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Volcanology and Petrology Of Submarine Volcanoes of the New Hebrides Island Arc

By

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B.App.Sc. (QUT)

2011

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A Thesis submitted for the degree of Master of Applied Science
Queensland University of Technology

Keywords

New Hebrides Island Arc, submarine volcanism, igneous petrology, geochemistry

Abstract

The New Hebrides Island Arc, an intra-oceanic island chain in the southwest Pacific, is formed by subduction of the Indo-Australian Plate beneath the Pacific Plate. The southern end of the New Hebrides Island Arc is an ideal location to study the magmatic and tectonic interaction of an emerging island arc as this part of the island chain is less than 3 million years old. A tectonically complex island arc, it exhibits a change in relative subduction rate from ~12cm/yr to 6 cm/yr before transitioning to a left-lateral strike slip zone at its southern end. Two submarine volcanic fields, Gemini-Oscostar and Volsmar, occur at this transition from normal arc subduction to sinistral strike slip movement. Multi-beam bathymetry and dredge samples collected during the 2004 CoTroVE cruise onboard the *RV Southern Surveyor* help define the relationship between magmatism and tectonics, and the source for these two submarine volcanic fields. Gemini-Oscostar volcanic field (GOVF), dominated by northwest-oriented normal faults, has mature polygenetic stratovolcanoes with evidence for explosive subaqueous eruptions and homogeneous monogenetic scoria cones. Volsmar volcanic field (VVF), located 30 km south of GOVF, exhibits a conjugate set of northwest and eastwest-oriented normal faults, with two polygenetic stratovolcanoes and numerous monogenetic scoria cones. A deep water caldera provides evidence for explosive eruptions at 1500m below sea level in the VVF. Both volcanic fields are dominated by low-K island arc tholeiites and basaltic andesites with calcalkalic andesite and dacite being found only in the GOVF. Geochemical signatures of both volcanic fields continue the along-arc trend of decreasing K_2O with both volcanic fields being similar to the New Hebrides central chain lavas. Lavas from both fields display a slight depletion in high field strength elements and heavy rare earth elements, and slight enrichments in large-ion lithophile elements and light rare earth elements with respect to N-MORB mantle. Sr and Nd isotope data correlate with heavy rare earth and high field strength element data to show that both fields are derived from depleted mantle. Pb isotopes define Pacific MORB mantle sources and are consistent with isotopic variation along the New Hebrides Island Arc. Pb isotopes show no evidence for sediment contamination; the subduction component enrichment is therefore a slab-derived enrichment. There is a subtle spatial variation in source chemistry which sees a northerly trend of decreasing enrichment of slab-derived fluids.

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Statement of Original Authorship

The work contained in this thesis has not been previously submitted for a degree or diploma at any other higher education institution. To the best of my knowledge, this thesis contains no material previously published or written by another person except where due reference is made.

Signed:  .....

Date:.....1/4/2011.....

Acknowledgements

I would like to sincerely thank the following for contributing their knowledge and expertise to this project Cameron Buchanan Geoscience Australia, Kevin Blake JCU, Zarah Heyworth, Gary Huftile and David Gust. Your help and support is greatly appreciated.

Introduction

Intraoceanic island arcs form by subduction of one plate beneath another. How and why subduction zones are initiated is still largely a mystery, their early formation and the interaction between magmatism and tectonics in young island arcs is not very well understood. The current model predicts that the magmatism of juvenile island arcs consists of three distinct series, low-K tholeiites, tholeiites, and calcalkalic magmas which are a result of dynamic melting of the mantle wedge (Pearce et al., 1995). However more established arcs for example the Izu-Bonin Arc and the Mariana Arc, highlight variations and complexities in island arc models (Arculus, 1994). The study of emerging island arcs therefore provides an opportunity to further constrain the magmatic character of young intraoceanic subduction zones.

Island arcs may also have complex tectonic processes that influence the nature of erupting magmas. The Aleutian Island Arc is divided into a series of volcanic segments which have calcalkalic rocks erupting within the segments and large tholeiitic volcanoes forming at the ends of the segments, as well as a suite of high-Mg andesites at the western end of the arc. The nature of this magmatic distribution is attributed to subduction of transform faults on the Pacific Plate and oblique subduction at the western end of the arc (Kay et al., 1982). Understanding how regional tectonic forces influence the magmatic character of islands arcs is key to understanding the relationship between tectonics and magmatism in young arcs.

Young volcanoes in island arcs are likely to be either partly or entirely submarine, creating difficulty in studying the relationship between magmatism and tectonics in juvenile arcs. Knowledge regarding submarine volcanology is limited by the difficulty in accessing and collecting data from volcanoes that can be located at depths greater than two kilometres. Debate in recent times has focused on the maximum depth to which explosive eruptions can take place, which was originally thought to be as little as 300m but is now thought to be up to 1000m (Cas, 1992; Cas and Wright, 1991; Cashman and Fiske, 1991; McBirney, 1963). By studying the geomorphology and geochemistry of young subaqueous volcanoes in island arcs we can gain a greater understanding of the relationship between magmatism and tectonics in subduction zones.

The New Hebrides Island Arc in the southwest Pacific is a relatively young arc in a complex regional tectonic setting. A great deal of interest in the New Hebrides Island Arc has been directed toward understanding the along and across arc changes in geochemistry and the causes behind such changes (for a tectonic and geochemical description of the arc see Peate et al., 1997; Pelletier et al., 1998; Schellart et al., 2006). Most of this interest to date has been focused on the subaerial islands between 16°S and 20°S; however there are a number of submarine volcanic centres located south of 20°S. These volcanoes are located in the southern section of the arc which is still propagating to the south as spreading continues in the North Fiji Basin (Falvey, 1978), and which experiences a change in strike of the trench before transitioning to a sinistral strike slip zone, the Hunter Fracture Zone (Figure 1). The seamounts are undated but are thought to be less than 3 million years old, providing an opportunity to study the morphology, magmatic and tectonic characteristics of volcanoes in a young island arc.

The aim of this project is to characterise the morphology of two submarine volcanic fields, and investigate the nature of the relationship between magmatism and tectonics in an emerging island arc. This will be achieved by producing the first geological map of the study area from bathymetry, backscatter data and dredge samples; and by developing the petrogenesis of the volcanoes from geochemical analysis. The geological map provides insight into the physical nature of submarine volcanoes, defines the structure of the fields and adds to the global view of subaqueous volcanism. The geochemical results characterise the source from which the volcanoes are derived. These results are combined to interpret a regional magmatic-tectonic pattern for the southern end of the arc and therefore gain insight into the interaction between magmatism and tectonics in an emerging island arc.

Geological Setting

The New Hebrides Island Arc is a ~1400 km long intra-oceanic island chain situated in the southwest Pacific roughly 1800 km northeast of Australia. The arc is largely subaerial and predominantly basaltic in composition (Macfarlane et al., 1988). A number of submarine volcanic edifices below 20°S have been the focus of

petrological, geochemical and geodynamic investigations in recent times (Maillet et al., 1986; Monzier et al., 1993; Monzier et al., 1984; Monzier et al., 1997). Three main zones of magmatic and tectonic activity are identified on the basis of age and composition; the western belt, the eastern belt and the central chain (Figure 1) with the oldest rocks being submarine lavas and volcaniclastics of Oligocene-Early Miocene age in the Western Belt (Gorton, 1977; Mitchell and Warden, 1971).

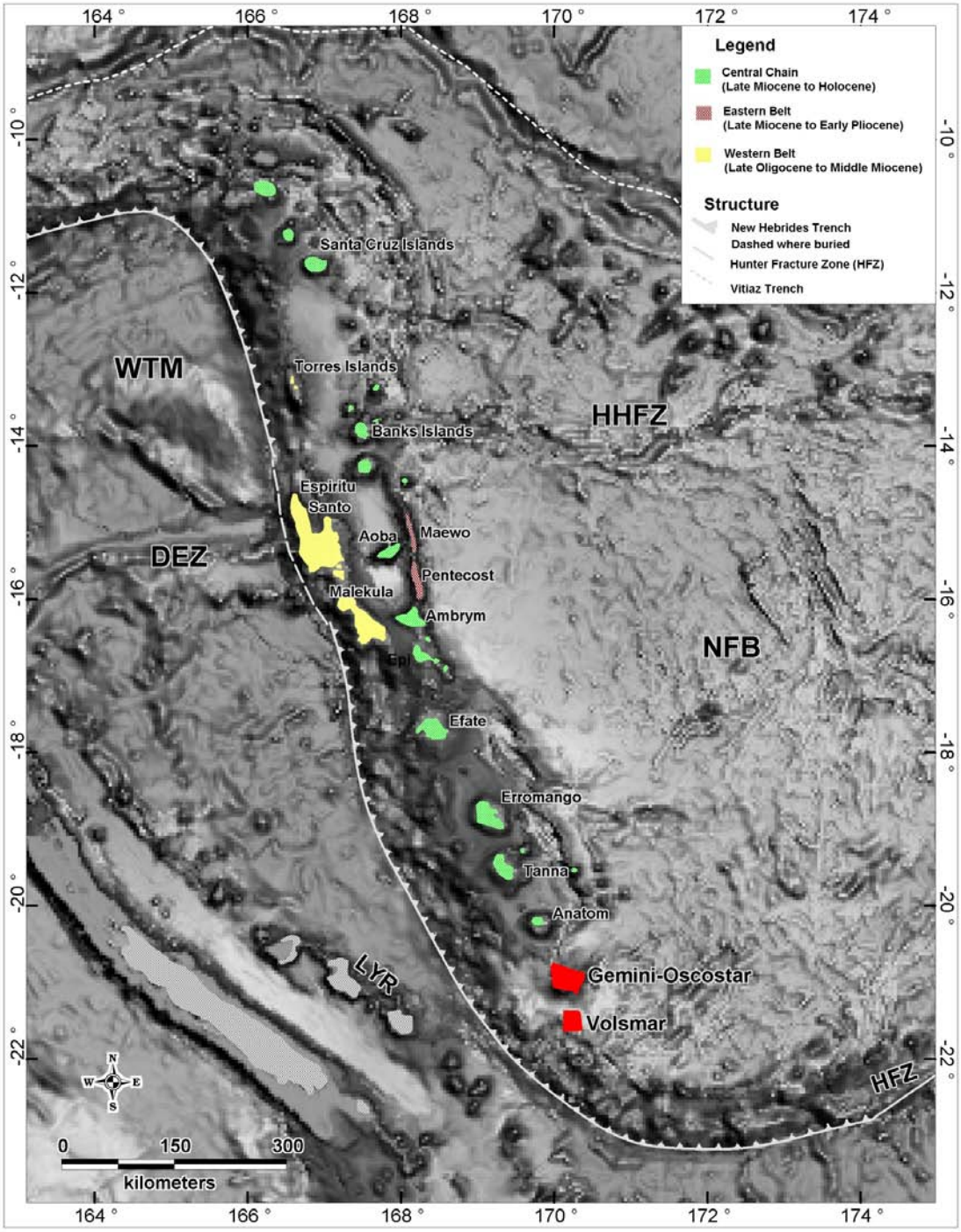


Figure 1 Tectonic Setting of the New Hebrides Island Arc

The subaerial islands of the New Hebrides Island Arc are subdivided into three belts based on geological age, the western belt, the eastern belt and the central chain (Mitchell and Warden, 1971). Three features on the Indo-Australian Plate are colliding with the arc, the Loyalty Ridge (LYR), the D'Entrecasteaux Zone (DEZ) and the West Torres Massif (WTM). A number of spreading ridges accommodate extension in the North Fiji Backarc basin (NFB), for example the Hazel Holme Fracture Zone (HHFZ). The study area, Gemini-Oscostar volcanic field and Volsmar volcanic field, are highlighted in red.

While the oldest rocks are Late Oligocene, the New Hebrides Island Arc is thought to have originated in the Eocene as the result of subduction of the Pacific Plate along the Vitiaz Trench (Falvey et al., 1991; Gill and Gorton, 1973; Kroenke, 1984). From 25-14 Ma the islands of Espiritu Santo, Malekula and the Torres Islands formed (known as the western belt) due to westward subduction of the Pacific Plate (Carney and MacFarlane, 1982; Mitchell and Warden, 1971). Two major collisions along the Vitiaz Trench occurred in the middle Miocene; the Ontong Java Plateau collided with the Solomon Islands to the northwest of the New Hebrides chain, followed by the Melanesian Border Plateau with the proto-New Hebrides Island Arc (Carney and Macfarlane, 1978; Dunkley, 1983; Falvey, 1975; Musgrave and Firth, 1999). It is thought the latter collision of the Melanesian Border Plateau caused a reversal in arc polarity with the initiation of subduction of the Indo-Australian Plate beneath the Pacific Plate and the termination of subduction at the Vitiaz Trench (Schellart et al., 2006).

Spreading in the North Fiji Backarc basin initiated roughly 12 Ma (Auzende et al., 1995) and accommodated migration and south-westwards rotation of the arc-trench, palaeomagnetism results imply ~28–52° clockwise rotation since the Late Miocene (Falvey, 1975; Greene et al., 1994; Musgrave and Firth, 1999). Volcanism in the eastern belt (Maewo and Pentecost) in the Early Pliocene (7-4 Ma) took place due to the now east-dipping subduction of the Indo-Australian Plate (Mitchell and Warden, 1971), while deposition of pelagic material and subsidence occurred within the western belt (Carney and MacFarlane, 1982). Present day volcanism occurs in the Central Chain (first initiated 6 Ma), particularly at Yasur volcano on the island of Tanna (Mitchell and Warden, 1971).

At present, three main features on the Indo-Australian Plate are colliding with the New Hebridean Arc: the D'Entrecasteaux Zone, the Loyalty Ridge and the West Torres Massif (Figure 1) (Greene and Collot, 1994; Maillet et al., 1983; Taylor, 1992). Subduction rates along the length of the arc determined by Louat and Pelletier (1989) range from 16, 15, 9 and 12 cm/yr at 11°, 12.5°, 15.5° and 20°S respectively. The slowest convergence rate of 9 cm/yr is seen in the region where the D'Entrecasteaux Zone is colliding with the central section of the arc (Louat and

Pelletier, 1989). A number of anomalous observations are recorded in this part of the arc; for example, compression in the backarc is only found between 13° 30'S and 17°S directly opposite the collision, a break in the trench opposite the larger islands of Espiritu Santo and Malekula occurs between 14° 30'S and 17°S, and there is significant major, trace and isotopic differences directly opposite the collision zone (Collot et al., 1985; Louat and Pelletier, 1989; Peate et al., 1997).

The southern section of the New Hebridean Arc is unusual for an intraoceanic island arc. The trench experiences a change in strike from NNW to EW (below 22°S) before transitioning to a major sinistral strike slip zone called the Hunter Fracture Zone, which joins the southern end of the New Hebrides Island Arc with the west-dipping Kermadec Trench. Where the strike of the arc is EW the Indo-Australian Plate is subducted to the north at the slow convergence rate of 6 cm/yr beneath the North Fiji Basin (Pelletier et al., 1998). A geodynamic model for the southern section of the New Hebridean Arc by Monzier et al. (1984) proposes that the Benioff zone shortens from 350 to 220 km below 20°S and that the curvature of the subduction zone results in two major hinges, trending N70°E, bisecting the slab between 22° and 23°S.

Previous Work at Study Site

Gemini-Oscostar and Volsmar volcanic fields are located at the southern termination of the New Hebrides Island Arc, ~60 km south of Anatom Island (Figure 1). Little is known of the morphology, magmatic history and structural setting of the volcanoes. There is no detailed bathymetry published for the volcanic fields, and the sample dataset for Gemini-Oscostar (GOVF) and Volsmar (VVF) volcanic field is extremely sparse with the only published data being from the ORSTOM cruise onboard the *RV Alis*, 1989 (Monzier et al., 1993). Absolute ages of the volcanoes have not been determined, however, they are likely to be less than 3 million years old (Monzier et al., 1993).

The structural setting of the southern end of the New Hebrides Island Arc is relatively complex. Historic shallow (0-70m) centroid-moment tensor solutions show VVF is characterised by NE-oriented left-lateral strike slip motion (Figure 2),

while GOVF is characterised by NNE-oriented left-lateral strike slip motion (Dziewonski and Woodhouse, 1983; Monzier et al., 1993). Regional geodynamic models proposed for the New Hebrides Island Arc (Pelletier et al., 1998) do not provide a clear understanding of the tectonics of GOVF and VVF.

Geochemical analysis of samples from the southern end of the New Hebrides Island Arc (excluding the current study) identify two distinct volcanic suites: a 'normal' calcalkalic suite with similarities to rocks of the New Hebrides central chain and a high-Mg andesite suite with some boninitic affinities. All the samples show systematically lower K_2O compared to New Hebrides central chain volcanoes. Samples from Gemini East volcano and Volsmar volcano are tholeiitic and similar to samples from the New Hebrides central chain suite. Gemini West volcano however shows incompatible trace element and REE patterns similar to Gemini East volcano but major element characteristics of the high-Mg andesite suite (Monzier et al., 1993).

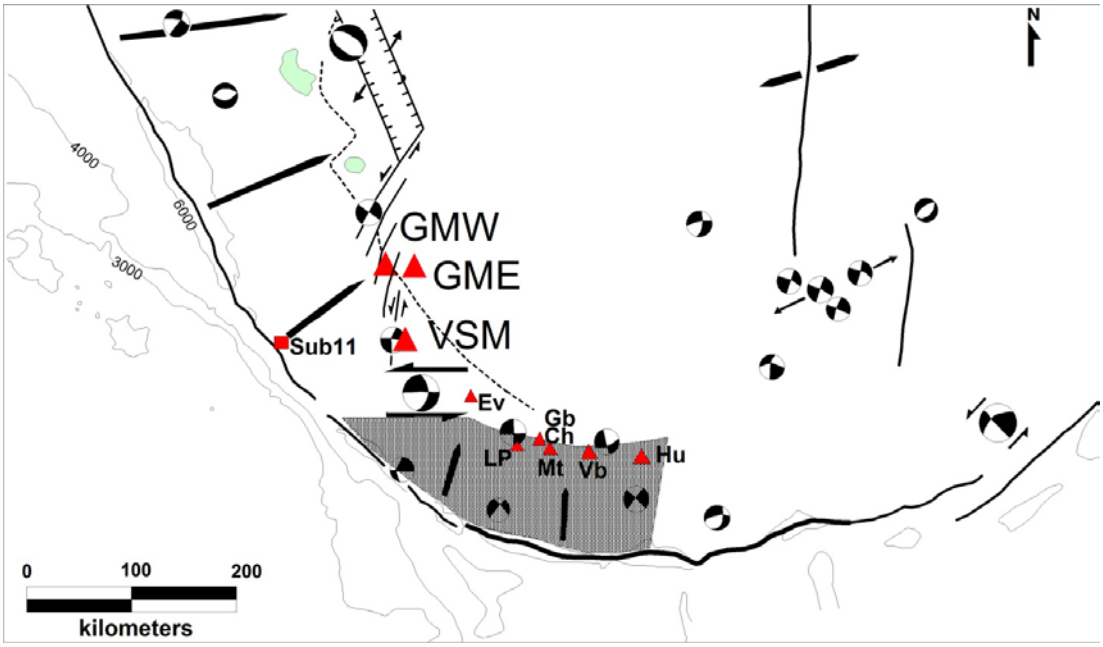


Figure 2 Southern New Hebrides Seamounts

The ORSTOM cruise sampled a number of submarine seamounts in the southern end of the New Hebrides Island Arc including Gemini West volcano (GMW), Gemini East volcano (GME), Volsmar volcano (VSM), Eva (Ev), La Perouse (LP) , Gilbert (Gb), Charlotte (Ch) and Vauban (Vb), and SUBPSO 11 Nautile dive locality (Sub11) (Monzier et al., 1993). Matthew (Mt) and Hunter (Hu) islands were also sampled and dredged on the ORSTOM cruise. Shallow (0-70m) centroid-moment tensor solutions (Dziewonski and Woodhouse, 1983) indicate predominantly northeast strike slip motion in both Gemini-Oscostar and Volsmar volcanic field (Dziewonski and Woodhouse, 1983). Figure after (Monzier et al., 1993).

