 | 231.8022 | 9.47278 | 48.8 | 80.5 | 141.721 | 0.48853 |
| 3 | 128.152 | 80.7921 | 269.643 | 231.8485 | 9.20786 | 54.1 | 80.8 | 321.906 | 0.35524 |
| 4 | 127.981 | 80.5471 | 269.991 | 232.0191 | 9.45287 | 52.1 | 80.5 | 322.021 | 0.01317 |
| 5 | 127.92 | 80.6393 | 269.87 | 232.0803 | 9.36066 | 52.9 | 80.6 | 322.102 | 0.13209 |
| 6 | 128.454 | 80.77 | 270.356 | 231.546 | 9.23 | 49.3 | 80.8 | 141.488 | 0.35436 |
| 7 | 128.028 | 80.6918 | 270.349 | 231.9716 | 9.30824 | 49.8 | 80.7 | 141.915 | 0.34624 |
| 8 | 128.412 | 80.4915 | 270.313 | 231.5884 | 9.50852 | 49.7 | 80.5 | 141.537 | 0.30734 |
| 9 | 128.109 | 80.7101 | 270.031 | 231.8913 | 9.28995 | 51.7 | 80.7 | 141.886 | 0.03051 |
| 10 | 128.343 | 80.7917 | 270.097 | 231.6569 | 9.20834 | 51 | 80.8 | 141.64 | 0.10367 |
| 12 | 128.432 | 80.4371 | 270.88 | 231.5684 | 9.5629 | 46.3 | 80.4 | 141.423 | 0.86521 |
| 13 | 128.592 | 80.7784 | 270.683 | 231.4081 | 9.22156 | 47.2 | 80.8 | 141.3 | 0.66352 |
| 14 | 127.933 | 80.5847 | 271.041 | 232.0672 | 9.41529 | 45.7 | 80.5 | 141.896 | 1.03466 |
| 16 | 128.004 | 80.3725 | 270.716 | 231.9958 | 9.62746 | 47.7 | 80.3 | 141.875 | 0.71295 |
| 17 | 127.901 | 80.3447 | 270.754 | 232.0988 | 9.65533 | 47.6 | 80.3 | 141.972 | 0.74652 |
| 18 | 128.217 | 80.3527 | 270.722 | 231.783 | 9.6473 | 47.5 | 80.3 | 141.662 | 0.71079 |
| 19 | 128.16 | 80.689 | 270.346 | 231.8396 | 9.31101 | 49.7 | 80.7 | 141.784 | 0.34113 |
| 20 | 127.973 | 80.7022 | 270.278 | 232.0269 | 9.29776 | 50.3 | 80.7 | 141.982 | 0.27537 |
| 22 | 127.981 | 80.9478 | 270.093 | 232.0186 | 9.05222 | 51.4 | 80.9 | 142.003 | 0.09662 |
| 24 | 128.372 | 80.5667 | 270.234 | 231.6284 | 9.43329 | 50.2 | 80.6 | 141.59 | 0.23012 |
| 26 | 128.126 | 80.8326 | 269.831 | 231.8741 | 9.16745 | 52.9 | 80.8 | 321.9 | 0.16192 |
| 27 | 128.255 | 80.7393 | 270.314 | 231.745 | 9.26071 | 49.8 | 80.7 | 141.694 | 0.31016 |
| 28 | 127.841 | 80.8748 | 270.451 | 232.1591 | 9.12522 | 49.3 | 80.9 | 142.087 | 0.44629 |
| 29 | 128.098 | 80.5124 | 270.502 | 231.9019 | 9.48759 | 48.9 | 80.5 | 141.82 | 0.48846 |
| 30 | 128.101 | 80.5735 | 270.678 | 231.8989 | 9.42652 | 47.8 | 80.5 | 141.788 | 0.66682 |
| 32 | 127.584 | 80.3001 | 271.269 | 232.4158 | 9.6999 | 44.9 | 80.2 | 142.201 | 1.25746 |
| 33 | 127.881 | 80.81 | 270.252 | 232.1188 | 9.18997 | 50.5 | 80.8 | 142.077 | 0.25546 |
| 34 | 128.176 | 80.8931 | 269.928 | 231.824 | 9.10687 | 52.3 | 80.9 | 321.836 | 0.07433 |
| 35 | 128.312 | 81.2286 | 269.839 | 231.6884 | 8.77141 | 52.7 | 81.2 | 321.712 | 0.15294 |
| 36 | 128.468 | 80.8383 | 270.248 | 231.5325 | 9.16172 | 50 | 80.8 | 141.494 | 0.24186 |
| 37 | 128.213 | 80.7794 | 270.469 | 231.7873 | 9.22065 | 48.9 | 80.8 | 141.713 | 0.45547 |
| 39 | 127.796 | 80.513 | 269.852 | 232.2042 | 9.48697 | 53.1 | 80.5 | 322.229 | 0.14582 |
| 40 | 128.322 | 80.4316 | 269.433 | 231.6783 | 9.56839 | 55.1 | 80.4 | 321.773 | 0.56237 |
| 41 | 127.496 | 80.6053 | 270.508 | 232.5039 | 9.39468 | 49.4 | 80.6 | 142.421 | 0.49991 |
| n=34 | | | | | | | | | |
| cpxF5 | | | | | | | | | |
| 1 | 16.1723 | 80.2777 | 5.297 | 343.8 | 9.7 | 252.9 | 5.2 | 135.069 | 78.9695 |
| 2 | 16.2571 | 80.4575 | 4.73206 | 343.7429 | 9.54248 | 253 | 4.7 | 137.083 | 79.3468 |
| 3 | 16.2856 | 80.4645 | 4.56875 | 343.7145 | 9.53553 | 253 | 4.5 | 138.026 | 79.4409 |
| 4 | 16.4797 | 80.8873 | 3.78903 | 343.5203 | 9.11274 | 252.9 | 3.7 | 141.031 | 80.1513 |
| 5 | 16.308 | 80.5825 | 4.99725 | 343.692 | 9.41747 | 252.9 | 4.9 | 135.735 | 79.3651 |
| 6 | 17.2195 | 81.3184 | 3.42609 | 342.7805 | 8.6816 | 252.4 | 8.3 | 119.168 | 78.0052 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 7 | 17.2912 | 81.4788 | 3.29203 | 342.7088 | 8.52116 | 252.2 | 3.3 | 141.218 | 80.8525 |
| n=7 | | | | | | | | | |
| cpxH1 | | | | | | | | | |
| 1 | 101.27 | 100.58 | 167.845 | 78.7 | 10.6 | 346.4 | 11.9 | 209.29 | 73.9532 |
| 2 | 101.492 | 100.536 | 168.158 | 78.5083 | 10.5358 | 346.3 | 11.6 | 209.689 | 74.2268 |
| 3 | 101.395 | 100.43 | 167.683 | 78.6052 | 10.4298 | 346.3 | 12.1 | 208.273 | 73.9146 |
| 4 | 101.041 | 100.793 | 167.607 | 78.9595 | 10.7934 | 346.6 | 12.2 | 209.329 | 73.5992 |
| 5 | 101.25 | 100.663 | 167.97 | 78.7499 | 10.6626 | 346.5 | 11.8 | 209.765 | 73.9923 |
| 6 | 101.629 | 100.06 | 166.637 | 78.3715 | 10.0599 | 346 | 13.2 | 204.605 | 73.2935 |
| 7 | 101.436 | 100.391 | 166.926 | 78.5641 | 10.3914 | 346.2 | 12.9 | 206.319 | 73.327 |
| 8 | 101.365 | 100.513 | 166.935 | 78.6346 | 10.5133 | 346.2 | 12.8 | 206.898 | 73.3182 |
| 9 | 101.346 | 100.597 | 167.302 | 78.6544 | 10.5966 | 346.3 | 12.5 | 207.832 | 73.5034 |
| 12 | 101.548 | 101.249 | 168.106 | 78.4522 | 11.2486 | 346.1 | 11.7 | 211.165 | 73.6587 |
| 13 | 101.916 | 100.499 | 167.312 | 78.0836 | 10.4989 | 345.7 | 12.5 | 206.992 | 73.5608 |
| 15 | 102.079 | 100.712 | 167.717 | 77.9212 | 10.7115 | 345.6 | 12.1 | 208.326 | 73.7311 |
| 16 | 101.769 | 100.925 | 168.483 | 78.2314 | 10.9249 | 346 | 11.3 | 211.162 | 74.1778 |
| 18 | 101.483 | 100.559 | 168.612 | 78.5169 | 10.5585 | 346.4 | 11.2 | 210.791 | 74.5123 |
| 20 | 101.467 | 100.624 | 167.57 | 78.5328 | 10.6236 | 346.2 | 12.2 | 208.471 | 73.7125 |
| 21 | 101.39 | 100.661 | 168.188 | 78.6101 | 10.6605 | 346.4 | 11.6 | 210.12 | 74.1442 |
| 22 | 102 | 100.939 | 168.16 | 77.9996 | 10.9387 | 345.7 | 11.6 | 210.193 | 73.9462 |
| 23 | 101.426 | 101.317 | 167.961 | 78.5737 | 11.3167 | 346.2 | 11.8 | 211.206 | 73.5389 |
| n=18 | | | | | | | | | |
| cpxH2 | | | | | | | | | |
| 1 | 91.4103 | 81.565 | 99.3312 | 268.6 | 8.4 | 40.3 | 77.5 | 177.23 | 9.19926 |
| 3 | 91.0209 | 82.0018 | 98.8027 | 268.9791 | 7.99821 | 40.9 | 78.1 | 177.741 | 8.73922 |
| 4 | 91.1924 | 81.6773 | 99.5042 | 268.8076 | 8.32274 | 39.7 | 77.4 | 177.421 | 9.39075 |
| 5 | 90.8193 | 81.5946 | 99.5711 | 269.1807 | 8.40544 | 40.1 | 77.3 | 177.77 | 9.45882 |
| 6 | 91.0164 | 81.3575 | 99.0094 | 268.9836 | 8.64251 | 42.4 | 77.5 | 177.613 | 8.94185 |
| 7 | 91.3909 | 81.4586 | 99.2145 | 268.6091 | 8.54144 | 41.1 | 77.5 | 177.234 | 9.08091 |
| 8 | 91.4966 | 81.5675 | 99.1783 | 268.5034 | 8.43255 | 40.7 | 77.6 | 177.15 | 9.05402 |
| 11 | 91.209 | 82.317 | 99.8359 | 268.791 | 7.68303 | 36.4 | 77.5 | 177.458 | 9.78334 |
| 12 | 91.516 | 81.7605 | 99.6676 | 268.484 | 8.23955 | 38.6 | 77.3 | 177.084 | 9.578 |
| 15 | 90.5452 | 81.535 | 99.4565 | 269.4548 | 8.465 | 40.9 | 77.3 | 178.046 | 9.38101 |
| 18 | 91.3712 | 81.6526 | 98.9019 | 268.6288 | 8.3474 | 41.5 | 77.8 | 177.325 | 8.81451 |
| 22 | 91.0118 | 81.1452 | 99.5083 | 268.9882 | 8.85485 | 41.6 | 77 | 177.508 | 9.41482 |
| n=12 | | | | | | | | | |
| cpxI1 | | | | | | | | | |
| 1 | 87.4742 | 99.5199 | 157.528 | 92.5 | 9.5 | 358.6 | 22.1 | 204.299 | 65.7421 |
| 4 | 87.4822 | 99.6635 | 157.277 | 92.51785 | 9.66346 | 358.5 | 22.5 | 204.25 | 65.3033 |
| 5 | 87.1907 | 99.6837 | 157.424 | 92.80933 | 9.68365 | 358.8 | 22.2 | 204.87 | 65.5669 |
| 6 | 87.282 | 100.028 | 157.493 | 92.71805 | 10.0278 | 358.6 | 22.1 | 205.558 | 65.508 |
| 8 | 87.5245 | 99.7533 | 157.91 | 92.47555 | 9.7533 | 358.5 | 21.8 | 205.078 | 65.9042 |
| 14 | 87.1718 | 99.7175 | 157.449 | 92.82823 | 9.71749 | 358.8 | 22.2 | 204.955 | 65.5512 |
| 15 | 87.6603 | 99.763 | 157.884 | 92.33975 | 9.76302 | 358.4 | 21.8 | 204.969 | 65.906 |
| 21 | 87.4233 | 99.6781 | 157.59 | 92.5767 | 9.67808 | 358.6 | 22.1 | 204.729 | 65.6638 |
| n=8 | | | | | | | | | |
| cpxK1 | | | | | | | | | |
| 1 | 138.484 | 100.431 | 68.0708 | 41.5 | 10.4 | 155.7 | 65.8 | 307.338 | 21.5773 |
| 2 | 138.436 | 100.512 | 68.2605 | 41.564 | 10.5124 | 156.2 | 66 | 307.412 | 21.3158 |
| 3 | 138.157 | 100.471 | 67.7161 | 41.843 | 10.4714 | 155.8 | 65.5 | 307.587 | 21.8795 |
| 4 | 138.501 | 100.15 | 67.669 | 41.4987 | 10.1503 | 154.7 | 65.6 | 307.362 | 21.9472 |
| 5 | 138.313 | 100.084 | 67.5959 | 41.6873 | 10.0838 | 154.7 | 65.5 | 307.552 | 22.0735 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 6 | 138.195 | 99.9693 | 67.6135 | 41.8053 | 9.96929 | 154.6 | 65.6 | 307.727 | 22.0299 |
| 7 | 137.31 | 99.6572 | 67.9427 | 42.6897 | 9.65718 | 155.2 | 66 | 308.799 | 21.7417 |
| 8 | 138.598 | 100.344 | 67.9628 | 41.4018 | 10.3439 | 155.3 | 65.8 | 307.25 | 21.6347 |
| 9 | 138.067 | 100.397 | 67.7164 | 41.9326 | 10.397 | 155.7 | 65.5 | 307.699 | 21.9187 |
| n=9 | | | | | | | | | |
| cpxK2 | | | | | | | | | |
| 1 | 76.777 | 93.7474 | 49.758 | 103.2 | 3.7 | 197.6 | 49.6 | 10.0723 | 40.1554 |
| 2 | 76.9372 | 93.8615 | 49.9517 | 103.0628 | 3.86149 | 197.6 | 49.8 | 9.82294 | 39.9392 |
| 3 | 76.7806 | 94.0032 | 49.8048 | 103.2194 | 4.00321 | 197.9 | 49.6 | 9.83864 | 40.1194 |
| 4 | 76.7774 | 94.6472 | 49.6372 | 103.2227 | 4.64721 | 198.7 | 49.4 | 9.28146 | 40.2162 |
| 5 | 77.0736 | 93.8332 | 50.1274 | 102.9264 | 3.83318 | 197.5 | 50 | 9.73311 | 39.7402 |
| 6 | 77.484 | 93.7799 | 49.7439 | 102.516 | 3.77992 | 197 | 48.6 | 9.20766 | 41.1364 |
| 7 | 77.0046 | 94.1341 | 49.0143 | 102.9954 | 4.13413 | 197.7 | 48.8 | 9.40554 | 40.9016 |
| 8 | 77.2608 | 93.6823 | 49.0872 | 102.7392 | 3.68229 | 197 | 49 | 9.55915 | 40.7602 |
| 9 | 77.3488 | 93.5539 | 48.2018 | 102.6512 | 3.55385 | 196.6 | 48.1 | 9.48145 | 41.6797 |
| 10 | 76.6454 | 93.773 | 50.1613 | 103.3546 | 3.77304 | 197.9 | 50 | 10.211 | 39.7454 |
| n=10 | | | | | | | | | |
| cpxK3 | | | | | | | | | |
| 1 | 76.9788 | 94.1604 | 49.2247 | 103 | 4.2 | 197.9 | 49 | 9.38039 | 40.6855 |
| 2 | 77.092 | 94.1071 | 49.2266 | 102.9081 | 4.10713 | 197.7 | 49.1 | 9.37952 | 40.6002 |
| 3 | 76.9159 | 93.4639 | 49.5406 | 103.0841 | 3.46392 | 197.1 | 49.4 | 10.1321 | 40.3902 |
| 4 | 76.9228 | 93.4621 | 49.4424 | 103.0772 | 3.46206 | 197.1 | 49.3 | 10.1166 | 40.4892 |
| 5 | 77.2957 | 94.0162 | 48.9341 | 102.7043 | 4.01615 | 197.3 | 48.8 | 9.21552 | 40.9166 |
| 6 | 77.307 | 93.9616 | 49.0673 | 102.693 | 3.96158 | 197.2 | 48.9 | 9.26273 | 40.827 |
| 7 | 77.3873 | 93.8268 | 49.1758 | 102.6127 | 3.82684 | 197 | 49 | 9.30928 | 40.7438 |
| 8 | 77.6559 | 93.7101 | 48.8929 | 102.3441 | 3.71013 | 196.6 | 48.8 | 9.11757 | 40.9573 |
| n=8 | | | | | | | | | |
| cpxK4 | | | | | | | | | |
| 1 | 73.736 | 110.412 | 287.499 | 106.3 | 20.4 | 328.4 | 63.4 | 202.56 | 16.3415 |
| 2 | 73.9056 | 110.084 | 287.12 | 106.0944 | 20.0842 | 328 | 63.8 | 202.144 | 16.0784 |
| 4 | 73.9101 | 110.156 | 286.952 | 106.0899 | 20.1564 | 327.6 | 63.9 | 202.086 | 15.8854 |
| 7 | 73.6807 | 110.503 | 286.815 | 106.3193 | 20.5034 | 327.1 | 63.7 | 202.364 | 15.7277 |
| 9 | 73.8884 | 110.135 | 287.122 | 106.1116 | 20.1345 | 327.9 | 63.8 | 202.16 | 16.0354 |
| 13 | 73.7132 | 110.313 | 287.414 | 106.2868 | 20.3132 | 328.4 | 63.5 | 202.5 | 16.2967 |
| 22 | 73.6644 | 109.971 | 287.443 | 106.3356 | 19.9714 | 328.9 | 63.7 | 202.46 | 16.3604 |
| 27 | 73.2977 | 109.826 | 287.752 | 106.7023 | 19.8257 | 330 | 63.6 | 202.9 | 16.6696 |
| 28 | 73.6515 | 109.8 | 287.753 | 106.3485 | 19.7997 | 329.7 | 63.6 | 202.545 | 16.6895 |
| 31 | 73.5697 | 110.089 | 287.677 | 106.4303 | 20.0893 | 329.3 | 63.5 | 202.676 | 16.5645 |
| 32 | 73.8034 | 109.936 | 287.705 | 106.1966 | 19.9358 | 329.3 | 63.6 | 202.402 | 16.5959 |
| 35 | 73.4502 | 110.557 | 287.637 | 106.5498 | 20.5567 | 328.7 | 63.2 | 202.91 | 16.4577 |
| 39 | 73.4423 | 110.578 | 287.694 | 106.5578 | 20.5784 | 328.8 | 63.1 | 202.961 | 16.5439 |
| 50 | 73.7037 | 110.224 | 287.549 | 106.2963 | 20.224 | 328.7 | 63.5 | 202.521 | 16.4001 |
| 52 | 73.3959 | 110.273 | 287.287 | 106.6041 | 20.2731 | 328.5 | 63.6 | 202.753 | 16.1722 |
| 54 | 73.6562 | 110.27 | 287.346 | 106.3438 | 20.2703 | 328.4 | 63.6 | 202.513 | 16.2242 |
| 55 | 73.4749 | 110.594 | 287.601 | 106.5252 | 20.5944 | 328.6 | 63.2 | 202.887 | 16.4289 |
| 62 | 73.3529 | 110.268 | 287.561 | 106.6471 | 20.2681 | 329.1 | 63.4 | 202.915 | 16.4702 |
| 63 | 73.7794 | 109.863 | 287.559 | 106.2206 | 19.8632 | 329.2 | 63.7 | 202.365 | 16.5043 |
| 64 | 73.4604 | 110.324 | 287.798 | 106.5396 | 20.3241 | 329.3 | 63.2 | 202.912 | 16.6819 |
| 65 | 73.2642 | 110.033 | 287.699 | 106.7358 | 20.0326 | 329.7 | 63.5 | 202.976 | 16.6009 |
| 67 | 73.7584 | 109.865 | 287.671 | 106.2416 | 19.8647 | 329.4 | 63.7 | 202.409 | 16.5609 |
| 68 | 73.2588 | 109.87 | 287.628 | 106.7413 | 19.8703 | 329.8 | 63.7 | 202.898 | 16.5287 |
| 71 | 73.4368 | 110.54 | 287.666 | 106.5632 | 20.5395 | 328.8 | 63.2 | 202.93 | 16.4878 |