Methods

Sampling and Analysis

The CoTroVE research cruise onboard the *RV Southern Surveyor* (2004) sampled and swath-mapped GOVF and VVF (Figure 3). Gemini East and Gemini West volcanoes of Monzier et al. (1993) were renamed Oscostar and Gemini South respectively. Samples were collected by dredge bucket; eleven dredges were performed at GOVF and eight at VVF (Figure 4 and Figure 5). The dredges were located by the GPS onboard, with an error of roughly 5m. Due to the nature of dredge sampling, multiple samples were retrieved from some dredges; twenty-five samples were recovered from GOVF and twenty-three samples from VVF (Table 1). Dredge sites included calderas, flanks and parasitic cones of both GOVF and VVF. Twenty-nine samples were appropriate for polished thin section preparation, fourteen from VVF and fifteen from GOVF.

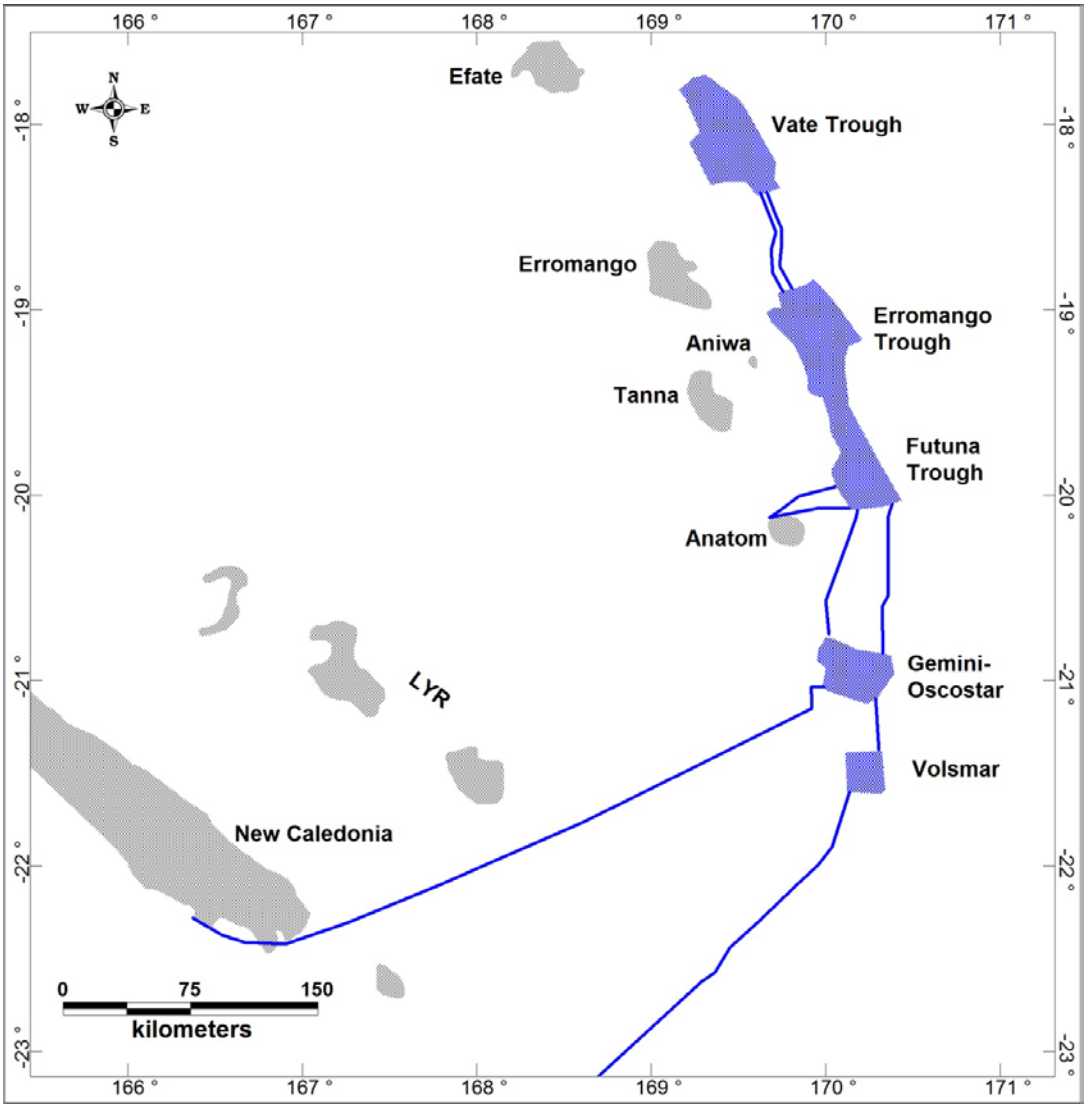


Figure 3 CoTroVE Voyage Track

Voyage track of *RV Southern Surveyor* cruise SS06/2004 marked in blue (lines and stipple). Departure was from Noumea, New Caledonia on Wednesday 2nd June 2004 and the end point was Sydney on Sunday 27th June 2004. Datum and projection is Lat/Long WGS84.

Table 1 Sample Manifest

Lithology of dredge samples from Gemini-Oscostar and Volsmar volcanic fields, collected during the 2004 CoTroVE cruise onboard the *RV Southern Surveyor*. Depth is in meters below sea level. Coordinates refer to the on or off-bottom position of the dredge bucket, which was located directly below the ship's hull.

Sample	Description	Depth on bottom	Depth off bottom	Latitude (on bottom)	Longitude (on bottom)	Latitude (off bottom)	Longitude (off bottom)
CD-01-1	Black porphyritic ol-pyx vesicular basalt.	508	593	-20.859783	170.028617	-20.85850	170.024300
CD-02-1	Light grey porphyritic plag phyric dacite with sulphur encrusted chill margin. 60% of plagioclase phenocrysts are altered.	207.5	149	-21.009000	170.051400	-20.01085	170.056683
CD-02-2	Mixed light-dark ashy rock with sulphur.	207.5	149	-21.009000	170.051400	-20.01085	170.056683
CD-02-3	Dark orange friable altered pumice.	207.5	149	-21.009000	170.051400	-20.01085	170.056683
CD-02-5	Light grey porphyritic andesite with manganese and coral encrusted surface.	207.5	149	-21.009000	170.051400	-20.01085	170.056683
CD-02-6	Pink-light grey altered porphyritic andesite.	207.5	149	-21.009000	170.051400	-20.01085	170.056683
CD-03-2	Pumice.	468	395	-21.001450	170.029767	-20.00360	170.031367
CD-04-1	Dark grey plagioclase phyric pumice.	423	322	-21.041733	170.068550	-20.04250	170.067000
CD-04-2	Plagioclase phyric pumice with sediment infilled vesicles.	423	322	-21.041733	170.068550	-20.04250	170.067000
CD-05-1	Vesicular porphyritic plagioclase and pyroxene phyric andesite.	835	702	-20.972217	170.099567	-20.98090	170.101933
CD-06-1	Black porphyritic vesicular ol basalt.	867	820	-20.859783	170.161317	-20.97928	170.152067
CD-07-1	Black porphyritic vesicular ol basalt.	720	670	-21.053217	170.232500	-20.05480	170.233583
CD-08-1	Dark grey vesicular basaltic andesite with minor amount of small vesicles present (10%).	348	305	-20.986833	170.276917	-20.98690	170.278500
CD-08-2	Vesicular pophyritic plagioclase phyric basalt.	348	305	-20.986833	170.276917	-20.98690	170.278500
CD-08-3	Hydrothermally altered aphyric pumice/dacite.	348	305	-20.986833	170.276917	-20.98690	170.278500
CD-08-4	waxy-grey plag phyric	348	305	-20.986833	170.276917	-20.98690	170.278500
CD-08-5	waxy-grey plag phyric (more plag than CD-08-4)	348	305	-20.986833	170.276917	-20.98690	170.278500
CD-08-6	Crushed basaltic material with sediment.	348	305	-20.986833	170.276917	-20.98690	170.278500
CD-09-1	Black porphyritic ol vesicular basalt.	722	637	-20.970950	170.219183	-20.97207	170.221650
CD-09-2	moderately vesicular plag-cpx-ol phyric basalt	722	637	-20.970950	170.219183	-20.97207	170.221650
CD-09-3	Basaltic scoria with granular sediment and echinoderms.	722	637	-20.970950	170.219183	-20.97207	170.221650
CD-10-1	Light grey vesicular basalt.	638	576	-20.908883	170.332933	-20.91087	170.333983
CD-10-2	Iron-rich basaltic breccia	638	576	-20.908883	170.332933	-20.91087	170.333983
CD-40-1	Ash to gravel sized black plagioclase phyric basaltic scoria.	74	79	-20.992600	170.285217	-20.99133	170.285733
CD-40-2	Black porphyritic ol vesicular basalt.	74	79	-20.992600	170.285217	-20.99133	170.285733
CD-41-1	Black vesicular porphyritic plag opx phyric basalt.	734	709	-21.425167	170.263500	-21.44288	170.263367
CD-42-3	Ash to lapilli sized basaltic tephra.	1613	1367	-21.490833	170.257667	-21.49417	170.267050
CD-42-4	Ash sized basaltic tephra	1613	1367	-21.490833	170.257667	-21.49417	170.267050

Sample	Description	Depth on bottom	Depth off bottom	Latitude (on bottom)	Longitude (on bottom)	Latitude (off bottom)	Longitude (off bottom)
	with sediment.						
CD-43-1	Dark grey ol-cpx vesicular basalt.	1885	1885	-21.584567	170.280733	-21.58527	170.281617
CD-43-2	Ash to lapilli sized basaltic tephra with sediment.	1885	1885	-21.584567	170.280733	-21.58527	170.281617
CD-43-3	Dark grey ol-cpx vesicular basaltic andesite.	1885	1885	-21.584567	170.280733	-21.58527	170.281617
CD-43-4	Dark grey ol-cpx vesicular basaltic andesite.	1885	1885	-21.584567	170.280733	-21.58527	170.281617
CD-43-5	Dark grey ol-cpx vesicular basaltic andesite.	1885	1885	-21.584567	170.280733	-21.58527	170.281617
CD-44-1	Vesicular aphyric clinkers/spatters, heavily coated in mud.	1821	1754	-21.545200	170.193500	-21.54650	170.195350
CD-44-2	Ash to lapilli sized basaltic tephra with sediment.	1821	1754	-21.545200	170.193500	-21.54650	170.195350
CD-45-1	Black plagioclase phyric vesicular basalt.	1457	1340	-21.556633	170.201467	-21.55803	170.204583
CD-45-2	Vesicular cpx phyric basalt.	1457	1340	-21.556633	170.201467	-21.55803	170.204583
CD-46-1	Black cpx plagioclase phyric basalt.	1346	1497	-21.522383	170.184817	-21.52400	170.191533
CD-46-3	Lapilli sized basaltic tephra in sediment.	1346	1497	-21.522383	170.184817	-21.52400	170.191533
CD-47-1	Black olivine vesicular basalt.	1008	831	-21.463967	170.218767	-21.46425	170.222050
CD-47-2	Ash sized basaltic tephra with pelagic sediment and echinoderms.	1008	831	-21.463967	170.218767	-21.46425	170.222050
CD-48-1	Black ol vesicular basalt. Fresh uncut surface is knobbly.	1438	1396	-21.450633	170.190483	-21.45180	170.194883
CD-48-2	Black ol vesicular basalt. Fresh uncut surface is knobbly.	1438	1396	-21.450633	170.190483	-21.45180	170.194883
CD-48-3	Ash and lapilli sized basaltic tephra with sediment and echinoderms.	1438	1396	-21.450633	170.190483	-21.45180	170.194883
CD-48-4	Black ol vesicular basalt. Fresh uncut surface is knobbly.	1438	1396	-21.450633	170.190483	-21.45180	170.194883
CD-48-5	Sediment covered cpx phyric basalt.	1438	1396	-21.450633	170.190483	-21.45180	170.194883
CD-48-6	Sediment covered cpx phyric basalt.	1438	1396	-21.450633	170.190483	-21.45180	170.194883
CD-48-7	Sediment covered plagioclase phyric basalt.	1438	1396	-21.450633	170.190483	-21.45180	170.194883

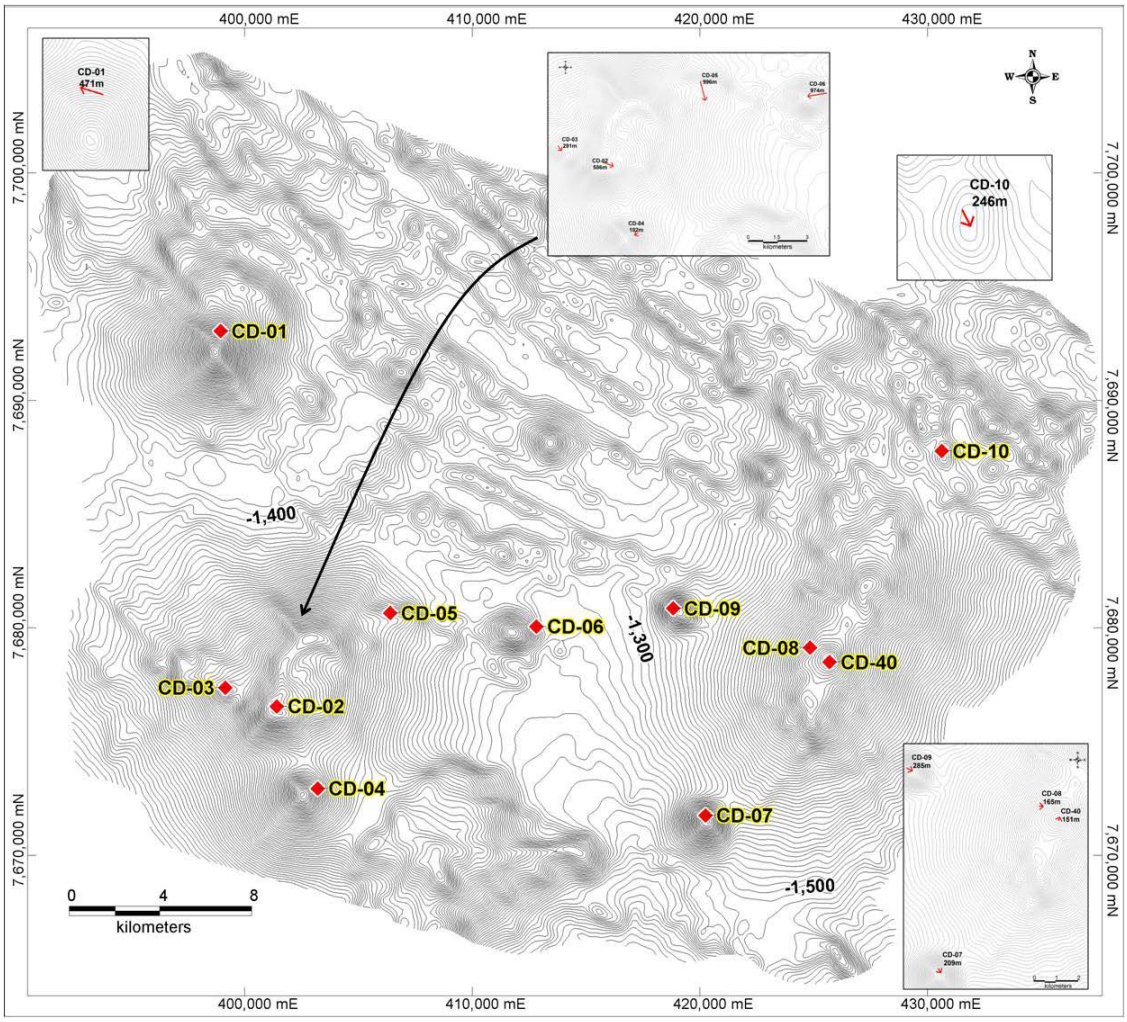


Figure 4 Dredge Sites in the Gemini-Oscostar Volcanic Field

Location of dredge sites from Gemini-Oscostar volcanic field with multi-beam bathymetry, at 20m contour intervals, in the background. Dredge sites (red diamonds) included stratovolcanoes and scoria cones. For dredges CD-02, CD-04, CD-08, CD-09, CD-10 multiple samples were recovered. Insets show dredge tracks, with arrows indicating the direction of travel. For on and off-bottom coordinates see Table 1.

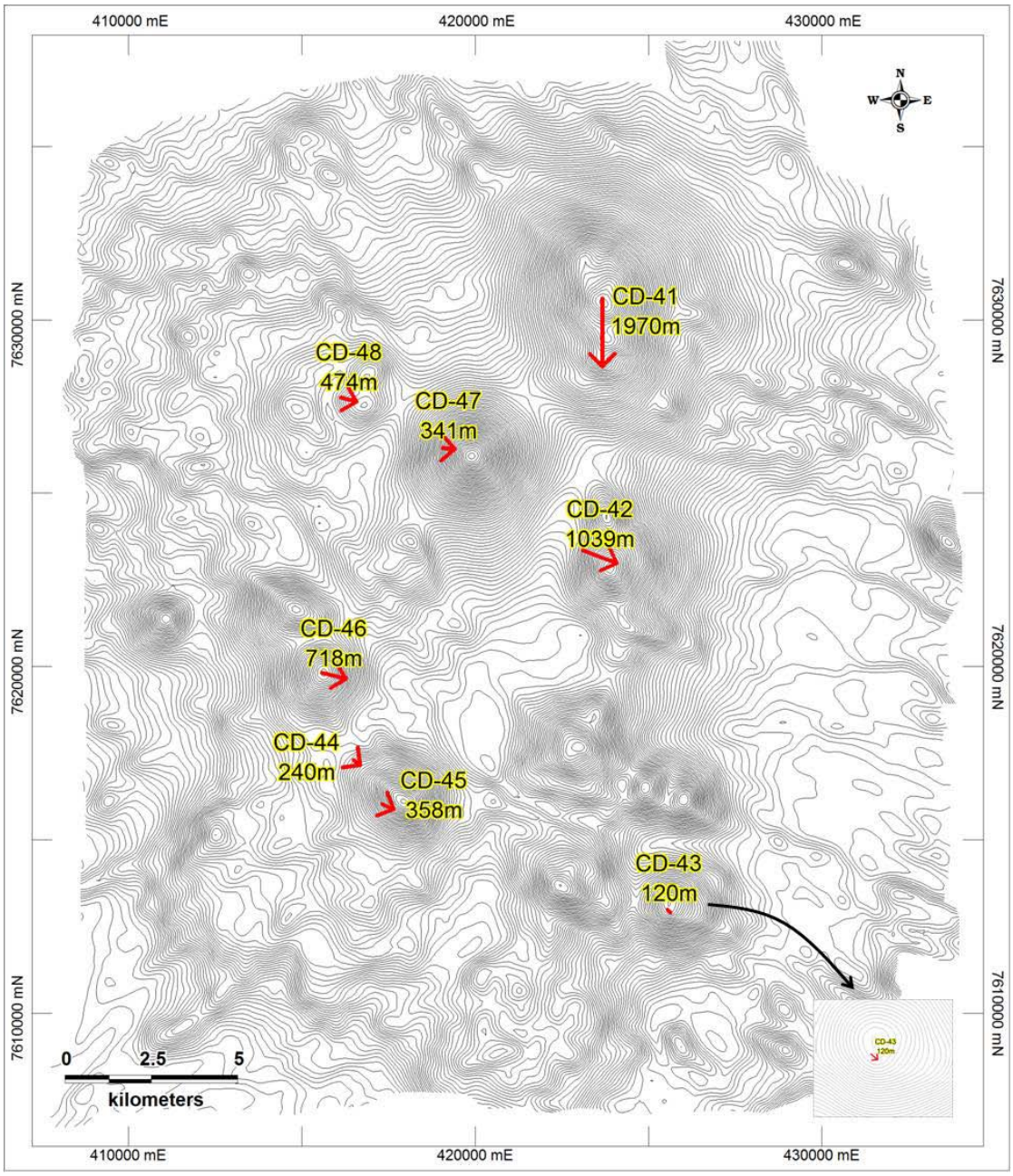


Figure 5 Dredge Sites in the Volsmar Volcanic Field

Location of dredge sites from Volsmar volcanic field with multi-beam bathymetry, 20m contour intervals, in the background. Dredge sites (red diamonds) included stratovolcanoes and scoria cones. All dredges with the exception of CD-41 retrieved multiple samples. Dredge tracks are shown by a red arrow, indicating the direction of travel. For on and off-bottom coordinates see Table 1.

Thirteen polished thin sections were selected for electron microprobe (EMP) analysis at the Australian Microscopy and Microanalysis Research Facility JCU, Townsville. Analysis was conducted on a Jeol JXA-8200 Superprobe by wavelength dispersive spectrometers (WDS). The operating conditions were 15 kV accelerating voltage, 20 nA beam current, 180 seconds count time, working distance of 11mm and a beam width of 3 µm.

Astimex standards used for calibration were kyanite for SiO_2 and Al_2O_3, hematite for FeO, tugtupite for Cl, olivine for MgO, wollastonite for CaO, spessartine for MnO, jadeite for Na_2O and orthoclase for K_2O (Table 2). Calibration included a PRZ (Phi-rho-z) matrix correction (Potts et al., 1995). Phenocryst and groundmass phases were analysed, core to rim transects were undertaken where zoning was observed in phenocrysts. Simple core to rim analysis was conducted on phenocrysts that showed little compositional variation.

Table 2 EMP Analysed Results for Astimex Standards

Standard	SiO_2	TiO_2	Al_2O_3	FeO	MnO	MgO	CaO	Na_2O	K_2O	Total
Kyanite	40.92	0.00	0.00	7.82	0.14	51.07	0.00	0.00	0.00	99.95
Hematite	41.10	0.00	0.00	7.59	0.16	50.59	0.01	0.00	0.00	99.46
Tugtupite	40.77	0.05	0.00	7.79	0.09	50.62	0.00	0.00	0.00	99.32
Olivine	51.24	0.00	0.00	0.01	0.00	0.09	48.41	0.01	0.00	99.76
Wollastonite	51.45	0.01	0.00	0.00	0.03	0.11	48.19	0.01	0.00	99.79
Kyanite	51.17	0.00	0.00	0.04	0.01	0.12	48.21	0.01	0.00	99.57
Spessartine	36.64	0.06	21.34	2.23	40.64	0.01	0.07	0.02	0.00	101.01
Jadeite	36.61	0.13	21.47	2.23	40.82	0.00	0.08	0.00	0.00	101.35
Orthoclase	36.72	0.07	21.25	2.12	40.52	0.01	0.07	0.02	0.00	100.78

Thirty-nine samples were selected for major element analysis. These were crushed to chips (2cm or less), placed in an ultra-sonic cleaner and in a 6N HCl bath for 1 hour at room temperature to remove residual carbonate material. The samples were crushed to powder with an agate mortar and pestle. Samples were prepared following the method of Kwiecien (1993) with a hydrofluoric acid digest overnight and dilution to 200ml. Loss on ignition was used to determine volatile content (H_2O^+, CO_2 and S) and involved heating samples in a silica crucible to 900°C for 20 minutes.

Major elements (Si, Ti, Al, Fe, Mn, Ca, Na and K) and two trace elements (Ba, Sr) were determined by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) while Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) determined P. Samples were run in batches of 10 with one blank and 6 internal standards inserted between each batch for calibration, as well as a control (standard AGV-2) inserted halfway through each batch. The internal standards were G-2, GSP-1, AGV-2, BCR-1 and W-2 and were referenced back to the original USGS standards of the same name. Both the control and calibration standards correlated extremely well with the accepted values (Table 3). IGPET (Igpet 32) software (using least squares best fit for major elements and Rayleigh fractionation equations for trace elements) was used for modelling.

Table 3 Comparison of Published and Analysed Results for Selected USGS Standards by ICP-OES

Published and analysed results for two standards used in major element determination. The published values are taken from the USGS powdered and archival sample website http://minerals.cr.usgs.gov/geo_chem_stand/index.html

	G-2 Published Value	Analysis	AGV-2 Published Value	Analysis
SiO_2	69.14	69.19	59.3	59.3
TiO_2	0.48	0.48	1.05	1.05
Al_2O_3	15.39	15.23	16.91	16.91
Fe_2O_3	2.66	2.67	6.69	6.69
MnO	0.03	0.035		0.1
MgO	0.75	0.75	1.79	1.79
CaO	1.96	1.98	5.2	5.2
Na_2O	4.08	4.08	4.19	4.19
K_2O	4.48	4.48	2.88	2.88
P_2O_5	0.14		0.48	
Total	**99.11**	**98.90**	**98.49**	**98.11**
Ba	1880	1900	1140	1140
Sr	478	478	658	658

All trace element concentrations (Sc, V, Cr, Ga, Rb, Sr, Y, Zr, Nb, Cs, Ba, La, Ce, Nd, Sm, Eu, Gd, Dy, Er, Yb, Lu, Hf, Ta, Pb, Th and U) were determined on glass discs by Laser Ablation, Inductively-Coupled Plasma Mass Spectrometry (LA-ICP-

MS) at the Research School of Earth Science, ANU. Glass discs were prepared by fusing 0.5 grams of powdered sample with 1.5 grams of Li-borate flux for 15 minutes at 1190°C. The LA-ICP-MS uses an ArF (193nm) EXCIMER laser and a Fisons PQ2 STE ICPMS. Full instrument details are outlined in Eggins and Shelley (2003). A spot size of 100µm and a repetition rate of 5Hz was used; counting time was set at 70 seconds. Instrument calibration was against NIST 612 glass and background analysis time was 30 seconds. ^{29}Si, ^{44}Ca, ^{49}Ti and ^{55}Mn were employed as internal standard isotopes, based on concentrations previously measured by ICP-OES. Rare earth element (REE) results were normalized to C1 Chondrite using data from Taylor and McLennan (1985).

Isotope analysis on five samples from the GOVF and five samples from the VVF were measured by multiple collector inductively-coupled-plasma mass spectrometer (MC-ICP-MS) at the University of Florida's Department of Geological Sciences. Methodology is detailed in Kamenov et al. (2008). Long term 2σ results and standard values can be found in Appendix A.

Mapping

Swath-mapping was undertaken at GOVF and VVF with multibeam sonar using the Simrad EM300 system 30 kHz 1°/1° (1° transmitter 1° received), onboard the *RV Southern Surveyor*. The data were collected along parallel track lines with line spacing between 3300 and 3800m. Rapid changes in seafloor topography produced gaps in coverage from 200-500m, resulting in 'holes' in the bathymetry data. After the completion of swath-mapping major data gaps were filled in, and subsequent passes during dredging operations covered minor data gaps.

The multibeam bathymetry data was processed using CARIS software (Cameron Buchanan at Geoscience Australia, Canberra). The appropriate resolution for interpretation (Table 4), taking into account the range in depth values for both volcanic fields, was determined as 5m for the summit of Gemini South and Oscostar volcanoes (Figure 7), and 28m for two overview maps of GOVF and VVF (Figure 6, Figure 8). Interpolation with a nearest neighbour setting of 5 was applied to all images in order to fill any 'holes' in the data. A series of georeferenced tiff files at

all possible Sun-shading angles were created from the original data for use in MapInfo and ER Mapper programs.

GIS adjust the brightness of grid cell colours to indicate slope direction relative to a defined light source direction. The program determines the orientation and assigns a brightness value to each cell, the maximum brightness occurring where the cell is perpendicular to the Sun's rays. This enhances the 3D aspect of the image and, even though the data has been collected under water, it appears to be hit by the Sun's rays. For interpretation purposes four different images were used, each Sun-shaded from the four azimuths. It is important to use all four images because the flank of a volcano not hit by the Sun's rays will be dark and may obscure important geomorphological information.

Table 4 Details of Resolution Parameters for Bathymetry Data

The resolution is a square box within which reflections are detected, also known as the grid cell or footprint. To see fine textural information a small resolution is useful, however to see gross structural information a larger resolution is necessary. Vertical exaggeration was applied to all images as it increases shadowing and artificial Sun-shading, which provides a better 3D image.

Locality	**Resolution**	**Vertical Exaggeration**	**Datum/ Projection**
Gemini South Caldera	5m	7	UTM/59S
Gemini-Oscostar volcanic field	28m	5	UTM/59S
Volsmar volcanic field	28m	5	UTM/59S

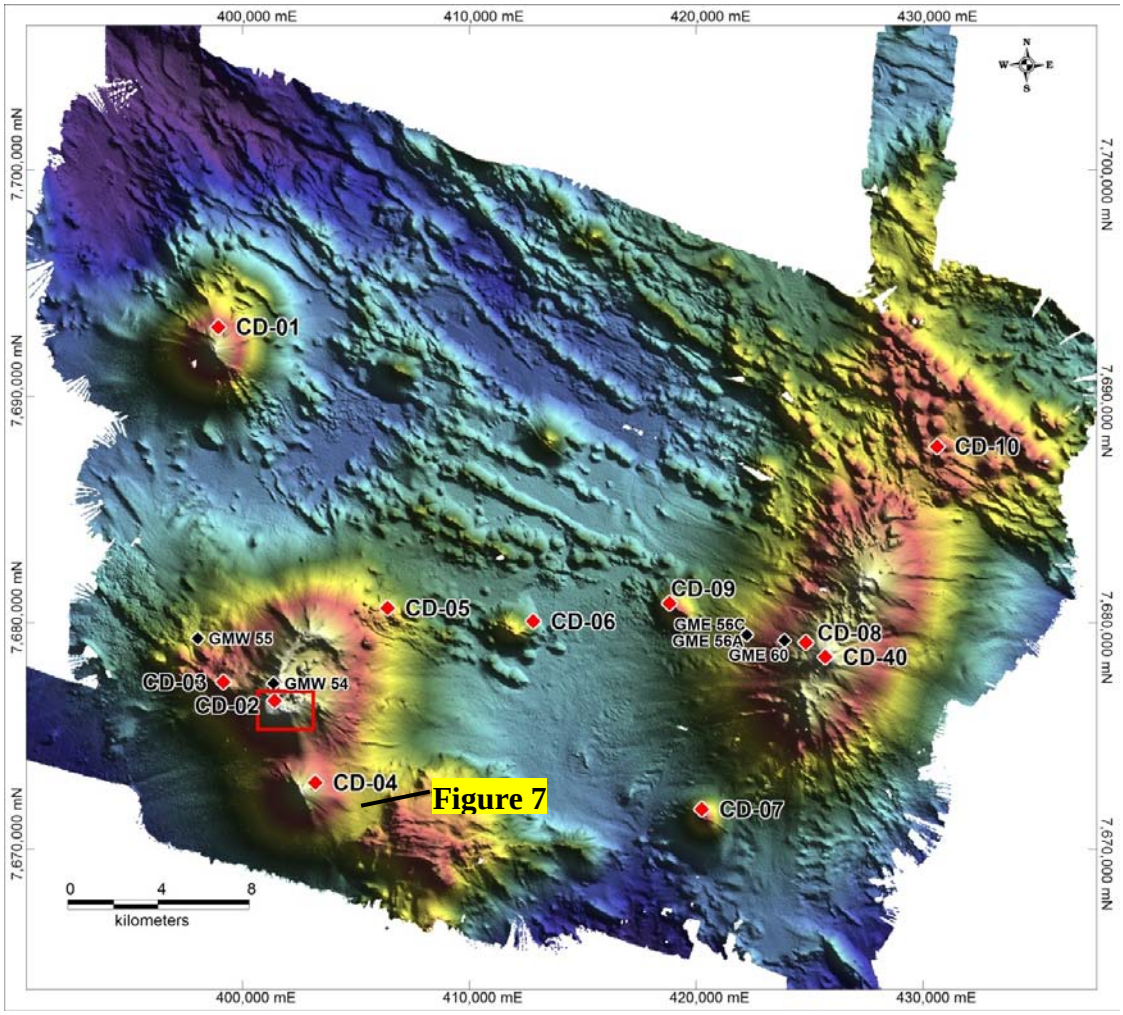


Figure 6 Gemini-Oscostar Volcanic Field Bathymetric Map

Northeast Sun-shaded bathymetry map of Gemini-Oscostar volcanic field with resolution of 28m. Eleven dredges (red diamonds) were collected by the RV *Southern Surveyor* (current study) five dredges (black diamonds) were collected by the RV *Alis* (Monzier et al., 1993).

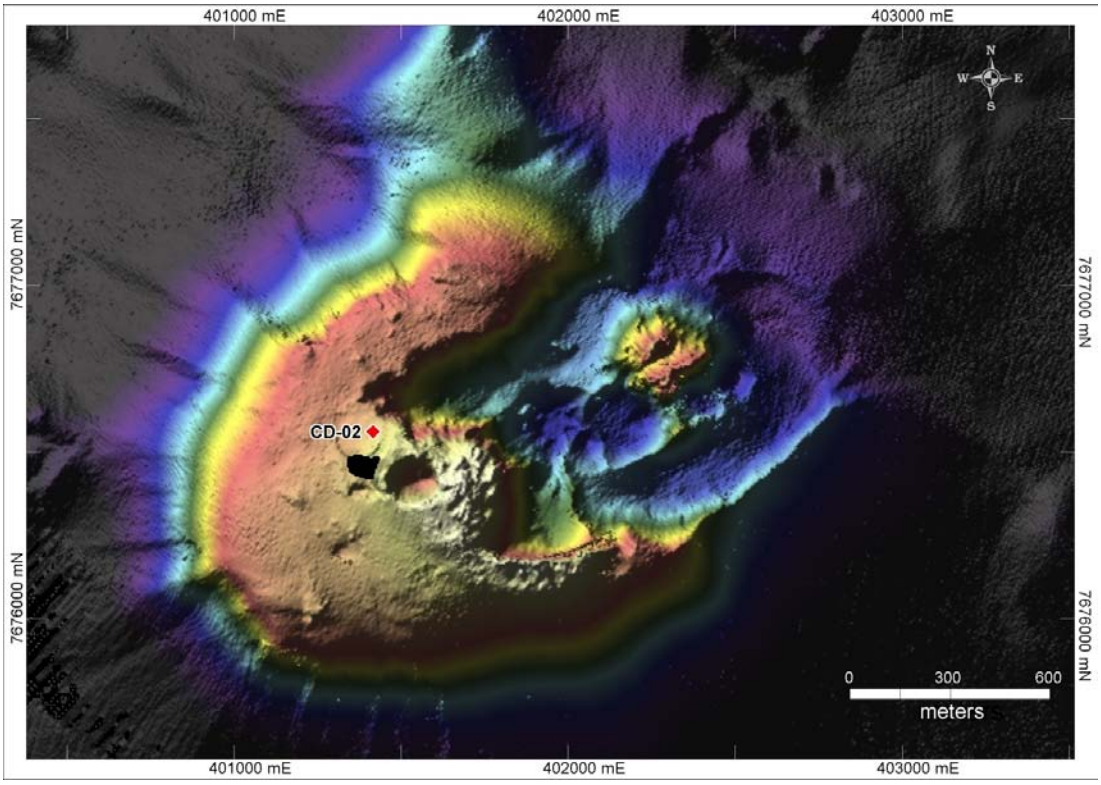


Figure 7 Bathymetry of Gemini South Caldera

In order to enhance the image for Gemini South caldera (Gemini-Oscostar volcanic field), a resolution of 5m was used. Note the greater detailed achieved. This image is Sun-shaded from the northwest. Dredge CD-02 (diamond) sampled multiple lithologies including two-pyroxene andesite and dacite.