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|---|---|---|---|---|---|---|---|---|---|
| n=24 | | | | | | | | | |
| cpxL1 | | | | | | | | | |
| 1 | 58.2369 | 87.1051 | 193.811 | 301.8 | 2.9 | 211.1 | 13.8 | 43.424 | 75.8874 |
| 2 | 58.2377 | 87.1355 | 194.012 | 301.7623 | 2.86447 | 211 | 14 | 43.0792 | 75.6958 |
| 4 | 58.0906 | 87.2392 | 194.011 | 301.9094 | 2.76077 | 211.2 | 14 | 42.8293 | 75.7185 |
| 5 | 57.9273 | 87.2729 | 193.824 | 302.0727 | 2.72709 | 211.4 | 13.8 | 43.0226 | 75.9225 |
| 10 | 58.3062 | 87.2875 | 194.25 | 301.6938 | 2.71248 | 211 | 14.2 | 42.2744 | 75.5322 |
| 14 | 58.1785 | 87.4235 | 193.845 | 301.8215 | 2.57649 | 211.2 | 13.8 | 42.1823 | 75.9527 |
| 18 | 58.3407 | 87.3274 | 193.611 | 301.6593 | 2.67263 | 211 | 13.6 | 42.5561 | 76.1294 |
| 24 | 58.2598 | 87.2652 | 194.355 | 301.7402 | 2.73478 | 211 | 14.3 | 42.3281 | 75.4278 |
| 25 | 57.7237 | 87.1944 | 194.469 | 302.2763 | 2.8056 | 211.6 | 14.5 | 42.9818 | 75.2216 |
| 26 | 58.0272 | 87.5248 | 194.521 | 301.9728 | 2.47522 | 211.3 | 14.5 | 41.443 | 75.2797 |
| 27 | 58.1771 | 87.2129 | 193.929 | 301.8229 | 2.78707 | 211.1 | 13.9 | 42.9239 | 75.8107 |
| 28 | 58.0259 | 87.2472 | 194.057 | 301.9742 | 2.75281 | 211.3 | 14 | 42.8647 | 75.7216 |
| 29 | 58.0025 | 87.1204 | 194.04 | 301.9975 | 2.87964 | 211.3 | 14 | 43.3757 | 75.696 |
| 30 | 57.9966 | 87.3493 | 193.885 | 302.0034 | 2.65069 | 211.3 | 13.9 | 42.5747 | 75.8373 |
| 33 | 58.1985 | 87.3511 | 193.795 | 301.8015 | 2.64886 | 211.2 | 13.8 | 42.447 | 75.9403 |
| 35 | 57.9213 | 86.9542 | 194.059 | 302.0787 | 3.04582 | 211.3 | 14 | 44.0907 | 75.6583 |
| 36 | 58.1352 | 87.0652 | 194.248 | 301.8648 | 2.93481 | 211.1 | 14.2 | 43.287 | 75.4863 |
| n=17 | | | | | | | | | |
| cpxL2 | | | | | | | | | |
| 1 | 92.2447 | 85.2906 | 102.03 | 267.8 | 4.7 | 19 | 77.1 | 176.801 | 11.9725 |
| 2 | 92.5095 | 85.1659 | 101.99 | 267.4905 | 4.83408 | 19.1 | 77.1 | 176.466 | 11.9361 |
| 3 | 91.4711 | 85.2703 | 101.822 | 268.5289 | 4.72968 | 20 | 77.3 | 177.542 | 11.7647 |
| 4 | 91.3307 | 85.6728 | 101.728 | 268.6693 | 4.32716 | 18.6 | 77.5 | 177.771 | 11.7064 |
| 5 | 91.3934 | 85.3168 | 101.648 | 268.6066 | 4.68318 | 20.2 | 77.5 | 177.646 | 11.5707 |
| 6 | 91.1495 | 85.8007 | 101.222 | 268.8505 | 4.19933 | 19.1 | 78 | 178.016 | 11.2177 |
| n=6 | | | | | | | | | |
| cpxM1 | | | | | | | | | |
| 1 | 92.3424 | 76.0549 | 308.271 | 267.7 | 13.9 | 14.6 | 49.7 | 166.983 | 36.9226 |
| 2 | 92.5262 | 75.7085 | 307.623 | 267.4738 | 14.29146 | 15.2 | 50.1 | 166.687 | 36.3052 |
| 3 | 92.3893 | 76.3341 | 308.278 | 267.6107 | 13.66593 | 14.3 | 49.7 | 167.048 | 37.0136 |
| 5 | 92.5447 | 75.7872 | 307.979 | 267.4553 | 14.21282 | 14.9 | 49.8 | 166.593 | 36.6498 |
| 6 | 92.2035 | 75.8431 | 308.064 | 267.7965 | 14.15689 | 15.1 | 49.8 | 166.962 | 36.6932 |
| 7 | 92.292 | 75.8649 | 307.068 | 267.708 | 14.13511 | 15.6 | 50.7 | 167.256 | 35.7676 |
| n=6 | | | | | | | | | |
| cpxM2 | | | | | | | | | |
| 1 | 92.6494 | 76.0525 | 307.474 | 267.4 | 13.9 | 14.7 | 50.4 | 166.96 | 36.2114 |
| 2 | 92.8055 | 75.6891 | 307.46 | 267.1946 | 14.31094 | 15.1 | 50.3 | 166.48 | 36.0838 |
| 5 | 92.6131 | 76.1371 | 307.372 | 267.387 | 13.86288 | 14.8 | 50.5 | 167.018 | 36.1038 |
| 6 | 92.6349 | 75.8964 | 306.722 | 267.3651 | 14.10363 | 15.5 | 51 | 167.059 | 35.4528 |
| 7 | 92.6593 | 75.5165 | 307.101 | 267.3407 | 14.48348 | 15.6 | 50.6 | 166.642 | 35.7052 |
| 9 | 92.7268 | 75.3024 | 307.528 | 267.2732 | 14.69761 | 15.6 | 50.1 | 166.252 | 36.0853 |
| 11 | 92.3771 | 76.2053 | 308.018 | 267.6229 | 13.79468 | 14.6 | 49.9 | 167.06 | 36.7471 |
| 12 | 92.3838 | 75.9191 | 307.884 | 267.6162 | 14.08092 | 15 | 50 | 166.915 | 36.5124 |
| 16 | 92.2627 | 76.2369 | 307.93 | 267.7373 | 13.76313 | 14.7 | 50 | 167.23 | 36.6675 |
| 18 | 92.6539 | 76.459 | 308.111 | 267.3461 | 13.54096 | 14 | 49.9 | 166.941 | 36.8664 |
| 20 | 92.9212 | 76.0162 | 308.12 | 267.0788 | 13.98378 | 14.2 | 49.8 | 166.355 | 36.7677 |
| 23 | 93.3579 | 76.297 | 307.021 | 266.6421 | 13.70297 | 14.1 | 50.9 | 166.526 | 35.7678 |
| 27 | 92.3895 | 76.4241 | 307.544 | 267.6105 | 13.57587 | 14.6 | 50.4 | 167.378 | 36.3398 |
| 28 | 92.994 | 76.181 | 307.564 | 267.006 | 13.81899 | 14.3 | 50.3 | 166.59 | 36.3159 |
| 29 | 92.7857 | 75.9321 | 306.643 | 267.2143 | 14.06793 | 15.3 | 51.1 | 166.963 | 35.3827 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| n=15 | | | | | | | | | |
| cpxS1 | | | | | | | | | |
| 1 | 79.84 | 71.8527 | 19.4952 | 280.2 | 18.1 | 183.9 | 18.5 | 51.4491 | 63.6311 |
| 2 | 79.1566 | 71.6169 | 19.8313 | 280.8434 | 18.38314 | 184.4 | 18.8 | 52.0054 | 63.2102 |
| 3 | 79.596 | 71.639 | 19.4102 | 280.404 | 18.36105 | 184.1 | 18.4 | 52.1937 | 63.5243 |
| 4 | 79.2237 | 71.7018 | 19.7923 | 280.7763 | 18.29824 | 184.4 | 18.8 | 51.8438 | 63.281 |
| 5 | 79.5905 | 71.7645 | 19.8315 | 280.4095 | 18.23553 | 184 | 18.8 | 51.367 | 63.3147 |
| 6 | 79.1935 | 71.6917 | 19.8251 | 280.8065 | 18.30834 | 184.3 | 18.8 | 51.826 | 63.2452 |
| 7 | 79.1006 | 71.6101 | 19.8691 | 280.8994 | 18.38986 | 184.4 | 18.8 | 52.0441 | 63.1932 |
| 8 | 79.7264 | 71.941 | 20.1705 | 280.2736 | 18.059 | 183.8 | 19.1 | 50.4983 | 63.2107 |
| 9 | 79.544 | 71.7327 | 19.8984 | 280.456 | 18.26734 | 184 | 18.9 | 51.2927 | 63.2157 |
| 10 | 79.1814 | 71.5378 | 20.0769 | 280.8186 | 18.46219 | 184.2 | 19 | 51.7218 | 62.9838 |
| 11 | 79.3726 | 71.2965 | 20.2137 | 280.6274 | 18.70346 | 183.9 | 19.1 | 51.6886 | 62.7334 |
| 13 | 79.2797 | 71.2268 | 19.2105 | 280.7203 | 18.7732 | 184.3 | 18.2 | 53.3619 | 63.3538 |
| 14 | 79.1387 | 71.1718 | 19.2398 | 280.8613 | 18.82823 | 184.4 | 18.2 | 53.5623 | 63.3072 |
| 16 | 78.9737 | 70.8749 | 19.5837 | 281.0263 | 19.12515 | 184.4 | 18.5 | 53.6249 | 62.8727 |
| 17 | 78.9988 | 70.7412 | 19.6105 | 281.0012 | 19.25883 | 184.3 | 18.5 | 53.7526 | 62.7651 |
| 19 | 79.0569 | 71.1 | 19.3897 | 280.9431 | 18.89996 | 184.4 | 18.3 | 53.5564 | 63.1747 |
| 20 | 78.971 | 71.5697 | 19.5393 | 281.029 | 18.43031 | 184.6 | 18.5 | 52.7108 | 63.3835 |
| 21 | 79.5379 | 72.1793 | 20.0922 | 280.4621 | 17.82074 | 184.1 | 19.1 | 50.3766 | 63.3891 |
| 22 | 79.7012 | 72.1857 | 20.0234 | 280.2988 | 17.81432 | 183.9 | 19 | 50.3308 | 63.454 |
| 23 | 79.5759 | 72.1237 | 20.0608 | 280.4241 | 17.87629 | 184 | 19.1 | 50.3945 | 63.3395 |
| 26 | 79.1151 | 72.2388 | 20.2232 | 280.885 | 17.76122 | 184.5 | 19.2 | 50.5536 | 63.3528 |
| 27 | 79.5469 | 72.3837 | 20.125 | 280.4531 | 17.61626 | 184.1 | 19.1 | 50.057 | 63.5218 |
| 28 | 79.1496 | 71.6324 | 19.8355 | 280.8504 | 18.36756 | 184.4 | 18.8 | 51.9858 | 63.2189 |
| 30 | 79.6628 | 72.0576 | 19.8523 | 280.3372 | 17.94244 | 184 | 18.8 | 50.8857 | 63.5222 |
| 31 | 79.2816 | 71.9458 | 19.4534 | 280.7184 | 18.05425 | 184.5 | 18.5 | 51.9378 | 63.6793 |
| 32 | 79.7107 | 71.8967 | 19.6785 | 280.2894 | 18.10328 | 183.9 | 18.7 | 51.2039 | 63.4737 |
| 35 | 79.0781 | 71.6411 | 20.1284 | 280.9219 | 18.35894 | 184.3 | 19.1 | 51.5259 | 62.9828 |
| 36 | 79.0556 | 71.5757 | 19.926 | 280.9444 | 18.42431 | 184.4 | 18.9 | 51.9725 | 63.093 |
| 37 | 79.3625 | 71.831 | 20.1964 | 280.6375 | 18.16902 | 184.1 | 19.1 | 50.9978 | 63.1252 |
| 38 | 79.5797 | 71.7677 | 19.7895 | 280.4203 | 18.23233 | 184 | 18.8 | 51.3678 | 63.3144 |
| 39 | 78.8102 | 71.6522 | 20.2681 | 281.1898 | 18.34778 | 184.6 | 19.2 | 51.6489 | 62.9293 |
| 40 | 78.5993 | 71.9691 | 20.519 | 281.4007 | 18.03087 | 184.8 | 19.5 | 50.9529 | 62.9244 |
| 41 | 78.8906 | 71.8207 | 20.5054 | 281.1094 | 18.17932 | 184.5 | 19.4 | 51.0223 | 62.8966 |
| 42 | 78.9131 | 71.7622 | 20.5423 | 281.087 | 18.23782 | 184.4 | 19.5 | 50.9097 | 62.7726 |
| n=34 | | | | | | | | | |
| cpxS2 | | | | | | | | | |
| 1 | 121.348 | 89.0703 | 94.9906 | 238.7 | 0.9 | 339.4 | 84.9 | 148.621 | 5.01048 |
| 2 | 121.32 | 89.1799 | 95.017 | 238.6803 | 0.82012 | 337.9 | 84.9 | 148.608 | 5.03343 |
| 3 | 120.509 | 88.7725 | 95.434 | 239.4913 | 1.22754 | 342.2 | 84.4 | 149.374 | 5.46113 |
| 5 | 119.665 | 87.991 | 93.1543 | 240.3352 | 2.00896 | 2.9 | 86.3 | 150.226 | 3.11575 |
| n=4 | | | | | | | | | |
| cpxS3 | | | | | | | | | |
| 3 | 93.0561 | 104.496 | 118.609 | 86.9 | 14.5 | 332.2 | 58.2 | 184.675 | 27.6128 |
| 4 | 93.2615 | 104.689 | 119.056 | 86.73846 | 14.6891 | 332.2 | 57.7 | 184.767 | 28.0475 |
| 5 | 93.2014 | 104.77 | 118.903 | 86.79861 | 14.7704 | 332 | 57.8 | 184.819 | 27.8886 |
| 7 | 92.9824 | 104.734 | 118.782 | 87.01763 | 14.7335 | 332.2 | 58 | 184.96 | 27.7209 |
| 8 | 93.1617 | 104.754 | 118.702 | 86.83834 | 14.7543 | 331.9 | 58 | 184.782 | 27.6887 |
| 9 | 93.1608 | 104.801 | 118.856 | 86.83925 | 14.8014 | 332 | 57.9 | 184.844 | 27.7903 |
| 11 | 93.1541 | 105.047 | 118.823 | 86.84589 | 15.0472 | 331.6 | 57.8 | 184.973 | 27.7395 |
| 12 | 93.2414 | 104.841 | 118.991 | 86.75856 | 14.8407 | 332 | 57.7 | 184.848 | 27.9725 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 13 | 92.98 | 104.559 | 118.681 | 87.02 | 14.5589 | 332.3 | 58.1 | 184.852 | 27.6843 |
| 17 | 93.2714 | 104.99 | 118.788 | 86.72862 | 14.9904 | 331.5 | 57.8 | 184.828 | 27.7518 |
| 19 | 93.269 | 104.967 | 118.819 | 86.731 | 14.9666 | 331.6 | 57.8 | 184.826 | 27.7794 |
| 20 | 93.2086 | 104.939 | 118.738 | 86.79136 | 14.9386 | 331.6 | 57.9 | 184.838 | 27.6847 |
| 21 | 93.1906 | 105.007 | 118.759 | 86.80944 | 15.007 | 331.6 | 57.9 | 184.89 | 27.6707 |
| 22 | 93.3102 | 104.583 | 118.774 | 86.68981 | 14.5832 | 332.1 | 58 | 184.573 | 27.7968 |
| 23 | 93.3866 | 104.453 | 119.101 | 86.61345 | 14.4528 | 332.5 | 57.8 | 184.523 | 28.0982 |
| 24 | 93.2273 | 104.758 | 118.823 | 86.77266 | 14.7575 | 331.9 | 57.9 | 184.752 | 27.7882 |
| 25 | 92.9095 | 105.279 | 118.118 | 87.09051 | 15.279 | 330.8 | 58.3 | 185.102 | 27.0305 |
| 26 | 93.0767 | 105.046 | 118.762 | 86.92327 | 15.0456 | 331.6 | 57.8 | 185.043 | 27.7206 |
| 27 | 93.4382 | 104.915 | 118.696 | 86.56177 | 14.9145 | 331.4 | 58 | 184.57 | 27.6117 |
| 28 | 93.0945 | 105.121 | 118.211 | 86.9055 | 15.1212 | 331 | 58.3 | 184.871 | 27.1489 |
| 29 | 93.5329 | 104.904 | 118.717 | 86.4671 | 14.9039 | 331.3 | 57.9 | 184.498 | 27.6956 |
| 30 | 93.1175 | 104.806 | 118.833 | 86.88255 | 14.8062 | 332 | 57.9 | 184.886 | 27.7791 |
| 31 | 93.5888 | 104.948 | 119.048 | 86.41124 | 14.9482 | 331.5 | 57.6 | 184.574 | 28.0037 |
| 33 | 93.7232 | 104.364 | 118.149 | 86.27685 | 14.3643 | 331.4 | 58.7 | 183.829 | 27.1667 |
| 34 | 93.3768 | 104.842 | 118.553 | 86.62318 | 14.8416 | 331.4 | 58.1 | 184.56 | 27.523 |
| 35 | 93.628 | 104.456 | 118.893 | 86.37202 | 14.456 | 332 | 58 | 184.206 | 27.8665 |
| 39 | 93.262 | 104.721 | 118.411 | 86.73805 | 14.7213 | 331.6 | 58.3 | 184.563 | 27.3927 |
| 42 | 92.7423 | 105.022 | 118.081 | 87.25773 | 15.0215 | 331.3 | 58.4 | 185.139 | 27.0666 |
| 43 | 92.8613 | 104.582 | 118.077 | 87.13875 | 14.5818 | 331.9 | 58.6 | 184.8 | 27.1353 |
| 47 | 93.1804 | 104.677 | 118.771 | 86.81959 | 14.6767 | 332 | 58 | 184.733 | 27.7283 |
| 48 | 93.3451 | 104.597 | 118.821 | 86.65486 | 14.5972 | 332 | 58 | 184.54 | 27.7791 |
| 49 | 93.1808 | 104.127 | 119.182 | 86.81923 | 14.1272 | 333.2 | 57.9 | 184.567 | 28.1744 |
| 51 | 93.1591 | 104.727 | 118.753 | 86.8409 | 14.7268 | 332 | 58 | 184.778 | 27.7162 |
| 53 | 93.5428 | 104.849 | 117.858 | 86.45718 | 14.8488 | 330.6 | 58.7 | 184.175 | 26.8653 |
| 54 | 93.6108 | 104.625 | 118.118 | 86.38924 | 14.6253 | 331.1 | 58.6 | 184.069 | 27.1173 |
| 55 | 93.2642 | 104.731 | 118.567 | 86.73581 | 14.7313 | 331.7 | 58.1 | 184.631 | 27.5841 |
| 56 | 93.7377 | 104.492 | 118.104 | 86.26231 | 14.4923 | 331.1 | 58.7 | 183.857 | 27.0816 |
| 57 | 93.7235 | 104.341 | 118.238 | 86.27649 | 14.3412 | 331.5 | 58.6 | 183.852 | 27.2781 |
| 58 | 93.4425 | 104.932 | 118.918 | 86.55751 | 14.9321 | 331.6 | 57.8 | 184.65 | 27.827 |
| 60 | 93.4129 | 104.937 | 118.635 | 86.58711 | 14.9368 | 331.3 | 58 | 184.596 | 27.5777 |
| n=40 | | | | | | | | | |
| n total = 287 | | | | | | | | | |

SAMPLE BAK-03-030A Chip

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| cpxJ1 | | | | | | | | | |
| 1 | 80.9036 | 85.3571 | 127.406 | 279.1 | 4.6 | 15.1 | 52.3 | 185.584 | 37.3165 |
| 2 | 80.6698 | 85.7132 | 127.462 | 279.3302 | 4.28683 | 14.9 | 52.3 | 186.048 | 37.3684 |
| 3 | 80.5659 | 85.5141 | 127.241 | 279.4341 | 4.48592 | 15.3 | 52.5 | 186.028 | 37.1367 |
| 4 | 80.637 | 85.4139 | 127.548 | 279.363 | 4.58615 | 15.3 | 52.2 | 185.844 | 37.421 |
| 5 | 80.6633 | 85.5612 | 127.728 | 279.3367 | 4.43885 | 15 | 52.1 | 185.916 | 37.55 |
| 6 | 80.7517 | 85.6455 | 127.775 | 279.2483 | 4.35449 | 14.8 | 52 | 185.879 | 37.6622 |
| 7 | 80.5203 | 85.4717 | 127.395 | 279.4797 | 4.52835 | 15.4 | 52.4 | 186.03 | 37.2286 |
| 8 | 80.5832 | 85.3735 | 127.733 | 279.4169 | 4.62647 | 15.4 | 52 | 185.842 | 37.6121 |
| 9 | 80.1519 | 85.3807 | 126.943 | 279.8481 | 4.61931 | 16 | 52.8 | 186.381 | 36.8101 |
| 14* | 17.5819 | 169.418 | 343.844 | 162.4182 | 79.418 | 56.5 | 2.9 | 325.98 | 10.1587 |
| 16* | 157.301 | 140.248 | 208.656 | 22.6992 | 50.2478 | 135.5 | 17.9 | 238.142 | 34.1225 |
| 17 | 80.406 | 85.3524 | 127.494 | 279.594 | 4.64756 | 15.6 | 52.3 | 186.042 | 37.3131 |
| 18 | 80.5795 | 85.8047 | 127.766 | 279.4205 | 4.19527 | 14.8 | 52 | 186.172 | 37.6841 |
| 20 | 80.3962 | 85.9113 | 127.335 | 279.6038 | 4.0887 | 14.9 | 52.5 | 186.493 | 37.2015 |
| 21 | 79.9585 | 86.2521 | 127.133 | 280.0415 | 3.7479 | 15 | 52.7 | 187.208 | 37.0441 |
| 22 | 80.3815 | 85.9333 | 127.177 | 279.6185 | 4.06668 | 15 | 52.6 | 186.536 | 37.0977 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 23 | 80.4249 | 85.9441 | 127.113 | 279.5751 | 4.05588 | 14.9 | 52.7 | 186.512 | 37.0034 |
| 24 | 80.1005 | 86.3302 | 126.829 | 279.8995 | 3.66982 | 14.8 | 53 | 187.154 | 36.7544 |
| 25 | 80.438 | 85.9291 | 127.255 | 279.562 | 4.07086 | 14.9 | 52.6 | 186.476 | 37.1006 |
| 26 | 80.556 | 85.9069 | 126.651 | 279.444 | 4.09314 | 14.9 | 53.2 | 186.409 | 36.4976 |
| 30 | 80.8625 | 85.6307 | 127.328 | 279.1375 | 4.36928 | 14.8 | 52.5 | 185.818 | 37.1591 |
| 31 | 80.9868 | 85.5623 | 126.75 | 279.0132 | 4.4377 | 14.9 | 53 | 185.704 | 36.6444 |
| 33 | 80.7433 | 86.1748 | 126.189 | 279.2567 | 3.82519 | 14.5 | 53.6 | 186.459 | 36.13 |
| n=23 | | | | | | | | | |
| cpxJ2 | | | | | | | | | |
| 1* | 136.178 | 132.26 | 20.5108 | 43.8 | 42.3 | 148 | 15 | 252.909 | 43.8362 |
| 2 | 9.84813 | 48.7352 | 171.995 | 350.2 | 41.3 | 85.5 | 6 | 177.78 | 48.0694 |
| 3 | 8.8474 | 48.5504 | 174.822 | 351.1526 | 41.44962 | 84.6 | 3.9 | 181.014 | 48.2837 |
| 4 | 8.48144 | 48.4282 | 174.692 | 351.5186 | 41.57183 | 85 | 4 | 180.522 | 48.1526 |
| 5 | 9.43589 | 48.4189 | 174.411 | 350.5641 | 41.58108 | 84.3 | 4.2 | 181.004 | 48.1096 |
| 6 | 8.89143 | 50.0793 | 173.624 | 351.1086 | 39.92068 | 85.2 | 4.9 | 179.007 | 49.657 |
| 7* | 15.2347 | 47.6297 | 206.902 | 344.7653 | 42.37026 | 235.9 | 19.5 | 127.824 | 41.225 |
| 8 | 14.1341 | 48.1137 | 162.446 | 345.8659 | 41.88634 | 87.8 | 13 | 191.249 | 45.2114 |
| 9 | 14.1973 | 47.9092 | 164.031 | 345.8027 | 42.0908 | 86.7 | 11.8 | 188.976 | 45.5043 |
| n=9 | | | | | | | | | |
| cpxK1 | | | | | | | | | |
| 1 | 15.0582 | 64.6825 | 13.8362 | 344.9 | 25.3 | 248.9 | 12.5 | 134.929 | 61.3801 |
| 2 | 15.2127 | 63.8889 | 13.9569 | 344.7873 | 26.11108 | 248.5 | 12.5 | 135.311 | 60.62 |
| 3 | 14.9497 | 64.1674 | 14.2475 | 345.0503 | 25.83261 | 248.7 | 12.8 | 134.788 | 60.7292 |
| 4 | 15.582 | 64.5705 | 13.7132 | 344.418 | 25.42951 | 248.4 | 12.4 | 134.717 | 61.3047 |
| 5 | 14.7253 | 63.6559 | 14.2393 | 345.2747 | 26.34414 | 248.8 | 12.7 | 135.527 | 60.3015 |
| 6 | 15.0859 | 63.7961 | 13.3833 | 344.9141 | 26.20387 | 248.9 | 12 | 136.561 | 60.7847 |
| 7 | 14.9647 | 64.8429 | 13.5251 | 345.0353 | 25.15715 | 249.2 | 12.2 | 135.571 | 61.6567 |
| 8 | 14.6436 | 63.7083 | 14.3393 | 345.3564 | 26.29172 | 248.9 | 12.8 | 135.416 | 60.3109 |
| 9 | 15.2574 | 63.077 | 13.539 | 344.7426 | 26.92299 | 248.5 | 12 | 136.799 | 60.1073 |
| 10 | 15.5739 | 63.9799 | 12.8939 | 344.4261 | 26.02013 | 248.7 | 11.6 | 136.822 | 61.1508 |
| 11 | 15.2611 | 62.7923 | 13.6184 | 344.739 | 27.20772 | 248.4 | 12.1 | 136.786 | 59.8005 |
| n=11 | | | | | | | | | |
| cpxL1 | | | | | | | | | |
| 1 | 80.199 | 92.1053 | 31.8037 | 99.8 | 2.1 | 191.1 | 31.8 | 6.42086 | 58.1143 |
| 3 | 80.9325 | 91.5297 | 31.8263 | 99.06747 | 1.52971 | 190 | 31.8 | 6.60329 | 58.1549 |
| 4 | 80.3169 | 92.1396 | 32.0661 | 99.68315 | 2.1396 | 191 | 32 | 6.26714 | 57.912 |
| 6 | 81.2102 | 91.4918 | 32.391 | 98.78979 | 1.49175 | 189.7 | 32.4 | 6.44178 | 57.558 |
| 7 | 80.5529 | 91.9212 | 32.4573 | 99.44707 | 1.92122 | 190.7 | 32.4 | 6.4256 | 57.5277 |
| 8 | 80.7026 | 93.0986 | 32.4263 | 99.29736 | 3.09857 | 191.3 | 32.4 | 4.4392 | 57.4134 |
| 9 | 81.0552 | 92.1458 | 32.3089 | 98.9448 | 2.14582 | 190.3 | 32.3 | 5.55851 | 57.6112 |
| 10 | 79.9289 | 92.2568 | 32.3273 | 100.0711 | 2.25676 | 191.5 | 32.3 | 6.51065 | 57.6017 |
| 11 | 79.8077 | 92.2786 | 32.237 | 100.1923 | 2.27857 | 191.6 | 32.2 | 6.58357 | 57.7008 |
| 13 | 80.736 | 91.474 | 31.9124 | 99.26404 | 1.47401 | 190.2 | 31.9 | 6.89868 | 58.0573 |
| 15 | 80.7123 | 92.5831 | 31.2613 | 99.28774 | 2.58309 | 190.9 | 31.2 | 5.03808 | 58.6667 |
| 16 | 79.8496 | 91.9135 | 31.7786 | 100.1504 | 1.91354 | 191.3 | 31.8 | 7.06992 | 58.1299 |
| 17 | 79.9628 | 92.54 | 31.9742 | 100.0372 | 2.53997 | 191.6 | 31.9 | 5.9702 | 57.9756 |
| 18 | 80.3199 | 92.0658 | 32.0289 | 99.68008 | 2.06577 | 191 | 32 | 6.38164 | 57.9162 |
| 19 | 80.8611 | 91.5075 | 32.0352 | 99.13895 | 1.50752 | 190.1 | 32 | 6.72932 | 57.9554 |
| 21 | 80.4932 | 92.3949 | 31.975 | 99.50683 | 2.39486 | 191 | 31.9 | 5.67086 | 57.9885 |
| 22 | 80.474 | 92.2011 | 32.018 | 99.52601 | 2.20105 | 190.9 | 32 | 6.01247 | 57.9061 |
| 23 | 80.3118 | 91.4809 | 32.5418 | 99.68821 | 1.48092 | 190.6 | 32.5 | 7.36618 | 57.4586 |
| 25 | 80.5734 | 92.1333 | 31.971 | 99.42664 | 2.13332 | 190.8 | 31.9 | 6.00769 | 58.0099 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 26 | 80.6299 | 91.9827 | 32.381 | 99.37009 | 1.98271 | 190.6 | 32.4 | 6.25205 | 57.5252 |
| 28 | 80.9734 | 91.8585 | 31.7198 | 99.02657 | 1.85852 | 190.2 | 31.7 | 6.02293 | 58.2318 |
| n=21 | | | | | | | | | |
| cpxL2 | | | | | | | | | |
| 1 | 81.6006 | 83.4304 | 133.605 | 278.4 | 6.6 | 15.3 | 46 | 182.154 | 43.2401 |
| 3 | 81.9535 | 83.2305 | 134.904 | 278.0466 | 6.76953 | 14.8 | 44.7 | 181.347 | 44.503 |
| 7* | 125.157 | 19.647 | 198.117 | 234.8428 | 70.35302 | 127.7 | 6 | 35.6689 | 18.6343 |
| 11 | 81.4706 | 83.8644 | 133.742 | 278.5294 | 6.13557 | 14.9 | 45.9 | 182.686 | 43.4447 |
| 13 | 82.0242 | 83.6932 | 133.623 | 277.9758 | 6.30677 | 14.6 | 46 | 181.997 | 43.3021 |
| 14* | 133.705 | 99.0731 | 239.614 | 46.2948 | 9.07309 | 151.3 | 58.4 | 311.008 | 29.9859 |
| 15 | 81.7433 | 84.1158 | 134.539 | 278.2567 | 5.88418 | 14.2 | 45.2 | 182.505 | 44.1991 |
| 16* | 175.017 | 49.9435 | 78.7767 | 184.9826 | 40.05655 | 22.1 | 48.7 | 282.245 | 8.55087 |
| 17* | 84.7861 | 104.232 | 144.363 | 95.21387 | 14.2316 | 355.2 | 34.4 | 204.13 | 51.9624 |
| 18* | 123.123 | 132.463 | 37.6874 | 56.8766 | 42.4625 | 174.4 | 26.8 | 285.707 | 35.729 |
| 22 | 81.8822 | 83.4159 | 133.877 | 278.1178 | 6.58413 | 14.9 | 45.7 | 181.819 | 43.5474 |
| n=11 | | | | | | | | | |
| cpxL3 | | | | | | | | | |
| 1 | 162.555 | 136.898 | 349.628 | 17.4 | 46.9 | 279.8 | 7.1 | 183.309 | 42.2277 |
| 2 | 162.87 | 136.61 | 349.974 | 17.1305 | 46.6099 | 279.8 | 6.9 | 183.419 | 42.5639 |
| 3* | 74.2224 | 64.2383 | 113.259 | 285.7776 | 25.76169 | 61.1 | 55.8 | 185.186 | 20.8505 |
| 4 | 162.668 | 136.935 | 349.493 | 17.3322 | 46.9353 | 279.6 | 7.2 | 183.03 | 42.1659 |
| 5 | 162.392 | 136.897 | 349.311 | 17.608 | 46.8965 | 279.8 | 7.3 | 183.134 | 42.1826 |
| 6 | 162.457 | 136.938 | 348.344 | 17.5435 | 46.9377 | 279 | 7.9 | 181.829 | 41.9752 |
| 7 | 162.439 | 136.626 | 349.504 | 17.5608 | 46.6257 | 279.9 | 7.2 | 183.258 | 42.4747 |
| 9 | 162.435 | 136.658 | 349.221 | 17.5652 | 46.6577 | 279.7 | 7.4 | 182.89 | 42.3948 |
| 11 | 162.857 | 136.677 | 349.715 | 17.1435 | 46.6774 | 279.6 | 7 | 183.149 | 42.4617 |
| 12 | 162.417 | 136.742 | 349.514 | 17.5834 | 46.7419 | 279.9 | 7.2 | 183.285 | 42.3593 |
| 13 | 162.911 | 136.61 | 349.993 | 17.0891 | 46.6102 | 279.8 | 6.9 | 183.418 | 42.5685 |
| 14 | 163.392 | 137.19 | 349.391 | 16.6082 | 47.1902 | 279.8 | 7.2 | 183.262 | 42.0249 |
| 15 | 162.979 | 137.141 | 349.298 | 17.0206 | 47.1407 | 279.1 | 7.3 | 182.492 | 41.9322 |
| 16 | 163.268 | 137.409 | 349.424 | 16.7324 | 47.4091 | 278.9 | 7.1 | 182.527 | 41.7057 |
| 17 | 163.298 | 136.605 | 350.427 | 16.7023 | 46.6052 | 279.7 | 6.6 | 183.584 | 42.6391 |
| 18 | 163.274 | 136.829 | 350.12 | 16.7265 | 46.829 | 279.5 | 6.7 | 183.345 | 42.3849 |
| 19 | 163.494 | 136.467 | 350.224 | 16.506 | 46.4665 | 279.4 | 6.7 | 183.166 | 42.7515 |
| 20 | 163.023 | 137.084 | 349.377 | 16.9769 | 47.0844 | 279.2 | 7.2 | 182.665 | 42.016 |
| 21* | 21.6162 | 158.974 | 311.561 | 158.3838 | 68.9737 | 21.9 | 15.6 | 287.978 | 13.7657 |
| 22 | 162.601 | 136.446 | 349.686 | 17.3992 | 46.4464 | 279.9 | 7.1 | 183.305 | 42.6798 |
| n=20 | | | | | | | | | |
| cpxT1 | | | | | | | | | |
| 1 | 76.117 | 76.9708 | 137.699 | 283.9 | 13 | 25.5 | 41 | 179.973 | 46.0831 |
| 2 | 76.4182 | 76.8813 | 137.137 | 283.5818 | 13.11866 | 25.5 | 41.5 | 180.154 | 45.5356 |
| 3 | 74.6906 | 76.6133 | 138.502 | 285.3094 | 13.38669 | 26.9 | 40.1 | 179.371 | 46.7996 |
| 4 | 75.8751 | 76.8358 | 138.141 | 284.1249 | 13.16424 | 25.7 | 40.5 | 180.143 | 46.4992 |
| 5 | 75.9721 | 76.563 | 138.027 | 284.0279 | 13.437 | 25.8 | 40.6 | 180.45 | 46.2989 |
| 6 | 76.2926 | 76.9591 | 138.568 | 283.7074 | 13.04088 | 25 | 40.1 | 180.649 | 46.9507 |
| 7 | 75.7751 | 77.4903 | 137.294 | 284.2249 | 12.50968 | 25.5 | 41.5 | 178.97 | 45.8125 |
| 8 | 74.5616 | 77.6919 | 138.305 | 285.4384 | 12.30809 | 26.2 | 40.5 | 178.032 | 46.8749 |
| 9 | 75.5062 | 77.5223 | 138.027 | 284.4938 | 12.47774 | 25.5 | 40.8 | 178.997 | 46.5121 |
| 10 | 75.7884 | 76.6864 | 138.963 | 284.2116 | 13.31358 | 25.5 | 39.7 | 180.617 | 47.2428 |
| 11 | 75.8033 | 77.0901 | 138.39 | 284.1967 | 12.90993 | 25.4 | 40.3 | 179.942 | 46.8214 |
| 12 | 76.5834 | 77.3396 | 138.635 | 283.4166 | 12.66037 | 24.3 | 40.1 | 180.587 | 47.13 |
| 13 | 76.2938 | 77.1177 | 138.74 | 283.7062 | 12.88234 | 24.8 | 40 | 180.553 | 47.1224 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 14 | 74.9894 | 76.2708 | 139.194 | 285.0106 | 13.72921 | 26.6 | 39.4 | 180.362 | 47.3369 |
| 15 | 75.0652 | 76.7883 | 139.146 | 284.9348 | 13.21171 | 26.1 | 39.6 | 179.849 | 47.3852 |
| 17 | 76.3813 | 77.1804 | 138.341 | 283.6187 | 12.81957 | 24.8 | 40.4 | 180.384 | 46.7575 |
| 18 | 76.7178 | 77.6803 | 137.726 | 283.2822 | 12.31972 | 24.3 | 41.1 | 179.916 | 46.2729 |
| 19 | 75.7493 | 76.7625 | 139.271 | 284.2507 | 13.2375 | 25.4 | 39.4 | 180.658 | 47.5617 |
| 20 | 75.6306 | 76.6803 | 138.734 | 284.3694 | 13.3197 | 25.8 | 39.9 | 180.355 | 47.0309 |
| n=19 | | | | | | | | | |
| cpxT2 | | | | | | | | | |
| 1 | 72.5621 | 79.8025 | 137.006 | 287.4 | 10.2 | 26.7 | 42.2 | 186.656 | 46.0143 |
| 2 | 72.5774 | 79.3384 | 136.917 | 287.4226 | 10.66163 | 27.2 | 42.2 | 186.243 | 45.8437 |
| 3 | 72.7028 | 79.4256 | 136.877 | 287.2972 | 10.57443 | 27 | 42.2 | 186.201 | 45.8737 |
| 4 | 72.9356 | 79.8923 | 137.396 | 287.0644 | 10.10773 | 26.2 | 41.8 | 186.262 | 46.4353 |
| 5 | 72.4462 | 79.5975 | 137.4 | 287.5538 | 10.4025 | 27 | 41.7 | 186.431 | 46.4196 |
| 8 | 72.3078 | 79.3874 | 137.31 | 287.6922 | 10.61262 | 27.3 | 41.8 | 186.402 | 46.2569 |
| 9 | 72.7354 | 79.3663 | 137.382 | 287.2646 | 10.6337 | 26.9 | 41.7 | 185.917 | 46.3412 |
| 13 | 73.1169 | 79.6908 | 137.13 | 286.8831 | 10.30923 | 26.3 | 42 | 185.964 | 46.1615 |
| 14 | 73.1195 | 79.4996 | 137.223 | 286.8805 | 10.50039 | 26.5 | 41.9 | 185.743 | 46.1832 |
| 15 | 72.9012 | 79.3659 | 136.845 | 287.0988 | 10.63414 | 26.9 | 42.2 | 185.949 | 45.8447 |
| 16 | 72.9772 | 79.4159 | 137.278 | 287.0229 | 10.58406 | 26.6 | 41.8 | 185.76 | 46.2679 |
| n=11 | | | | | | | | | |
| cpxZ1 | | | | | | | | | |
| 1* | 13.3855 | 101.554 | 312.584 | 166.6145 | 11.5544 | 64.3 | 46.2 | 267.032 | 41.4919 |
| 5* | 13.4372 | 99.7943 | 321.744 | 166.5628 | 9.79432 | 68.9 | 37.6 | 268.735 | 50.6936 |
| 7** | 175.61 | 158.689 | 80.9179 | 4.3905 | 68.6893 | 174.7 | 21 | 265.958 | 3.27399 |
| 11*** | 97.51 | 83.8455 | 330.758 | 262.49 | 6.15454 | 355.9 | 29.1 | 161.666 | 60.1346 |
| 16* | 10.2362 | 94.9643 | 320.523 | 169.7638 | 4.96425 | 75.7 | 39.3 | 265.762 | 50.2641 |
| 18**** | 153.21 | 98.0898 | 310.026 | 26.7896 | 8.08984 | 287.3 | 49.3 | 123.531 | 39.5517 |
| 19**** | 153.134 | 98.027 | 310.164 | 26.8661 | 8.02703 | 287.5 | 49.2 | 123.583 | 39.6721 |
| n=7 | | | | | | | | | |
| n total = 132 | | | | | | | | | |