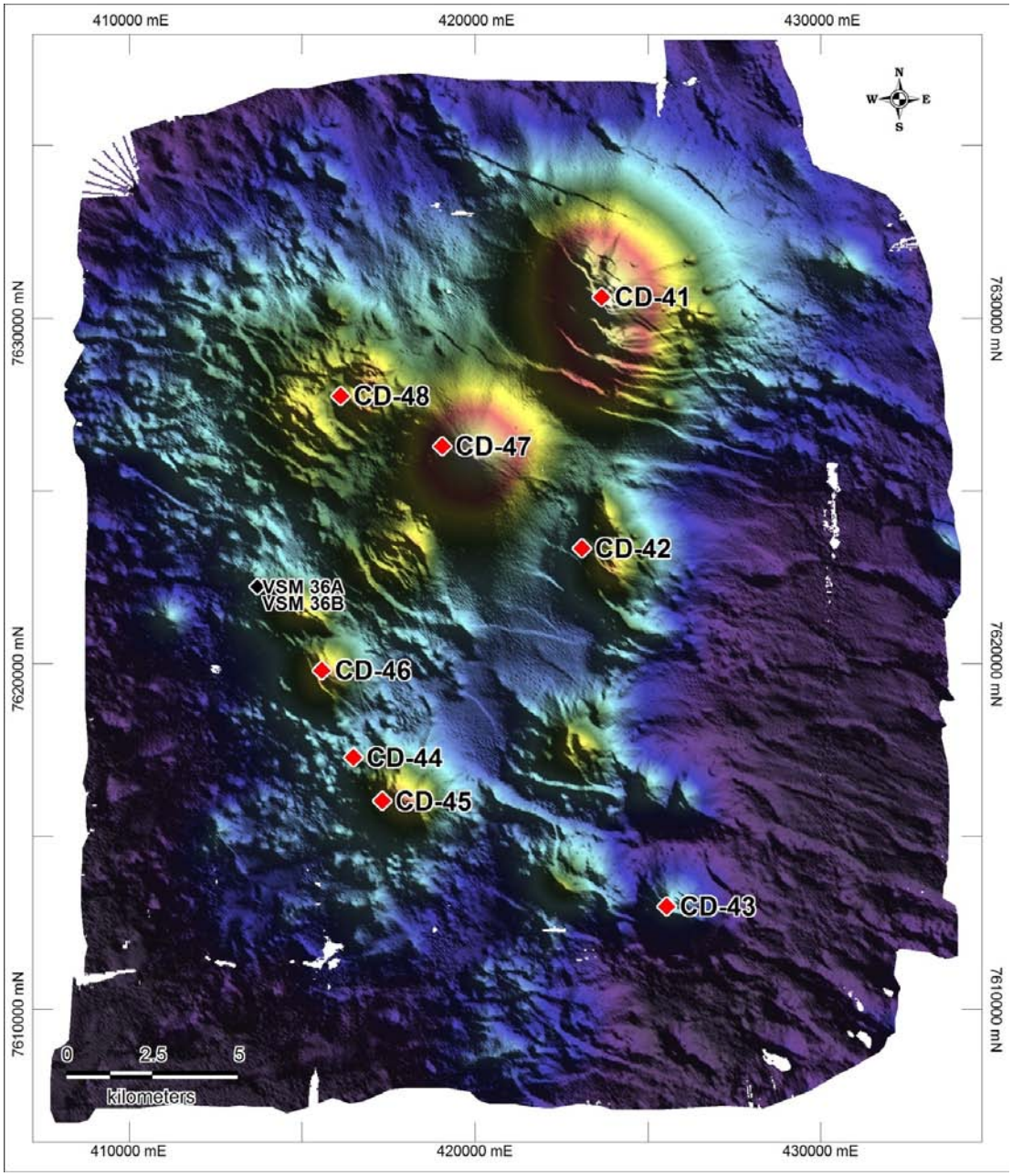


Figure 8 Volsmar Volcanic Field Bathymetric Map

Northeast Sun-shaded bathymetry map of the Volsmar volcanic field at 28m resolution. Eleven dredges were collected by the RV *Southern Surveyor* (red diamond), two dredges (black diamond) were collected by the RV *Alis* (Monzier et al., 1993).

A backscatter intensity image was also produced for both volcanic fields (Figure 9, Figure 10). Backscatter intensity is related to the nature of the seafloor and slope angle (Ondreas et al., 1997). High values indicate a rough seafloor surface while low values indicate a smooth seafloor surface. The nature of a backscatter image is usually greyscale; to aid the interpretation, a red-blue colour grid was applied to enhance the difference between a low and high response. The colour grid ranges from blue as the maximum value (240) to red as the minimum value (140). The resolution (grid cell) for the backscatter intensity is 15m for both fields. The datum and projection for the bathymetry and backscatter is UTM59S.

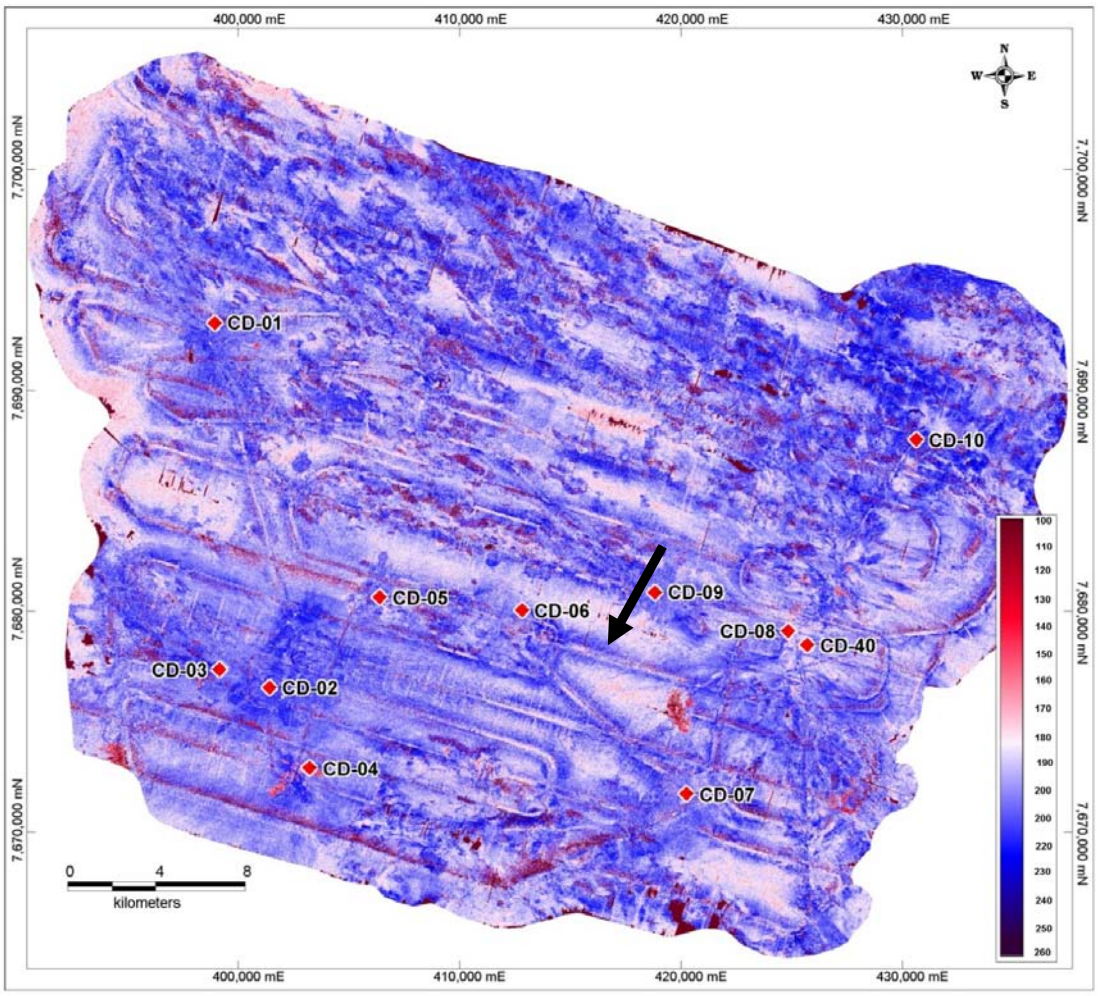


Figure 9 Gemini-Oscostar Volcanic Field Backscatter Image

Backscatter intensity image for Gemini-Oscostar volcanic field, grid cell resolution is 15m. An acoustically low response is coloured red (smooth terrain), while an acoustically high response is coloured blue (rough terrain). Note the effect of beam pattern residuals (arrow), these appear as linear features and correspond to the *RV Southern Surveyor's* tracks.

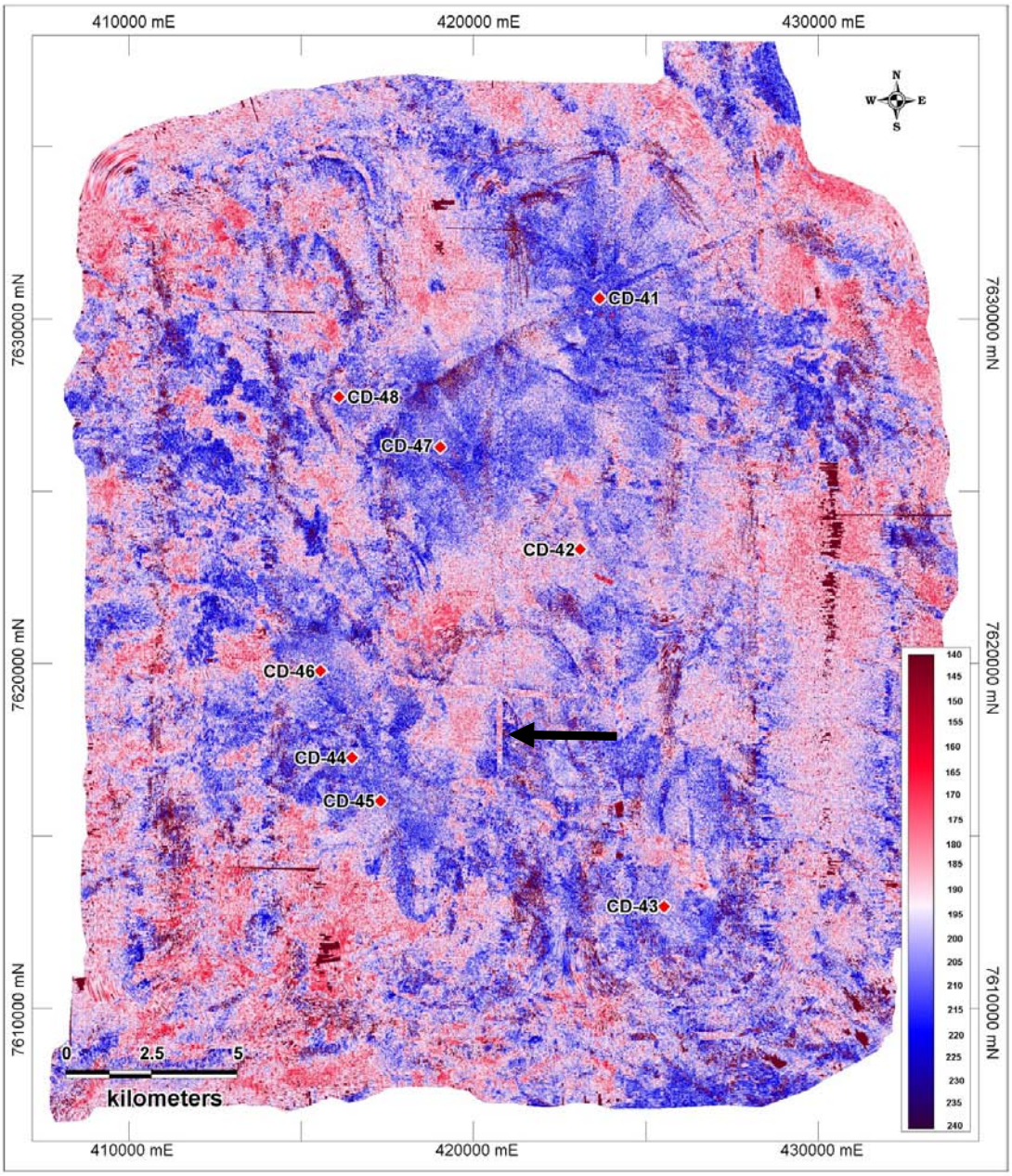


Figure 10 Volsmar Volcanic Field Backscatter Image

Backscatter intensity image for Volsmar volcanic field, grid cell resolution is 15m. An acoustically low response ('smooth' terrain) is coloured red, while an acoustically high response ('rough' terrain) is coloured blue. Note the effect of beam pattern residuals (arrow), these appear as linear features and correspond to the ship's tracks.

Geological Map

The geological maps of GOVF and VVF are an interpretation of bathymetry and backscatter data complemented by dredge samples, and are the first geological maps of the study area. Each map is composed of two key elements, a structural map and a lithological map. Faults digitised from the high-resolution bathymetry are the main components of the structural map; faults may be observed in backscatter data however it was not particularly useful for their identification due to the high degree of noise in the signal. Dip is calculated by the three-point problem method.

Interpretation of volcanic deposits from the bathymetry data forms the lithological map which is composed of a number of geological map units. The backscatter data was then used to characterise the nature of each unit and augment the flow boundaries where possible. In some cases the backscatter image provided greater resolution of the data allowing lava flows to be defined with greater confidence. However backscatter data are affected by slope angle and therefore steep slopes may appear 'rough' which does not necessarily mean they are recent lava flows. Other noise in the data also affect the image that is produced for example, the signals returned directly below the ship are artificially intensified and appear as bright lines parallel with the ship's tracks, these are known as beam pattern residuals.

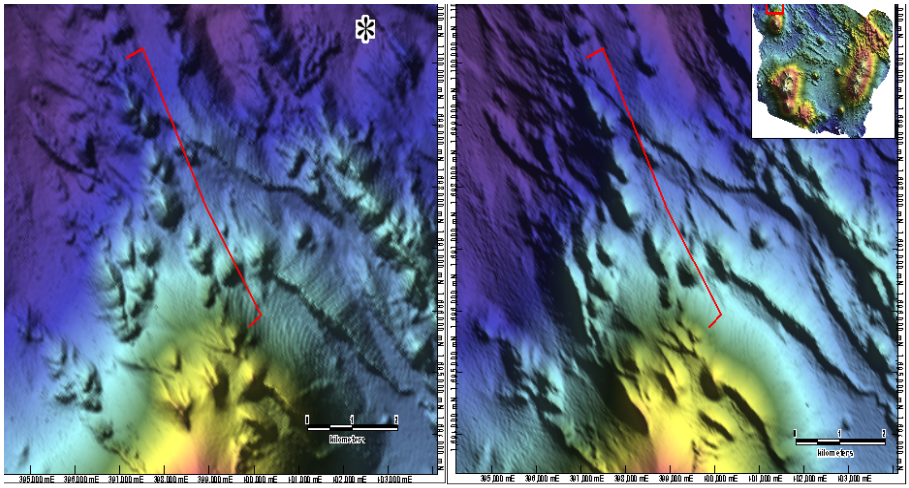
The criteria for geological map units is based on the submarine geologic map of Anatahan Volcano, northern Mariana Islands (Chadwick et al., 2005). In order of increasing age (roughly) these units are lava flow, caldera deposits, bedrock outcrop, volcaniclastic apron, cones, eruptive vents, stratovolcano deposits and abyssal sediment. It should be noted though that the interpreted age relationships of these units is complex and it is assumed that some units may have more than one 'age'. For example volcaniclastic deposits and abyssal sediment may form after lava flows and are therefore 'older'. The geological interpretations of the composition of each unit are based on the current understanding of submarine volcanism, for example (Busby, 2005; Cas, 1992; Cas and Wright, 1991; Cashman and Fiske, 1991; Downey and Lentz, 2006; McBirney, 1963; Moore, 1975; Simpson et al., 2007), and the assumption that subaqueous volcanoes behave in a similar manner to subaerial volcanoes.

Table 5 Geological Map Unit Assumptions

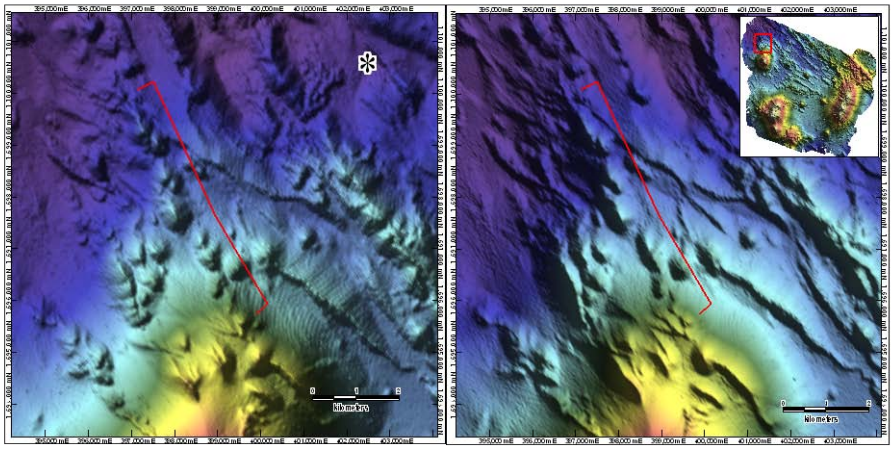
In determining relative ages of the geological map units a number of assumptions were made.

Geological Map Unit	Assumptions
Lava flow and bedrock outcrop	The 'lava flow' unit may be composed of individual flows or multiple flows. The composition of the flows may be variable. Age relationship is interpreted by cross-cutting relationships observed in the geological map.
Caldera deposits	Age relationship is interpreted by cross-cutting relationships observed in the geological map.
Volcaniclastic apron	Assumed to occur around the flanks of volcanoes due to current knowledge of volcanic products (see discussion for more in depth explanation).
Cones and eruptive vents	This unit is assumed to have pyroclastic origins due to the slope angle (>20°) and the nature of samples derived from dredges.
Stratovolcano deposits	The main volcanoes of both fields are assumed as stratovolcanoes due to slope angle and erupted products sampled by dredging.
Abyssal sediment	It is assumed that the seafloor contains sediment derived from pelagic material. This material is assumed to be older than recent flows because the recent flows (and other volcanic material) have not been covered with sediment yet.

Viewing the bathymetry image at different Sun-shading angles is crucial to the production of the geologic map, as more subtle features are more apparent in a Sun-shaded map rather in a map contoured at 20m intervals. Features aligned in a northwest direction may appear as a sharp ridge when viewed on an image Sun-shaded from the northeast, however when Sun-shading is applied from the northwest, the same feature appears as a line of coalesced cinder cones (Figure 11). It is therefore important to utilise all possible Sun-shading options when interpreting bathymetry images.



A



B

Figure 11 Sun-shaded Bathymetry Images of Gemini-Oscostar Volcanic Field

A) Coalesced scoria cones are viewed on an image Sun-shading from the northwest. B) Sun-shading from the northeast shows the same linear feature as a sharp ridge rather than scoria cones.

A lineament map is the key interpretive tool for the structural analysis of GOVF and VVF. The lineament map is produced by digitising linear features observed in the bathymetry, compared to the structural map which represents faults (Figure 12). A fault is identified by the presence of a scarp, and the sense of slip and direction of dip is determined from the topographic expression of the scarp (where possible). A 'linear' is a topographic feature that forms a line which may or may not be fault-related; this line is quite often formed by scoria cones. The lineament map differs from the structural map because the origin of the lineaments is unclear. The linears may be older fractures in the crust along which magma has been focused allowing chains of scoria cones to form, however the scoria cones are not faulted.