# APPENDIX B

## Rutile EBSD Analyses including Euler rotations and trend and plunge for [001], a(100) and [010]

SAMPLE BAK-03-001 chip

| | | | <001> | | a(100) | | b[010] | |
|---|---|---|---|---|---|---|---|---|
| Euler1 | Euler2 | Euler 3 | Trend | Plunge | Trend | Plunge | Trend | Plunge |
| Rutile H1 | | | | | | | | |
| 113.4057 | 162.4643 | 36.93362 | 66.5943 | 72.4643 | 192.2 | 10.3 | 284.8 | 13.8 |
| 112.8611 | 162.4284 | 36.36338 | 67.1389 | 72.4284 | 192.1 | 10.4 | 284.7 | 14 |
| 112.6533 | 162.3513 | 36.22694 | 67.3467 | 72.3513 | 192.1 | 10.4 | 284.8 | 14.1 |
| 112.845 | 162.764 | 36.63969 | 67.155 | 72.764 | 192.4 | 10.3 | 284.9 | 13.7 |
| 112.2259 | 162.5069 | 36.05287 | 67.7741 | 72.5069 | 192.6 | 10.3 | 285.2 | 14 |
| 113.4622 | 162.2447 | 37.19021 | 66.5378 | 72.2447 | 192.3 | 10.7 | 285 | 14 |
| 112.4324 | 162.2706 | 36.25533 | 67.5676 | 72.2706 | 192.5 | 10.5 | 285.2 | 14.1 |
| n= 7 | | | | | | | | |
| Rutile I1 | | | | | | | | |
| 83.54196 | 151.8704 | 39.35158 | 96.45804 | 61.8704 | 222.4 | 17.5 | 319.4 | 21.3 |
| 83.53252 | 151.2907 | 39.04566 | 96.46748 | 61.2907 | 221.9 | 17.7 | 319.3 | 21.8 |
| 83.08819 | 151.5572 | 38.50111 | 96.91181 | 61.5572 | 221.8 | 17.3 | 319 | 21.8 |
| 83.46955 | 151.2501 | 38.99671 | 96.53045 | 61.2501 | 221.8 | 17.7 | 319.2 | 21.9 |
| 83.52912 | 151.1231 | 38.92118 | 96.47088 | 61.1231 | 221.8 | 17.8 | 319.2 | 22 |
| 82.90001 | 151.1426 | 38.20984 | 97.09999 | 61.1426 | 221.6 | 17.5 | 319 | 22.2 |
| n=6 | | | | | | | | |
| Rutile I2 | | | | | | | | |
| 126.0068 | 84.91146 | 8.008764 | 233.9932 | 5.08854 | 143.2 | 8 | 355.7 | 80.6 |
| 126.1218 | 84.99632 | 8.070512 | 233.8782 | 5.00368 | 143.1 | 8.1 | 354.9 | 80.5 |
| 125.9015 | 84.83176 | 8.227189 | 234.0985 | 5.16824 | 143.3 | 8.2 | 355.5 | 80.3 |
| 126.1977 | 84.5299 | 7.95298 | 233.8023 | 5.4701 | 142.9 | 7.9 | 357.6 | 80.4 |
| 126.1278 | 84.48548 | 7.992049 | 233.8722 | 5.51452 | 143 | 9 | 357.7 | 80.3 |
| 125.913 | 84.8594 | 8.180341 | 234.087 | 5.1406 | 143.3 | 8.2 | 355.5 | 80.2 |
| n=6 | | | | | | | | |
| Rutile K1 | | | | | | | | |
| 6.172831 | 156.1458 | 31.86788 | 173.8272 | 66.1458 | 293.4 | 12.4 | 28 | 20 |
| 7.906046 | 155.8081 | 33.60042 | 172.094 | 65.8081 | 293.3 | 13.2 | 28.1 | 19.9 |
| 9.746029 | 155.612 | 35.27418 | 170.254 | 65.612 | 293.1 | 13.9 | 28.2 | 19.6 |
| 9.141826 | 155.7917 | 35.08499 | 170.8582 | 65.7917 | 293.6 | 13.7 | 28.5 | 19.5 |
| 7.906046 | 155.8081 | 33.60036 | 172.094 | 65.8081 | 293.3 | 13.2 | 28.1 | 19.9 |
| 8.71928 | 156.1375 | 34.02037 | 171.2807 | 66.1375 | 293 | 13.2 | 27.7 | 19.5 |
| 8.038591 | 156.27 | 33.26804 | 171.9614 | 66.27 | 293 | 12.9 | 27.6 | 19.5 |
| 6.03269 | 156.4448 | 31.60122 | 173.9673 | 66.4448 | 293.4 | 12.2 | 27.9 | 19.8 |
| n=8 | | | | | | | | |
| Rutile K2 | | | | | | | | |
| 173.9935 | 84.90263 | 34.96542 | 186.0065 | 5.09737 | 92.3 | 34.8 | 283.1 | 54.7 |
| 173.9875 | 84.84224 | 34.77356 | 186.0125 | 5.15776 | 92.3 | 34.6 | 283.2 | 54.9 |
| 174.0614 | 84.88708 | 34.68673 | 185.9386 | 5.11292 | 92.2 | 34.5 | 283.1 | 55 |
| 174.2147 | 84.94768 | 34.82772 | 185.7853 | 5.05232 | 92.2 | 34.7 | 282.8 | 54.9 |
| 173.8774 | 84.92254 | 35.01769 | 186.1226 | 5.07746 | 92.4 | 34.8 | 283.2 | 54.7 |
| 174.0702 | 84.9595 | 34.76924 | 185.9298 | 5.0405 | 92.3 | 34.6 | 283 | 55 |
| 174.1549 | 84.86213 | 34.70614 | 185.8451 | 5.13787 | 92.1 | 34.5 | 283.1 | 55 |
| n=7 | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rutile R1 | | | | | | | | |
| 134.3367 | 113.8033 | 70.40952 | 45.6633 | 23.8033 | 184.3 | 59.6 | 307.4 | 17.8 |
| 134.4637 | 114.1593 | 70.02388 | 45.5363 | 24.1593 | 183.7 | 59.1 | 307 | 18.2 |
| 134.7103 | 113.9413 | 69.99336 | 45.2897 | 23.9413 | 183.3 | 59.3 | 306.8 | 18.2 |
| 134.4924 | 113.8417 | 70.20868 | 45.5076 | 23.8417 | 183.7 | 59.5 | 307.1 | 18 |
| 134.2142 | 113.8209 | 70.21231 | 45.7858 | 23.8209 | 184 | 59.5 | 307.4 | 18 |
| 134.2028 | 114.1451 | 70.18636 | 45.7972 | 24.1451 | 184.3 | 59.2 | 307.3 | 18 |
| 134.2239 | 114.2781 | 70.4052 | 45.7761 | 24.2781 | 184.9 | 59.3 | 307.4 | 17.7 |
| n=7 | | | | | | | | |
| n total = 41 | | | | | | | | |

SAMPLE BAK-03-001 Thin section

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| rutile 1 | | | | | | | | |
| 176.7793 | 123.6803 | 53.53419 | 3.2207 | 33.6803 | 130 | 42.1 | 250.8 | 29.6 |
| 177.1677 | 123.1491 | 54.02158 | 2.8323 | 33.1491 | 129.7 | 42.7 | 251.1 | 29.4 |
| 176.312 | 123.2984 | 53.56307 | 3.688 | 33.2984 | 130.3 | 42.3 | 251.5 | 29.7 |
| 177.3641 | 123.12 | 54.2307 | 2.6359 | 33.12 | 129.6 | 42.9 | 251 | 29.3 |
| 176.4838 | 123.7161 | 53.51203 | 3.5162 | 33.7161 | 130.3 | 42 | 251.1 | 29.6 |
| n=5 | | | | | | | | |
| Rutile2 | | | | | | | | |
| 38.10661 | 113.0022 | 42.21669 | 141.8934 | 23.0022 | 251.3 | 38.3 | 28.5 | 42.9 |
| 37.94922 | 113.1663 | 42.20935 | 142.0508 | 23.1663 | 251.7 | 38.2 | 28.5 | 42.8 |
| 38.07796 | 113.1151 | 42.26128 | 141.922 | 23.1151 | 251.4 | 38.2 | 28.4 | 42.9 |
| 38.30089 | 111.2149 | 38.50095 | 141.6991 | 21.2149 | 247.6 | 35.5 | 27.1 | 46.8 |
| n=4 | | | | | | | | |
| Rutile 3 | | | | | | | | |
| 24.08804 | 89.37716 | 2.480856 | 335.912 | 0.62284 | 245.8 | 2.5 | 77.9 | 87.5 |
| 24.08804 | 89.37716 | 2.480856 | 335.912 | 0.62284 | 245.8 | 2.5 | 77.9 | 87.5 |
| 88.60885 | 88.76677 | 1.9165 | 271.3912 | 1.23323 | 181.3 | 1.9 | 31.9 | 87.8 |
| 24.11155 | 89.37379 | 2.553141 | 335.8885 | 0.62621 | 245.8 | 2.6 | 77.5 | 87.4 |
| 88.79454 | 89.03217 | 1.928051 | 271.2055 | 0.96783 | 181.1 | 1.9 | 25.5 | 87.9 |
| 24.0981 | 89.38722 | 2.518004 | 335.9019 | 0.61278 | 245.8 | 2.5 | 77.4 | 87.4 |
| 24.08804 | 89.37716 | 2.480856 | 335.912 | 0.62284 | 245.8 | 2.5 | 77.9 | 87.5 |
| 24.0981 | 89.38722 | 2.518004 | 335.9019 | 0.61278 | 245.8 | 2.5 | 77.4 | 87.4 |
| 88.79138 | 89.00672 | 1.972098 | 271.2086 | 0.99328 | 181.1 | 2 | 25.7 | 87.8 |
| n=9 | | | | | | | | |
| Rutile 3extra | | | | | | | | |
| 20.54012 | 82.05624 | 7.604272 | 339.4599 | 7.94376 | 248.3 | 7.6 | 115 | 79.1 |
| 135.7932 | 86.27187 | 79.77977 | 224.2068 | 3.72813 | 113.9 | 79.1 | 314.8 | 10.2 |
| 20.03592 | 82.31678 | 8.003633 | 339.9641 | 7.68322 | 248.8 | 8 | 113 | 79 |
| 19.99061 | 82.1546 | 7.988187 | 340.0094 | 7.8454 | 248.8 | 7.9 | 113.9 | 78.9 |
| 24.49149 | 89.50941 | 2.278409 | 335.5085 | 0.49059 | 245.4 | 2.3 | 75.3 | 87.7 |
| 20.0382 | 82.28278 | 7.865011 | 339.9618 | 7.71722 | 248.8 | 7.8 | 113.7 | 79 |
| 20.67003 | 82.23628 | 7.716867 | 339.33 | 7.76372 | 248.2 | 7.6 | 114 | 79.2 |
| n=7 | | | | | | | | |
| Rutile 4 | | | | | | | | |
| 163.7821 | 129.1725 | 50.88275 | 16.2179 | 39.1725 | 143.9 | 37 | 258.9 | 29.2 |
| 163.7821 | 129.1725 | 50.88275 | 16.2179 | 39.1725 | 143.9 | 37 | 258.9 | 29.2 |
| 163.7821 | 129.1725 | 50.88275 | 16.2179 | 39.1725 | 143.9 | 37 | 258.9 | 29.2 |
| 163.5748 | 129.4081 | 50.64525 | 16.4252 | 39.4081 | 144 | 36.8 | 258.8 | 29.3 |
| n=4 | | | | | | | | |
| n total = 29 | | | | | | | | |

BAK-03-014 Chip

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rutile 1 | | | | | | | | |
| 42.25636 | 28.97624 | 86.13586 | 317.7436 | 61.02376 | 142.2 | 28.8 | 51.1 | 2 |
| 42.01391 | 29.08224 | 86.13574 | 317.9861 | 60.91776 | 142.4 | 28.9 | 51.3 | 2 |
| 42.20464 | 29.08987 | 86.29404 | 317.7954 | 60.91013 | 142 | 28.9 | 51 | 1.9 |
| 41.89673 | 29.04774 | 86.40379 | 318.1033 | 60.95226 | 142.2 | 28.9 | 51.2 | 1.8 |
| 42.12176 | 29.11824 | 86.31617 | 317.8782 | 60.88176 | 142.1 | 29 | 51 | 1.9 |
| n=5 | | | | | | | | |
| Rutile 2 | | | | | | | | |
| 32.10429 | 111.8677 | 39.98175 | 147.8957 | 21.8677 | 255.1 | 36.7 | 33.8 | 45.3 |
| 32.15974 | 111.6455 | 40.38112 | 147.8403 | 21.6455 | 255.1 | 37 | 34.2 | 45.1 |
| 32.1316 | 111.9557 | 40.04389 | 147.8684 | 21.9557 | 255.3 | 36.7 | 33.8 | 45.1 |
| 32.13526 | 111.958 | 40.0677 | 147.8647 | 21.958 | 255.3 | 36.7 | 33.8 | 45.1 |
| 32.14681 | 111.9922 | 40.11974 | 147.8532 | 21.9922 | 255.3 | 36.8 | 33.8 | 45.1 |
| 32.12543 | 111.9109 | 39.9902 | 147.8746 | 21.9109 | 255.2 | 36.7 | 33.8 | 45.2 |
| n=6 | | | | | | | | |
| Rutile 3 | | | | | | | | |
| 140.4792 | 106.2652 | 1.782295 | 39.5208 | 16.2652 | 129.9 | 1.7 | 225.7 | 73.5 |
| 140.476 | 106.0489 | 1.893721 | 39.524 | 16.0489 | 129.9 | 1.8 | 226.9 | 73.7 |
| 140.5351 | 106.2709 | 1.736448 | 39.4649 | 16.2709 | 129.9 | 1.7 | 225.8 | 73.5 |
| 140.5373 | 106.1817 | 1.782307 | 39.4627 | 16.1817 | 129.9 | 1.8 | 226 | 73.6 |
| 140.4285 | 106.2293 | 1.852898 | 39.5715 | 16.2293 | 130 | 1.8 | 226.3 | 73.6 |
| n=5 | | | | | | | | |
| Rutile 4 | | | | | | | | |
| 114.1761 | 142.4131 | 51.40038 | 65.8239 | 52.4131 | 200.5 | 28.6 | 303.4 | 22.3 |
| 112.737 | 143.1754 | 48.71524 | 67.263 | 53.1754 | 199.6 | 26.9 | 302.2 | 23.2 |
| 123.7118 | 139.5616 | 57.54217 | 56.2882 | 49.5616 | 196.4 | 33.3 | 300.4 | 20.3 |
| 114.9296 | 143.5673 | 51.16503 | 65.0704 | 53.5673 | 200.1 | 27.7 | 302.1 | 21.8 |
| 123.1696 | 139.8031 | 57.39608 | 56.8304 | 49.8031 | 196.8 | 33 | 300.7 | 20.3 |
| n=5 | | | | | | | | |
| n total = 21 | | | | | | | | |

SAMPLE BAK-03-015 Chip

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rutile A1 | | | | | | | | |
| 12.04524 | 57.60763 | 72.31576 | 347.9548 | 32.39237 | 198.6 | 53.5 | 87.5 | 14.9 |
| 12.0546 | 57.6909 | 72.35754 | 347.9454 | 32.3091 | 198.6 | 53.5 | 87.5 | 14.9 |
| 11.93036 | 57.48811 | 72.50883 | 348.0696 | 32.51189 | 198.4 | 53.5 | 87.6 | 14.7 |
| 12.04524 | 57.60763 | 72.31576 | 347.9548 | 32.39237 | 198.6 | 53.5 | 87.5 | 14.9 |
| 11.96143 | 57.62884 | 72.33821 | 348.0386 | 32.37116 | 198.7 | 53.5 | 87.6 | 14.9 |
| 11.92064 | 57.60903 | 72.19361 | 348.0794 | 32.39097 | 199 | 53.4 | 87.8 | 15 |
| 11.66384 | 57.59806 | 72.73197 | 348.3362 | 32.40194 | 198.4 | 53.6 | 87.7 | 14.6 |
| n=7 | | | | | | | | |
| Rutile E1 | | | | | | | | |
| 136.1834 | 152.7349 | 38.29519 | 43.8166 | 62.7349 | 168.8 | 16.6 | 265.4 | 21 |
| 136.3247 | 152.8821 | 38.14337 | 43.6753 | 62.8821 | 168.6 | 16.5 | 265.1 | 20.9 |
| 136.183 | 152.6961 | 38.11576 | 43.817 | 62.6961 | 168.6 | 16.5 | 265.2 | 21.1 |
| 135.9794 | 152.5376 | 37.9043 | 44.0206 | 62.5376 | 168.6 | 16.5 | 265.2 | 21.3 |
| 136.1375 | 152.8089 | 38.04087 | 43.8625 | 62.8089 | 168.7 | 16.5 | 265.2 | 21 |
| 136.1022 | 152.8773 | 38.1119 | 43.8978 | 62.8773 | 168.8 | 16.4 | 265.3 | 20.9 |
| 136.1352 | 153.0225 | 37.89677 | 43.8648 | 63.0225 | 168.6 | 16.3 | 265 | 20.9 |
| n=7 | | | | | | | | |
| Rutile E2 | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 91.99137 | 97.87458 | 12.41474 | 88.00863 | 7.87458 | 179.6 | 12.3 | 325.8 | 75.3 |
| 92.01555 | 97.83813 | 12.45873 | 87.98445 | 7.83813 | 179.6 | 12.4 | 326 | 75.2 |
| 91.81584 | 97.82517 | 12.77055 | 88.18416 | 7.82517 | 179.9 | 12.7 | 326.9 | 75 |
| 92.00441 | 97.84262 | 12.74691 | 87.99559 | 7.84262 | 179.7 | 12.6 | 326.6 | 75 |
| 91.91364 | 97.71032 | 12.60618 | 88.08636 | 7.71032 | 179.7 | 12.5 | 326.8 | 75.2 |
| n=5 | | | | | | | | |
| Rutile H1 | | | | | | | | |
| 73.48478 | 24.89298 | 83.58532 | 286.5152 | 65.10702 | 113.6 | 24.6 | 22.3 | 2.8 |
| 73.36591 | 24.84349 | 83.67822 | 286.6341 | 65.15651 | 113.6 | 24.6 | 22.3 | 2.7 |
| 73.34423 | 24.6646 | 83.63222 | 286.6558 | 65.3354 | 113.7 | 24.4 | 22.4 | 2.7 |
| 73.3614 | 24.79804 | 83.42835 | 286.6386 | 65.20196 | 113.9 | 24.5 | 22.6 | 2.8 |
| 73.7357 | 25.08188 | 83.13211 | 286.2643 | 64.91812 | 113.8 | 24.8 | 22.4 | 3 |
| 73.56236 | 24.727 | 83.43302 | 286.4376 | 65.273 | 113.7 | 24.4 | 22.4 | 2.8 |
| n=6 | | | | | | | | |
| Rutile J2 | | | | | | | | |
| 76.08646 | 105.9335 | 55.90908 | 103.9135 | 15.9335 | 215.8 | 52.8 | 3.3 | 32.6 |
| 75.97337 | 106.1285 | 55.80624 | 104.0266 | 16.1285 | 216.1 | 52.6 | 3.2 | 32.7 |
| 75.96852 | 106.0705 | 55.67762 | 104.0315 | 16.0705 | 215.9 | 52.5 | 3.2 | 32.8 |
| 76.06886 | 105.6997 | 55.9153 | 103.9311 | 15.6997 | 215.5 | 52.8 | 3.4 | 32.7 |
| 75.92833 | 106.0119 | 55.81138 | 104.0717 | 16.0119 | 216.1 | 52.7 | 3.4 | 32.6 |
| 75.75547 | 106.0477 | 55.77657 | 104.2445 | 16.0477 | 216.1 | 52.6 | 3.5 | 32.7 |
| n=6 | | | | | | | | |
| Rutile K1 | | | | | | | | |
| 150.6532 | 152.3461 | 36.83706 | 29.3468 | 62.3461 | 152.8 | 16.2 | 249.4 | 21.7 |
| 150.7229 | 152.621 | 36.76419 | 29.2771 | 62.621 | 152.8 | 16.1 | 249.4 | 21.5 |
| 150.5246 | 152.5195 | 36.26982 | 29.4754 | 62.5195 | 152.5 | 15.9 | 249.1 | 21.7 |
| 150.4767 | 152.7227 | 37.37368 | 29.5233 | 62.7227 | 153.6 | 16.2 | 250.1 | 21.3 |
| 149.9912 | 152.7717 | 36.31718 | 30.0088 | 62.7717 | 153.1 | 15.8 | 249.5 | 21.5 |
| 150.512 | 152.372 | 36.56227 | 29.488 | 62.372 | 152.8 | 16.1 | 249.4 | 21.8 |
| 150.7638 | 152.5558 | 36.79844 | 29.2362 | 62.5558 | 152.7 | 16.1 | 249.3 | 21.6 |
| n=7 | | | | | | | | |
| Rutile K2 | | | | | | | | |
| 69.19523 | 99.82514 | 10.02444 | 110.8048 | 9.82514 | 202.4 | 9.9 | 336.5 | 75.9 |
| 69.58495 | 99.80393 | 10.4674 | 110.4151 | 9.80393 | 202.1 | 10.3 | 337.4 | 75.6 |
| 69.53358 | 99.75349 | 10.29744 | 110.4664 | 9.75349 | 202.2 | 10.2 | 337.3 | 75.8 |
| 69.63695 | 99.85679 | 10.44211 | 110.3631 | 9.85679 | 202.1 | 10.3 | 337.3 | 75.6 |
| 69.53608 | 99.62874 | 10.27584 | 110.4639 | 9.62874 | 202.1 | 10.2 | 337.6 | 75.9 |
| 69.28772 | 100.0208 | 10.40357 | 110.7123 | 10.0208 | 202.4 | 10.2 | 336.9 | 75.5 |
| 69.24032 | 99.88743 | 9.958071 | 110.7597 | 9.88743 | 202.4 | 9.9 | 336.2 | 75.9 |
| n=7 | | | | | | | | |
| Rutile L1 | | | | | | | | |
| 103.2701 | 103.1864 | 86.65782 | 76.7299 | 13.1864 | 242.1 | 76.5 | 345.9 | 3.3 |
| 103.1819 | 103.2629 | 86.27041 | 76.8181 | 13.2629 | 240.7 | 76.3 | 345.9 | 3.6 |
| 102.6758 | 103.3552 | 86.31224 | 77.3242 | 13.3552 | 241.5 | 76.3 | 346.4 | 3.6 |
| 103.2553 | 103.3224 | 86.74895 | 76.7447 | 13.3224 | 242.5 | 76.4 | 345.9 | 3.2 |
| 103.0908 | 103.1087 | 86.12105 | 76.9092 | 13.1087 | 240.7 | 76.4 | 345.9 | 3.8 |
| 103.1428 | 103.2335 | 86.2535 | 76.8572 | 13.2335 | 241 | 76.3 | 345.9 | 3.6 |
| n=6 | | | | | | | | |
| Rutile L2 | | | | | | | | |
| 83.70865 | 34.42767 | 28.58628 | 276.2914 | 55.57233 | 162 | 15.6 | 62.8 | 29.9 |
| 83.83668 | 34.41927 | 28.25654 | 276.1633 | 55.58073 | 162.2 | 15.5 | 63 | 30 |
| 84.31931 | 34.45672 | 27.83135 | 275.6807 | 55.54328 | 162.1 | 15.2 | 63 | 30.1 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 84.29909 | 34.32037 | 27.83769 | 275.7009 | 55.67963 | 162.1 | 15.2 | 63.1 | 30 | |
| 84.07258 | 34.44663 | 28.0919 | 275.9274 | 55.55337 | 162.1 | 15.3 | 63 | 30 | |
| 84.40653 | 34.19055 | 27.6126 | 275.5935 | 55.80945 | 162.1 | 15 | 63.3 | 30 | |
| n=6 | | | | | | | | | |
| n total = 57 | | | | | | | | | |