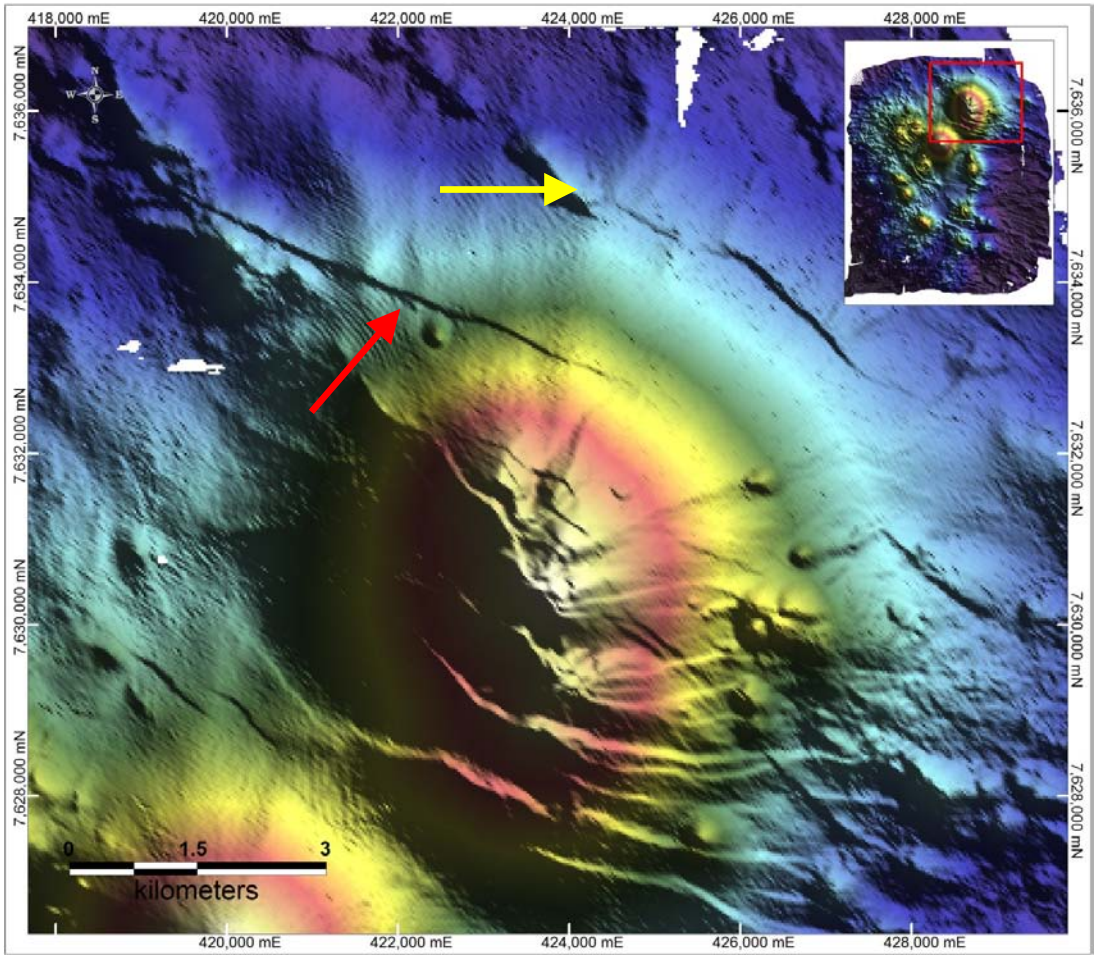


Figure 12 Distinction between Lineaments and Faults

This figure shows the difference between a lineament (yellow arrow) and a fault (red arrow). A lineament may be either a chain of scoria cones or a scarp, while a fault is defined only a scarp. The stratovolcano in the centre of the image is clearly cut by numerous faults.

Results

Rock types dredged from GOVF include ashy pumice, relatively fresh plagioclase-phyric andesite, altered andesite, highly altered orange material, porphyritic vesicular basalt with varying degrees of alteration, pelagic sediment with echinoderms and coral fragments, and volcanic tephra. Rock types from VVF consists of porphyritic basalt of varying vesicularity, pelagic mud with carbonate organisms and basaltic clasts ranging in size, and hydrothermally altered breccia.

Petrology and Phase Chemistry

Basalts

Basalts from GOVF and VVF are predominantly vesicular, porphyritic and phenocryst inclusion-rich with intersertal texture, comprising olivine-clinopyroxene-phyric basalts, olivine-phyric basalts and aphyric basalt. The main phenocryst assemblage is plagioclase, clinopyroxene, orthopyroxene, olivine and spinel; in most samples plagioclase, clinopyroxene, and orthopyroxene glomerocrysts are present (Table 6). Plagioclase phenocrysts are subhedral to euhedral, with inclusions of clinopyroxene, spinel and glass. Plagioclase and clinopyroxene phenocrysts commonly display normal zoning, or rare oscillatory zoning with variable changes in composition from core to rim.

Olivine-clinopyroxene basalts (CD-01-1, CD-45-1 and CD-46-1) are characterised by phenocrysts of plagioclase, olivine, clinopyroxene and minor orthopyroxene microphenocrysts (<10%). Olivine phenocrysts show little to no compositional change from core to rim, for example from cores of Fo_{79} to rims Fo_{76} (Table 7). There are two populations of plagioclase phenocrysts, a normally zoned group that shows a modest decrease in An content from core ($An_{88}Ab_{12}$ –$An_{84}Ab_{16}$) to rim ($An_{79}Ab_{21}$ – $An_{78}Ab_{22}$), or an oscillatory zoned group with variable changes in composition from core to rim. Most oscillatory zoned phenocrysts are only weakly compositionally zoned, from An_{88} cores to An_{85} rims, however a small number of phenocrysts have anorthite cores ($An_{95}Ab_{5}$ – $An_{92}Ab_{8}$) and bytownite rims ($An_{78}Ab_{22}$ – $An_{77}Ab_{22}$) (Table 8). Clinopyroxene phenocrysts contain numerous fluid inclusions and show minimal compositional zoning. Core compositions typically range from $Wo_{46}En_{47}Fs_{7}$ to rim compositions of $Wo_{42}En_{48}Fs_{10}$ (Table 12).

Enstatite microphenocrysts show little compositional change from core ($Wo_4En_{73}Fs_{23}$) to rim ($Wo_4En_{71}Fs_{25}$). Groundmass phases include predominantly plagioclase ($An_{83}Ab_{17}$ – $An_{76}Ab_{24}$), aluminous-titanomagnetite, clinopyroxene ($Wo_{37}En_{51}Fs_{12}$ – $Wo_{23}En_{53}Fs_{24}$ (metastable?)) and glass (Table 13).

Olivine-clinopyroxene basalts CD-48-1, CD-48-2, CD-48-4, CD-48-6 and CD-48-7 differ from other olivine-clinopyroxene basalts as they lack plagioclase phenocrysts and have a high content of olivine and pyroxene phenocrysts. Olivine phenocrysts show minimal compositional change from core to rim and are either normal or reversely zoned, for example from cores of Fo_{83} to rims of Fo_{84}. Clinopyroxene phenocrysts show a subtle change from core ($Wo_{48}En_{50}Fs_2$ – $Wo_{44}En_{47}Fs_8$) to rim ($Wo_{46}En_{51}Fs_2$ – $Wo_{41}En_{53}Fs_6$. Groundmass olivine covers a narrow compositional range from Fo_{92} – Fo_{90} and clinopyroxene also shows a restricted compositional range from $Wo_{46}En_{50}Fs_4$ – $Wo_{42}En_{51}Fs_7$.

Olivine basalts (CD-06-1, CD-07-1, CD-08-2 and CD-47-1) are dominated by plagioclase phenocrysts (Table 6) with minor olivine, clinopyroxene (<10%) and orthopyroxene (<5%) phenocrysts. Plagioclase phenocrysts are subhedral to euhedral with numerous fluid inclusions and commonly form glomeroporphyritic clusters with olivine and clinopyroxene. There are two distinct populations of plagioclase phenocrysts, a normal zoned group which shows variable changes in composition from core to rim and an oscillatory zoned group. The normally-zoned phenocrysts may either show a modest change from core ($An_{90}Ab_{10}$) to rim ($An_{87}Ab_{13}$), or a significant decrease from core ($An_{94}Ab_6$) to rim ($An_{73}Ab_{27}$). The oscillatory-zoned phenocrysts show a modest range in An content from core ($An_{86}Ab_{14}$ – $An_{83}Ab_{16}$) to rim ($An_{83}Ab_{17}$ – $An_{74}Ab_{26}$). Olivine phenocrysts are essentially unzoned with cores of Fo_{76} and rims of Fo_{75}. Groundmass phases include plagioclase, clinopyroxene, spinel and olivine (Fo_{75} – Fo_{74}) (Table 7).

Table 6 Petrographic Summary of Gemini-Oscostar and Volsmar Volcanic Fields

The phenocryst assemblage of rocks from Gemini-Oscostar and Volsmar volcanic fields is composed of various combinations of plag (plagioclase), cpx (clinopyroxene), opx (orthopyroxene), ol (olivine) and spinel. The basalt type present is tholeiitic basalt as determined by normative hypersthene and quartz. Pyx-pyroxene. * denotes probe data available. ^ denotes hand sample description only, no thin section available. Note opx may be misidentified and requires microprobe data to confirm identification.

		Modal Phenocryst Assemblage							Modal Groundmass Assemblage				
Sample	**Rock Name**	**Plag**	**Cpx**	**Opx**	**Ol**	**Spinel**	**GM**	**Total**	**Plag**	**Cpx**	**Opx**	**Ol**	**Spinel**
CD-01-1	Ol-cpx basalt	20	3	2	10		65		80				20
CD-02-1*	Cpx dacite	20	10	3		2	65	100	75		5		20
CD-02-5	2 pyx andesite	20	3	15		2	60	100	80				20
CD-02-6	2 pyx andesite	20	3	15		2	60	100	80				20
CD-03-2^	Basaltic andesite	10	2				88	100					
CD-04-1^	Andesite	15	2				83	100					
CD-04-2^	Basalt	20	3				77	100					
CD-05-1*	2 pyx andesite	20	5	5			70		80				20
CD-06-1	Ol basalt	30			5		65	100	95			3	2
CD-07-1*	Ol basalt	20		3	10		67	100	85			5	10
CD-08-1	Ol-cpx basaltic andesite						100	100	80	10		10	
CD-08-2*	Ol basalt	15			2		83	100	80	20			
CD-08-6^	Basalt	15					85	100					
CD-09-1^	Basalt	20	5				75	100					
CD-10-1^	Basalt	10					90	100					
CD-40-1^	Basalt	25			1		74	100					
CD-40-2^	Basalt	30	2				68	100					
CD-41-1*	2 pyx basaltic andesite	20	3	10		5	62	100	86	2	2		10
CD-42-3^	Basalt	15					85	100					
CD-42-4a^	Basalt	10					90	100					
CD-42-4b^	Basalt	10					90	100					
CD-43-1*	2 pyx basaltic andesite		15	15	10		60	100	90	9			1
CD-43-2^	Basalt	15					85	100					
CD-43-3	2 pyx basaltic andesite		15	15	10		60	100	90	9			1
CD-43-4*	2 pyx basaltic andesite		15	15	10		60	100	90	9			1
CD-43-5	2 pyx basaltic andesite		15	15	10		60	100	90	9			1
CD-44-1	Cpx basalt						100	100	75	20	5		
CD-44-2^	Basalt	10					90	100					

		Modal Phenocryst Assemblage							Modal Groundmass Assemblage				
Sample	**Rock Name**	**Plag**	**Cpx**	**Opx**	**Ol**	**Spinel**	**GM**	**Total**	**Plag**	**Cpx**	**Opx**	**Ol**	**Spinel**
CD-45-1*	Ol-cpx basalt	30	1	1	10	5	53	100	80	20			
CD-45-2^	Basalt	15	2				83	100					
CD-46-1*	Ol-cpx basalt	30	5	10	3	2	50	100	80	18			2
CD-46-3^	Basaltic andesite	25	2				73	100					
CD-47-1*	Ol basalt	20			10		70	100	90		5	5	
CD-47-2^	Basalt	15					85	100					
CD-48-1*	Ol-cpx basalt		15	3	10	2	70	100	40	60			
CD-48-2*	Ol-cpx basalt		15	3	10	2	70	100	40	60			
CD-48-3^	Aphyric basalt							100					
CD-48-4	Ol-cpx basalt		15	3	10	2	70	100	40	45		10	5
CD-48-6	Ol-cpx basalt		15	3	10	2	70	100	40	45		10	5
CD-48-7	Ol-cpx basalt		15	3	10	2	70	100	40	45		10	5

Table 7 Olivine Compositions

(1) Selected olivine phenocryst core analyses by WDS EMP. (2) Selected results for olivine phenocryst rim analyses by WDS EMP. The rim compositions presented here correspond to the core analyses in (1). (3) Selected groundmass olivine results for rocks from Gemini-Oscostar and Volsmar volcanic fields. Olivine is predominantly found in basalt (B) and basaltic andesite (BA). Results are presented in wt % oxide and stoichiometry is calculated on the basis of four oxygens to determine forsterite (Fo) and fayalite (Fa) proportions. Total Fe as FeO. Appendix C contains the full dataset.

1 Core	**CD-07-1**	**CD-45-1**	**CD-46-1**	**CD-47-1**	**CD-48-1**	**CD-48-2**	**CD-43-1**	**CD-43-4**
Rock Type	**B**	**B**	**B**	**B**	**B**	**B**	**BA**	**BA**
SiO_2	38.42	38.51	38.87	38.51	39.78	40.42	40.05	39.39
TiO_2	0.01	0.01	0.02	0.00	0.00	0.01	0.05	0.00
Al_2O_3	0.01	0.03	0.00	0.03	0.04	0.01	0.00	0.00
Cr_2O_3	0.00	0.00	0.02	0.00	0.01	0.04	0.04	0.02
FeOT	22.86	22.50	19.91	23.28	14.08	9.03	15.18	15.58
MnO	0.40	0.32	0.30	0.36	0.20	0.17	0.23	0.23
MgO	39.27	39.75	41.97	39.45	45.86	50.46	45.50	44.85
CaO	0.27	0.14	0.15	0.20	0.17	0.25	0.18	0.17
Na_2O	0.02	0.01	0.02	0.00	0.00	0.00	0.00	0.01
Total	101.28	101.27	101.26	101.83	100.14	100.39	101.24	100.26
Fo	75.4	75.9	79.0	75.1	85.3	83.4	84.2	83.7
Fa	24.6	24.1	21.0	24.9	14.7	16.6	15.8	16.3
2 Rim	**CD-07-1**	**CD-45-1**	**CD-46-1**	**CD-47-1**	**CD-48-1**	**CD-48-2**	**CD-43-1**	**CD-43-4**
Rock Type	**B**	**B**	**B**	**B**	**B**	**B**	**BA**	**BA**
SiO_2	38.32	38.23	38.19	38.46	39.84	40.32	39.73	39.56
TiO_2	0.01	0.04	0.03	0.03	0.00	0.05	0.03	0.00
Al_2O_3	0.03	0.03	0.03	0.01	0.00	0.01	0.05	0.02
Cr_2O_3	0.00	0.02	0.01	0.00	0.01	0.03	0.02	0.01
FeOT	22.58	23.07	22.73	23.20	15.12	9.52	16.53	15.76
MnO	0.41	0.31	0.35	0.34	0.23	0.17	0.28	0.21
MgO	39.25	39.42	39.74	39.29	45.73	50.15	44.40	44.63
CaO	0.25	0.16	0.21	0.21	0.20	0.26	0.20	0.23
Na_2O	0.01	0.01	0.17	0.00	0.00	0.00	0.02	0.02
Total	100.85	101.28	101.46	101.53	101.13	100.51	101.27	100.44
Fo	75.6	75.3	75.7	75.1	84.3	83.5	82.7	83.5
Fa	24.4	24.7	24.3	24.9	15.7	16.5	17.3	16.5

Table 7 Continued

3 GM Rock Type	CD-07-1 B	CD-07-1 B	CD-47-1 B	CD-47-1 B	CD-47-1 B	CD-48-2 B	CD-48-2 B	CD-48-2 B
SiO_2	38.02	38.18	37.98	38.72	38.33	40.24	40.58	40.43
TiO_2	0.00	0.07	0.01	0.00	0.00	0.00	0.02	0.00
Al_2O_3	0.03	0.02	0.03	0.03	0.01	0.01	0.03	0.02
Cr_2O_3	0.00	0.00	0.01	0.00	0.01	0.08	0.08	0.08
FeOT	24.29	24.18	24.10	23.42	23.56	9.96	8.30	9.08
MnO	0.39	0.37	0.37	0.36	0.35	0.15	0.16	0.17
MgO	37.92	37.80	38.13	39.13	38.92	49.18	50.18	49.90
CaO	0.34	0.35	0.28	0.25	0.26	0.25	0.25	0.23
Na_2O	0.03	0.02	0.01	0.02	0.02	0.03	0.02	0.01
Total	101.02	100.98	100.92	101.93	101.45	99.89	99.60	99.92
Fo	73.6	73.6	73.8	74.9	74.6	89.8	91.5	90.7
Fa	26.4	26.4	26.2	25.1	25.4	10.2	8.5	9.3

Table 8 Selected Plagioclase Phenocryst Compositions

Selected core and rim analyses of plagioclase phenocrysts determined by WDS EMP for rocks from Gemini-Oscostar and Volsmar volcanic field. Results are in wt%. Core compositions correspond to rim compositions presented here. Rock types analysed by EMP include basalt (B), basaltic andesite (BA), andesite (An) and dacite (D). Appendix contains the full dataset including stoichiometry of plagioclase analyses.

A	Core	Core	Core	Core	Core	Rim	Rim	Rim	Rim	Rim
Rock Type	CD-07-1 B	CD-46-1 B	CD-41-1 BA	CD-05-1 An	CD-02-1 D	CD-07-1 B	CD-46-1 B	CD-41-1 BA	CD-05-1 An	CD-02-1 Da
SiO_2	46.70	44.84	47.23	50.51	50.98	46.96	48.50	45.87	50.61	52.52
TiO_2	0.02	0.00	0.02	0.06	0.02	0.00	0.03	0.00	0.00	0.04
Al_2O_3	33.22	34.21	32.64	30.20	29.79	32.98	31.13	33.18	30.49	28.88
FeO*	0.10	0.18	0.70	0.80	0.62	0.19	0.24	0.80	0.83	0.62
MnO	0.00	0.01	0.00	0.02	0.02	0.00	0.00	0.00	0.01	0.02
MgO	0.16	0.09	0.07	0.09	0.06	0.15	0.17	0.08	0.09	0.03
CaO	17.45	18.65	16.92	14.06	13.14	17.42	15.61	17.12	14.11	11.99
Na_2O	1.73	0.92	1.94	3.36	3.90	1.77	2.50	1.40	3.09	4.45
K_2O	0.02	0.01	0.03	0.08	0.11	0.03	0.06	0.04	0.06	0.16
Total	99.40	98.91	99.55	99.18	98.64	99.51	98.24	98.49	99.29	98.71
An	85	92	83	70	65	84	77	87	71	59
Ab	15	8	17	30	35	16	22	13	28	40
Or	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	1	<0.5	1	1

Table 9 Selected Plagioclase Groundmass Compositions

Selected groundmass plagioclase results for lavas from Gemini-Oscostar and Volsmar volcanic field. The rock types analysed by WDS EMP include basalt (B), basaltic andesite (BA), andesite (A) and dacite (D). Appendix C contains the full dataset including stoichiometry of plagioclase analyses

Sample Rock Type	CD-08-2 B	CD-47-1 B	CD-41-1 BA	CD-43-1 BA	CD-05-1 A	CD-02-1 D
SiO_2	50.23	50.39	48.57	49.00	51.55	50.97
TiO_2	0.00	0.04	0.00	0.00	0.00	0.04
Al_2O_3	29.63	30.02	31.54	32.02	30.32	30.76
FeO*	1.10	1.51	1.06	0.82	0.93	0.73
MnO	0.01	0.00	0.01	0.00	0.01	0.02
MgO	0.19	0.24	0.13	0.24	0.13	0.04
CaO	14.05	14.68	15.95	16.08	13.31	14.18
Na_2O	3.62	2.96	2.28	2.37	3.50	3.41
K_2O	0.05	0.12	0.07	0.06	0.08	0.14
Total	98.88	99.96	99.61	100.58	99.83	100.28

Table 10 Selected Spinel Phenocryst Compositions

Selected spinel phenocryst compositions determined by WDS EMP. Cumulate olivine-clinopyroxene basalt (B) from Volsmar volcanic field comprises picrochromite, while the andesite samples (A) from Gemini-Oscostar predominantly contain magnetite and al-titanomagnetite. Results are recalculated to determine Fe_2O_3 based on a ratio of 4 oxygens to 3 cations. Appendix C contains the full dataset, including stoichiometry.

	CD-48-2 core	CD-48-2 rim	CD-48-2	CD-02-1 core	CD-02-1 rim	CD-02-1 core	CD-02-1 rim	CD-05-1 core	CD-05-1 rim
Rock Type	B	B	B	D	D	D	D	A	A
Spinel Name	picro-chromite	picro-chromite	picro-chromite	Titano-magnetite	Titano-magnetite	Titano-magnetite	Titano-magnetite	magnetite	magnetite
SiO_2	0.03	0.05	0.04	0.16	0.13	0.16	0.13	0.09	0.09
TiO_2	0.10	0.16	0.19	10.39	10.44	10.30	10.29	6.27	5.71
Al_2O_3	6.36	6.78	6.16	1.91	1.96	2.43	2.33	3.57	3.71
Cr_2O_3	62.74	61.97	62.32	0.00	0.00	0.01	0.01	0.04	0.08
Fe_2O_3	8.22	10.20	10.74	46.91	52.78	44.70	43.50	57.58	57.70
FeO	10.59	9.48	9.06	39.08	31.17	41.05	42.97	30.78	31.20
MnO	0.27	0.27	0.28	0.54	0.45	0.56	0.55	0.31	0.33
MgO	14.46	13.59	13.88	0.97	0.98	0.98	0.98	2.69	2.71
Total	102.77	102.50	102.67	99.97	97.91	100.20	100.77	101.31	101.53
Cr #	0.91	0.90	0.91	0.00	0.00	0.01	0.00	0.01	0.02

Table 11 Selected Orthopyroxene Groundmass Compositions

Selected orthopyroxene groundmass phases determined by WDS EMP. Groundmass pigeonite is observed in cpx dacite (Da) from Gemini-Oscostar and two-pyroxene basaltic andesite (BA) from Volsmar. Groundmass enstatite is observed in two-pyroxene basaltic andesite and olivine basalt (B) from Volsmar. Appendix C contains the full dataset, including stoichiometry.

Sample	**CD-47-1**	**CD-41-1**	**CD-41-1**	**CD-41-1**	**CD-02-1**
Rock Type	**B**	**BA**	**BA**	**BA**	**Da**
SiO_2	53.99	53.21	54.78	53.77	50.01
TiO_2	0.08	0.16	0.08	0.13	0.03
Al_2O_3	0.93	2.95	1.07	1.76	0.32
Cr_2O_3	0.04	0.02	0.11	0.04	0.00
Fe_2O_3	0.00	0.00	0.00	0.00	0.00
FeO	15.72	19.37	13.65	16.51	30.86
MnO	0.46	0.47	0.34	0.43	1.57
MgO	26.24	21.70	27.43	25.56	12.89
CaO	3.20	2.69	2.30	2.44	3.29
Na_2O	0.06	0.17	0.04	0.02	0.10
Total	100.71	100.73	99.80	100.66	99.08
Wo	6.15	5.6	4.5	4.8	7.26
En	70.2	62.9	74.7	69.9	39.6
Fs	23.60	31.5	20.8	25.3	53.16

Sample	**CD-47-1**	**CD-41-1**	**CD-41-1**	**CD-41-1**	**CD-02-**
Rock Type	**B**	**BA**	**BA**	**BA**	**1 Da**
SiO_2	53.99	53.21	54.78	53.77	50.01
TiO_2	0.08	0.16	0.08	0.13	0.03
Al_2O_3	0.93	2.95	1.07	1.76	0.32
Cr_2O_3	0.04	0.02	0.11	0.04	0.00
Fe_2O_3	0.00	0.00	0.00	0.00	0.00
FeO	15.72	19.37	13.65	16.51	30.86
MnO	0.46	0.47	0.34	0.43	1.57
MgO	26.24	21.70	27.43	25.56	12.89
CaO	3.20	2.69	2.30	2.44	3.29
Na_2O	0.06	0.17	0.04	0.02	0.10
Total	100.71	100.73	99.80	100.66	99.08
Wo	6.15	5.6	4.5	4.8	7.26
En	70.2	62.9	74.7	69.9	39.6
Fs	23.60	31.5	20.8	25.3	53.16

Table 12 Selected Clinopyroxene Phenocryst Compositions

(1) Selected core phenocryst compositions determined by WDS EMP. Augite is the dominant phenocryst composition found in both fields. (2) Selected phenocryst rim compositions (corresponding to core compositions in (1)) for lavas from Gemini-Oscostar and Volsmar volcanic fields. (3) Selected groundmass (Gm) analyses from both volcanic field. Rock types analysed include basalt (B), basaltic andesite (BA), andesite (A) and dacite (D). Results are recalculated on the basis of a ratio of 6 oxygens to 4 cations. Appendix C contains the full dataset, including stoichiometry.

1 Core	**CD-08-2**	**CD-46-1**	**CD-48-1**	**CD-48-1**	**CD-45-1**	**CD-41-1**	**CD-43-1**	**CD-43-4**	**CD-05-1**	**CD-05-1**	**CD-02-1**
Rock Type	**B**	**B**	**B**	**B**	**B**	**BA**	**BA**	**BA**	**A**	**A**	**D**
SiO_2	50.21	50.93	50.73	52.77	50.97	51.64	53.76	52.62	51.64	51.53	51.43
TiO_2	0.18	0.19	0.02	0.04	0.00	0.23	0.11	0.07	0.11	0.31	0.28
Al_2O_3	2.75	3.65	3.27	1.85	2.74	2.02	1.11	1.85	2.24	1.97	1.62
Cr_2O_3	0.00	0.40	0.04	0.73	0.04	0.00	0.49	0.44	0.37	0.00	0.01
Fe_2O_3	2.99	3.17	4.29	1.97	2.61	2.60	1.44	1.55	1.80	3.47	2.11
FeO	6.80	4.33	4.68	3.03	7.52	8.59	4.03	3.18	3.31	8.73	8.87
MnO	0.27	0.17	0.18	0.16	0.29	0.36	0.19	0.12	0.15	0.50	0.51
MgO	14.83	15.71	15.73	17.73	14.66	14.52	19.37	17.11	16.87	14.61	14.22
CaO	19.73	21.78	20.89	21.58	20.12	20.07	19.45	22.17	21.65	19.63	20.07
Na_2O	0.30	0.14	0.22	0.15	0.26	0.30	0.15	0.17	0.12	0.32	0.28
Total	98.06	100.47	100.05	100.01	99.21	100.33	100.11	99.27	98.26	101.06	99.40
Wo	43.2	46.3	45.0	44.4	43.4	42.7	39.3	45.8	45.4	42.0	42.9
En	45.2	46.5	47.1	50.7	44.0	43.0	54.4	49.1	49.2	43.5	42.3
Fs	11.6	7.2	7.9	4.9	12.7	14.3	6.4	5.1	5.4	14.6	14.8

2 Rim	**CD-08-2**	**CD-46-1**	**CD-48-1**	**CD-48-1**	**CD-45-1**	**CD-41-1**	**CD-43-1**	**CD-43-4**	**CD-05-1**	**CD-05-1**	**CD-02-1**
Rock Type	**B**	**B**	**B**	**B**	**B**	**BA**	**BA**	**BA**	**A**	**A**	**D**
SiO_2	48.97	50.38	52.93	53.34	50.55	52.93	51.96	53.05	51.46	51.08	51.41
TiO_2	0.16	0.23	0.03	0.03	0.07	0.34	0.20	0.04	0.13	0.32	0.29
Al_2O_3	4.18	3.11	1.55	1.59	3.36	3.30	3.02	1.68	2.73	2.65	1.45
Cr_2O_3	0.14	0.03	0.24	0.61	0.02	0.00	0.68	0.43	0.63	0.06	0.00
Fe_2O_3	3.07	4.53	0.00	1.50	3.71	0.00	2.02	1.51	2.34	2.71	2.37
FeO	6.00	5.95	2.03	3.50	6.72	12.80	4.16	3.72	2.19	6.34	9.94
MnO	0.17	0.28	0.21	0.13	0.22	0.38	0.17	0.15	0.12	0.31	0.55
MgO	14.17	15.90	18.09	17.91	15.65	13.25	17.20	18.15	16.53	15.89	13.81
CaO	20.33	19.49	19.95	21.54	19.31	16.31	20.67	20.66	22.68	19.81	19.72
Na_2O	0.26	0.20	0.13	0.14	0.20	0.34	0.18	0.17	0.18	0.22	0.29
Total	97.45	100.09	95.15	100.29	99.80	99.65	100.26	99.56	98.99	99.39	99.82
Wo	45.5	42.1	42.7	43.8	41.7	36.5	43.2	42.3	47.9	42.3	42.2
En	44.1	47.8	53.9	50.7	47.0	41.2	50.0	51.7	48.5	47.2	41.2
Fs	10.5	10.0	3.4	5.5	11.3	22.3	6.8	5.9	3.6	10.6	16.6

Table 12 Continued

2 Gm Rock Type	CD-08-2 B	CD-46-1 B	CD-48-2 B	CD-45-1 B	CD-41-1 BA	CD-43-1 BA	CD-05-1 A	CD-05-1 A
SiO_2	50.28	51.98	52.48	51.46	51.34	51.94	52.93	50.39
TiO_2	0.15	0.31	0.13	0.03	0.12	0.19	0.11	0.42
Al_2O_3	3.78	3.31	1.91	2.68	2.60	3.20	1.34	4.14
Cr_2O_3	0.08	0.01	0.85	0.02	0.07	0.71	0.40	0.08
Fe_2O_3	3.24	0.00	1.76	3.05	3.58	2.28	1.76	3.50
FeO	7.46	14.72	2.50	10.99	7.25	5.16	3.43	6.21
MnO	0.24	0.38	0.14	0.38	0.27	0.18	0.14	0.27
MgO	15.56	17.95	17.39	19.16	16.14	18.83	18.32	17.24
CaO	18.61	10.65	22.33	11.95	18.87	17.60	20.71	17.54
Na_2O	0.21	0.12	0.13	0.16	0.22	0.18	0.14	0.20
Total	99.61	99.43	99.62	99.87	100.46	100.26	99.27	99.99
Wo	40.4	22.6	46.1	25.3	40.2	36.8	42.4	37.8
En	47.0	53.0	49.9	56.5	47.8	54.8	52.2	51.7
Fs	12.6	24.4	4.0	18.2	12.0	8.4	5.5	10.4

Table 13 Glass Compositions

Selected glass compositions determined by WDS EMP, Appendix C contains the full dataset. Analyses are normalized to 100%. Rock types with interstitial glass include basalt (B), basaltic andesite (BA), andesite (An) and dacite (Da).

Sample Rock Type	CD-45-1 B	CD-45-2 B	CD-48-1 B	CD-41-1 BA	CD-41-1 BA	CD-05-1 An	CD-02-1 Da	CD-02-1 Da
SiO_2	56.05	55.54	61.33	71.89	72.06	68.29	81.28	97.76
TiO_2	0.12	0.17	0.17	0.55	0.45	0.85	0.40	0.09
Al_2O_3	15.27	15.16	14.57	11.48	11.56	11.97	12.21	1.68
FeO	12.54	12.79	11.37	7.60	7.06	10.22	3.14	0.05
MnO	0.22	0.21	0.15	0.12	0.15	0.21	0.09	0.00
MgO	4.42	4.65	2.82	1.02	1.06	1.69	0.15	0.01
CaO	9.61	9.77	7.78	4.14	4.18	4.53	0.62	0.03
Na_2O	1.40	1.34	0.73	1.56	1.62	1.59	0.49	0.13
K_2O	0.38	0.37	1.08	1.64	1.86	0.66	1.63	0.24
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Basaltic Andesites

GOVF and VVF basaltic andesites display glomeroporphyritic, intersertal textures with numerous vesicles. Two-pyroxene basaltic andesite (CD-41-1) has phenocrysts of plagioclase, clinopyroxene, orthopyroxene and aluminous-titanomagnetite set in a glassy groundmass. Plagioclase phenocrysts are either subtly oscillatory zoned, or decrease in An content from core to rim (Table 8). The oscillatory zoned phenocrysts core compositions have lower An content ($An_{83}Ab_{17}$ – $An_{80.4}Ab_{19.4}Or_{0.2}$) than rim compositions ($An_{87}Ab_{13}$ – $An_{82.2}Ab_{17.4}Or_{0.4}$).

Glomerocrysts of enstatite and plagioclase are common. Groundmass phases include bytownite ($An_{81}Ab_{18}Or_1$ – $An_{71}Ab_{28}Or_1$), enstatite ($Wo_4En_{75}Fs_{21}$ – $Wo_5En_{70}Fs_{25}$), pigeonite ($Wo_6En_{63}Fs_{31}$) (

Table 11), spinel and glass (Table 13).

Two-pyroxene basaltic andesites from dredge CD-43 of VVF (CD-43-1, CD-43-3, CD-43-4 and CD-43-5) are petrographically similar to the olivine-clinopyroxene basalts (dredge CD-48). The two-pyroxene basaltic andesites comprise clinopyroxene, orthopyroxene, olivine and rare, small plagioclase phenocrysts in a granular matrix of bytownite, augite and spinel. Olivine phenocrysts are commonly embayed with associated magmatic glass, or are uncorroded phenocrysts with chromite inclusions. Olivine phenocrysts show very little change from core to rim, with compositions ranging from Fo_{84} – Fo_{80}. Clinopyroxene phenocrysts are subhedral-euhedral with inclusions of chromite and aluminous-titanomagnetite. Clinopyroxene phenocrysts display normal and reverse zoning with rare oscillatory zoning also. Normally-zoned phenocrysts show a modest range in composition from cores of $Wo_{46}En_{49}Fs_5$ to rims of $Wo_{42}En_{52}Fs_6$ (Table 12). The groundmass is predominantly bytownite ($An_{81}Ab_{19}$ – $An_{74}Ab_{25}Or_1$), augite ($Wo_{41}En_{51}Fs_8$ – $Wo_{37}En_{55}Fs_8$) and equant spinel grains with varying amounts of glass present (Table 13).

Andesite and Dacite

Andesite and dacite are found only in the GOVF. They are predominantly porphyritic, pilotaxitic, vesicular rocks. Two-pyroxene andesite samples CD-02-5, CD-02-6 and CD-05-1 comprise plagioclase, clinopyroxene and orthopyroxene phenocrysts (Table 6). Plagioclase phenocrysts are predominantly normally zoned, with highly variable compositions from core to rim. A small population of phenocrysts vary greatly from core ($An_{84}Ab_{16}$) to rim ($An_{59}Ab_{40}Or_1$); while other phenocrysts only show a modest decrease from core ($An_{70}Ab_{30}$) to rim ($An_{64}Ab_{36}$). Plagioclase phenocrysts also show rare oscillatory zoning with core compositions of $An_{57}Ab_{42}Or_1$ and rim compositions of $An_{55}Ab_{44}Or_1$. Orthopyroxene phenocrysts are either normally zoned or reversely zoned, and show minimal compositional change from core to rim. Reversely zoned phenocrysts range from cores of $Wo_3En_{61}Fs_{35}$ to rims of $Wo_3En_{68}Fs_{29}$. Orthopyroxene and clinopyroxene phenocrysts contain inclusions of magnetite and commonly form glomeroporphyritic clusters with plagioclase. Two-pyroxene andesites also contain phenocrysts of

euhedral, equant grains of magnetite (Table 10). Groundmass phases in the two-pyroxene andesites are predominantly labradorite ($An_{69}Ab_{30}Or_1$ – $An_{58}Ab_{41}Or_1$), equant grains of magnetite and glass.

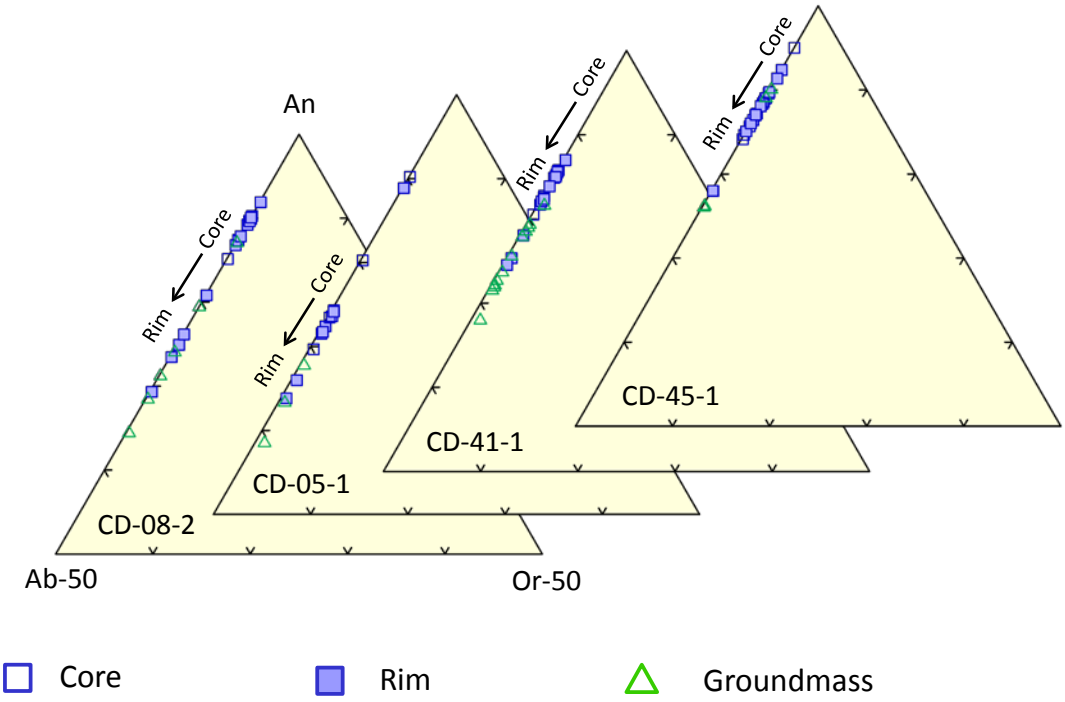


Figure 13 Selected Plagioclase Phenocryst EMP Results

WDS EMP results from Gemini- Oscostar (CD-05-1, CD-08-2) and Volsmar (CD-41-1, CD-45-1) volcanic fields with the general core to rim trend (arrow). Groundmass compositions show considerable overlap with phenocryst compositions for most samples. Rock types analysed include basalt (CD-08-2, CD-45-1), basaltic andesite (CD-41-1) and andesite (CD-05-1).