SAMPLE BAK-03-017 Chip

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rutile H1 | | | | | | | | |
| 68.3852 | 148.3875 | 75.29442 | 111.6148 | 58.3875 | 274.4 | 30.6 | 8.9 | 7.6 |
| 68.4985 | 148.4772 | 75.46667 | 111.5015 | 58.4772 | 274.8 | 30.5 | 9.1 | 7.4 |
| 68.42165 | 148.4304 | 75.33233 | 111.5784 | 58.4304 | 274.5 | 30.5 | 9 | 7.5 |
| 68.41716 | 148.3984 | 75.30138 | 111.5828 | 58.3984 | 274.5 | 30.5 | 9 | 7.5 |
| 68.4007 | 148.3674 | 75.3051 | 111.5993 | 58.3674 | 274.5 | 30.6 | 9 | 7.6 |
| 68.40866 | 148.2745 | 75.36497 | 111.5913 | 58.2745 | 274.5 | 30.7 | 9 | 7.5 |
| 67.55183 | 148.3179 | 74.22723 | 112.4482 | 58.3179 | 274 | 30.5 | 8.8 | 8.2 |
| 67.59996 | 148.202 | 74.23617 | 112.4 | 58.202 | 274 | 30.6 | 8.9 | 8.1 |
| n=8 | | | | | | | | |
| Rutile I1 | | | | | | | | |
| 106.6713 | 116.5844 | 8.933244 | 73.3287 | 26.5844 | 167.2 | 8 | 272.5 | 62 |
| 106.8598 | 116.3969 | 8.967115 | 73.1402 | 26.3969 | 167 | 8 | 272.5 | 62.1 |
| 106.7109 | 116.4093 | 8.886734 | 73.2891 | 26.4093 | 167.2 | 8 | 272.6 | 62.1 |
| 106.6422 | 116.6003 | 8.919042 | 73.3578 | 26.6003 | 167.3 | 8.1 | 272.7 | 61.9 |
| 106.6981 | 116.4076 | 8.681347 | 73.3019 | 26.4076 | 167.1 | 7.8 | 272.2 | 62.2 |
| 106.6066 | 116.6423 | 8.827957 | 73.3934 | 26.6423 | 167.4 | 7.8 | 272.3 | 62 |
| n=6 | | | | | | | | |
| Rutile I2 | | | | | | | | |
| 7.316372 | 35.15821 | 41.85613 | 352.6836 | 54.84179 | 226.4 | 22.5 | 125 | 25.5 |
| 7.316372 | 35.15821 | 41.85613 | 352.6836 | 54.84179 | 226.4 | 22.5 | 125 | 25.5 |
| 7.316386 | 35.13315 | 41.90318 | 352.6836 | 54.86685 | 226.4 | 22.5 | 125 | 25.4 |
| 7.316372 | 35.15821 | 41.85613 | 352.6836 | 54.84179 | 226.4 | 22.5 | 125 | 25.5 |
| 7.316372 | 35.15821 | 41.85613 | 352.6836 | 54.84179 | 226.4 | 22.5 | 125 | 25.5 |
| 7.316372 | 35.15821 | 41.85613 | 352.6836 | 54.84179 | 226.4 | 22.5 | 125 | 25.5 |
| 6.906618 | 35.11488 | 42.28454 | 353.0934 | 54.88512 | 226.4 | 22.7 | 125 | 25.3 |
| 7.316372 | 35.15821 | 41.85613 | 352.6836 | 54.84179 | 226.4 | 22.5 | 125 | 25.5 |
| 7.316372 | 35.15821 | 41.85613 | 352.6836 | 54.84179 | 226.4 | 22.5 | 125 | 25.5 |
| n=9 | | | | | | | | |
| Rutile J1 | | | | | | | | |
| 147.963 | 134.6526 | 87.09045 | 32.037 | 44.6526 | 207.8 | 45.4 | 299.9 | 2 |
| 150.5369 | 139.7917 | 4.622442 | 29.4631 | 49.7917 | 123 | 3.1 | 215.6 | 39.9 |
| 149.2427 | 139.4511 | 6.32075 | 30.7573 | 49.4511 | 125.6 | 4.2 | 219.1 | 40.1 |
| 149.0415 | 139.366 | 6.201543 | 30.9585 | 49.366 | 125.7 | 4.1 | 219.2 | 40.2 |
| 150.203 | 140.0078 | 6.453997 | 29.797 | 50.0078 | 124.7 | 4.2 | 218.2 | 39.6 |
| 149.2206 | 139.7076 | 6.247135 | 30.7794 | 49.7076 | 125.5 | 4.1 | 219 | 39.9 |
| n=6 | | | | | | | | |
| Rutile J2 | | | | | | | | |
| 138.0535 | 105.0708 | 87.90929 | 41.9465 | 15.0708 | 213.7 | 74.9 | 311.3 | 2 |
| 138.2214 | 107.5743 | 89.38913 | 41.7786 | 17.5743 | 219.8 | 72.5 | 31.5 | 0.5 |
| 137.9535 | 105.2805 | 88.45067 | 42.0465 | 15.2805 | 215.9 | 74.8 | 311.5 | 1.5 |
| 138.0761 | 107.4483 | 89.44449 | 41.9239 | 17.4483 | 220 | 72.7 | 311.7 | 0.5 |
| 137.8776 | 105.0347 | 87.76119 | 42.1224 | 15.0347 | 213.4 | 74.9 | 311.4 | 2.2 |
| n=5 | | | | | | | | |
| Rutile M1 | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 177.4615 | 36.64358 | 87.99216 | 182.5385 | 53.35642 | 5 | 36.5 | 274.1 | 1.3 |
| 177.8241 | 36.53192 | 87.70719 | 182.1759 | 53.46808 | 5 | 36.4 | 274 | 1.4 |
| 177.3275 | 36.8087 | 88.01614 | 182.6725 | 53.1913 | 5.3 | 36.4 | 274.3 | 1.3 |
| 177.2052 | 36.67778 | 88.18615 | 182.7948 | 53.32222 | 5.1 | 36.6 | 274.2 | 1.2 |
| 177.1276 | 36.64391 | 88.24394 | 182.8724 | 53.35609 | 5.1 | 36.5 | 274.2 | 1.1 |
| 177.171 | 36.47516 | 88.27718 | 182.829 | 53.52484 | 5 | 36.3 | 274.2 | 1.1 |
| 177.2309 | 36.56726 | 88.13706 | 182.7691 | 53.43274 | 5.1 | 36.5 | 274.2 | 1.2 |
| n=7 | | | | | | | | |
| Rutile M2 | | | | | | | | |
| 78.82938 | 26.35587 | 74.59908 | 281.1706 | 63.64413 | 118.2 | 25.3 | 25 | 6.9 |
| 78.28758 | 26.38663 | 75.22676 | 281.7124 | 63.61337 | 118.1 | 25.3 | 25 | 6.6 |
| 78.25242 | 26.47373 | 75.23607 | 281.7476 | 63.52627 | 118.1 | 25.4 | 25 | 6.6 |
| 78.90757 | 26.65892 | 74.66258 | 281.0924 | 63.34108 | 118.1 | 25.5 | 24.8 | 6.9 |
| 78.67837 | 26.51655 | 74.83755 | 281.3216 | 63.48345 | 118.2 | 25.4 | 24.9 | 6.8 |
| n=5 | | | | | | | | |
| Rutile M3 | | | | | | | | |
| 127.9424 | 107.0921 | 16.48887 | 52.0576 | 17.0921 | 147 | 15.8 | 277.2 | 66.3 |
| 127.8603 | 107.4019 | 16.80113 | 52.1397 | 17.4019 | 147.1 | 16 | 277.2 | 66 |
| 127.3721 | 106.6986 | 16.31605 | 52.6279 | 16.6986 | 147.3 | 15.6 | 277.9 | 66.8 |
| 128.2074 | 107.3436 | 16.412 | 51.7926 | 17.3436 | 146.7 | 15.7 | 276.3 | 66.2 |
| n=4 | | | | | | | | |
| Rutile M4 | | | | | | | | |
| 42.15999 | 77.96173 | 58.39941 | 317.84 | 12.03827 | 208.9 | 56.3 | 55 | 30.9 |
| 42.12216 | 78.02016 | 58.27304 | 317.8778 | 11.97984 | 209.2 | 56.3 | 55.1 | 31 |
| 42.0803 | 77.91028 | 58.43978 | 317.9197 | 12.08972 | 208.9 | 56.4 | 55.1 | 30.8 |
| 42.27739 | 77.88197 | 58.49193 | 317.7226 | 12.11803 | 208.6 | 56.4 | 54.9 | 30.8 |
| 42.08328 | 78.02536 | 58.43806 | 317.9167 | 11.97464 | 209.1 | 56.4 | 55.1 | 30.8 |
| n=5 | | | | | | | | |
| Rutile N1 | | | | | | | | |
| 85.77004 | 14.92816 | 1.107583 | 274.23 | 75.07184 | 183.1 | 0.2 | 93.1 | 15 |
| 85.57755 | 14.78598 | 1.238333 | 274.4225 | 75.21402 | 183.2 | 0.2 | 93.1 | 14.9 |
| 84.73143 | 14.8994 | 2.025773 | 275.2686 | 75.1006 | 183.3 | 0.4 | 93.2 | 15 |
| 84.66076 | 14.86132 | 2.457698 | 275.3392 | 75.13868 | 182.9 | 0.5 | 92.8 | 14.9 |
| 84.52493 | 14.87755 | 2.378379 | 275.4751 | 75.12245 | 183.3 | 0.5 | 93 | 15 |
| 85.63045 | 15.01239 | 1.469 | 274.3696 | 74.98761 | 182.9 | 0.3 | 92.8 | 15.1 |
| 86.52423 | 14.97595 | 0.347291 | 273.4758 | 75.02405 | 3.1 | 0.1 | 93.1 | 15.1 |
| n=7 | | | | | | | | |
| n total = 62 | | | | | | | | |

SAMPLE BAK-03-021 Chip

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rutile A1 | | | | | | | | |
| 115.381 | 40.0985 | 73.63242 | 244.619 | 49.9015 | 85.6 | 38.1 | 347.2 | 10.5 |
| 115.4244 | 40.42424 | 73.82066 | 244.5756 | 49.57576 | 85.4 | 38.4 | 347 | 10.5 |
| 116.0055 | 40.29392 | 73.45284 | 243.9945 | 49.70608 | 85.2 | 38.2 | 346.7 | 10.7 |
| 115.6265 | 40.35406 | 73.65693 | 244.3735 | 49.64594 | 85.4 | 38.3 | 346.9 | 10.6 |
| n=7 | | | | | | | | |
| Rutile A2 | | | | | | | | |
| 110.3583 | 153.0668 | 57.5275 | 69.6417 | 63.0668 | 214 | 22.6 | 310 | 14 |
| 110.6428 | 152.777 | 57.50152 | 69.3572 | 62.777 | 213.8 | 22.8 | 309.9 | 14.1 |
| 110.2382 | 153.0358 | 57.42215 | 69.7618 | 63.0358 | 214.2 | 22.6 | 310.1 | 14 |
| 109.9662 | 153.3737 | 57.05838 | 70.0338 | 63.3737 | 214 | 22.2 | 309.9 | 14 |
| 110.2412 | 153.3469 | 57.297 | 69.7588 | 63.3469 | 214.1 | 22.3 | 309.9 | 13.9 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 110.1508 | 153.3635 | 57.23631 | 69.8492 | 63.3635 | 214 | 22.2 | 309.8 | 14 |
| n=6 | | | | | | | | |
| Rutile A3 | | | | | | | | |
| 44.72678 | 114.779 | 24.76096 | 135.2732 | 24.779 | 236.2 | 22.4 | 2.9 | 55.4 |
| 44.8647 | 114.9153 | 25.05221 | 135.1353 | 24.9153 | 236.1 | 22.6 | 2.9 | 55.2 |
| 44.79931 | 114.8706 | 24.89787 | 135.2007 | 24.8706 | 236.1 | 22.5 | 2.9 | 55.3 |
| 44.8647 | 114.9153 | 25.05221 | 135.1353 | 24.9153 | 236.1 | 22.6 | 2.9 | 55.2 |
| 44.8647 | 114.9153 | 25.05221 | 135.1353 | 24.9153 | 236.1 | 22.6 | 2.9 | 55.2 |
| n=5 | | | | | | | | |
| Rutile F1 | | | | | | | | |
| 72.11108 | 156.3382 | 77.04414 | 107.8889 | 66.3382 | 273.8 | 23.1 | 6 | 5.1 |
| 72.96103 | 156.0641 | 77.59969 | 107.039 | 66.0641 | 273.4 | 23.5 | 5.6 | 4.9 |
| 72.19277 | 156.3129 | 76.99144 | 107.8072 | 66.3129 | 273.6 | 23.1 | 5.8 | 5.1 |
| 72.09766 | 156.535 | 76.86259 | 107.9023 | 66.535 | 273.6 | 22.9 | 5.8 | 5.1 |
| 72.24336 | 156.2187 | 76.86647 | 107.7566 | 66.2187 | 273.5 | 23.2 | 5.7 | 5.1 |
| 72.82938 | 156.7421 | 77.72592 | 107.1706 | 66.7421 | 273.9 | 22.8 | 5.9 | 4.7 |
| n=6 | | | | | | | | |
| Rutile F2 | | | | | | | | |
| 133.4753 | 74.21029 | 45.75083 | 226.5247 | 15.78971 | 120.8 | 43.5 | 331.3 | 42.2 |
| 133.3779 | 73.92381 | 45.78805 | 226.6221 | 16.07619 | 120.6 | 43.5 | 331.6 | 42.1 |
| 133.4302 | 74.32941 | 45.84708 | 226.5698 | 15.67059 | 120.9 | 43.7 | 331.1 | 42.1 |
| 133.5959 | 73.82749 | 45.76122 | 226.4041 | 16.17251 | 120.3 | 43.4 | 331.5 | 42.1 |
| 133.4923 | 74.21764 | 45.85433 | 226.5077 | 15.78236 | 120.7 | 43.6 | 331.2 | 42.1 |
| 133.3836 | 73.91886 | 45.80155 | 226.6164 | 16.08114 | 120.6 | 43.5 | 331.6 | 42.1 |
| n=6 | | | | | | | | |
| Rutile H1 | | | | | | | | |
| 175.0292 | 43.44613 | 89.13709 | 184.9708 | 46.55387 | 6.1 | 43.4 | 275.5 | 0.7 |
| 176.0321 | 43.1342 | 87.55136 | 183.9679 | 46.8658 | 7.3 | 43 | 275.7 | 1.7 |
| 174.6432 | 43.46293 | 89.48685 | 185.3568 | 46.53707 | 6 | 43.4 | 275.7 | 0.4 |
| 173.3621 | 43.45491 | 89.91463 | 186.6379 | 46.54509 | 6.8 | 43.3 | 276.6 | 0.1 |
| 175.3254 | 43.59967 | 88.92654 | 184.6746 | 46.40033 | 6.1 | 43.5 | 275.4 | 0.8 |
| 176.0321 | 43.1342 | 87.55136 | 183.9679 | 46.8658 | 7.3 | 43 | 275.7 | 1.7 |
| n=6 | | | | | | | | |
| Rutile H2 | | | | | | | | |
| 22.66599 | 89.07233 | 40.48455 | 337.334 | 0.92767 | 246.4 | 40.4 | 68.3 | 49.5 |
| 22.75592 | 89.13576 | 40.35702 | 337.2441 | 0.86424 | 246.3 | 40.3 | 68.1 | 49.7 |
| 22.66599 | 89.07233 | 40.48455 | 337.334 | 0.92767 | 246.4 | 40.4 | 68.3 | 49.5 |
| 22.49816 | 89.39517 | 40.69263 | 337.5018 | 0.60483 | 246.8 | 40.7 | 68.1 | 49.3 |
| 22.84367 | 89.14053 | 40.38061 | 337.1563 | 0.85947 | 246.4 | 40.4 | 68 | 49.6 |
| 22.73139 | 89.05342 | 40.48298 | 337.2686 | 0.94658 | 246.4 | 40.5 | 68.2 | 49.5 |
| n=6 | | | | | | | | |
| Rutile H3 | | | | | | | | |
| 90.50491 | 41.93939 | 78.58595 | 269.4951 | 48.06061 | 104.7 | 40.8 | 8 | 7.7 |
| 9.570971 | 64.54711 | 43.64289 | 350.429 | 25.45289 | 238 | 38.5 | 104.6 | 40.9 |
| 90.0639 | 42.27741 | 78.93021 | 269.9361 | 47.72259 | 104.7 | 41.2 | 8.1 | 7.5 |
| 90.46178 | 41.94901 | 78.51736 | 269.5382 | 48.05099 | 104.8 | 40.8 | 8.1 | 7.7 |
| n=4 | | | | | | | | |
| Rutile I1 | | | | | | | | |
| 118.5228 | 101.9466 | 54.05192 | 61.4772 | 11.9466 | 167.3 | 52.4 | 322.8 | 35 |
| 118.2366 | 101.7198 | 54.14133 | 61.7634 | 11.7198 | 167.4 | 52.6 | 323.3 | 34.9 |
| 118.5228 | 101.9466 | 54.05192 | 61.4772 | 11.9466 | 167.3 | 52.4 | 322.8 | 35 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 118.4295 | 101.9098 | 54.15812 | 61.5705 | 11.9098 | 167.4 | 52.5 | 323 | 34.9 |
| 118.3553 | 101.5801 | 54.849 | 61.6447 | 11.5801 | 167.3 | 53.2 | 323.5 | 34.4 |
| 118.7321 | 101.7931 | 54.51791 | 61.2679 | 11.7931 | 167.2 | 52.9 | 322.9 | 34.6 |
| 118.3223 | 102.1033 | 54.06741 | 61.6777 | 12.1033 | 167.7 | 52.4 | 322.9 | 35 |
| 118.3632 | 102.1176 | 54.10038 | 61.6368 | 12.1176 | 167.6 | 52.4 | 322.9 | 35 |
| n=8 | | | | | | | | |
| Rutile I2 | | | | | | | | |
| 74.31461 | 143.1741 | 16.33306 | 105.6854 | 53.1741 | 208.9 | 8.9 | 305.8 | 35 |
| 73.91105 | 143.0158 | 15.83563 | 106.089 | 53.0158 | 208.8 | 9.5 | 305.6 | 35.3 |
| 74.35376 | 143.212 | 16.19175 | 105.6462 | 53.212 | 208.6 | 9.7 | 305.5 | 35 |
| 74.27326 | 142.9184 | 16.56202 | 105.7267 | 52.9184 | 209 | 10 | 306.1 | 35.2 |
| 74.75224 | 143.4106 | 16.90431 | 105.2478 | 53.4106 | 208.8 | 10 | 305.9 | 34.7 |
| 74.38381 | 143.1511 | 16.28133 | 105.6162 | 53.1511 | 208.7 | 9.8 | 305.6 | 35.1 |
| n=6 | | | | | | | | |
| n total =60 | | | | | | | | |

SAMPLE BAK-03-023 Thin section

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rutile 1 | | | | | | | | |
| 142.7548 | 54.40325 | 61.52254 | 217.2452 | 35.59675 | 80.3 | 46.4 | 324.4 | 22.6 |
| 149.7751 | 53.22787 | 59.12716 | 210.2249 | 36.77213 | 75.1 | 43.3 | 319.8 | 24.3 |
| 142.8539 | 54.19117 | 61.44462 | 217.1461 | 35.80883 | 80 | 45.3 | 324.7 | 22.9 |
| 149.7242 | 53.47144 | 59.39502 | 210.2758 | 36.52856 | 75 | 43.7 | 319.6 | 24.2 |
| 142.8266 | 54.25002 | 61.50732 | 217.1734 | 35.74998 | 80 | 45.4 | 324.7 | 22.8 |
| 149.6522 | 53.40952 | 59.05867 | 210.3478 | 36.59048 | 75.4 | 43.4 | 319.9 | 24.5 |
| n=6 | | | | | | | | |
| Rutile 2 | | | | | | | | |
| 153.6907 | 127.9057 | 80.02396 | 26.3093 | 37.9057 | 190.3 | 51.1 | 290.1 | 7.8 |
| 153.7261 | 127.9059 | 80.07937 | 26.2739 | 37.9059 | 190.4 | 51.1 | 290.1 | 7.7 |
| 9.002694 | 164.3621 | 29.97942 | 170.9973 | 74.3621 | 290 | 7.8 | 21.9 | 13.4 |
| 9.568763 | 164.2576 | 30.40156 | 170.4312 | 74.2576 | 289.8 | 8 | 11.5 | 14.6 |
| 153.6056 | 127.8932 | 79.89566 | 26.3944 | 37.8932 | 190.2 | 51.1 | 290.1 | 7.9 |
| 153.8144 | 128.0529 | 80.10029 | 26.1856 | 38.0529 | 190.4 | 51 | 290 | 7.7 |
| 153.7186 | 128.0336 | 80.1361 | 26.2814 | 38.0336 | 190.5 | 51 | 290.1 | 7.7 |
| 153.7202 | 127.9361 | 80.06263 | 26.2798 | 37.9361 | 190.4 | 51.1 | 290.1 | 7.7 |
| n=8 | | | | | | | | |
| Rutile 3 | | | | | | | | |
| 112.7471 | 100.1178 | 8.126531 | 67.2529 | 10.1178 | 158.6 | 8.1 | 286.3 | 76.9 |
| 112.7957 | 100.1327 | 8.276687 | 67.2043 | 10.1327 | 158.6 | 8.2 | 286.5 | 76.9 |
| 171.0551 | 90.80823 | 11.80555 | 8.9449 | 0.80823 | 99 | 11.8 | 274.6 | 78.2 |
| n=3 | | | | | | | | |
| n total = 17 | | | | | | | | |

SAMPLE BAK-03-026 Chip

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rutile F2 | | | | | | | | |
| 112.0596 | 59.5271 | 20.34672 | 247.9404 | 30.4729 | 147.2 | 16.3 | 31.7 | 54 |
| 111.8536 | 59.66483 | 20.72441 | 248.1464 | 30.33517 | 147.2 | 17.7 | 31.3 | 53.9 |
| 112.1393 | 59.4459 | 20.65897 | 247.8607 | 30.5541 | 146.9 | 17.7 | 31.2 | 53.8 |
| 112.0162 | 59.73181 | 20.00667 | 247.9838 | 30.26819 | 147.5 | 17.1 | 32 | 54.3 |
| 112.5268 | 59.82853 | 20.06268 | 247.4732 | 30.17147 | 147 | 17.2 | 31.4 | 54.4 |
| 112.1481 | 59.65508 | 20.49988 | 247.8519 | 30.34492 | 147.1 | 17.6 | 31.2 | 54 |
| n=6 | | | | | | | | |
| Rutile F3 | | | | | | | | |
| 36.65616 | 57.51504 | 34.66964 | 323.3438 | 32.48496 | 212.9 | 28.6 | 91.1 | 44 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 36.85107 | 57.35893 | 34.66668 | 323.1489 | 32.64107 | 212.6 | 28.5 | 91 | 43.9 |
| 36.89931 | 57.50921 | 34.59799 | 323.1007 | 32.49079 | 212.7 | 28.6 | 90.9 | 44 |
| 36.77477 | 57.51918 | 34.69099 | 323.2252 | 32.48082 | 212.7 | 28.6 | 90.9 | 44 |
| 36.78641 | 57.26024 | 34.49592 | 323.2136 | 32.73976 | 212.7 | 28.4 | 91.3 | 44 |
| n=5 | | | | | | | | |
| Rutile H1 | | | | | | | | |
| 80.74273 | 5.590915 | 74.03996 | 279.2573 | 84.40909 | 115.3 | 5.3 | 25.1 | 1.6 |
| 80.90339 | 5.296171 | 74.10898 | 279.0966 | 84.70383 | 115 | 5 | 24.9 | 1.5 |
| 79.75009 | 5.406539 | 75.36528 | 280.2499 | 84.59346 | 114.9 | 5.1 | 24.8 | 1.5 |
| 78.48571 | 5.341347 | 76.10491 | 281.5143 | 84.65865 | 115.5 | 5.1 | 25.3 | 1.4 |
| 78.98367 | 5.599398 | 76.11024 | 281.0163 | 84.4006 | 115 | 5.3 | 24.8 | 1.4 |
| 82.04745 | 5.505002 | 73.07421 | 277.9526 | 84.495 | 114.9 | 5.2 | 24.8 | 1.7 |
| n=6 | | | | | | | | |
| Rutile I1 | | | | | | | | |
| 126.9033 | 60.41966 | 4.281624 | 233.0967 | 29.58034 | 140.9 | 3.7 | 44.4 | 60.2 |
| 126.5922 | 60.21414 | 4.345379 | 233.4078 | 29.78586 | 141.2 | 3.7 | 44.7 | 60 |
| 126.5295 | 60.54247 | 4.497102 | 233.4705 | 29.45753 | 141.2 | 3.9 | 44.3 | 60.3 |
| 126.7285 | 60.26652 | 4.242458 | 233.2715 | 29.73348 | 141.1 | 3.7 | 44.7 | 60.1 |
| 126.2279 | 60.34559 | 4.618888 | 233.7721 | 29.65441 | 141.1 | 4 | 44.4 | 60.1 |
| 126.5431 | 60.20604 | 4.296041 | 233.4569 | 29.79396 | 141.3 | 3.7 | 44.8 | 60 |
| n=6 | | | | | | | | |
| Rutile I2 | | | | | | | | |
| 61.15653 | 48.67572 | 17.84573 | 298.8435 | 41.32428 | 196.8 | 13.2 | 92.8 | 45.7 |
| 61.06247 | 48.63298 | 17.6967 | 298.9375 | 41.36702 | 196.9 | 13.1 | 93.1 | 45.7 |
| 61.12448 | 48.58127 | 17.70117 | 298.8755 | 41.41873 | 196.9 | 13.1 | 93.1 | 45.7 |
| 131.1529 | 164.7055 | 59.36536 | 48.8471 | 74.7055 | 197.2 | 11.2 | 288.7 | 7.7 |
| 60.82329 | 48.71212 | 17.67772 | 299.1767 | 41.28788 | 197.2 | 13.1 | 93.3 | 45.8 |
| 131.7953 | 164.6997 | 60.0265 | 48.2047 | 74.6997 | 197.3 | 13.3 | 289.1 | 7.5 |
| 132.0433 | 164.8022 | 59.85248 | 47.9567 | 74.8022 | 197 | 13.2 | 288.7 | 7.4 |
| n=7 | | | | | | | | |
| Rutile K1 | | | | | | | | |
| 171.1943 | 57.1943 | 85.7708 | 188.8057 | 32.8057 | 16.6 | 56.8 | 281 | 3.6 |
| 171.1944 | 57.18378 | 85.62812 | 188.8056 | 32.81622 | 16.8 | 56.8 | 281.1 | 3.7 |
| 171.2171 | 57.25351 | 85.64797 | 188.7829 | 32.74649 | 16.8 | 56.9 | 281.1 | 3.7 |
| 170.936 | 57.37568 | 85.91858 | 189.064 | 32.62432 | 16.6 | 57.1 | 281.2 | 3.5 |
| 171.0654 | 57.23673 | 85.7142 | 188.9346 | 32.76327 | 16.8 | 56.9 | 281.2 | 3.7 |
| 171.4381 | 57.09584 | 85.46354 | 188.5619 | 32.90416 | 16.8 | 56.8 | 280.9 | 3.8 |
| n=6 | | | | | | | | |
| Rutile K2 | | | | | | | | |
| 79.26475 | 73.09165 | 32.00117 | 280.7353 | 16.90835 | 180.3 | 30.4 | 35.6 | 54.3 |
| 79.13024 | 73.14472 | 32.05393 | 280.8698 | 16.85528 | 180.5 | 30.5 | 35.5 | 54.2 |
| 79.16012 | 73.04586 | 31.83804 | 280.8399 | 16.95414 | 180.4 | 30.2 | 35.9 | 54.4 |
| 79.11113 | 73.11677 | 31.94767 | 280.8889 | 16.88323 | 180.5 | 30.4 | 35.7 | 54.3 |
| 79.2565 | 73.11307 | 31.93087 | 280.7435 | 16.88693 | 180.3 | 30.3 | 35.6 | 54.4 |
| 79.20571 | 73.06017 | 31.79497 | 280.7943 | 16.93983 | 180.5 | 30.2 | 35.8 | 54.4 |
| 79.26239 | 73.17515 | 31.92227 | 280.7376 | 16.82485 | 180.4 | 30.3 | 35.5 | 54.4 |
| n=7 | | | | | | | | |
| Rutile L1 | | | | | | | | |
| 28.91265 | 158.002 | 21.23055 | 151.0874 | 68.002 | 260.9 | 7.9 | 352.8 | 20.3 |
| 29.12429 | 158.0379 | 21.32123 | 150.8757 | 68.0379 | 260.8 | 7.9 | 353.7 | 20.3 |
| 28.86918 | 158.0482 | 21.24866 | 151.1308 | 68.0482 | 260.9 | 7.9 | 252.8 | 20.3 |
| 28.79043 | 157.9535 | 20.97246 | 151.2096 | 67.9535 | 260.7 | 7.8 | 353.6 | 20.4 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 28.73647 | 158.0822 | 20.92032 | 151.2635 | 68.0822 | 260.8 | 7.8 | 353.7 | 20.3 |
| 28.9044 | 157.8696 | 21.12694 | 151.0956 | 67.8696 | 260.8 | 7.9 | 353.7 | 20.5 |
| 28.97912 | 157.9651 | 21.17048 | 151.0209 | 67.9651 | 260.7 | 7.9 | 353.6 | 20.4 |
| n=7 | | | | | | | | |
| Rutile M1 | | | | | | | | |
| 1.66559 | 94.94377 | 52.38524 | 178.3344 | 4.94377 | 274.5 | 52.1 | 84.4 | 37.5 |
| 1.81993 | 94.97472 | 52.58048 | 178.1801 | 4.97472 | 274.5 | 52.3 | 84.3 | 37.2 |
| 1.808148 | 94.95488 | 52.46416 | 178.1919 | 4.95488 | 274.5 | 52.2 | 84.3 | 37.4 |
| 1.694578 | 94.95303 | 52.4725 | 178.3054 | 4.95303 | 274.5 | 52.2 | 84.4 | 37.4 |
| 1.761406 | 95.01795 | 52.41066 | 178.2386 | 5.01795 | 274.5 | 52.1 | 84.3 | 37.5 |
| 1.375497 | 94.9159 | 52.53657 | 178.6245 | 4.9159 | 274.8 | 52.3 | 84.7 | 37.3 |
| n=6 | | | | | | | | |
| Rutile S1 | | | | | | | | |
| 36.84874 | 133.3206 | 13.06385 | 143.1513 | 43.3206 | 242.2 | 9.6 | 341.9 | 45 |
| 36.72669 | 133.3031 | 13.12393 | 143.2733 | 43.3031 | 242.3 | 9.6 | 342.1 | 45 |
| 36.55088 | 133.2325 | 12.99527 | 143.4491 | 43.2325 | 242.3 | 9.5 | 341.9 | 45.2 |
| 36.68503 | 133.2657 | 13.2593 | 143.315 | 43.2657 | 242.4 | 9.7 | 342.2 | 45 |
| 36.42175 | 133.2566 | 13.24372 | 143.5783 | 43.2566 | 242.7 | 9.7 | 342.6 | 45 |
| 36.79069 | 133.3544 | 13.2046 | 143.2093 | 43.3544 | 242.3 | 9.6 | 342 | 45 |
| 36.67385 | 133.4349 | 13.13443 | 143.3262 | 43.4349 | 242.3 | 9.5 | 342 | 44.9 |
| 36.62888 | 133.3492 | 12.91035 | 143.3711 | 43.3492 | 242.3 | 9.4 | 341.9 | 45 |
| n=8 | | | | | | | | |
| Rutile S2 | | | | | | | | |
| 54.73631 | 161.228 | 77.18922 | 125.2637 | 71.228 | 291.8 | 18.4 | 23.1 | 4 |
| 57.12631 | 161.3782 | 79.38077 | 122.8737 | 71.3782 | 291.7 | 18.4 | 22.8 | 3.3 |
| 55.10781 | 161.3178 | 77.75406 | 124.8922 | 71.3178 | 292 | 18.3 | 23.3 | 3.8 |
| 55.10734 | 161.1219 | 77.67907 | 124.8927 | 71.1219 | 291.9 | 18.5 | 23.2 | 3.9 |
| 55.07186 | 161.0949 | 77.37877 | 124.9281 | 71.0949 | 291.5 | 18.5 | 22.9 | 4 |
| 55.29136 | 160.9351 | 77.3598 | 124.7086 | 70.9351 | 291.3 | 18.7 | 22.7 | 4 |
| 56.24815 | 161.2852 | 78.40562 | 123.7519 | 71.2852 | 291.6 | 18.4 | 22.8 | 3.6 |
| 55.40529 | 160.9872 | 77.95985 | 124.5947 | 70.9872 | 291.9 | 18.7 | 23.2 | 3.8 |
| n=8 | | | | | | | | |
| n total = 72 | | | | | | | | |

SAMPLE BAK-03-303A Chip

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rutile J1 | | | | | | | | |
| 12.59216 | 119.9569 | 75.64767 | 167.4078 | 29.9569 | 320.2 | 57.2 | 70 | 12.4 |
| 12.13339 | 120.4293 | 75.86802 | 167.8666 | 30.4293 | 321.5 | 56.8 | 70.5 | 12.1 |
| 12.13067 | 120.1577 | 75.60501 | 167.8693 | 30.1577 | 320.8 | 57 | 70.5 | 12.3 |
| 12.07379 | 120.3038 | 75.89533 | 167.9262 | 30.3038 | 321.3 | 57 | 70.6 | 12.1 |
| 12.38116 | 120.2959 | 75.86918 | 167.6188 | 30.2959 | 321 | 57 | 70.3 | 12.1 |
| 12.4965 | 120.1109 | 75.41808 | 167.5035 | 30.1109 | 320 | 56.9 | 70 | 12.5 |
| 12.45526 | 120.4092 | 75.96109 | 167.5447 | 30.4092 | 321 | 56.9 | 70.2 | 12.1 |
| n=7 | | | | | | | | |
| Rutile J2 | | | | | | | | |
| 155.1569 | 84.55051 | 28.03544 | 204.8431 | 5.44949 | 111.8 | 27.8 | 304.8 | 61.5 |
| 155.137 | 84.60342 | 27.95565 | 204.863 | 5.39658 | 111.9 | 27.8 | 304.7 | 61.6 |
| 155.2184 | 84.64281 | 28.04219 | 204.7816 | 5.35719 | 111.8 | 27.9 | 304.5 | 61.5 |
| 155.1029 | 84.56669 | 27.94976 | 204.8971 | 5.43331 | 111.9 | 27.8 | 304.8 | 61.6 |
| 155.1327 | 84.45372 | 28.08524 | 204.8673 | 5.54628 | 111.8 | 28 | 304.9 | 61.4 |
| n=5 | | | | | | | | |
| Rutile K1 | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 29.64649 | 58.63442 | 3.948253 | 330.3535 | 31.36558 | 238.2 | 3.4 | 142.7 | 58.5 |
| 29.64649 | 58.63442 | 3.948253 | 330.3535 | 31.36558 | 238.2 | 3.4 | 142.7 | 58.5 |
| 28.84475 | 58.80957 | 4.633967 | 331.1553 | 31.19043 | 238.7 | 3.9 | 142.2 | 58.6 |
| 29.44782 | 59.29899 | 4.564826 | 330.5522 | 30.70101 | 238.2 | 3.9 | 141.6 | 59.1 |
| 29.25184 | 58.93454 | 4.569995 | 330.7482 | 31.06546 | 238.3 | 3.8 | 142 | 58.7 |
| 29.2952 | 58.7461 | 4.498637 | 330.7048 | 31.2539 | 238.3 | 3.8 | 142.1 | 58.6 |
| 29.42394 | 58.94875 | 4.508417 | 330.5761 | 31.05125 | 238.2 | 3.8 | 141.8 | 58.8 |
| 29.23565 | 59.02878 | 4.52811 | 330.7644 | 30.97122 | 238.4 | 3.9 | 142 | 58.8 |
| n=8 | | | | | | | | |
| Rutile L1 | | | | | | | | |
| 154.8229 | 57.62556 | 64.08524 | 205.1771 | 32.37444 | 67.3 | 49.4 | 309.7 | 21.7 |
| 154.7129 | 57.59632 | 64.1176 | 205.2871 | 32.40368 | 67.4 | 49.4 | 309.8 | 21.7 |
| 154.5894 | 57.71813 | 64.18756 | 205.4106 | 32.28187 | 67.5 | 49.5 | 309.8 | 21.7 |
| 154.8251 | 57.62885 | 64.08982 | 205.1749 | 32.37115 | 67.3 | 49.4 | 309.7 | 21.7 |
| 154.5421 | 57.71494 | 64.11947 | 205.4579 | 32.28506 | 67.6 | 49.5 | 309.9 | 21.7 |
| 154.7408 | 57.65874 | 64.03027 | 205.2592 | 32.34126 | 67.5 | 49.4 | 309.8 | 21.8 |
| 154.7373 | 57.56274 | 64.06966 | 205.2627 | 32.43726 | 67.4 | 49.3 | 309.8 | 21.7 |
| n=7 | | | | | | | | |
| Rutile L2 | | | | | | | | |
| 154.5156 | 57.63666 | 64.33271 | 205.4844 | 32.36334 | 67.3 | 49.5 | 309.8 | 21.5 |
| 11.94552 | 90.87244 | 17.86356 | 168.0545 | 0.87244 | 259.3 | 17.9 | 75 | 72.1 |
| 11.94552 | 90.87244 | 17.86356 | 168.0545 | 0.87244 | 259.3 | 17.9 | 75 | 72.1 |
| 11.86184 | 90.89583 | 17.72738 | 168.1382 | 0.89583 | 258.3 | 17.7 | 75 | 72.3 |
| 11.84485 | 90.88794 | 17.7094 | 168.1552 | 0.88794 | 258.4 | 17.8 | 76.1 | 72.2 |
| 11.98679 | 90.86234 | 17.83753 | 168.0132 | 0.86234 | 258.2 | 17.8 | 75 | 72.2 |
| 11.87284 | 90.89425 | 17.70768 | 168.1272 | 0.89425 | 258.3 | 17.7 | 75 | 72.3 |
| 11.96367 | 90.90176 | 17.81587 | 168.0363 | 0.90176 | 258.2 | 17.8 | 74.9 | 72.2 |
| 12.08344 | 90.95641 | 17.75225 | 167.9166 | 0.95641 | 258.1 | 17.7 | 64.6 | 72.2 |
| n=9 | | | | | | | | |
| Rutile T1 | | | | | | | | |
| 36.05445 | 40.28765 | 12.88013 | 323.9456 | 49.71235 | 224 | 8.2 | 127.2 | 39.2 |
| 36.05445 | 40.28765 | 12.88013 | 323.9456 | 49.71235 | 224 | 8.2 | 127.2 | 39.2 |
| 35.96965 | 40.29427 | 13.13964 | 324.0304 | 49.70573 | 223.9 | 8.4 | 127 | 39.1 |
| 36.19132 | 40.23867 | 13.02962 | 323.8087 | 49.76133 | 223.7 | 8.3 | 126.9 | 39.1 |
| 36.14735 | 40.26552 | 12.80742 | 323.8527 | 49.73448 | 224 | 8.2 | 127.2 | 39.2 |
| 36.01339 | 40.19612 | 13.09089 | 323.9866 | 49.80388 | 223.9 | 8.3 | 127 | 39 |
| 35.96794 | 40.23286 | 13.16673 | 324.0321 | 49.76714 | 223.8 | 8.4 | 127 | 39.1 |
| n=7 | | | | | | | | |
| Rutile Z1 | | | | | | | | |
| 46.42739 | 46.3355 | 10.32184 | 313.5726 | 43.6645 | 216.3 | 7.4 | 118.8 | 45.5 |
| 46.50594 | 46.38942 | 9.854986 | 313.4941 | 43.61058 | 216.6 | 7.1 | 119.3 | 45.6 |
| 46.47236 | 46.4461 | 10.26768 | 313.5276 | 43.5539 | 216.3 | 7.3 | 118.8 | 45.6 |
| 46.58801 | 46.29984 | 9.6184 | 313.412 | 43.70016 | 216.7 | 6.9 | 119.6 | 45.6 |
| 46.53477 | 46.31232 | 10.02009 | 313.4652 | 43.68768 | 216.4 | 7.2 | 119.1 | 45.5 |
| 46.01068 | 46.22452 | 10.3237 | 313.9893 | 43.77548 | 216.7 | 7.4 | 119.2 | 45.4 |
| 46.52918 | 46.48352 | 10.26726 | 313.4708 | 43.51648 | 216.3 | 7.4 | 118.7 | 7.4 |
| 46.40608 | 46.27471 | 10.02377 | 313.5939 | 43.72529 | 216.6 | 7.2 | 119.2 | 45.5 |
| 46.42891 | 46.31737 | 9.996992 | 313.5711 | 43.68263 | 216.5 | 7.2 | 119.2 | 45.5 |
| n=9 | | | | | | | | |
| n total = 52 | | | | | | | | |

# APPENDIX C

## Mircoprobe analyses with weight percent oxides and cations and pyroxene classification.

*Analyses with low weight % totals and SiO2 <50% are most likely amphibole.

| **sample** | BAK-03-001 K | | | | | |
|---|---|---|---|---|---|---|
| | rim | rim | amphibole | amphibole | amphibole | core |
| **No.** | 21 | 22 | 23 | 24 | 25 | 26 |
| $SiO_2$ | 51.77 | 51.54 | 45.421 | 43.759 | 44.223 | 50.824 |
| $TiO_2$ | 0.23 | 0.19 | 1.056 | 1.021 | 0.933 | 0.172 |
| $Al_2O_3$ | 3.85 | 3.70 | 11.916 | 13.184 | 13.147 | 8.046 |
| FeO | 7.61 | 7.54 | 11.991 | 12.434 | 12.38 | 7.712 |
| MnO | 0.03 | 0.04 | 0.035 | 0.007 | 0 | 0.032 |
| MgO | 13.87 | 14.03 | 14.21 | 13.522 | 13.362 | 11.057 |
| CaO | 21.89 | 22.34 | 11.64 | 11.692 | 11.866 | 19.473 |
| $K_2O$ | 0.00 | 0.00 | 0.08 | 0.115 | 0.096 | 0 |
| $Na_2O$ | 1.15 | 1.13 | 2.112 | 2.459 | 2.368 | 2.637 |
| $Li_2O$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| ZnO | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| NiO | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| $Cr_2O_3$ | 0.04 | 0.10 | 0.08 | 0.08 | 0.13 | 0.10 |
| $Sc_2O_3$ | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Si | 1.895 | 1.883 | 1.679 | 1.619 | 1.635 | 1.857 |
| Ti | 0.006 | 0.005 | 0.029 | 0.028 | 0.026 | 0.005 |
| Al (T) | 0.105 | 0.117 | 0.321 | 0.381 | 0.365 | 0.143 |
| Al (M1) | 0.062 | 0.042 | 0.198 | 0.194 | 0.207 | 0.204 |
| $Fe^{3+}$ (T) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| $Fe^{3+}$ (M1) | 0.111 | 0.143 | 0.214 | 0.305 | 0.272 | 0.113 |
| $Fe^{2+}$ | 0.122 | 0.088 | 0.157 | 0.080 | 0.110 | 0.123 |
| Mn | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 | 0.001 |
| Mg | 0.757 | 0.764 | 0.783 | 0.746 | 0.736 | 0.602 |
| Ca | 0.859 | 0.874 | 0.461 | 0.463 | 0.470 | 0.762 |
| K | 0.000 | 0.000 | 0.004 | 0.005 | 0.005 | 0.000 |
| Na | 0.082 | 0.080 | 0.151 | 0.176 | 0.170 | 0.187 |
| Li | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Zn | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Ni | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Cr | 0.001 | 0.003 | 0.002 | 0.002 | 0.004 | 0.003 |
| Sc | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Total** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** |
| **Group** | **Quad** | **Quad** | **Quad** | **Ca-Na** | **Ca-Na** | **Ca-Na** |
| **Prefix** | **aluminian ferrian** | **aluminian ferrian** | **aluminian ferrian sodian subsilicic** | **subsilicic** | **subsilicic** | |
| **pyroxene** | **diopside** | **diopside** | **augite** | **aegirine-augite** | **aegirine-augite** | **omphacite** |
| enstatite | 40.93 | 40.86 | 48.46 | ---------- | ---------- | ---------- |
| ferrosillite | 12.64 | 12.38 | 23.01 | ---------- | ---------- | ---------- |
| wollastonite | 46.43 | 46.76 | 28.53 | ---------- | ---------- | ---------- |
| jadeite | ---------- | ---------- | ---------- | 8.34 | 8.86 | 12.91 |
| aegirine | ---------- | ---------- | ---------- | 13.15 | 11.64 | 7.17 |
| Quad | ---------- | ---------- | ---------- | 78.51 | 79.50 | 79.92 |

BAK-03-001 K - cont.

| rim 27 | core 28 | core 29 | core 30 | rim 31 | rim 32 | rim 33 |
|---|---|---|---|---|---|---|
| 50.736 | 51.512 | 51.3 | 51.264 | 50.517 | 50.438 | 50.211 |
| 0.111 | 0.195 | 0.145 | 0.217 | 0.211 | 0.392 | 0.42 |
| 7.745 | 8.842 | 8.819 | 9.092 | 6.944 | 5.63 | 5.625 |
| 12.97 | 8.686 | 7.728 | 7.535 | 7.37 | 7.774 | 8.011 |
| 0.066 | 0 | 0.036 | 0.057 | 0.019 | 0.04 | 0.011 |
| 13.165 | 10.555 | 10.192 | 10.399 | 11.933 | 12.831 | 13.361 |
| 13.117 | 17.477 | 17.89 | 18.327 | 21.086 | 21.878 | 21.22 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2.457 | 3.294 | 3.548 | 3.239 | 1.905 | 1.418 | 1.303 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.05 | 0.11 | 0.08 | 0.09 | 0.08 | 0.12 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.857 | 1.869 | 1.872 | 1.865 | 1.851 | 1.846 | 1.840 |
| 0.003 | 0.005 | 0.004 | 0.006 | 0.006 | 0.011 | 0.012 |
| 0.143 | 0.131 | 0.128 | 0.135 | 0.149 | 0.154 | 0.160 |
| 0.191 | 0.247 | 0.251 | 0.254 | 0.150 | 0.089 | 0.083 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.120 | 0.103 | 0.117 | 0.095 | 0.120 | 0.142 | 0.143 |
| 0.277 | 0.161 | 0.119 | 0.134 | 0.106 | 0.096 | 0.103 |
| 0.002 | 0.000 | 0.001 | 0.002 | 0.001 | 0.001 | 0.000 |
| 0.718 | 0.571 | 0.554 | 0.564 | 0.652 | 0.700 | 0.730 |
| 0.514 | 0.679 | 0.699 | 0.714 | 0.828 | 0.858 | 0.833 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.174 | 0.232 | 0.251 | 0.228 | 0.135 | 0.101 | 0.093 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.002 | 0.003 | 0.002 | 0.003 | 0.002 | 0.003 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** |
| **Quad** | **Ca-Na** | **Ca-Na** | **Ca-Na** | **Quad** | **Quad** | **Quad** |
| **aluminian ferrian sodian** | | | | **aluminian ferrian sodian** | **aluminian ferrian sodian** | **aluminian ferrian** |
| **augite** | **omphacite** | **omphacite** | **omphacite** | **diopside** | **diopside** | **diopside** |
| 44.02 | ---------- | ---------- | ---------- | 38.21 | 38.95 | 40.35 |
| 24.45 | ---------- | ---------- | ---------- | 13.27 | 13.31 | 13.59 |
| 31.52 | ---------- | ---------- | ---------- | 48.52 | 47.74 | 46.06 |
| ---------- | 17.46 | 18.27 | 17.78 | ---------- | ---------- | ---------- |
| ---------- | 7.27 | 8.51 | 6.66 | ---------- | ---------- | ---------- |
| ---------- | 75.27 | 73.22 | 75.55 | ---------- | ---------- | ---------- |

BAK-03-001 R

| | core | core | core | core | rim | core | core |
|---|---|---|---|---|---|---|---|
| | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
| | 51.582 | 51.64 | 51.835 | 51.022 | 50.783 | 52.332 | 52.25 |
| | 0.513 | 0.52 | 0.491 | 0.518 | 0.64 | 0.551 | 0.551 |
| | 9.566 | 9.58 | 9.54 | 9.7 | 4.605 | 9.383 | 9.449 |
| | 6.77 | 6.63 | 6.532 | 6.345 | 8.242 | 6.853 | 6.992 |
| | 0.381 | 0.36 | 0.374 | 0.374 | 0.395 | 0.377 | 0.362 |
| | 10.647 | 10.67 | 10.745 | 10.761 | 13.823 | 10.983 | 10.527 |
| | 17.028 | 17.43 | 17.081 | 17.243 | 20.992 | 16.739 | 16.995 |
| | 0.072 | 0.09 | 0.081 | 0.081 | 0.09 | 0.081 | 0.09 |
| | 3.993 | 4.17 | 4.16 | 4.178 | 1.201 | 3.874 | 3.893 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 0.75 | 0.80 | 0.76 | 0.75 | 0.82 | 0.79 | 0.78 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | 1.846 | 1.835 | 1.846 | 1.826 | 1.845 | 1.862 | 1.864 |
| | 0.014 | 0.014 | 0.013 | 0.014 | 0.017 | 0.015 | 0.015 |
| | 0.154 | 0.165 | 0.154 | 0.174 | 0.155 | 0.138 | 0.136 |
| | 0.249 | 0.236 | 0.246 | 0.235 | 0.042 | 0.256 | 0.261 |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | 0.133 | 0.166 | 0.147 | 0.180 | 0.139 | 0.097 | 0.093 |
| | 0.070 | 0.031 | 0.047 | 0.010 | 0.111 | 0.107 | 0.116 |
| | 0.012 | 0.011 | 0.011 | 0.011 | 0.012 | 0.011 | 0.011 |
| | 0.568 | 0.565 | 0.570 | 0.574 | 0.749 | 0.583 | 0.560 |
| | 0.653 | 0.664 | 0.652 | 0.661 | 0.817 | 0.638 | 0.650 |
| | 0.003 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 |
| | 0.277 | 0.287 | 0.287 | 0.290 | 0.085 | 0.267 | 0.269 |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | 0.021 | 0.022 | 0.021 | 0.021 | 0.024 | 0.022 | 0.022 |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** |
| | **Ca-Na** | **Ca-Na** | **Ca-Na** | **Ca-Na** | **Quad** | **Ca-Na** | **Ca-Na** |
| | **chromian** | **chromian** | **chromian** | **chromian** | **aluminian chromian ferrian** | **chromian** | **chromian** |
| | **omphacite** | **omphacite** | **omphacite** | **omphacite** | **augite** | **omphacite** | **omphacite** |
| | ---------- | ---------- | ---------- | ---------- | 40.95 | ---------- | ---------- |
| | ---------- | ---------- | ---------- | ---------- | 14.36 | ---------- | ---------- |
| | ---------- | ---------- | ---------- | ---------- | 44.69 | ---------- | ---------- |
| | 19.60 | 18.38 | 19.51 | 17.98 | ---------- | 20.79 | 21.31 |
| | 10.43 | 12.95 | 11.64 | 13.79 | ---------- | 7.92 | 7.58 |
| | 69.97 | 68.67 | 68.85 | 68.23 | ---------- | 71.29 | 71.10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| BAK-03-001 R- cont. | | | | | BAK-03-026 F | |
| core | core | rim | core | core | rim | rim |
| 43 | 44 | 45 | 46 | 47 | 48 | 49 |
| 51.151 | 51.252 | 49.602 | 51.449 | 50.21 | 52.74 | 51.24 |
| 0.575 | 0.543 | 0.575 | 0.543 | 0.471 | 0.08 | 0.14 |
| 9.486 | 9.479 | 7.02 | 9.088 | 8.974 | 3.23 | 4.97 |
| 6.733 | 7.402 | 8.384 | 7.171 | 7.564 | 7.93 | 8.35 |
| 0.418 | 0.366 | 0.41 | 0.418 | 0.38 | 0.08 | 0.07 |
| 10.728 | 10.519 | 12.832 | 11.166 | 10.916 | 13.09 | 11.48 |
| 17.63 | 17.142 | 19.203 | 17.371 | 17.409 | 20.02 | 20.69 |
| 0.09 | 0.081 | 0.115 | 0.09 | 0.081 | 0.01 | 0.01 |
| 3.948 | 3.515 | 1.665 | 3.033 | 2.735 | 1.45 | 2.02 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.82 | 0.80 | 0.85 | 0.83 | 0.82 | 0.04 | 0.11 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.826 | 1.848 | 1.813 | 1.857 | 1.847 | 1.969 | 1.906 |
| 0.015 | 0.015 | 0.016 | 0.015 | 0.013 | 0.002 | 0.004 |
| 0.174 | 0.152 | 0.187 | 0.143 | 0.153 | 0.031 | 0.094 |
| 0.225 | 0.251 | 0.116 | 0.243 | 0.235 | 0.111 | 0.124 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.168 | 0.095 | 0.133 | 0.059 | 0.063 | 0.019 | 0.104 |
| 0.033 | 0.129 | 0.124 | 0.158 | 0.169 | 0.229 | 0.156 |
| 0.013 | 0.011 | 0.013 | 0.013 | 0.012 | 0.002 | 0.002 |
| 0.571 | 0.565 | 0.699 | 0.601 | 0.598 | 0.729 | 0.636 |
| 0.674 | 0.662 | 0.752 | 0.672 | 0.686 | 0.801 | 0.824 |
| 0.004 | 0.004 | 0.005 | 0.004 | 0.004 | 0.001 | 0.001 |
| 0.273 | 0.246 | 0.118 | 0.212 | 0.195 | 0.105 | 0.145 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.023 | 0.023 | 0.025 | 0.024 | 0.024 | 0.001 | 0.003 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** |
| **Ca-Na** | **Ca-Na** | **Quad** | **Ca-Na** | **Ca-Na** | **Quad** | **Quad** |
| **chromian** | **chromian** | **aluminian chromian ferrian sodian** | **chromian** | **chromian** | **aluminian sodian** | **aluminian ferrian sodian** |
| **omphacite** | **omphacite** | **augite** | **omphacite** | **omphacite** | **diopside** | **diopside** |
| ---------- | ---------- | 40.65 | ---------- | ---------- | 40.95 | 36.94 |
| ---------- | ---------- | 15.64 | ---------- | ---------- | 14.05 | 15.21 |
| ---------- | ---------- | 43.72 | ---------- | ---------- | 45.00 | 47.85 |
| 17.15 | 19.32 | ---------- | 18.44 | 16.68 | ---------- | ---------- |
| 12.80 | 7.28 | ---------- | 4.45 | 4.48 | ---------- | ---------- |
| 70.05 | 73.40 | ---------- | 77.11 | 78.85 | ---------- | ---------- |

| BAK-03-026 F- cont. | | | | | BAK-03-030A J | |
|---|---|---|---|---|---|---|
| core | rim | rim | rim | rim | core | core |
| 51 | 52 | 53 | 54 | 55 | 11 | 12 |
| 50.862 | 50.363 | 51.175 | 51.175 | 51.248 | 51.56 | 50.98 |
| 0.114 | 0.183 | 0.132 | 0.132 | 0.165 | 0.23 | 0.19 |
| 6.579 | 4.971 | 6.141 | 6.141 | 5.982 | 9.14 | 8.97 |
| 7.87 | 8.414 | 7.877 | 7.877 | 8.088 | 5.76 | 5.59 |
| 0.062 | 0.096 | 0.078 | 0.078 | 0.106 | 0.06 | 0.00 |
| 10.257 | 11.987 | 11.292 | 11.292 | 11.321 | 10.82 | 11.29 |
| 17.956 | 21.102 | 20.087 | 20.087 | 20.154 | 18.66 | 19.45 |
| 0.03 | 0.013 | 0.013 | 0.013 | 0.013 | 0.00 | 0.00 |
| 3.35 | 1.559 | 2.497 | 2.497 | 2.44 | 3.16 | 2.77 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.15 | 0.11 | 0.08 | 0.08 | 0.07 | 0.07 | 0.07 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.910 | 1.881 | 1.888 | 1.888 | 1.889 | 1.880 | 1.863 |
| 0.003 | 0.005 | 0.004 | 0.004 | 0.005 | 0.006 | 0.005 |
| 0.090 | 0.119 | 0.112 | 0.112 | 0.111 | 0.120 | 0.137 |
| 0.201 | 0.100 | 0.155 | 0.155 | 0.148 | 0.273 | 0.249 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.122 | 0.118 | 0.127 | 0.127 | 0.126 | 0.055 | 0.071 |
| 0.125 | 0.145 | 0.116 | 0.116 | 0.123 | 0.120 | 0.099 |
| 0.002 | 0.003 | 0.002 | 0.002 | 0.003 | 0.002 | 0.000 |
| 0.574 | 0.667 | 0.621 | 0.621 | 0.622 | 0.588 | 0.615 |
| 0.722 | 0.845 | 0.794 | 0.794 | 0.796 | 0.729 | 0.761 |
| 0.001 | 0.001 | 0.001 | 0.001 | 0.001 | 0.000 | 0.000 |
| 0.244 | 0.113 | 0.179 | 0.179 | 0.174 | 0.223 | 0.196 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.005 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** |
| **Ca-Na** | **Quad** | **Quad** | **Quad** | **Quad** | **Ca-Na** | **Ca-Na** |
| | **aluminian ferrian sodian** | **aluminian ferrian sodian** | **aluminian ferrian sodian** | **aluminian ferrian sodian** | | |
| **omphacite** | **diopside** | **diopside** | **diopside** | **diopside** | **omphacite** | **omphacite** |
| ---------- | 37.54 | 37.40 | 37.40 | 37.24 | ---------- | ---------- |
| ---------- | 14.95 | 14.78 | 14.78 | 15.12 | ---------- | ---------- |
| ---------- | 47.50 | 47.82 | 47.82 | 47.64 | ---------- | ---------- |
| 15.91 | ---------- | ---------- | ---------- | ---------- | 19.71 | 16.33 |
| 9.64 | ---------- | ---------- | ---------- | ---------- | 4.00 | 4.67 |
| 74.46 | ---------- | ---------- | ---------- | ---------- | 76.29 | 79.01 |

BAK-03-030A J- cont.