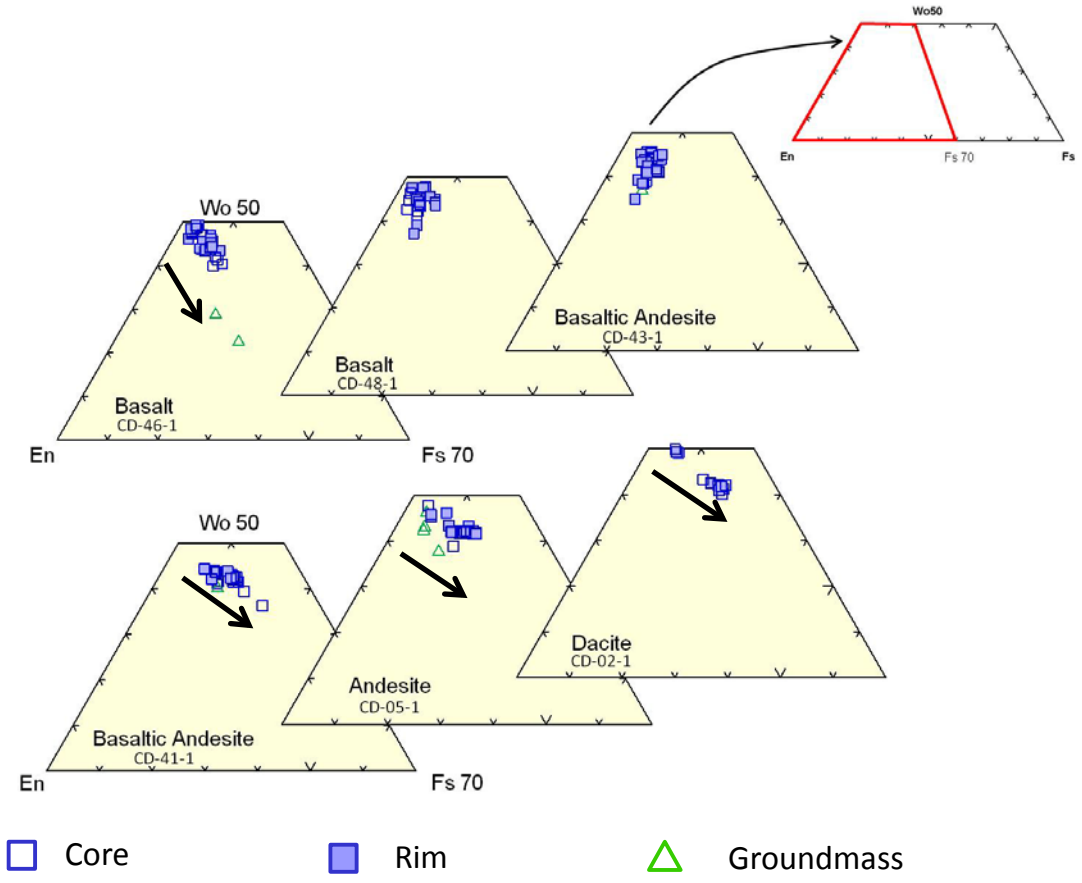


Figure 14 Selected Clinopyroxene EMP Analyses

EMP results for selected zoned clinopyroxene analyses from Gemini-Oscostar (CD-02-1, CD-05-1) and Volsmar (CD-41-1, CD-43-1, CD-46-1, CD-48-1) volcanic fields, plotted in the left-hand side of the pyroxene quadrilateral (see inset). The general core to rim trend is towards Fe enrichment (arrow), with the exception of the olivine-clinopyroxene basalt (CD-48-1) and the two-pyroxene basaltic andesite (CD-43-1). The rocks trend toward En enrichment.

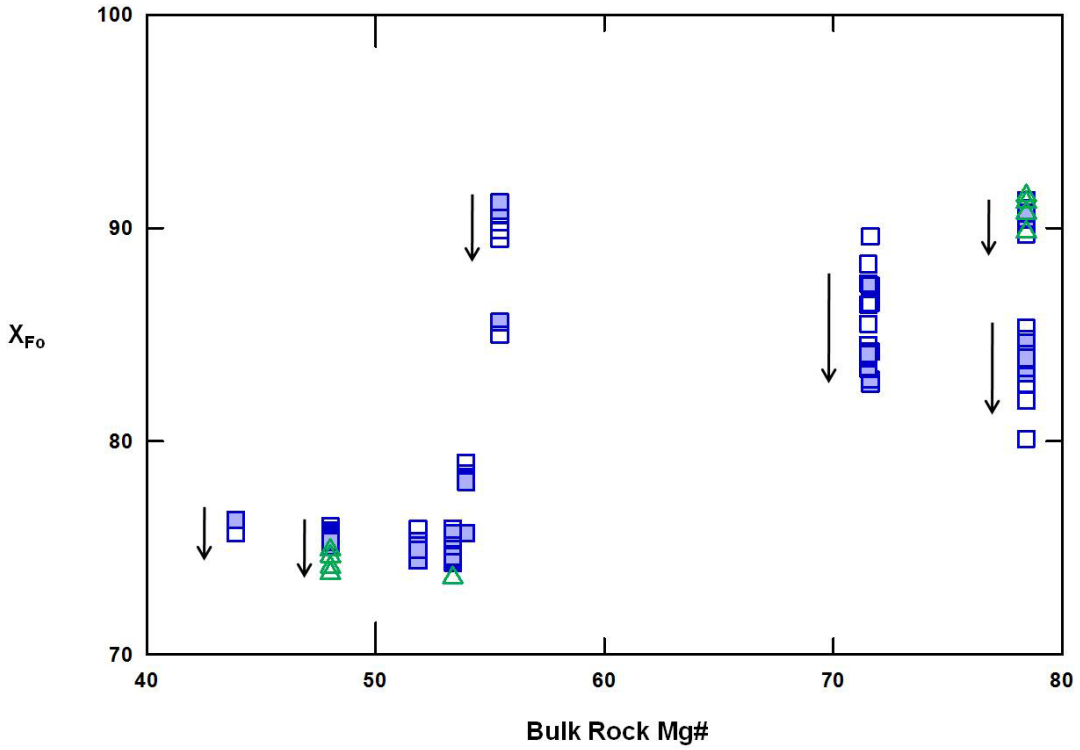


Figure 15 Olivine EMP Analyses

Olivine WDS EMP analyses for samples from Gemini-Oscostar (open squares) and Volsmar (closed squares) volcanic fields. A trend of decreasing Fo content from core to rim is observed in most samples (arrow). Groundmass results (triangles) either overlap or are greater than phenocryst compositions. Mg# is the calculated Mg ratio of the bulk rock.

Bathymetry

The submarine geomorphology of the volcanic fields is characterised by a small number of polygenetic stratovolcanoes with/without calderas, a relatively small number of medium-sized stratovolcanoes with no associated calderas and many monogenetic scoria cones that impart a northwesterly structural fabric to the fields. The total area of GOVF is 1311 km^2 comprising Gemini South, a stratovolcano with a breached caldera, Oscostar, an elongated stratovolcano with three eruptive centres located along axis, and Gemini North, a stratovolcano (Figure 16). Gemini South volcano has a basal diameter of 13km and at 1240m high and 60m below sea level, is the highest volcanic edifice in the GOVF. Basal diameter in this study is defined by the break in slope. Oscostar volcano with a basal diameter of 15km is elongated to the northeast with an orientation of N32°E. Gemini North volcano is much smaller with a basal diameter of 6km. All volcanoes have associated parasitic cones that vary in size and volume. The remainder of GOVF comprises five medium-sized

scoria cones and 581 small-sized scoria cones. The scoria cones occur either as isolated cones on the oceanic plain or as chains of overlapping coalesced cones.

The total area of VVF is 730 km^2 comprising two stratovolcanoes, Mariposa and Abeja, a caldera and numerous small-sized scoria cones (Figure 17). Mariposa volcano with a height of 1200m is the highest edifice in the VVF; the summit of Mariposa volcano is 615m below sea level. Mariposa volcano has a number of parasitic scoria cones on the eastern flank. Abeja volcano is located adjacent to Mariposa volcano to the southwest and has a basal diameter of 5km and a height of 1170m. There are also thirteen medium-sized scoria cones and 198 small-sized scoria cones in VVF, including the parasitic scoria cones on Mariposa volcano.

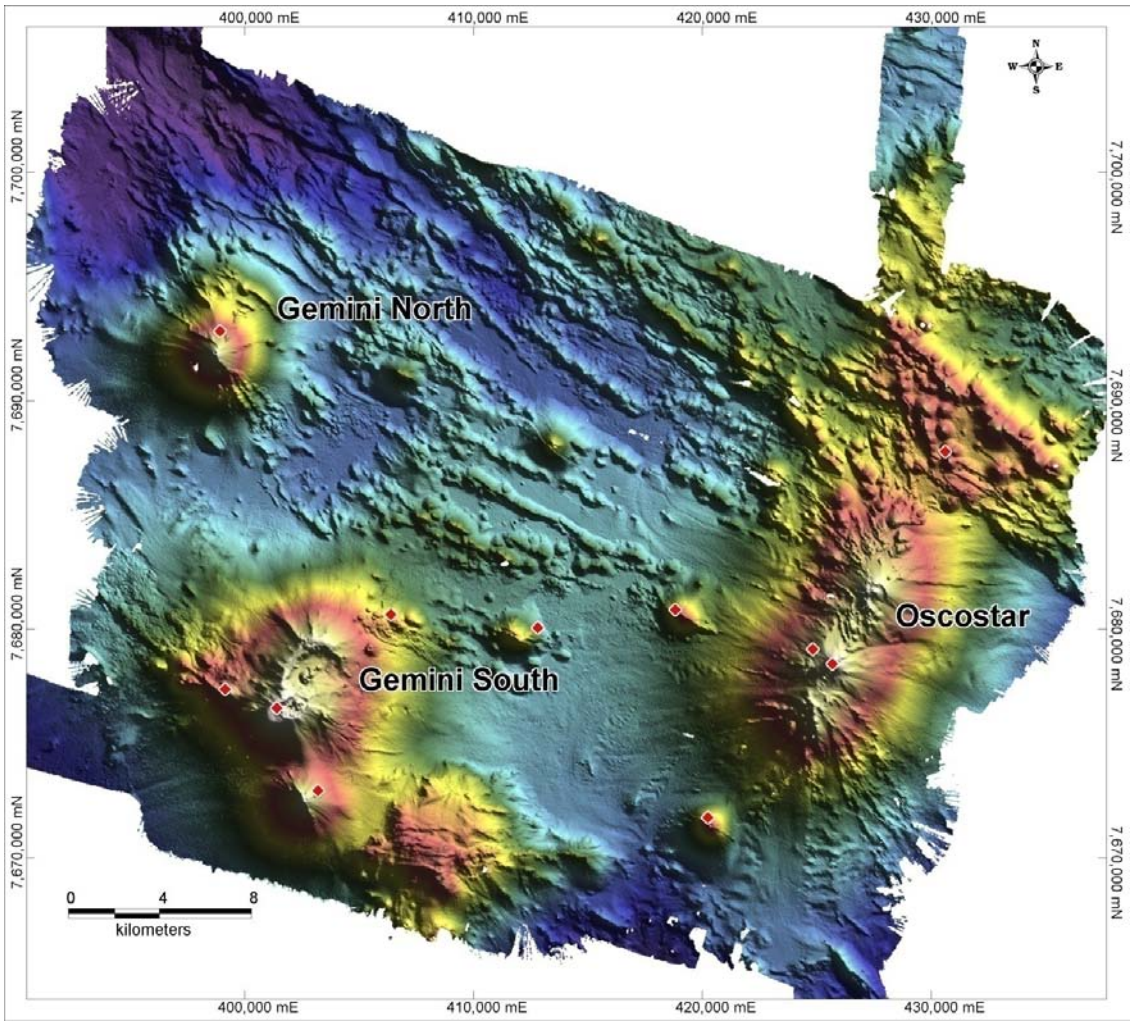


Figure 16 Volcanoes of Gemini-Oscostar Volcanic Field

Gemini-Oscostar volcanic field comprises an elongated stratovolcano (Oscostar), a breached caldera (Gemini South), a stratovolcano (Gemini North) as well as numerous scoria cones. Gemini South and Oscostar volcanoes were originally known as Gemini West and Gemini East respectively (Monzier et al., 1993).

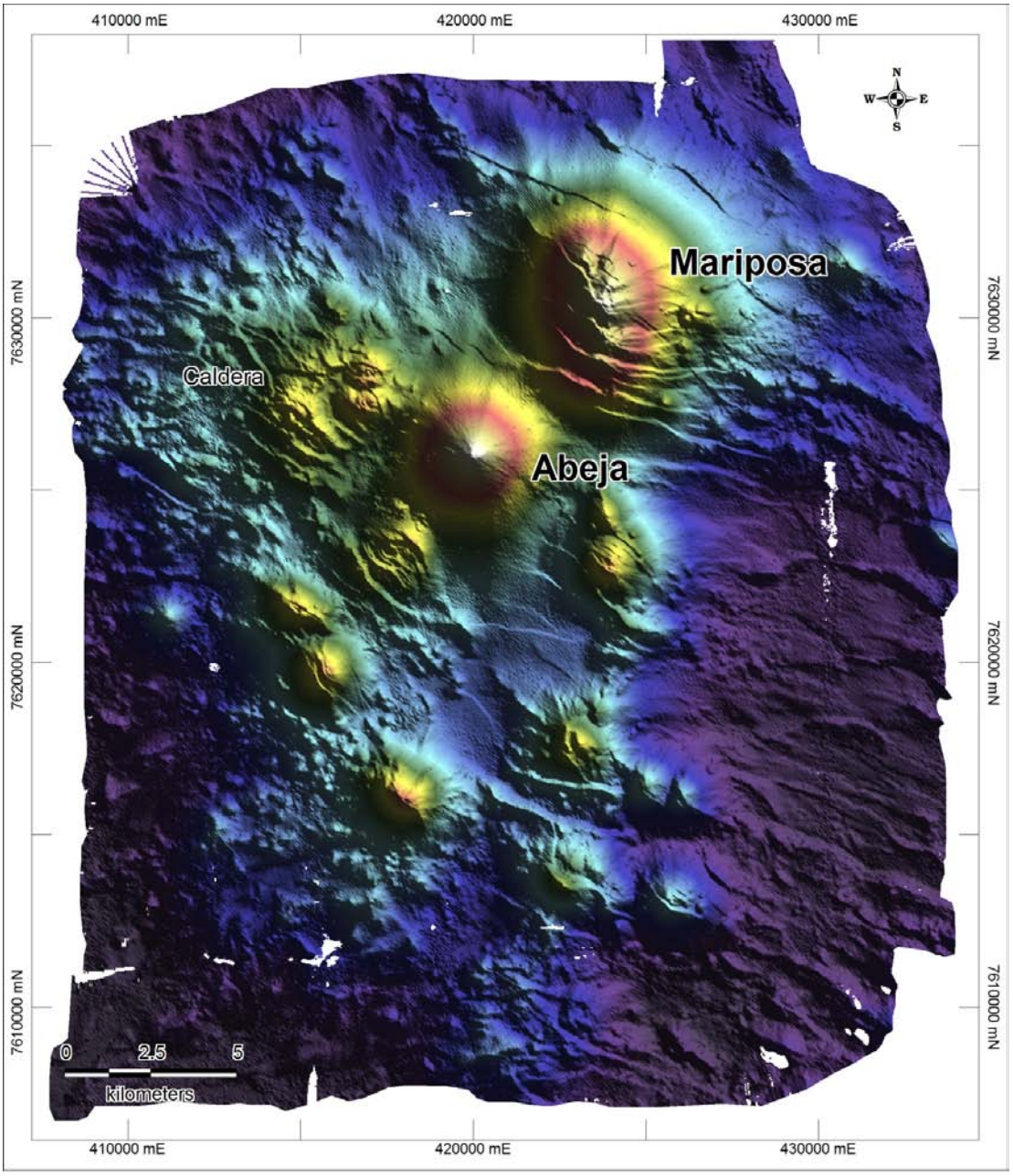


Figure 17 Volcanoes of Volsmar Volcanic Field

Volsmar volcanic field consists of two stratovolcanoes, Mariposa and Abeja, a deep water caldera with two scoria cones in its centre, ten medium scoria cones and numerous small scoria cones.

Geochemistry

Major Elements

The rocks sampled from GOVF and VVF are predominantly basalt and basaltic andesite, with less andesite and dacite present (Table 14, Figure 18). GOVF and VVF rocks are both tholeiitic and calcalkalic, according to the FeO/MgO versus SiO_2 and AFM diagrams of Miyashiro (1974) and Kuno (1968) respectively (Figure 19, Figure 20). Calcalkalic samples include CD-04-1 and CD-05-1 from GOVF; CD-41-1, all samples from dredge CD-43, and all samples from dredge CD-48 from VVF. The majority of samples from both fields are from the low-K series with the exception of CD-02-1, CD-02-5, CD-04-1 and CD-05-1 which are classified as medium-K according to the andesite-type diagram of Gill (1981) (Table 15).

The major elements of samples from GOVF and VVF overlap on Harker variation diagrams. Mg# is used for comparison as the range in SiO_2 for both volcanic fields is relatively narrow. SiO_2, Al_2O_3, Na_2O, and P_2O_5 decrease with increasing Mg# ($Mg/Mg+Fe^{2+}$), while CaO increases with decreasing Mg# (Figure 21). The variation of TiO_2 with respect to Mg# appears to show three groups of lavas, all of which decrease with increasing Mg#. There is a small group from GOVF that is low TiO_2, a group from VVF that is slightly higher in TiO_2, and finally a combined group of GOVF and VVF that is high TiO_2. Two groups of lavas are observed on a MnO and Mg# plot, a small number of samples from GOVF increase with increasing Mg#, while the remainder from GOVF and VVF occur over a narrow range (0.1-0.2 wt %) of MnO with increasing Mg#. K_2O variation with Mg# is similar to TiO_2, a group from GOVF and VVF that decrease with increasing Mg#, and a group that is higher in K_2O that also decreases with increasing Mg#.

Two groups of lavas are seen on a Fe_2O_3T and Mg# plot (Figure 21), a low group from GOVF and VVF that increases with decreasing Mg# and a relatively higher group that decreases with increasing Mg#. The variation of FeO and MgO shows a low-FeO group made up predominantly of GOVF lavas that increase with respect to MgO, a moderate-FeO group from both GOVF and VVF that also increase with respect to MgO, and a high-FeO group from both volcanic fields that decreases with respect to MgO.

Mg# cover a broad range from 31.8-80.0 for rocks from GOVF and VVF. The two-pyx basaltic andesites from VVF (dredge CD-43) range from 71.5 to 72.1 and olivine-pyroxene basalts from VVF (dredge CD-48) range from 77.1 to 80.0. Only two basalts from GOVF (CD-09-1 and CD-10-1) have Mg# above 60.