| core 13 | rim 14 | core 15 | core 16 | core 17 | rim 18 | rim 19 |
|---|---|---|---|---|---|---|
| 51.184 | 50.192 | 51.987 | 52.037 | 52.252 | 51.152 | 50.109 |
| 0.225 | 0.305 | 0.241 | 0.175 | 0.13 | 0.146 | 0.212 |
| 8.752 | 5.496 | 8.916 | 9.105 | 8.886 | 4.225 | 6.579 |
| 6.028 | 7.07 | 5.668 | 5.471 | 5.328 | 6.646 | 6.655 |
| 0.033 | 0.043 | 0.059 | 0.001 | 0.033 | 0.059 | 0.043 |
| 11.129 | 13.548 | 10.85 | 11.047 | 11.217 | 13.931 | 12.679 |
| 19.254 | 21.595 | 18.487 | 18.526 | 18.421 | 22.318 | 21.495 |
| 0 | 0.025 | 0 | 0 | 0 | 0 | 0 |
| 2.858 | 1.166 | 3.291 | 3.314 | 3.429 | 0.996 | 1.448 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.07 | 0.12 | 0.11 | 0.01 | 0.03 | 0.02 | 0.04 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.869 | 1.849 | 1.892 | 1.888 | 1.893 | 1.886 | 1.849 |
| 0.006 | 0.008 | 0.007 | 0.005 | 0.004 | 0.004 | 0.006 |
| 0.131 | 0.151 | 0.108 | 0.112 | 0.107 | 0.114 | 0.151 |
| 0.245 | 0.088 | 0.274 | 0.278 | 0.272 | 0.070 | 0.135 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.074 | 0.126 | 0.050 | 0.057 | 0.068 | 0.107 | 0.106 |
| 0.110 | 0.092 | 0.123 | 0.109 | 0.093 | 0.098 | 0.099 |
| 0.001 | 0.001 | 0.002 | 0.000 | 0.001 | 0.002 | 0.001 |
| 0.606 | 0.744 | 0.589 | 0.598 | 0.606 | 0.766 | 0.697 |
| 0.753 | 0.852 | 0.721 | 0.720 | 0.715 | 0.882 | 0.850 |
| 0.000 | 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.202 | 0.083 | 0.232 | 0.233 | 0.241 | 0.071 | 0.104 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.002 | 0.004 | 0.003 | 0.000 | 0.001 | 0.001 | 0.001 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** |
| **Ca-Na** | **Quad** | **Ca-Na** | **Ca-Na** | **Ca-Na** | **Quad** | **Quad** |
| | **aluminian ferrian** | | | | **aluminian ferrian** | **aluminian ferrian sodian** |
| **omphacite** | **diopside** | **omphacite** | **omphacite** | **omphacite** | **diopside** | **diopside** |
| ---------- | 40.98 | ---------- | ---------- | ---------- | 41.30 | 39.76 |
| ---------- | 12.07 | ---------- | ---------- | ---------- | 11.15 | 11.79 |
| ---------- | 46.95 | ---------- | ---------- | ---------- | 47.55 | 48.45 |
| 16.61 | ---------- | 20.73 | 20.43 | 20.30 | ---------- | ---------- |
| 4.99 | ---------- | 3.76 | 4.21 | 5.11 | ---------- | ---------- |
| 78.41 | ---------- | 75.51 | 75.37 | 74.59 | ---------- | ---------- |

| | | | | | | |
|---|---|---|---|---|---|---|
| | BAK-03-030A L | | | | | |
| rim | core | core | core | core | amphibole | core |
| 20 | 1 | 2 | 3 | 4 | 5 | 6 |
| 50.164 | 53.10 | 53.24 | 52.895 | 51.968 | 44.604 | 52.21 |
| 0.345 | 0.15 | 0.15 | 0.142 | 0.227 | 1.726 | 0.18 |
| 6.237 | 8.64 | 8.67 | 8.681 | 8.574 | 11.371 | 8.76 |
| 6.655 | 4.72 | 4.72 | 4.99 | 5.508 | 11.049 | 5.07 |
| 0.059 | 0.00 | 0.00 | 0 | 0.031 | 0.054 | 0.05 |
| 12.657 | 11.05 | 11.26 | 11.228 | 11.48 | 14.105 | 11.14 |
| 21.686 | 17.60 | 17.51 | 17.991 | 19.116 | 11.745 | 18.72 |
| 0.014 | 0.00 | 0.00 | 0 | 0 | 0.286 | 0.00 |
| 1.422 | 4.03 | 3.89 | 3.653 | 2.961 | 2.049 | 3.31 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 0.09 | 0.11 | 0.07 | 0.06 | 0.10 | 0.22 | 0.06 |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 1.852 | 1.921 | 1.924 | 1.914 | 1.885 | 1.672 | 1.897 |
| 0.010 | 0.004 | 0.004 | 0.004 | 0.006 | 0.049 | 0.005 |
| 0.148 | 0.079 | 0.076 | 0.086 | 0.115 | 0.328 | 0.103 |
| 0.124 | 0.290 | 0.294 | 0.284 | 0.251 | 0.174 | 0.272 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.104 | 0.060 | 0.045 | 0.049 | 0.057 | 0.199 | 0.052 |
| 0.101 | 0.082 | 0.098 | 0.102 | 0.110 | 0.147 | 0.102 |
| 0.002 | 0.000 | 0.000 | 0.000 | 0.001 | 0.002 | 0.002 |
| 0.697 | 0.596 | 0.607 | 0.606 | 0.621 | 0.788 | 0.603 |
| 0.858 | 0.682 | 0.678 | 0.697 | 0.743 | 0.472 | 0.729 |
| 0.001 | 0.000 | 0.000 | 0.000 | 0.000 | 0.014 | 0.000 |
| 0.102 | 0.282 | 0.273 | 0.256 | 0.208 | 0.149 | 0.233 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.003 | 0.003 | 0.002 | 0.002 | 0.003 | 0.007 | 0.002 |
| 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** | **4.000** |
| **Quad** | **Ca-Na** | **Ca-Na** | **Ca-Na** | **Ca-Na** | **Quad** | **Ca-Na** |
| **aluminian ferrian sodian** | | | | | **aluminian ferrian sodian subsilicic** | |
| **diopside** | **omphacite** | **omphacite** | **omphacite** | **omphacite** | **augite** | **omphacite** |
| 39.54 | ---------- | ---------- | ---------- | ---------- | 49.02 | ---------- |
| 11.77 | ---------- | ---------- | ---------- | ---------- | 21.65 | ---------- |
| 48.69 | ---------- | ---------- | ---------- | ---------- | 29.33 | ---------- |
| ---------- | 24.28 | 24.54 | 22.80 | 17.96 | ---------- | 20.61 |
| ---------- | 5.06 | 3.74 | 3.92 | 4.07 | ---------- | 3.94 |
| ---------- | 70.66 | 71.72 | 73.27 | 77.97 | ---------- | 75.45 |

| BAK-03-030A L- cont. | | | |
|---|---|---|---|
| rim | amphibole | rim | core |
| 7 | 8 | 9 | 10 |
| 50.25 | 44.782 | 51.479 | 51.71 |
| 0.17 | 0.773 | 0.184 | 0.142 |
| 5.44 | 11.795 | 3.263 | 8.437 |
| 6.49 | 10.999 | 6.574 | 5.575 |
| 0.06 | 0.019 | 0.031 | 0.055 |
| 13.60 | 14.429 | 14.922 | 11.52 |
| 22.11 | 11.805 | 21.948 | 19.38 |
| 0.01 | 0.267 | 0.039 | 0 |
| 1.04 | 1.967 | 0.787 | 2.825 |
| 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 |
| 0.00 | 0.00 | 0.00 | 0.00 |
| 0.15 | 0.26 | 0.13 | 0.03 |
| 0.00 | 0.00 | 0.00 | 0.00 |
| 1.855 | 1.674 | 1.899 | 1.882 |
| 0.005 | 0.022 | 0.005 | 0.004 |
| 0.145 | 0.326 | 0.101 | 0.118 |
| 0.091 | 0.194 | 0.041 | 0.244 |
| 0.000 | 0.000 | 0.000 | 0.000 |
| 0.114 | 0.223 | 0.102 | 0.065 |
| 0.086 | 0.120 | 0.101 | 0.105 |
| 0.002 | 0.001 | 0.001 | 0.002 |
| 0.748 | 0.804 | 0.821 | 0.625 |
| 0.874 | 0.473 | 0.868 | 0.756 |
| 0.000 | 0.013 | 0.002 | 0.000 |
| 0.074 | 0.143 | 0.056 | 0.199 |
| 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 |
| 0.000 | 0.000 | 0.000 | 0.000 |
| 0.004 | 0.008 | 0.004 | 0.001 |
| 0.000 | 0.000 | 0.000 | 0.000 |
| **4.000** | **4.000** | **4.000** | **4.000** |
| **Quad** | **Quad** | **Quad** | **Ca-Na** |
| **aluminian ferrian** | **aluminian ferrian sodian subsilicic** | **aluminian ferrian** | |
| **diopside** | **augite** | **diopside** | **omphacite** |
| 41.02 | 49.59 | 43.38 | ---------- |
| 11.08 | 21.24 | 10.77 | ---------- |
| 47.91 | 29.16 | 45.85 | ---------- |
| ---------- | ---------- | ---------- | 16.71 |
| ---------- | ---------- | ---------- | 4.45 |
| ---------- | ---------- | ---------- | 78.84 |

# APPENDIX D

## Crystallographic axes orientation determined from Euler rotation data and the geographic corrections applied to the Lick Ridge eclogite clinopyroxene.

**The a*(100) notation**

The [100] axis is not perpendicular to the b-c plane due to the monoclinic nature of the clinopyroxene, (Figure D1). Euler rotations require the α, β and γ crystallographic angles to be 90°. Therefore the cpx [100] is not appropriate for use with Euler rotations and the pole to <100>, which is annotated a*(100) and is ~15-18° from [100], must be used (Figure D1).

**Euler Rotations**

The trend and plunge of each LPO data point was determined before the effect of the post-Taconic fold could be removed and a regional trend could become apparent. The Channel5 software provides the LPO as three Euler rotations, φ1, Φ and φ2. The crystal lattice is rotated from an initial orientation that is common to each data point and each sample. The initial orientation places the [001] perpendicular to the surface of the sample. The [010] is parallel to the long side of the section and the a*(100) is parallel to the short side. This is true in this study because the long side of the slide was parallel to the SEM chamber floor after the sample was tilted 70°.

The φ1 rotation rotates the a*(100) and the [010] axis counter-clockwise around [001] (Figure D2). Φ is a counter-clockwise rotation about the a*(100) axis. The final rotation, φ2, is counter-clockwise about [001]. Using the Euler rotations the trend and plunge can be determined for each crystallographic axis.

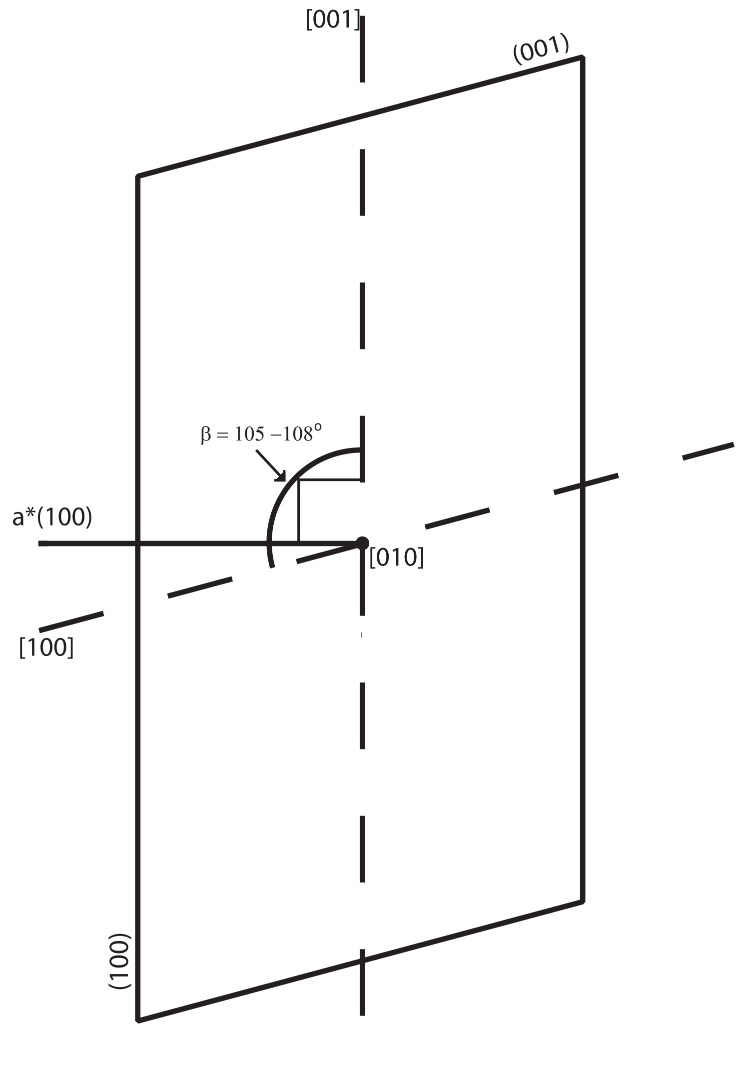


Figure D1: The monoclinic nature of cpx. A β angle of 105-108 degrees requires the use of the normal to the (100) plane rather the the [100] axes for EBSD analysis and data manipulation.

**[001]-axis**

The trend and plunge of the c-axis can be determined geometrically. The φ2 rotation is about the c-axis and therefore its final orientation is affected by φ1 and Φ only (Figure D2). The c-axis trend, $t_c$, is determined according to the following:

$$\text{if } \Phi < 90^\circ \text{ then } t_c = 360 - \varphi 1 \quad (1a)$$

or

$$\text{if } \Phi > 90^\circ \text{ then } t_c = 180 - \varphi 1 \quad (1b)$$

The plunge of the c-axis, pc, is the angle between the lower hemisphere great circle and the c-axis after the Φ rotation., or:

$$p_c = 90 - \Phi \quad (2)$$

**a*(100) axes**

The a*(100) axis is not affected by the Φ rotation. To determine the trend and plunge of this axis ($t_a$ and $p_a$) first rotated the axis counter-clockwise about the c-axis:

$$\text{if } \varphi 1 < 90^\circ \text{ then } t_{a\varphi 1} = 90 - \varphi 1 \quad (3a)$$

or

$$\text{if } \varphi 1 > 90^\circ \text{ then } t_{a\varphi 1} = 360 - (\varphi 1 - 90) \quad (3b)$$

and

$$p_{a\varphi 1} = 0^\circ$$

where $t_{a\varphi 1}$ and $p_{a\varphi 1}$ are the trend and plunge, respectively, of the a*(100) axis after the φ1 rotation.

To determine $t_a$ and $p_a$, $t_{a\varphi 1}$ and $p_{a\varphi 1}$ must be rotated counter-clockwise about the c-axis with the $t_c$ and $p_c$ orientation by an angle equal to the φ2 rotation. This is best done in a stereonet program following the following rules:

if φ1 < 90° then φ2 is negative (a counter-clockwise rotation)
if φ1 > 90° then φ2 is positive (a clockwise rotation).

**[010] axis**

The b-axis is perpendicular to the plane containing the c and a*(100) axes. Using the trends and plunges of these two axes, the orientation of the b-axis can be calculated using direction cosines.

1) Convert $t_c$, $p_c$, $t_a$ and $p_a$ to the direction cosines $l_c$, $m_c$, $n_c$, $l_a$, $m_a$, and $n_a$. With θ equal to the trend, φ equal to the plunge and r is one on a unit sphere:

$$l = (\cos\theta)(\cos\varphi) \text{ or } l = (\cos \mathrm{t}_{c/a})(\cos \mathrm{p}_{c/a}) \quad (4a)$$

$$m = (\sin\theta)(\cos\varphi) \text{ or } m = (\sin \mathrm{t}_{c/a})(\cos \mathrm{p}_{c/a}) \quad (4b)$$

$$n = (\sin\varphi) \text{ or } n = (\sin \mathrm{p}_{c/a}) \quad (4c)$$

2) The cross product is:

$$[001] \times a^*(100) = \begin{bmatrix} l_b & m_b & n_b \\ l_c & m_c & n_c \\ l_a & m_a & n_a \end{bmatrix} \quad (5)$$

The determinant of eq. 5 is

$$l_b = m_c n_a - n_c m_a \quad (6a)$$

$$m_b = n_c l_a - l_c n_a \quad \text{and} \quad (6b)$$

$$n_b = l_c m_a - m_c l_a \quad (6c)$$

3) Determine the plunge of [010], $p_b$ by solving equation 4c for p:

$$p_b = \sin^{-1} n_b$$

4) Solve for $t_b$ by rearranging either 4a or 4b:

$$\mathrm{t}_b = \cos^{-1}\left(\frac{l_b}{\cos \mathrm{p}_b}\right) \quad \text{or} \quad (4b)$$

$$\mathrm{t}_b = \sin^{-1}\left(\frac{m_b}{\cos \mathrm{p}_b}\right) \quad (4c)$$

# Tinkertoy Model

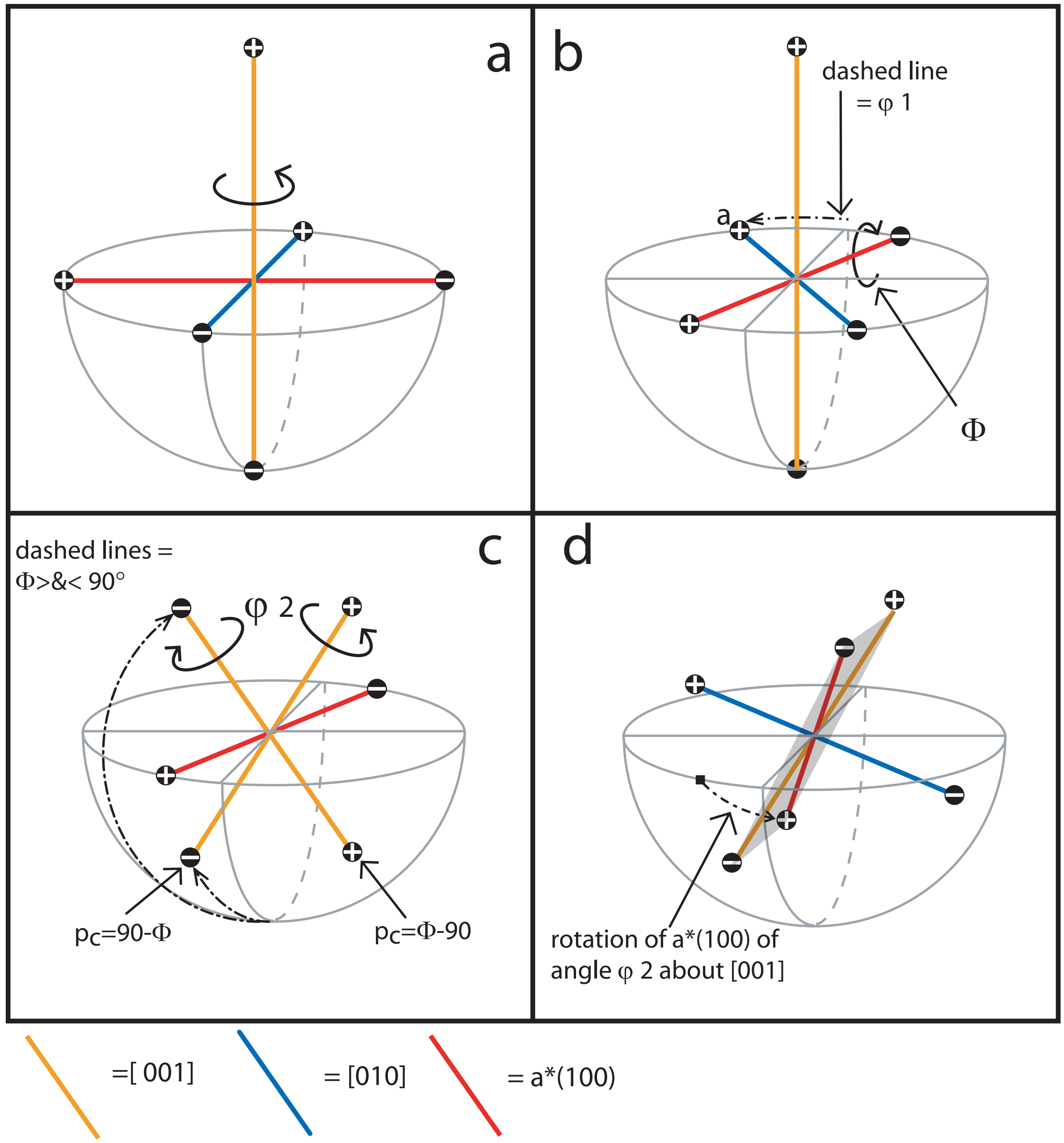


Figure D2: A "Tinkertoy" model to illustrate the handling of the Euler rotations to recreate the lower hemisphere plot generated by the Channel5 software. All the gray "bowls" represent the equal area lower hemisphere projections. **a**) The initial orientation of the axes. φ1 rotates a*(100) and [010] about the [001] axis. **b**) Orientation of a*(100) and [010] after φ1. The trend of [001] will be parallel to [010] trending either towards point A or B. If $\Phi < 90°$ than $t_c$ = A and if $\Phi > 90°$ than $t_c$ = B. Φ rotates [010] and [001] about a*(100) clockwise. **c**) The omission of [010] is intentional to demonstrate the two possible scenarios of [001] after Φ. If the negative end of [001] plunges into the southern hemisphere plot than φ2 will be counterclockwise about the -[001] axis. If the positive end plunges into the plot than φ2 will rotate a*(100) and [010] in a clockwise direction about the + [001] axis. **d**) The final rotation (φ2) will cause the a*(100) pole to rotate off of the primitive. The normal to the plane containing a*(100) and [001], shaded, is the [010] axis. It is this perpendicular relationship that enables the use of direction cosines.

**Geographic and foliation corrections**

The data from samples BAK-03-026 will be used to demonstrate the method to place the axes in true geographic orientations and then subtract the affect of the post-Taconic synform. The steps are identical for each sample. An oriented sample was taken from an eclogite body and the foliation of the outcrop was measured while in the field. Two faces were cut perpendicular to each other and to the foliation as lineations were not apparent. The orientations of these cut faces were determined from the strike and dip measured in the field so that the long side of the thin section was cut parallel to the strike of the face. One face was chosen based on the relative amounts of omphacite (or lack of retrogression) evident. The long axis of the BAK-03-026 slide trends 142° and the short side plunges 61° (Figure D3).

- Rotation 1: Rotate the data to align the long axis to its proper place in geographic space. The long axis of the slide strikes 90°. This, however, is arbitrary as long as the appropriate corrections are applied to the strike and dip of the sample. For example the true strike of the long axis of the slide is 142°. Therefore, the LPO data must be rotated 52°, or 142° minus 90°, clockwise about a vertical axis.
- Rotation 2: Then rotate the data to its proper dip in geographic space about a horizontal axis parallel to the trend. For example, BAK-03-026: 61° was rotated clockwise about a horizontal axis trending 142°.

The final rotation corrects for the post-Taconian synform evident in the structure data. The foliation of the outcrop from which BAK-03-026 was collected has a strike of 290° and a dip of 62° as measured in the field.

- Rotate the data about a horizontal axis parallel to the strike of the foliation at an angle equal to the dip of the foliation.  BAK-03-026 was rotated 62° counter clockwise about a horizontal axis trending 290°.

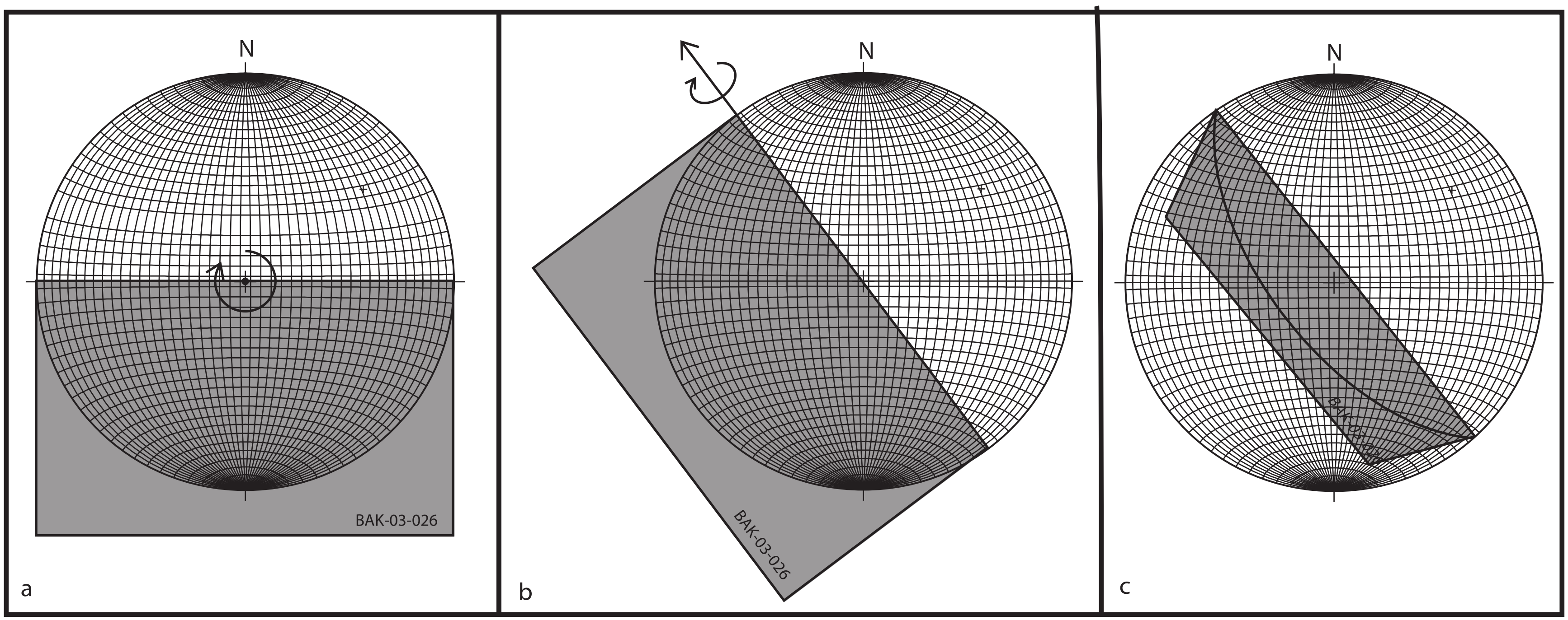


Figure D3:  Geographic correction for BAK-03-026 as an example. The shaded rectangle represents the surface of the sample.  **a**) the initial orientation of BAK-03-026 as related to the LPO data given by the Channel5 software.  The arrow shows the first rotation about a vertical axis which aligns the samples trend (long edge) with the actual trend on the lower hemisphere, equal area net.  **b**) After the first rotation the trend is oriented correctly in geographic space, The second rotation swings the plane of the sample down from horizontal about the axis shown at an angle equal to the surface's dip. **c**) The final orientation of the sample in space and the trace of the sample's surface with the lower hemisphere plot.

# APPENDIX E

## Petrographic descriptions of Thin Sections

## BAK-03-001 through BAK-03-036

## 1 Thin Section Petrography Description

UNC Sample #: BAK-03-001(a) Petrographer: K. Syvertsen
Lab Sample #: OJL-01 Date: 07-10-03

| Orientation and comments: | 219 / 75 |
|---|---|

### Location:

Quadrangle: Bakersville UTM: zone 17 398521E 3986719N

| Description: Discovery outcrop- along Redwood road |
|---|

### Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~50%** | Mottled, intermingled plagioclase (mainly fined grained). A few areas may be approaching a symplectic texture. The pyroxene is pale green and not pleochroic under PPL. Under crossed nicols the grains display up to first order pink interference colors. Most of the cpx displaces well defined cleavage in one direction. The plagioclase inclusions tend to be elongate, aligned parallel to the foliation. In the more mottled areas, distinct grain boundaries are distinguishable under crossed polars. A second grain type, displaying two cleavage directions is also present. It may be a pyroxene because the cleavages are at a nearly 90 degree angle one each other and it is green, but non-pleochroic. It also tends to have similar optical properties under crossed polars with less plagioclase inclusions. Any garnet/pyroxene interface is separated with a thin, twinned plagioclase rim. |
| **Garnet ~30%** | Grains 1-3 mm. Relatively inclusion free except for some rutile which is distributed throughout the section. Grains are highly fractured which are all oriented mainly NNE-SSW with truncated perpendicular fractures. The edges are undulatory due to the breakdown to plagioclase and amphibole. |
| **Amphibole 5-10%** | The darker green color-light green &/or brown pleochroism distinguishes the amphibole from the cpx under ppl and has a lower maximum interference color (1st order orange rather than 2$^{nd}$ order red) in crossed polarized light. The mineral is not widespread in this slide and is mainly restricted to the south-east and north-west corner and as a mantle around garnet grains (inter-grown with plagioclase at times). CPX tends to grade into amphibole on occasion. An increase in the frequency of the amphibole may be coincident with an increase in the amount of rutile. |
| **Quartz ~5%** | The largest grains are up to 0.8mm and are anhedral with few inclusions. Most contain subgrains and exhibit undulatory extinction. These quartz, and those throughout all the slides, have higher than usual birefringence under crossed-polars. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo 1(6X mag), 3(5.5X mag), 106 (7.5 X mag)

| 2 mottled cpx |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-002(b)  Petrographer: K. Syvertsen
Lab Sample #: OJL-02  Date: 07-10-03

| Orientation and comments: | N 7 ________________ cut face was glued<br>92OH |
|---|---|

## Location:

Quadrangle: Bakersville  UTM: zone 17 396664 E 3986833N

| Description: Across from the white house with a metal roof, up road ¼ mile from discovery outcrop. Sample taken from waste level on the left edge of the exposure. |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~40%** | Very light green to clear grains are heavily mottled with plagioclase. Few, if any, coherent omphacite is present. Hornblende retrogression is evident on the edges of the cpx as well as within the pyroxene masses. The hornblende is not optically continuous with the cpx. |
| **Garnet ~30%** | Most garnets are subhedral with embayed edges caused by a breakdown to plagioclase and hornblende. They contain a large amount of inclusions of quartz, feldspar, rutile, and zircon/apatite that tend to be oriented perpendicular to the fractures. The fractures tend N-S with weaker fractures perpendicular. Many grains are nearly inclusion free or too degraded to contain any inclusions. Rims are thick plagioclase and hornblende. Breakdown rxns seem to pull apart the grains. |
| **Amphibole ~10%** | Some large, coherent grains present. If amphibole grains are in contact with cpx the contacts are not well defined. At least two different compositions are present; bright green → light brown pleochroic with a lack of well defined cleavage and brown → dark green pleochroic with cleavage in one or two directions. |
| **Plagioclase ~20%** | Very abundant in this sample. Pinched out albite and pericline twinning prevalent. Plagioclase present as 1) small inclusions in garnets, 2) large coherent grains that permeate into the center of the garnet from outside the grain 3) thick garnet rims 4) intermingled with hbd in or out of contact with garnet 5) exsolution lamellie. All plagioclase except 5 show concentric zoning |
| **Quartz** trace | A minor phase, present only as garnet inclusions. Very little quartz found in matrix on the west side of the slide. |

### Additional comments including textures, structures and/or microstructures present:

Pyroxene foliation not as well defined as BAK-03-001
Plagioclase near south-east corner contains odd, fine, cubic inclusions that are arranged in lineations.
Bulk rock foliation may be too course to see in thin section.

**Associated photo files:** 4, 105 (1.25 X mag)

2 mottled cpx

# Thin Section Petrography Description

UNC Sample #: Bak-03-003(b) Petrographer: K. Syvertsen
Lab Sample #: OJL-03 Date: 07-11-03

Orientation and comments: 7 ________________ strike is not labeled on the slide
85OH

## Location:

Quadrangle: Bakersville UTM: zone 17 398450E 3988858N

Description: Within ridge, not a roadside sample.

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 40-45%** | Poikilitic with few pristine grains. Most grains grade to a less jadeite composition from core to rim. |
| **Garnet 20-30%** | Grains are up to 3mm in diameter. Some have plagioclase or quartz cores. Most grains are rimmed by plagioclase with an outer halo of hornblende. Less frequently these two minerals are intermingled. Two fracture directions are present, oriented NW-SE and NE-SW. |
| **Amphibole ~10%** | Confined to a) garnet rims in association with plagioclase and b) reaction textures with cpx. There are few individual amphibole grains present. |
| **Plagioclase ~10%** | Present as reaction rims around garnet and exsolved from cpx. The plagioclase rims tend to be thin unless the garnet has been severely retrograded. Twinning includes albite &/or carlsbad twinning most common in grains adjacent to garnet. |
| **Quartz 5-10%** | Anhedral quartz blobs are located throughout the matrix. Subgrain development may be oriented parallel to fractures in garnets. |
| **Accessories** | Rutile and zircon are present in moderate abundance throughout the matrix and within the garnets. |

**Additional comments including textures, structures and/or microstructures present:** West to east omphacite foliation is most well defined on the west side of the slide.

**Associated photo files:** Photo 5 (shows 2 cleavage directions) 6 and 7. All 5 ½ mag

**1** 

# Thin Section Petrography Description

UNC Sample #: BAK-03-004(a)   Petrographer: K. Syvertsen
Lab Sample #: OJL-04   Date: 07-11-03

| Orientation and comments: | N $\frac{280}{68}$ |
|---|---|

## Location:

Quadrangle: Bakersville   UTM: zone 17 398414E 3988918N

| Description: |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 35-40%** | Many well preserved grains present. These are all light green in PPL. The remainder of the cpx is less green and poikilitic. These also a tendency for these to grade to a less jadeite composition towards the rim. A thin film of plagioclase generally separates any two adjacent cpx grains. |
| **Garnet 30-40%** | Most are between 1-2mm in diameter and have thin rims of plagioclase and hornblende. Fractures generally trend NE-SW with a second set oriented NNW-SSE. Most garnets have lost little structural integrity with retrograde reactions confined to the rims. Euhedral fine zircon inclusions are generally confined to the core of the garnet and many may have a preferred orientation. |
| **Amphibole ~15%** | Present as isolated pockets scattered throughout the slide. Distinct grains tend to be enclosed in plagioclase. Reaction textures directly with cpx are not as abundant as in other samples. At least two types of amphibole are present; 1) Light green → pale green pleochroic w/one distinct cleavage direction and 2) Dark green → brown pleochroic w/two distinct cleavage directions. |
| **Quartz ~2%** | Minor amounts of quartz present. Undulatory extinction and subgrain growth evident. |
| **Feldspar ~5%** | All grains are < 4mm. Most are intermingled with amphibole around garnets and w/in cpx. |
| **Accessories** | Zircon seems to be confines to garnets. Rutile is present through to slide, but not abundant. |

## Additional comments including textures, structures and/or microstructures present:

Clinopyroxene foliation generally NW↔SE, which is (nearly?) parallel to the garnet fractures in the hand sample.

**Associated photo files:** Photo 8 (5 ¾ magnified), 9 (7X mag), 10 (4X mag), 11 (2½X mag)- two cpx cleavage directions present.

# 1 Thin Section Petrography Description

UNC Sample #: BAK-03-005(a)  Petrographer: K. Syvertsen
Lab Sample #: OJL-05  Date: 07-11-03

| Orientation and comments: 103 / 40 |
|---|
| Orientation in field was difficult due to size and shape of the hand sample. |

## Location:

Quadrangle: Bakersville  UTM: zone 17 398258E 3988698N

| Description: |
|---|
| Waterfall Outcrop |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~15-20%** | Coherent and poikilitic grains present. Many grains appear “shattered.” Plagioclase exsolutions are not abundant. Foliation is generally oriented NE-SW. The “shattered” cpx tend to grade toward a more diopside pyroxene toward the edges. The more coherent grains may have this retrogressed cpx within the grains. |
| **Garnet ~60-70%** | The north half of the slide is highly concentrated with 1-1½ mm garnets. Two fracture directions present, NW-SE and NNE-SSW. Most garnets are heavily included with zircon, quartz, and feldspar. Several have cores of a fine grained, highly birefringent material. The larger garnets in the southern half of the slide contain more prismatic rutile that are concentrated in the garnet cores. The southern half of the slide appears to be more affected by retrogression than the northern half. The plagioclase/hornblende garnet rims are thicker in the south than the north. |
| **Amphibole ~2-3%%** | Not a major phase in this sample. Present as fin grained surrounding garnet along with plagioclase and/or surrounding cpx grains. It is generally bright green and pleochroic and most easily distinguished from cpx by a difference in interference colors under crossed polars. |
| **Feldspar ~2-3%** | Limited in the north to thin garnet rims. Rare albite twins present. In the south, present as hornblende symplectite or rimmed by hornblende, around garnets. |
| **Quartz ~5%** | Amorphous grains usually nestled between other grains. Subgrain development and undulatory extinction present. |
| **Accessories** | Irregularly shaped apatite scatter in abundance throughout slide between other phases. Mainly in north half. |

**Associated photo files:** Photo 12 (5½X mag), 13 (5X mag) & 14 contained 2 grains (5¾X mag)

| 3 hbld rich some cpx |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-006(b)T    Petrographer: K. Syvertsen
Lab Sample #: OJL-06    Date: 07-11-03

| Orientation and comments: N _______________ 281 ← incorrect on slide (not 182) 0 |
|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17 398094E 3988616N

| Description: Upslope from nearby path. There is more pristine eclogite to the west of this outcrop |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene** | Few coherent omphacite grains are present with sharp grain boundaries. They are surrounded by less coherent cpx or amphibole. These grains do not appear zoned. Poikilitic cpx is rare, but the "shattered" variety is abundant. |
| **Garnet ~35%** | Very inclusion free. Some contain rutile inclusions. One set of fractures is foliation parallel, NW-SE, and a second set of fractures is oriented N-S. The grains are subhedral with a thin rind of plagioclase. |
| **Amphibole** | This slide is highly retrogressed in the NE corner where amphibole is the dominant phase and garnet & cpx are nearly completely gone. Otherwise amphibole is present as larger, dark brown, pleochroic grains. |
| **Plagioclase ~5%** | The plagioclase is only present as thin garnet rims expect in the NE corner. Where nearly complete retrogression has taken place, plagioclase/amphibole symplectite has replaced the garnets. |
| **Quartz ~10%** | Numerous small (≤ 1mm), anhedral grains exhibit undulatory extinction and subgrain growth. |
| **Accessory** | Fine grain, round rutile are scattered throughout the slide. |

**Additional comments including textures, structures and/or microstructures present:**

Garnet defined foliation obvious in slide running NW↔SE

**Associated photo files:** Photo 51 (2¼X mag), 52 (6X mag), 53 (5X mag), & 54 (3½X mag)

| 3 poik. CPX |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-007(a)  Petrographer: K. Syvertsen
Lab Sample #: OJL-07  Date: 07-25-03

| Orientation and comments: | N _______________ 46<br>79 |
|---|---|

## Location:

Quadrangle: Bakersville  UTM: zone 17 397967E 3988728N

| Description: Question if this block is in place |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~20%** | Most grains are poikilitic although a few coherent cpx grains are present. The cpx tends to grade to a more diopsidic composition at the grain rim. |
| **Garnet 30-35%** | Distinct fractures are oriented ENE-WSW and NNW-SSE. Garnets contain inclusions of fine grained zircon, rutile and quartz that tend to be concentrated in the garnet cores. Some inclusions may form linear or circular patterns. Garnets are rimmed with plagioclase which is then surrounded by hornblende. Hornblende only touches the garnet as “fingers” through the plagioclase. At these locations the garnets tend to be embayed. |
| **Amphibole ~20%** | Present as bright green pleochroic grains that either surround cpx or as individual green → brown pleochroic grains. |
| **Plagioclase 10-15%** | Thin but well developed symplectic rims around garnets, wormy inclusions into hornblende and exsolved from cpx. Albite twinning is prevalent in the garnet rimming plagioclase. |
| **Quartz 5-10%** | Concentrated into foliation parallel <1mm long grains. Subgrain growth is extensive. |

**Associated photo files:** Photo 15 (7½X mag), 16 (10X mag)

4 mottled

# Thin Section Petrography Description

UNC Sample #: Bak-03-008(a) Petrographer: K. Syvertsen
Lab Sample #: OJL-08 Date: 07-28-03

Orientation and comments: N ______________ 43
not 84 as is on the slide→54

## Location:

Quadrangle: Bakersville UTM: zone 17 397886E 3988661N

Description: Very large (30M high) outcrop

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 25-30%** | Nearly 100% of the cpx is of the light brown "shattered" variety. The above map shows the location of the few isolated grains of more coherent omphacite. |
| **Garnet ~30%** | Large, 3mm sized, highly fractured grains. Fractures are oriented NE-SE. They contain inclusions of zircon, rutile and plagioclase. Garnets are rimmed by plagioclase, or plagioclase/hornblende symplectite. |
| **Amphibole 25-30%** | Most occurs as symplectite with plagioclase. Also present as large, coherent lt. green → brown pleochroic grains. One well-defined cleavage direction is oriented NE-SW. |
| **Plagioclase ~5%** | Not abundant in this sample. Present with hornblende as symplectite rims around garnets. Twinning is not profuse, but most of the plagioclase are concentrically zoned. |
| **Quartz 5-10%** | Present as irregular, rounded <1mm grains. Concentric extinction is prevalent |
| **Accessory** | Rutile is plentiful throughout this sample as large, ~1mm irregularly shaped grains within the matrix as well as small, <0.1mm, rounded grain within the matrix and garnet inclusions. Zircon is also present in this sample. |

**Additional comments including textures, structures and/or microstructures present:**

Garnet fractures visible w/out a microscope

**Associated photo files:** none

## 1 Thin Section Petrography Description

UNC Sample #: BAK-03-009(a)  Petrographer: K. Syvertsen
Lab Sample #: OJL-05  Date: 07-11-03

| Orientation and comments: | N 57 311 |
|---|---|

## Location:

Quadrangle: Bakersville  UTM: zone 17 397795E 3988678N

| Description: Massive outcrop |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~35%** | Both coherent and poikilitic grains present, although the latter is more abundant. Both regress into a less jadeite rich composition at the edges. |
| **Garnet ~40%** | Poorly developed NW-SE oriented fractures are parallel to the rock's foliation. The grains are up to 1.5mm in diameter. Included with elongate and globular rutile, quartz and zircon concentrated at the grain's core. Garnets are rimmed with either plagioclase, or plagioclase/hornblende symplectite. |
| **Amphibole ~8%** | Not a major phase in the sample. Limited mainly to garnet rims. |
| **Quartz ~15%** | Characteristically irregularly shaped grains that fill the spaces between other grains. Undulatory extinction and subgrain growth abundant. |
| **Feldspar ~2%** | Not a major phase in the sample. Limited mainly to garnet rims and possibly the cleavage planes of the cpx. Albite twinning is present. |
| **Accessory** | Abundant, 0.2mm, globular grains, indiscriminately dispersed throughout the slide. Elongate rutile are confined to garnet inclusions. |

**Additional comments including textures, structures and/or microstructures present:**

Strong pyroxene defined foliation. Quartz vein in NW corner of slide

**Associated photo files:** Photo 17 (5X mag), 18 (7X mag), 19 (3¼ X mag), 20 (6X mag)

# 1 Thin Section Petrography Description

UNC Sample #: BAK-03-010A(a) Petrographer: K. Syvertsen
Lab Sample #: OJL-010 Date: 07-13-03

| Orientation and comments: | 163← not labeled on slide |
|---|---|
| | 71 |

## Location:

Quadrangle: Bakersville UTM: zone 17 397738E 3988715N

| Description: |
|---|
| Massive outcrop |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 35-45%** | Well-preserved omphacite present in this sample. Foliation orientation is NE-SW. Some grains contain poikilitic plagioclase. At times there is a sharp boundary between the omphacite and an adjacent grain as at times the cpx grades from a jadite to a diopside rich composition. |
| **Garnet 35-45%** | ≤ 2mm grain size. Most have a thin rind of plagioclase ± hornblende. Cores tend to be highly included with zircon and plagioclase. Rutile inclusions tend to not be confined to the core. Fractures are NW-SE, ⊥ to foliation. |
| **Amphibole <10%** | Present only surrounding garnets and always symplectic with plagioclase. Symplectite frequently stretches between two garnet grains. |
| **Quartz 5-10%** | ≤ 2.5 mm, irregularly shaped blebs elongate ‖ to foliation. Some exhibit subgrain growth and undulatory extinction. |
| **Feldspar <10%** | Present as rims around garnets or as an exsolution lamellae within cpx. Simple and Albite twinning present in the plagioclase rims. |
| **Accessory** | Small grains aligned with foliation. Well-formed prisms confined to garnet inclusions. |

**Additional comments including textures, structures and/or microstructures present:**

Foliation defined by clinopyroxene cleavage NE↔SW
Relatively fine grained sample

**Associated photo files:** Photo 21 (8X mag), 22 (6X map), 23 (11X mag), 24 (4X mag).

# 1 Thin Section Petrography Description

UNC Sample #: BAK-03-010B(b) Petrographer: K. Syvertsen
Lab Sample #: OJL-011 Date: 07-13-03

| Orientation and comments: | N 330 ______________ 67OH |
|---|---|

## Location:

Quadrangle: Bakersville UTM: zone 17 397738E 3988715N

| Description: |
|---|
| Massive outcrop |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~30%** | Abundant well preserved omphacite present. Cleavage is oriented NW-SE, defining the foliation. A minority of the grains' foliations are oriented N-S or NE-SW especially in the southwest corner. Some grains have optically distinct amphibole at an edge or within the cpx grain. |
| **Garnet 40-50%** | <1.5mm well preserved grains with this plagioclase rims. Fractures are oriented NE-SW. Most garnets have many inclusions that are concentrated in their core with the exception of rutile. |
| **Amphibole ~10% (including plag)** | Three types of amphibole are present:<br>1)Dark→ lt. brown pleochroic w/in a retrograded band running NW-SE through the slide (see map above)<br>2) Bright green pleochroic band that cross cut the above amphibole in three fractures evident when viewing the slide without a microscope.<br>3) Small, isolated grain located within garnet rims (although generally not completely surrounding the garnet) throughout the slide always with plagioclase. |
| **Quartz 5-10%** | Near the three fractures the quartz are larger (≤2.5 mm) irregularly shaped grains with varying degrees of undulatory extinction and few subgrain growth. In the remaining of the sample the quartz are ~0.5mm and near all undulatory to a greater degree than the large quartz grains. |

**Additional comments including textures, structures and/or microstructures present:**

Strong foliation not present
Clinopyroxene foliation NW↔SE which is parallel to the retrograded band

**Associated photo files:** Photo 25 (5½ X mag), 26 (4X mag), 27 (6X mag)

2 some cpx, ugly slide

# Thin Section Petrography Description

UNC Sample #: Bak-03-0011(a)    Petrographer: K. Syvertsen
Lab Sample #: OJL-12    Date: 07-13-03

Orientation and comments:    N $\frac{\quad\quad}{85\ OH}$ 150

## Location:

Quadrangle: Bakersville    UTM: zone 17 398455E 3989510N

Description: Large retrograded outcrop, ~10m X 10m X 5m.

## Thin Section Description:

| Mineral | Comments |
|---|---|
| | Although sample appear very retrograded there is omphacite present |
| **Clinopyroxene 20-25%** | The pyroxene present is light green with one well defined cleavage plane and few plagioclase lamellae. Dominant cleavage is oriented NNE-SSW although some are oriented nearly perpendicular to that trend. The grain boundaries tend to be sharp. |
| **Garnet 10-15%** | Sub-Euhedral grains with little to no embayments. Heavily included with plagioclase throughout the entire grain. Zircon is also included but rutile is absent. Although rims do exist, the surrounding grains tend to be courser plagioclase, quartz and hornblende. The fractures are oriented N-S. |
| **Amphibole 20-25%** | Grains tend to be ≤2mm, sub-anhedral, homogeneous, light brown pleochroic with a well defined cleavage direction. |
| **Plagioclase 35%** | This is a dominant phase in this slide. Albite twinning is extensive. The twins within grains in close proximity tend to be parallel. Light colored grains exhibit circular undulatory extinct and may be quartz. Faint twinning may be present. If so, then quartz is very rare in this sample. |
| **Rutile (?) 15%** | A brown/red mineral is prevalent in this sample. It lacks any specific shape, but tends to fill in areas between grains as well as "stain" the surrounding grains, especially along cleavage planes. |

### Additional comments including textures, structures and/or microstructures present:

Foliation NE↔SW defined by 1) increase and decrease in the amount of plagioclase and rutile present

**Associated photo files:** Photo 28 (6¼X mag), 29 (7X mag), 30 (4½X mag)

| 2 some good omph |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-012(a) Petrographer: K. Syvertsen
Lab Sample #: OJL-013 Date: 07-12-03

| Orientation and comments: | N ______________ 72<br>39 OH |
|---|---|

## Location:

Quadrangle: Bakersville UTM: zone 17 397863E 3989069N

| Description: Not a large outcrop (in place?) |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~40%** | The majority of the grains present of riddled with plagioclase lamellae or are of the "shattered" variety. |
| **Garnet 20-30%** | Grains are rarely larger than 1mm and about 30-40% contain inclusion of rutile, zircon and quartz. The poorly-developed fractures are oriented W-E with another weaker set oriented N-S. The garnets tent to be fully to partially rimmed by plagioclase. A spectacular embayment, illustrated below, is mapped above as an #. |
| **Amphibole 5-10%** | Bright green – brown pleochrioc, coherent and well defined grains. The amphibole adjacent the garnets is bright green – light green pleochroic. There are a few, isolated spots of amph/plag symplectite. |
| **Plagioclase 5-10%** | There are many "wormy" intergrowths between the grains. Albite twinning is common. |
| **Quartz ~10%** | Undulatory extinction and subgrain growth is common. Grains are <1.5mm and irregularly shaped. |

**Additional comments including textures, structures and/or microstructures present:**
E↔W foliation defined by garnet banding

**Associated photo files:** Photo 31 (6X mag), 32 (5½X mag), 33 (2½ X mag ) contains photo32 location, 34 (6X mag).

**2** cpx present

# Thin Section Petrography Description

UNC Sample #: Bak-03-0013(b) Petrographer: K. Syvertsen
Lab Sample #: OJL-014 Date: 07-24-03

| Orientation and comments: | N | $\frac{\phantom{xx}}{85}$ 218 |
|---|---|---|

## Location:

Quadrangle: Bakersville UTM: zone 17 397964E 3989000N

| Description: small outcrop |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 35-40%** | 30-40% of cpx is pristine. Remainder is tan → slightly green with two well developed cleavages and much of it is "shattered." The pristine cpx have 1 well developed cleavage direction oriented NE-SW. Between cpx and garnet tends to be plag/amph symplectite. Some hornblende and plagioclase can be found within cpx. Extensive plagioclase lamellae are not common. |
| **Garnet ~40%** | Garnets tend to be <2mm with abundant, aligned inclusions of rutile, zircon ± quartz/plagioclase concentrated in the garnet core. Some garnets have embayed edges and many are thinly rimmed with wither plagioclase or a plag/amph symplectite. |
| **Amphibole 5-10%** | Only extensive in the southwest corner (visible without a scope). Otherwise present as fine grains between cpx and garnet. Usually bright green → brown pleochroic. |
| **Plagioclase ~5%** | Usually symplectic with amph or fine grained. Few twins are present. |
| **Quartz 2%** | Round, ~0.3mm grains located within cpx with little to no undulation. Larger, 0.5-0.7mm undulatory grains are confined as garnet inclusions. |

### Additional comments including textures, structures and/or microstructures present:

NE↔SW pattern of 1) Size and concentration of garnets into bands 2) change in the degree of plagioclase rims around garnets 3) an increase in the amount of mottled pyroxene (and finer grained omphacite)

**Associated photo files:** 45 (9½X mag), 46 (2X mag), 47 (2¼X mag), 48 (6X mag), 49 (3X mag), 50 (10X mag).

| |
|---|
| **3** cpx scarce/mottled |

# Thin Section Petrography Description

UNC Sample #: Bak-03-014(b)T Petrographer: K. Syvertsen
Lab Sample #: OJL-015 Date: 07-24-03

| |
|---|
| Orientation and comments: N ______________ 40<br>66 (not OH) |

## Location:

Quadrangle: Bakersville UTM: zone 17 398219E 3988970N

| |
|---|
| Description: 2D view of this outcrop |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 25-35%** | Well preserved omphacite is scarce. Most of the pyroxene is heavily mottled with plagioclase detached lamellae and grade to a less jadeite rich composition at the edges. The remaining cpx is "mottled." The predominant cleavage direction of NNE-SSW. |
| **Garnet 30-40%** | Garnets are up to 2mm in diameter, but many are ~0.5MM. The dominant fracture direction is N-S with a secondary fracture set oriented NE-SW. Most grains are embayed with plagioclase and hornblende and have a well developed plagioclase rim surrounded by amphibole. Abundant inclusions consist of zircon, rounded rutile & quartz and blocky plagioclase and are concentrated in the center of the garnet grain. |
| **Amphibole ~20%** | At least three types present: 1) Bright green → Light green pleochroic. 1 cleavage plane evident at times. Adjacent to cpx. 1$^{st}$ order yellow interference color. 2) Not as abundant as (1). Darker under PPL with 1$^{st}$ order orange to red interference colors. 3) Least abundant pxn type. Dark → light brown pleochroic with one well developed cleavage plain. |
| **Plagioclase ~5%** | Present as rims around garnets and as fine grains within cpx. Albite twinning present. |
| **Quartz ~10%** | Small (<0.5mm) anhedral grains. Most exhibit undulatory extinction. |

### Additional comments including textures, structures and/or microstructures present:

Fractures throughout section definable under the microscope by a thin narrow increase in the size and abundance of amphibole which indicates an increase in the severity of retrogression.

**Associated photo files:** Photo 35 (8X mag), 36 (11X mag), 37 (4½X mag), 38 (6X mag), 137, 138, 139, 140, 141, 412, 143.

**2** cpx near crack

# Thin Section Petrography Description

UNC Sample #: Bak-03-015(a)    Petrographer: K. Syvertsen
Lab Sample #: OJL-016    Date: 07-24-03

Orientation and comments: N 247 ____________
71 OH

## Location:

Quadrangle: Bakersville    UTM: zone 17 397655E 3988668N

Description: West side of field area

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~69%** | The greater majority of the cpx is light brown, non-pleochroic with large amounts of plagioclase exsolved lamellae. Many have a wormy texture. <20% of the grains present are greener, more coherent that may be more omphacitic in composition. CPX dominated cleavage is generally W-E which appears similar to the bulk foliation of the slide. The larger cpx grains are located to the south of the crack. |
| **Garnet 20-30%** | ~2mm maximum size, most are between 0.5 and 1mm. Most are subhedral and contain a high concentration of inclusions, mainly zircon, in the core. The edges of the grains undulate and the cavities are filled mainly plagioclase ± hornblende. |
| **Amphibole 3-4%** | Present mostly as reaction rims, symplectic with plagioclase, around garnets. There a few large, more coherent grains with one cleavage plane evident. |
| **Plagioclase 5-10%** | Albite and pericline twinning present in the symplectic garnet rims. No twins are apparent within the exsolved lamellae in the cpx. |
| **Quartz ~5%** | Quartz fills in the crack that cuts through the slide. Otherwise quartz is present as <1mm, anhedral grains with extensive undulatory extinction and subgrain development. |

**Additional comments including textures, structures and/or microstructures present:**
Symplectic textures involving plagioclase and garnet with or without amphibole are abundant

**Associated photo files:** Photo 42 (4½X mag), 43 (6¾X mag), 44 (10X mag).

| 3poikiolitic cpx |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-016(a)    Petrographer: K. Syvertsen
Lab Sample #: OJL-017    Date: 07-28-03

| Orientation and comments: | 325 / 79 |
|---|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17 397658E 3988779N

| Description: |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 25%** | Most cpx contains a large amount of plagioclase lamellae. Few well preserved grains (<5%) remain. CPX foliation trend NW-SE and the concentric chemical zoning is extensive. |
| **Garnet 25%** | Fractures are very well defined oriented NE-SW. Grains are up to 2mm in diameter although most are ~1mm. The boundaries tend to be undulatory where in contact with hornblende. Inclusions or rutile tend to be randomly distributed while Zircon and (possibly) quartz tend to be concentrated at the center. Rims tend to be thin and comprised of either amphibole or plagioclase or a symplectite or both. |
| **Amphibole 25-30%** | There are many large bright green → light brown pleochroic amphibole grains. Some amphibole is present with plagioclase as symplectic garnet rims. A small amount of the amphibole does not turn brown, but a light green under PPL. |
| **Plagioclase 10%** | Albite twins are well developed in all plagioclase except that fully encompassed within cpx grains. Plagioclase is also concentrically chemically zoned. The plagioclase lamellae are also zoned and tend to be concentrated outside of the core of the cpx grain. |
| **Quartz/Rutile 10-15%** | Quartz is present mainly as garnet inclusions and within the vein in the southwest corner. These grains are highly undulatory or sub-grains have developed. These subgrain boundaries may be aligned parallel to the garnet fractures.<br>The rutile are fine, elongate→ rounded grains randomly dispersed throughout the slide. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo 39 (7¼X mag), 40 (6X mag), 41 (3¼X mag)

| 2 cpx not abundant |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-017(a)    Petrographer: K. Syvertsen
Lab Sample #: OJL-018    Date: 07-28-03

| Orientation and comments: | 258 / 90 | *Strike is not indicated on the slide |
|---|---|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17 397656E 3988773N

| Description: |
|---|
| |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~20%** | The best cpx is concentrated on the east side of the slide and especially between the hornblende defined lineations. Prominent cpx foliation is NE-SW. These cpx are free of plagioclase lamellae optically pristine. At times the grain's edge graduates to a less omphacite rich pyroxene. The rest of the cpx is the "shattered" variety. It has more well defined cleavage and is browner under PPL with more fine plagioclase lamellae. |
| **Garnet 40-50%** | The garnets vary widely in size from 0.1mm to 1.2mm. Fractures are oriented NW-SE and grains tend to be euhedral. If present, rims are thin. There tends to be no direct contact between garnet and amphibole. Some grains are inclusion free while others have inclusions that tend to concentrate in the grain's core. The inclusions in several grains appear to be organized in a circular pattern. |
| **Amphibole ~20%** | Amphibole defines the two dark lineations visible w/out a scope. Several different amphiboles are within close proximity. 1) green → brown pleochroic ($1^{st}$ order orange) 2) light brown → pale green ($1^{st}$ order pink). At time it is symplectic with plagioclase. |
| **Plagioclase <5%** | Patchy and symplectic. Generally fine wormy grains throughout the entire sample. There are a few isolated grains with well defined albite twins, but not markedly zoned. |
| **Quartz/Rutile 5-10%** | The quartz are erratically and round shaped and located extensively throughout the slide. They are highly undulatory.<br>The rutile are widely dispersed throughout the slide as generally elongate, <0.4mm grains with rounded edges. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo 55, (8X mag), 56 (7½X mag), 57 (6X mag), 58 (4X mag) contains two grains

4

# Thin Section Petrography Description

UNC Sample #: Bak-03-018(b)    Petrographer: K. Syvertsen
Lab Sample #: OIV-001    Date: 07-28-03

| Orientation and comments: 95 / 75 OH |
|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17 397599E 3988912N

| Description: |
|---|
| |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| | This sample is nearly completely retrograded. The garnets have been degraded to an amphibole pseudomorph. There is a small, 2mm patch of pyroxene in the south-west corner of the slide. It grades away from omphacite at the edges. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** none

**4** 

# Thin Section Petrography Description

UNC Sample #: Bak-03-020(b) Petrographer: K. Syvertsen
Lab Sample #: OJL-019 Date: 07-24-03

Orientation and comments: 234 / 95 OH

## Location:

Quadrangle: Bakersville UTM: zone 17 397638E 3989318N

Description: North-facing side of Lick Ridge

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~10%** | There is very little cpx remaining in this sample. All is a light brown variety of pyroxene and contain plagioclase lamellae. |
| **Garnet 30-40%** | Garnets are extensively fractured. The main set is parallel to the rock's foliation, NW-SE. A second set is truncated by the first and is oriented WSW-ENE. Rims generally consist of plagioclase and amphibole symplectite, rarely plagioclase alone. When the amphibole is in contact with the garnet, the garnet boundary is deeply embayed. The garnets range from 0.3mm to 1.5 mm. Large, rounded quartz, fine zircon/apatite and elongate rutile are included in the garnets, mainly toward the grain's core. |
| **Amphibole 30-40%** | Three types present; 1) Generally large, coherent grains with no well defined cleavage. Green-brown pleochroic. 2) Bright gr-light brown. Finer then (1) and usually sandwiched btwn garnets. There was little to no cleavage evident. 3) light brown – brown, 1 to 2 defined cleavage planes. Neither (2) nor (3) are as abundant as (1). |
| **Plagioclase 5-10%** | Present as either lamellae within cpx, as file grained aggregates or in symplectite in garnet rims. On the east side of the slide there are larger, ~1.0mm grain with albite twins. |
| **Quartz/Rutile ~5%** | Not abundant, but present as ~2.00mm, amorphous highly undulatory grains with extensive subgrain development. The rutile are less than 0.1mm with rounded corners and randomly distributed throughout the slide. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** none

| 2 cpx w/ amphibolite |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-021(b)    Petrographer: K. Syvertsen
Lab Sample #: OLV-002    Date: 07-29-03

| Orientation and comments: | 358/85 |
|---|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17  397680E 3989422N

| Description: |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 15%** | Nearly all the pyroxene is small and brown with extensive plagioclase lamellae. The largest omphacite are ~1.0mm and are located mainly on the west side of the slide. |
| **Garnet ~35%** | The garnet contains a large amount of elliptical quartz inclusions that tend to define a circular pattern away from the grain's edge. Rutile and zircon/apatite are also present, but not abundant. The garnets are broken, so any fracture pattern is not obvious, however, it seems to be predominantly N-S. The grains' edges are embayed and rim course plagioclase/amphibole symplectite. The only straight edges are in contact with quartz. |
| **Amphibole 35%** | This is the dominant phase in this sample with the same three varieties as BAK-03-020(a). |
| **Plagioclase ~3%** | Only present mainly within symplectite with amphibole or an exsolution lamellae in pyroxene. Some albite twins present. Plagioclase is present in the matrix as a jacket around quartz. |
| **Quartz ~10%** | Abundant in this sample. Sizes vary from <0.4mm to 2mm. Grain shapes are highly irregular and there is extensive subgrain development. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo 59 (8X mag) two grains, 60 (4X mag), 61 (6½X mag), 62 (4½X mag) two grains, 63 (7X mag)

| 3 cpx not abundant |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-022(b)T    Petrographer: K. Syvertsen
Lab Sample #: OLV-003    Date: 07-31-03

Orientation and comments: 34 / 90 *Strike is not indicated on the slide

## Location:

Quadrangle: Bakersville    UTM: zone 17 397551E 3989256N

Description:

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 30-40%** | Majority of the pxn in this slide is light brown with extensive plagioclase exsolution. There are a few small pockets of omphacite, but the grains may have rotated during a younger foliation development. Degradation to a lower pressure pyroxene (or amphibole) is common both on the grains edge and within a grain. |
| **Garnet ~20%** | Most garnets are less than 1.5mm. W-E fractures truncate N-S fractures. There is less embayment of the grains' edges than many other samples. Inclusions are not as common as in many other samples as well. The inclusions are < 0.3 mm rounded quartz, <0.5mm elongate, sub-round rutile and fine zircon. Garnets have thick rims of amphibole or plag+amph symplectite. |
| **Amphibole ~30%** | The majority of the amphibole is green-brown pleochroic coherently <3mm grains and often symplectic with plag. |
| **Plagioclase 5%** | Plagioclase is present within symplectite or cpx as lamellae. Twinning is extensive. |
| **Quartz ~5%** | Many large (3.0mm), irregularly shaped angular grains throughout the sample. The undulatory extinction tends to be parallel with the sample's foliation. |

**Associated photo files:** Photo 64 (3½X mag), 65 (3X mag), 66 (4½X mag)

1

# Thin Section Petrography Description

UNC Sample #: Bak-03-023(a)    Petrographer: K. Syvertsen
Lab Sample #: OLV-004    Date: 07-31-03

| Orientation and comments: 155 ______________ 29 OH *Strike is incorrectly labeled on slide |
|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17 397543E 3989117N

| Description: |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 45-55%** | The vein-like feature on the west side of the slide is an area of large (>3mm) cpx. Much of the pyroxene aside from that in the 'vein' is browner and more of the "shattered" variety will cleavage developed in two directions. All the predominant cleavage in all the pyroxene appears to be parallel with the bulk foliation of the sample. Gradation from green to brown is present in many grains at the grain's edge as well as within the grain new an exsolved plagioclase. |
| **Garnet 25-30%** | Grains are generally well preserved, although the corners tend to be rounded. Well defined fractures are oriented WNW-ESE. Most garnets have a thin rim of plagioclase and direct contact between the plagioclase and the amphibole is rare. The inclusions are concentrated at the core and are randomly oriented. Inclusions are rounded quartz, some rutile and a large amount of zircon. |
| **Amphibole 10-15%** | Several 2mm grains are located within the cpx "vein." Otherwise amphibole is confined to small, but frequent occurrences btwn cpx and plag/garnet and the SE corner where brown → light brown pleochroic amphibole is prevalent and amphibole/plagioclase symplectite is beginning to develop. |
| **Plagioclase ~5%** | Exclusively thin, highly twinned garnet rims and fine grains isolated btwn garnets. Also as exsolution lamellae in pyroxene. |
| **Quartz ~15%** | Large size range, up to 3mm. Irregularly shaped and highly undulatory with extensive subgrain development. |

### Additional comments including textures, structures and/or microstructures present:

**Associated photo files:** Photo 67 (3½X mag), 68 (2¼X mag), 69 (3½X mag), 70 (3¼X mag), 71 (5X mag)

**1** 

# Thin Section Petrography Description

UNC Sample #: Bak-03-025(a) Petrographer: K. Syvertsen
Lab Sample #: OLV-005 Date: 07-31-03

| Orientation and comments: | 112 ______________ 92 OH *not 42 as etched on slide |
|---|---|

## Location:

Quadrangle: Bakersville UTM: zone 17 398178E 3988734N

| Description: |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~45%** | Omphacite is abundant in this sample. Contains isolated plagioclase lamellae. About 20% of the pyroxene present has regressed to light brown with two well defined cleavages. |
| **Garnet ~45%** | Garnets contain well developed feldspar rims with amphibole on occasion. Two fracture directions are N-S which truncates the WSW-ENE set. Some garnets do not appear to contain inclusions, while others have a "dusty" core. Rutile is present as large grains on the outside of the garnet's care and fine grains within the core. Rounded quartz and abundant zircon are also found as inclusions. |
| **Amphibole ~5%** | Brown → green pleochroic grains are rare and small (~0.4mm). Most amphibole is bright green → lt green and located at the edge of pyroxene grains. It is rarely present as symplectite in garnet rims. |
| **Plagioclase 5-10%** | Thin rims around garnets with extensive albite twinning. Small grains are also present, rarely, between garnets. Also present as cleavage parallel lamellae within pyroxene. |
| **Quartz ~10%** | Highly irregularly shaped grains of various sizes, <2mm. Most display an undulatory extinction, but it is not as extensive as in many other samples. Quartz contained completely within pyroxene displays a concentric zoning generally confined to the outer rim. |

**Additional comments including textures, structures and/or microstructures present:**
**Associated photo files:** Photo 72 (7¼X mag), 73 (3½X mag), 74 (2½X mag) two grains, 75 (3¾X mag) two grains.

**1**

# Thin Section Petrography Description

UNC Sample #: Bak-03-026(b)    Petrographer: K. Syvertsen
Lab Sample #: OLV-006    Date: 08-01-03

| | |
|---|---|
| Orientation and comments: | 142 ______________ <br> 61 OH |

## Location:

Quadrangle: Bakersville    UTM: zone 17 398128E 3988813N

| |
|---|
| Description:<br>North side of the valley. No eclogite is mapped here. |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 40-45%** | About half of the pyroxene present has been retrogressed to a light brown. There are several grains that are well preserved with little to no plagioclase lamellae. Many grains tent to degrade at the edge and some within the grain near cleavage planes, although that is not extensive. |
| **Garnet ~25%** | These grains contain little to no plagioclase rims but, when on contact with hornblende the garnet edge is deeply embayed. There are two fracture directions, W-E and N-S, equally is prominent, although neither are well developed. Most of the grains contain inclusions concentrated in the core. The inclusions are mainly rutile as rounded columnar prisms, fine grained zircon and rare quartz. |
| **Amphibole ~15%** | 1) Dark brown → light brown, with two well defined cleavage directions. 2) bright → light green, symplectic with plag. And adjacent to garnet and cpx. 3) lt green → light brown with one cleavage direction. |
| **Plagioclase 5-10%** | Confined to symplectite near garnets (with amphibole) and as lamellae within pyroxene. Albite twinning is rare, but the larger grains are concentrically zoned. |
| **Quartz ~10%** | Irregular to square shaped grains generally <1mm. All exhibit undulatory extinction and extensive subgrain growth. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** 76 (5¾X mag), 77 (2½X mag), 78 (4½X mag), 79 (8X mag)

| 2 | **Thin Section Petrography Description** |
|---|---|

UNC Sample #: Bak-03-027(b)T    Petrographer: K. Syvertsen
Lab Sample #: OLV-007    Date: 08-04-03

| Orientation and comments: 182 / 90 *Strike incorrectly reads 102 on the slide |
|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17 397796E 3988879N

| Description: In place? |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 45-50%** | Nearly 30-40% of the cpx present appears to be omphacite with few plagioclase lamellae and poorly developed cleavage planes. The rest is mostly green with a greater amount of lamellae and 2 well defined cleavage planes or is brown. Almost all of the cpx grades to a less omphacitic pyroxene at the grain's egde. The most dominant omphacite cleavage is oriented N-S. |
| **Garnet ~30%** | The garnets are highly fractured porphyroblasts. Most of the fractures are oriented NE-SW or NW-SE. The garnets are 1mm +/- 0.3mm. Most grains have a thin rim of plagioclase, jacked by hornblende. The inclusions are rounded quartz and fine zircon and tend to be concentrated at the grain's core. Some show a W-E preferred alignment. About 60-65% of all garnets contain extensive inclusions. |
| **Amphibole 5-10%** | There is more amphibole on the east side of the slide. Most are green → light brown pleochroic although a few are light brown → dark brown. On the west side there are a few independent grains and majority of present appears to be the result of cpx retrogression. |
| **Plagioclase ~5%** | Present as garnet rims, with extensive albite twinning, between garnets symplectic with amphibole and as lamellae within cpx. |
| **Quartz 8-10%** | Most quartz are <1.5mm, but some grains are up to 7mm in size. The grains are anhedral and some are rounded. Undulatory extinction is extensive. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo (80 3¾X mag), 81 (2X mag), 82 (8X mag)

| 2 |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-028(a)   Petrographer: K. Syvertsen
Lab Sample #: OLV-008   Date: 08-04-03

| Orientation and comments: | $\frac{\rule{3cm}{0.4pt}\ 294}{86}$ |
|---|---|

Orientation and comments: ______________ 294 / 86

## Location:

Quadrangle: Bakersville   UTM: zone 17  397726E 3988792N

| Description: |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~30%** | Much of the cpx in this sample is altered, or the "shattered" variety, although more coherent omphacite is present. These patches tend to be ≤1mm. The prevalent cleavage tends to be parallel with the rock's foliation, NE-SW, although some cpx is oriented more W-E. Most of the omphacite lacks extensive plagioclase exsolution lamellae and grain boundaries between cpx and horneblend is sharp. |
| **Garnet ~30%** | The garnets are fairly well in tact and have thick plagioclase & hornblende symplectite rims. The grains boundaries are straight and tend to have few embayments. Fractures are oriented N-S. Over 50% for the garnets do not contain a large number of inclusions. The inclusions are small, round quartz, some rutile and fine zircon. The zircon is confined to the grains' cores. |
| **Amphibole 20-30%** | 1) green → light brown with 1 well defined cleavage. 2$^{nd}$ order blue max. ~85% of all amphibole. 2) light brown → dark brown. 1$^{st}$ order orange max. ~5-10% of all amphibole. 3) bright green → light green. ~ 5-10% of all amphibole. |
| **Plagioclase 5%** | No large plagioclase grains present, only as garnet rims with or without amphibole or poikilitic in omphacite. The plagioclase not within cpx demonstrates some albite twinning and concentric zoning. |
| **Quartz 5-10%** | Irregularly shaped, rounded and less than 1mm. Undulatory extinction and some subgrain growth visible. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo 83 (5X mag), 84 (5X mag), 85 (8½X mag), 86 (5½X mag)

| **3** 2-3 good cpx |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-029(a)T    Petrographer: K. Syvertsen
Lab Sample #: OLV-009    Date: 08-04-03

| Orientation and comments: | $\frac{97}{82}$ *Strike is not indicated on the slide, not OH |
|---|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17 397908E 3988726N

| Description: |
|---|
| |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 25-30%** | ~10% of pyroxene in slide is well preserved omphacite. Cleavage does tend to be parallel to the rock's foliation and the grains are ~2mm. Most of the omphacite contains extensive plagioclase lamellae. Few omphacite contain a small number of lamellae and some pyroxene approach a symplectic texture with plagioclase. |
| **Garnet ~40%** | Well developed NNE-SSW fractures are visible without the aid of a microscope. Most grains are subhedral and some are rimmed with plagioclase or plag/amph symplectite. <50% contain many inclusions. Zircon inclusions tend to be at the grains' cores with quartz &/or rutile toward the outside. In a few samples the zircon are aligned, usually parallel to the fractures. |
| **Amphibole ~10%** | The three varieties described for sample BAK-03-028 are present here, with the amount of (1) ≈ (2) with a small amount of (3). The amphibole tends to be presents in clumps and show a tendency to enhance the rock's foliation. |
| **Plagioclase <5%** | No large grains present. Plagioclase is present as course symplectite with cpx and as exsolution lamellae. Albite twinning is common when grain is located outside and adjacent to a garnet. Some concentric zoning is also present. |
| **Quartz 15-20%** | Large, irregularly shaped grains tend to be fractured parallel to those present in the garnets. Extensive undulatory extinction and block-like subgrain growth is present. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo 87 (5¾X mag), 88 ( 2½X mag), 89 (4X mag), 90 (3½X mag)

| 2 poikiolitic cpx |
| --- |

# Thin Section Petrography Description

UNC Sample #: Bak-03-030A(b)　　Petrographer: K. Syvertsen
Lab Sample #: OLV-010　　Date: 08-04-03

| Orientation and comments: | 274 / 33 |
| --- | --- |

## Location:

Quadrangle: Bakersville　　UTM: zone 17 398080E 3988675N

| Description: |
| --- |
| Hummocky topography |

## Thin Section Description:

| Mineral | Comments |
| --- | --- |
| **Clinopyroxene 40%** | More cpx is less green than the best omphacite and "shattered." This, and the more well preserved omphacite, have N-S oriented cleavage. The omphacite present does tend to be poikiolitic (plagioclase). |
| **Garnet ~20%** | Two fracture directions are NE-SW and NW-SE, the latter being truncated by the earlier although this relationship is not obvious. Many grains are "missing" sides or corners and have been replaced with plag/amph symplectite. Many have rims of plagioclase (with an amphibole jacket at times) or symplectite with plag & amph. The edges are many grains are highly embayed. Zircon inclusions are always concentrated at the grains' cores. Rutile inclusions located close to the grains' cores tend to be small and prismatic, while those close to the grains' edges are larger and round. Few garnets have quartz inclusions. |
| **Amphibole ~25%** | Mostly individual, isolated grains. Green→ brown and up to 2nd order blue. A browner variety present has more well defined cleavage in two directions. A bright green amphibole, usually bordering garnets, is not abundant. |
| **Plagioclase 5%** | Not abundant in the slide. Plagioclase is present as garnet rims with twinning and concentric zoning present, or within cpx as exsolution lamellae. |
| **Quartz ~10%** | Slide contains many small (<1mm), irregularly shaped grains. Subgrain growth present with these boundaries tending to be oriented W-E. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo 91 (3½X mag) two small grains, 92 (6X mag), 93 (7X mag), 94 (4X mag), 95 (11X mag)

1

# Thin Section Petrography Description

UNC Sample #: Bak-03-030B(b)  Petrographer: K. Syvertsen
Lab Sample #: OLV-011  Date: 08-05-03

| Orientation and comments: $\frac{217}{79}$ | 217 *Strike is not indicated on the slide<br>* dip indicated as 74 |
|---|---|

## Location:

Quadrangle: Bakersville  UTM: zone 17 398080E 3988675N

| Description: |
|---|
| Hummocky topography |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~20%** | The majority of the pyroxene is well preserved omphacite. The omphacite present does contain pyroxene exsolution lamellae, but not contain extensively. The omphacite does tend to grade to a less-Na rich cpx on the edge and within the grain adjacent to the cleavage planes. The cleavage plane orientation tends to be parallel to the bulk foliation of the slide: NE-SW. |
| **Garnet 35-40%** | Most garnets are<2.0mm and a few are very euhedral. Many, however, have embayed or undulatory edges infilled with plag &/or amph. The dominant fracture orientation is NW-SE, although these are not well developed. Another, even lesser developed fracture set is oriented 50˚ CW from the first set. Garnets have thin rims of plagioclase followed by plag/amph symplectite. There are a lot of zircon inclusions in cores and many are parallel or 90˚ to cpx cleavage. Well rounded quartz and rutile are generally located away from the grains' centers. Finer rutile can be found in the grains' cores. |
| **Amphibole ~20%** | All three previously described amphiboles are present; 1) 75-80% 2)~10% 3)10-15%. There is not a lot of symplectite present. |
| **Plagioclase 10%**<br>**Quartz 10-15%** | The vein in the southern half of the slide in fine grained (~0.4mm) plagioclase with extensive albite twinning. Twinning as abundant in the plagioclase of the garnet rim. Not twinning, but concentric zoning is present in the exsolved plagioclase within the cpx. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo 96 (7X mag), 97 (3X mag), 98 (6Xmag), 99(2½X mag)

**4**

# Thin Section Petrography Description

UNC Sample #: Bak-03-031(a)    Petrographer: K. Syvertsen
Lab Sample #: OLV-0012    Date: 08-05-03

| Orientation and comments: | $\frac{192}{83}$ *Strike is indicated as 197 on slide |
|---|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17 397263E 3988926N

| Description: |
|---|
| This block may not be in place |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~30%** | Omphacite is rare in the sample. The cpx present contains abundant bulbous plagioclase lamellae. Degradation evident at grains' edges and near plagioclase. |
| **Garnet 30-40%** | Well preserved, euhedral grains that are ≤3.0mm. A set of WNW-ESE fractures are truncated by a NNW SSE set. The rims are thick plagioclase, but generally do not completely surround the grain. The edges are slightly undulatory, with plag/symplectite filling in the deeper embayments. Inclusions are rounded quartz (<0.05mm, most abundant inclusion), Ultra fine grained zircon concentrated away from the edges of the garnet, and randomly located rutile. |
| **Amphibole 25-30%** | Large thumb-shaped area in east- slight brown → green. Low interference colors appear masked by mineral color. Entire area is optically continuous. A Dark brown → light brown variety is also present (with high interference colors). |
| **Plagioclase ~10%** | Entire slide is mottled with <0.6mm size plagioclase grains. If plagioclase in entirely surrounded by cpx then there are not twins present. Otherwise albite twinning is evident. |
| **Quartz 2-3%** | Not extensive in the slide. Grains are irregularly shaped and tend to be <1.0mm. Typical subgrain growth is present. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** none

**3** cpx in grt mass

# Thin Section Petrography Description

UNC Sample #: Bak-03-032(a)  Petrographer: K. Syvertsen
Lab Sample #: OLV-013  Date: 08-05-03

Orientation and comments: 15 / 93 OH  *Orientation on slide is wrong

## Location:

Quadrangle: Bakersville  UTM: zone 17 397274E 3988929N

Description:

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 15%** | All cpx is highly poikiolitic. Cpx has two well developed cleavage planes, is pale green with wormy plagioclase lamellae. A few area of possible preserved omphacite are located on the map above. These areas are 1-3mm long. Small omphacite grains are preserved among the garnets in the lower section on the slide. |
| **Garnet ~35%** | Those in the lower section are characteristically different than the upper section. [S=south N=north] S: no garnets > 1.5mm, most ,1.0mm. N: Most are 1-2 mm and highly degraded. S: Thin plag rims, if present. N: Most have thick, well developed plag rims. S: edges are slightly undulatory, although not nearly as embayed as those in the north. N: deep embayments filled with plag and amph. Many corners and edges are "missing." S: Well defined N-S fractures N: N-S fractures not as well developed. Another set is possibly running E-W. S: inclusions are highly concentrated in the grains' cores. Fine grained zircon is abundant. Rutile and quartz are not. N: many rounded quartz inclusions and rounded-elongate rutile. Zircon is hard to find since the garnets are not intact. |
| **Amphibole 15%** | (1) Small but extensive grains, <2mm scattered throughout the slide. (2) <0.5mm grains. About 27% of the amphibole present is this variety. (3) Only present adjacent to omphacite. It is not abundant in the garnet-rich southern region. |
| **Plagioclase 25%** | This slide is riddled with plagioclase. Symplectic texture is not common. Plagioclase is much less common in the southern region of the slide. |
| **Quartz ~5%** | Isolated, irregularly shaped grains, ~1mm. Not as undulatory with less subgrain growth than previous slides. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo 100 (4X mag), 101 (5¼X mag)

| 3cpx not abundant |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-033(a)    Petrographer: K. Syvertsen
Lab Sample #: OLV-014    Date: 08-05-03

| Orientation and comments: | 250 / 34 |
|---|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17 397272E 3989075N

| Description: |
|---|
| Several large blocks are in this area with two different orientations. |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~20%** | Few well preserved omphacite present. Majority has been altered and "shattered." Most of the cleavage is oriented parallel to the rock foliation. Grain boundaries are well defined rather than gradational. |
| **Garnet ~30%** | Most grains are <1mm, but a few are up to 2mm. Fractures are oriented NNW-SSE and nearly perpendicular; NE-SW. Most grains have lost their corners and are nearly round. The feldspar rims are thin and discontinuous (often the garnets are in contact with large amphiboles). |
| **Amphibole 20-30%** | Both type (1) and (2) are abundant. The large patches do not tend to be optically continuous. |
| **Plagioclase 10-20%** | Slide is poikilitic with wormy plagioclase. Albite twinning is well developed except when surrounded by cpx. |
| **Quartz ~5%** | Many irregularly shaped grains scattered throughout the slide. Generally <0.5mm. Subgrain growth is extensive. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** Photo 102 (9X mag), 103 (4½X mag), 104 (11X mag)

4

# Thin Section Petrography Description

UNC Sample #: Bak-03-034A(a)T    Petrographer: K. Syvertsen
Lab Sample #: OLV-015    Date: 08-06-03

| Orientation and comments: | 95 / 82    *NOT OH |
|---|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17  397337E 3988984N

| Description: |
|---|
| |

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 20-25%** | No coherent omphacite grains present. All the pyroxene has large plagioclase exsolution inclusions. A high magnification view shows that some of the cpx between the plagioclase may be omphacite as it has a green tint under ppl. Also, much of the pyroxene also contains fine grained rutile. |
| **Garnet 20-25%** | Very large porphyroblasts- up to 0.6cm. Most are between 0.2 and 0.4 cm, although many have been degraded on the edges. Most contain large round quartz inclusions. Rutile and zircon inclusions can be found in the more intact grains. A few grains are surrounded by fine grained poly-crystalline plag jackets but most have a fine mix of plag and amphibole rims. |
| **Amphibole 25-30%** | >80% present is dark green → light brown either as small, isolated grains (2-3mm) or as large, optically continuous areas visible w/out a microscope. Amphibole (2) [lt brown → dark brown] is present to a small extent. |
| **Plagioclase 15-20%** | Grains tend to be <2mm. Exsolution lamellae are extensive in cpx. Also present with amphibole adjacent to garnet. Albite twinning is present but not as extensive as in other samples. Some grains are concentrically zoned. |
| **Quartz ~5%** | Present in the matrix as 0.5-0.6 cm long grains with extensive subgrain growth. Quartz is also present as garnet inclusions. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** none

| 4 |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-034B(b)  Petrographer: K. Syvertsen
Lab Sample #: OLV-016  Date: 08-05-03

| Orientation and comments: | 267 / 35 | *Dip is not indicated on the slide |
|---|---|---|

## Location:

Quadrangle: Bakersville  UTM: zone 17 397337E 3988984N

| Description: |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 25-30%** | The only few coherent cpx is located next to the quartz vein on the west side of the slide. These grains are degraded on the edge as well as within the grain at the cleave planes. The remainder of the cpx is highly poikilitic (plag). This cpx is light green under ppl. |
| **Garnet 20-25%** | All are <2mm. Some tend to be nearly euhedral. Edges are undulatory, but not embayed. Fractures are oriented W-E but may be truncated by a NNE-SSW set. Some grains have thick polycrystalline plag rims. Many garnets are relatively inclusion free. Zircon is present in many garnet cores. Some rutile and quartz are included in garnets as well. Garnets on the east side tend to be more inclusion rich. |
| **Amphibole ~30%** | Nearly all the amphibole present is (1)- green → light brown with low birefringence. Grains adjacent to each other are not optically continuous except for the large area in the NE corner. |
| **Plagioclase 20%** | Generally~0.5mm or less contained within cpx except for 3 retrograded veins. They both run NE-SW and contained well twinned 4 mm long plag. grains. |
| **Quartz ~3%** | Quartz vein on west side of slide. Present in remainder of the slide as small isolated grains or larger aggregates of small subgrains. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** none

| 4 |
|---|

# Thin Section Petrography Description

UNC Sample #: Bak-03-035(a)T    Petrographer: K. Syvertsen
Lab Sample #: OLV-017    Date: 08-05-03

| Orientation and comments: | 112 ______________<br>83 OH |
|---|---|

## Location:

Quadrangle: Bakersville    UTM: zone 17  397441E 3989143N

| Description: |
|---|

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene ~10%** | The small amount of cpx in this sample is light brown with many plag exsolution blebs. Most cpx is located in the eastern portion of the slide among the smaller garnets. |
| **Garnet ~20%** | See map above. Fractures are not well developed but are most likely NW-SE. Most are rounded with small embayments on the grains' edges. Rims tend to be 0.5-2mm thick plag +/- plag/amphibole symplectite. Inclusions tend to be very fine grained zircon in the grains' cores along with rutile and quartz. |
| **Amphibole ~50%** | All three varieties present. (1) is the most abundant followed by (2) and (3). (1) and (3) seem to grade into each other within the same grain. |
| **Plagioclase ~10%** | Confined to cpx and (amphibole) symplectite in garnet replacement. The latter is extensively albite twinned. |
| **Quartz ~10%** | Many, randomly dispersed, irregular or round grains. They are generally <1mm but some are up to 2mm. |

**Additional comments including textures, structures and/or microstructures present:**

**Associated photo files:** none

3cpx not abundant

# Thin Section Petrography Description

UNC Sample #: Bak-03-036 Petrographer: K. Syvertsen
Lab Sample #: OLV-018 Date: 08-05-03

Orientation and comments: ____________ 141 *Strike is incorrectly labeled 14 on the slide 77 *Dip is wrong on slide

## Location:

Quadrangle: Bakersville UTM: zone 17 397369E 3988266N

Description:

## Thin Section Description:

| Mineral | Comments |
|---|---|
| **Clinopyroxene 20-25%** | Very mottled, only thin remnants of cpx remain in the slide. No omphacite was found. |
| **Garnet ~20%** | Grains range from euhedral to rounded. The edges are undulatory and embayed at times. Sizes range from 0.5-2mm. The fractured are oriented N-S and are visible without a scope. Zircon inclusions are concentrate at the grains' cores. Prismatic rutile are located throughout the garnet and some quartz inclusions can be found towards the grains' edges. |
| **Amphibole 10-15%** | Tends to be amber brown and not very pleochroic. Amphibole is present generally as gradational from pyroxene. |
| **Plagioclase 30-40%** | Plagioclase is a major phase in this slide. The entire slide is mottled with "wormy," often twined (unless surrounded by pyroxene) plag. Most grains are <0.4mm. |
| **Quartz ~5%** | Isolated, randomly dispersed, irregularly shaped grains. Generally they are <1mm with extensive subgrain growth. |

**Additional comments including textures, structures and/or microstructures present:**
A W-E foliation may be present in the slide
**Associated photo files:** none

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