Table 14 Major and Trace Element Results

Major element results are presented in wt% oxide (ICP-OES and ICP-AES), trace element results are presented in ppm (LA-ICP-MS). Total Fe as Fe_2O_3.

	CD-01-1 *basalt*	**CD-02-1** *dacite*	**CD-02-5** *andesite*	**CD-03-2** *basaltic andesite*	**CD-04-1** *andesite*	**CD-04-2** *basalt*	**CD-05-1** *andesite*	**CD-06-1** *basalt*	**CD-07-1** *basalt*
SiO_2	49.2	63.9	60.8	55.4	61.6	46.1	57.8	51.4	47.8
TiO_2	0.8	0.5	0.6	0.6	0.5	0.4	0.6	0.7	0.8
Al_2O_3	17.9	15.5	17.5	17.5	16.1	24.8	15.3	20.1	18.1
Fe_2O_3	2.0	1.0	1.2	1.6	1.3	1.2	1.4	1.6	1.9
FeO	10.0	5.2	6.2	8.1	6.5	6.3	7.3	8.2	9.5
MnO	0.2	0.1	0.2	0.2	0.1	0.1	0.2	0.2	1.1
MgO	6.5	1.4	1.9	3.2	2.7	4.0	5.1	2.7	6.1
CaO	10.9	5.1	7.1	8.0	4.7	14.1	8.1	11.5	11.6
Na_2O	2.7	4.1	3.9	3.3	3.2	1.5	3.1	2.6	2.4
K_2O	0.3	1.1	1.0	0.6	1.0	0.1	0.8	0.4	0.3
P_2O_5	0.1	0.2	0.3	0.2	0.2	0.1	0.2	0.1	0.1
LOI	0.00	0.61	0.04	0.52	1.76	0.89	0.38	0.24	0.66
Total	100.5	98.9	100.5	99.1	99.6	99.6	100.1	99.7	100.4
Mg#	53.5	31.8	35.2	41.3	42.1	53.1	55.4	37.0	53.4
La	2.48	7.41	6.65	4.30	5.64	0.56	5.44		
Ce	5.90	17.31	15.22	10.11	13.08	1.58	13.19		
Pr	1.09	2.67	2.28	1.56	1.91	0.28	1.97		
Nd	5.74	12.79	11.71	7.09	9.97	1.74	9.91		
Sm	1.65	3.43	3.48	2.15	2.50	0.61	2.73		
Eu	0.70	0.96	0.90	0.91	1.06	0.30	0.85		
Gd	2.16	3.97	3.68	2.39	2.82	0.67	2.97		
Tb	0.35	0.68	0.58	0.34	0.54	0.15	0.45		
Dy	2.39	4.23	3.67	2.55	3.61	1.02	3.07		
Ho	0.55	0.88	0.79	0.57	0.81	0.18	0.65		
Er	1.53	2.81	2.42	1.69	2.38	0.54	1.85		
Tm	0.26	0.43	0.37	0.28	0.37	0.12	0.29		
Yb	1.55	2.95	2.72	1.76	2.61	0.66	2.07		
Lu	0.24	0.39	0.37	0.27	0.42	0.10	0.31		
Rb	2.78	14.02	11.70	6.99	11.27	0.24	10.75		
Sr	443.4	349.5	425.1	475.6	329.3	440.0	352.8		
Cs	0.11	0.41	0.27	0.25	0.30	-0.01	0.29		
Ba	43.9	149.1	118.5	85.1	155.9	12.0	105.6		
Pb	1.24	3.64	3.70	2.47	3.21	0.56	2.89		
Y	13.29	24.43	21.03	15.27	19.88	5.04	17.91		
Zr	21.42	64.13	54.91	42.71	63.23	7.68	46.20		
Nb	0.24	0.88	0.78	0.67	0.87	0.08	0.60		
Hf	0.67	1.83	1.80	1.24	2.30	0.28	1.51		
Ta	0.02	0.01	0.02	0.01	0.03	< 0.008	0.01		
Th	0.12	0.62	0.49	0.43	0.55	< 0.03	0.41		
U	0.07	0.43	0.42	0.21	0.46	0.08	0.31		
Sc	38.91	22.01	23.81	32.33	27.32	29.59	31.05		
V	381.73	104.76	133.82	205.60	180.29	245.78	208.22		
Cr	47.20	11.55	11.69	10.53	10.22	22.62	214.15		
Ni	41.10	6.30	5.51	7.98	7.48	22.73	53.54		
Cu	168.43	14.17	28.34	13.46	28.41	30.14	60.33		
Zn	67.46	76.18	76.53	82.12	63.13	31.26	66.20		

Table 14 continued

	CD-08-1 *basaltic andesite*	CD-08-2 *basalt*	CD-08-6 *basalt*	CD-09-1 *basalt*	CD-10-1 *basalt*	CD-40-1 *basalt*	CD-40-2 *basalt*	CD-41-1 *basaltic andesite*	CD-42-3 *basalt*	CD-42-4a *basalt*	CD-42-4b *basalt*
SiO_2	52.3	50.7	51.4	49.8	48.2	51.0	50.6	54.7	50.6	50.1	50.4
TiO_2	1.2	0.8	1.1	0.8	0.7	0.8	0.9	0.4	0.6	0.6	0.6
Al_2O_3	15.4	18.9	16.2	16.3	17.8	19.5	19.3	18.2	18.6	18.8	19.5
Fe_2O_3	2.2	1.7	1.9	1.7	1.4	1.7	1.8	1.3	1.7	1.7	1.7
FeO	11.3	8.8	9.7	8.8	7.1	8.9	8.9	6.7	8.7	8.8	8.6
MnO	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.2	0.2
MgO	4.8	3.9	5.2	8.3	8.9	4.4	4.5	4.9	4.3	4.8	4.3
CaO	9.5	11.6	10.4	12.0	13.0	11.5	11.5	10.8	11.2	11.0	11.0
Na_2O	3.2	2.3	2.9	2.2	2.0	2.6	2.8	2.2	2.6	2.0	2.1
K_2O	0.4	0.3	0.3	0.3	0.1	0.3	0.3	0.6	0.6	0.6	0.6
P_2O_5	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
LOI	0.02	0.61	0.13	0.21	0.70	0.00	0.00	0.52	1.22	0.05	0.02
Total	100.8	99.9	99.6	100.8	100.0	100.9	100.7	100.5	100.5	98.8	99.1
Mg#	43.0	43.9	48.9	62.5	69.3	46.9	47.1	56.5	46.8	49.4	47.4
La	4.65	3.35	2.33			2.46	2.56	3.10	4.67	2.67	4.28
Ce	11.40	8.40	6.51			6.71	6.81	6.75	10.31	6.84	10.11
Pr	1.88	1.28	1.02			1.09	1.16	1.00	1.65	1.11	1.49
Nd	9.99	7.39	5.87			6.29	5.99	5.15	8.27	6.16	7.98
Sm	2.87	2.00	2.02			1.81	1.88	1.29	2.15	1.95	1.92
Eu	1.26	0.79	0.70			0.72	0.78	0.44	0.70	0.85	0.75
Gd	3.93	2.34	2.25			2.37	2.67	1.61	2.21	2.58	2.11
Tb	0.65	0.37	0.33			0.43	0.42	0.29	0.33	0.43	0.29
Dy	4.43	2.71	2.57			3.10	2.82	1.95	2.18	2.94	1.98
Ho	1.04	0.64	0.53			0.63	0.61	0.50	0.46	0.57	0.41
Er	3.00	1.76	1.44			1.56	1.81	1.30	1.44	1.66	1.27
Tm	0.44	0.25	0.23			0.23	0.28	0.21	0.19	0.27	0.19
Yb	2.93	1.97	1.80			1.75	2.01	1.66	1.40	2.05	1.33
Lu	0.50	0.26	0.24			0.23	0.25	0.25	0.25	0.28	0.20
Rb	4.43	4.99	2.87			3.10	2.69	8.08	6.27	2.71	6.20
Sr	303.0	399.1	353.2			302.2	357.2	309.4	553.1	348.0	506.0
Cs	0.20	0.16	0.19			< 0.1	0.12	0.26	0.49	< 0.1	0.23
Ba	64.0	62.8	40.8			44.3	38.4	75.9	88.0	38.8	82.6
Pb	2.46	2.13	1.23			1.12	1.33	2.57	3.29	1.22	2.32
Y	25.02	15.50	14.13			15.19	16.68	11.84	12.20	15.98	10.80
Zr	56.25	88.17	35.01			36.47	34.47	23.34	25.86	32.87	23.27
Nb	1.11	0.31	0.49			0.36	0.54	0.44	0.37	0.64	0.32
Hf	1.70	2.28	0.97			1.05	0.94	0.80	0.83	1.01	0.91
Ta	0.03	0.01	< 0.015			0.02	< 0.015	< 0.01	< 0.015	< 0.03	0.01
Th	0.32	0.30	0.15			0.15	0.14	0.25	0.30	0.15	0.27
U	0.23	0.28	0.10			0.08	0.09	0.20	0.27	0.11	0.21
Sc	42.99	37.86	40.41			46.77	39.12	43.23	38.30	38.22	39.73
V	450.93	407.60	318.96			316.81	366.41	247.85	355.73	368.50	365.59
Cr	14.26	27.03	27.87			180.11	36.11	137.49	44.52	35.36	50.76
Ni	16.25	25.91	35.46			67.64	16.80	104.75	31.91	19.37	25.38
Cu	116.88	152.72	140.24			115.49	119.89	101.94	232.22	117.66	142.87
Zn	94.72	74.09	59.47			52.79	64.97	65.79	70.17	62.61	64.57

Table 14 continued

	CD-43-1 *basaltic andesite*	CD-43-2 *basalt*	CD-43-3 *basaltic andesite*	CD-43-4 *basaltic andesite*	CD-43-5 *basaltic andesite*	CD-44-1 *basalt*	CD-44-2 *basalt*	CD-45-1 *basalt*	CD-45-2 *basalt*
SiO_2	52.5	51.4	52.5	52.4	52.5	49.7	48.3	51.5	51.0
TiO_2	0.4	0.4	0.4	0.4	0.4	0.6	0.5	0.5	0.5
Al_2O_3	12.0	12.8	12.0	12.4	11.9	16.7	16.9	18.6	18.5
Fe_2O_3	1.6	1.6	1.6	1.6	1.6	1.9	1.9	1.8	1.7
FeO	8.3	8.0	8.1	8.1	8.2	9.9	9.6	9.0	8.8
MnO	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MgO	11.8	11.6	11.7	11.4	11.8	6.7	6.4	5.4	5.1
CaO	10.7	10.8	10.6	10.6	10.7	11.6	11.8	11.2	11.6
Na_2O	1.7	1.5	1.6	1.7	1.6	2.2	1.9	2.0	2.1
K_2O	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.3	0.3
P_2O_5	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1
LOI	0.73	0.52	0.86	0.99	0.83	0.66	0.67	0.38	1.03
Total	100.5	99.2	100.4	100.3	100.4	100.6	98.7	100.9	101.0
Mg#	71.6	72.1	72.0	71.5	72.1	54.6	54.4	51.8	50.6
La	4.68	4.33	4.59	4.21	4.49	4.15	3.28	3.03	3.24
Ce	9.43	10.36	9.24	8.68	9.18	8.82	7.90	6.76	6.84
Pr	1.40	1.45	1.32	1.27	1.42	1.49	1.19	1.19	1.07
Nd	6.91	6.93	6.62	6.61	6.36	6.85	5.93	6.20	6.01
Sm	1.52	2.10	1.64	1.40	1.82	1.70	1.78	1.76	1.68
Eu	0.54	0.62	0.48	0.64	0.59	0.63	0.67	0.62	0.57
Gd	1.96	2.21	1.77	1.50	1.82	2.07	1.62	1.87	1.95
Tb	0.27	0.33	0.28	0.29	0.26	0.35	0.23	0.28	0.28
Dy	1.64	2.15	1.63	1.64	1.71	1.98	1.73	1.93	1.90
Ho	0.38	0.48	0.37	0.36	0.38	0.43	0.36	0.44	0.40
Er	1.13	1.42	1.04	1.12	1.15	1.20	1.04	1.09	1.26
Tm	0.19	0.22	0.19	0.15	0.19	0.13	0.16	0.17	0.15
Yb	1.17	1.54	1.02	1.02	1.17	1.02	0.96	1.27	1.46
Lu	0.17	0.20	0.16	0.14	0.16	0.16	0.14	0.24	0.14
Rb	5.81	6.33	5.90	6.07	6.16	4.28	3.92	3.46	3.44
Sr	254.9	527.6	251.6	247.1	249.7	460.3	414.5	453.6	474.4
Cs	0.18	0.23	0.15	0.08	0.19	0.18	0.16	0.18	0.15
Ba	57.5	79.3	55.2	53.4	55.8	53.1	57.3	47.7	55.7
Pb	3.33	2.30	2.06	2.31	2.25	1.89	1.66	2.17	2.53
Y	9.57	11.27	9.53	9.50	9.64	10.58	8.59	10.14	10.73
Zr	27.09	23.44	26.26	25.68	25.71	19.92	19.48	14.95	15.37
Nb	0.47	0.37	0.36	0.38	0.36	0.26	0.32	0.25	0.24
Hf	0.80	0.85	0.65	0.75	0.86	0.67	0.56	0.46	0.63
Ta	0.01	0.01	< 0.03	< 0.01	0.01	0.02	0.01	< 0.015	< 0.015
Th	0.31	0.28	0.35	0.35	0.36	0.26	0.25	0.11	0.17
U	0.19	0.15	0.17	0.18	0.20	0.17	0.09	0.08	0.12
Sc	46.64	38.49	46.27	46.68	47.61	48.77	43.87	44.38	44.23
V	274.91	367.30	271.20	277.82	271.89	377.52	350.00	365.16	379.83
Cr	757.78	41.27	757.19	769.02	757.25	40.85	39.26	50.46	37.44
Ni	158.52	21.02	161.08	171.30	154.03	39.96	34.11	22.29	19.43
Cu	89.40	161.13	136.71	85.83	82.79	120.12	162.26	105.63	147.11
Zn	58.83	66.15	58.98	58.02	57.37	74.07	65.23	69.19	71.85

Table 14 continued

	CD-46-1 *basalt*	CD-46-3 *basaltic andesite*	CD-47-1 *basalt*	CD-47-2 *basalt*	CD-48-1 *basalt*	CD-48-2 *basalt*	CD-48-3a *basalt*	CD-48-3b *basalt*	CD-48-4 *basalt*	CD-48-6 *basalt*	CD-48-7 *basalt*
SiO_2	51.8	49.1	50.8	50.6	50.6	50.5	47.8	48.8	50.5	50.5	50.9
TiO_2	0.5	0.5	0.5	0.6	0.3	0.3	0.3	0.4	0.4	0.4	0.4
Al_2O_3	17.6	17.6	20.0	18.6	10.5	10.2	9.3	10.6	10.7	10.6	11.0
Fe_2O_3	1.7	1.8	1.7	1.7	1.5	1.5	1.5	1.5	1.6	1.6	1.6
FeO	8.9	9.1	8.5	8.9	7.7	7.9	7.7	7.8	8.0	7.9	8.2
MnO	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
MgO	5.8	6.4	4.4	4.3	15.7	16.1	17.3	15.3	15.7	15.4	15.6
CaO	11.0	11.6	11.7	11.1	11.8	11.6	12.1	12.2	11.7	11.9	12.1
Na_2O	2.0	1.9	2.0	2.3	1.6	1.5	1.1	1.5	1.5	1.7	1.6
K_2O	0.5	0.4	0.5	0.6	0.3	0.3	0.2	0.2	0.3	0.3	0.3
P_2O_5	0.1	0.2	0.1	0.2	0.1	0.1	0.2	0.1	0.1	0.1	0.1
LOI	0.52	0.80	0.23	0.96	0.54	0.48	1.22	0.35	0.54	0.42	0.00
Total	100.7	99.6	100.5	100.0	100.8	100.5	98.8	98.9	101.0	100.9	101.9
Mg#	53.9	55.5	48.0	46.6	78.4	78.4	80.0	77.8	77.8	77.6	77.1
La	4.60	3.30	3.40		2.21	2.01	1.21	1.56	2.29	2.22	2.50
Ce	9.94	7.50	7.99		4.79	4.45	3.08	4.00	4.74	4.85	5.10
Pr	1.42	1.05	1.14		0.72	0.71	0.44	0.60	0.74	0.76	0.79
Nd	7.19	5.67	6.66		3.89	3.49	2.60	3.03	4.59	4.14	4.05
Sm	1.77	1.05	1.78		1.28	0.71	0.65	1.01	1.13	1.17	1.05
Eu	0.74	0.50	0.56		0.41	0.33	0.28	0.37	0.50	0.42	0.37
Gd	1.93	1.55	2.01		1.45	1.34	1.05	1.19	1.42	1.30	1.30
Tb	0.32	0.19	0.35		0.26	0.18	0.14	0.18	0.26	0.26	0.21
Dy	1.67	1.51	1.68		1.44	1.45	0.93	1.10	1.59	1.82	1.56
Ho	0.42	0.31	0.40		0.39	0.30	0.22	0.26	0.37	0.36	0.31
Er	1.27	0.86	1.17		1.02	1.01	0.63	0.68	0.93	0.88	0.99
Tm	0.17	0.14	0.12		0.11	0.12	0.11	0.11	0.19	0.12	0.20
Yb	0.92	1.00	1.11		1.07	0.82	0.70	0.70	0.96	1.07	1.07
Lu	0.24	0.14	0.17		0.15	0.15	0.11	0.12	0.17	0.16	0.20
Rb	5.97	4.26	4.88		2.52	2.65	1.79	2.37	2.76	2.31	2.43
Sr	515.0	461.7	539.4		252.7	240.6	180.7	218.6	250.9	249.7	255.8
Cs	0.17	0.17	0.15		0.14	0.25	0.08	0.07	0.13	0.08	0.16
Ba	74.5	56.9	60.2		38.8	38.4	26.4	34.4	42.6	36.4	33.8
Pb	2.31	2.97	2.11		1.83	1.53	1.07	0.99	1.92	2.05	< 2.0
Y	10.39	7.86	10.31		8.10	7.57	5.69	6.57	8.52	8.79	9.67
Zr	21.25	22.60	18.97		15.24	15.00	16.19	14.22	15.66	15.45	15.93
Nb	0.29	0.71	0.28		0.27	0.27	0.44	0.29	0.25	0.32	0.31
Hf	0.69	0.71	0.66		0.48	0.53	0.43	0.38	0.50	0.37	0.53
Ta	< 0.015	< 0.015	< 0.01		< 0.01	0.02	< 0.01	< 0.008	< 0.01	< 0.015	< 0.015
Th	0.45	0.34	0.20		0.15	0.11	0.10	0.10	0.12	0.09	0.16
U	0.18	0.11	0.12		0.12	0.12	0.23	0.08	0.18	0.16	0.22
Sc	45.36	44.67	38.10		51.56	49.85	46.56	45.72	51.50	52.15	53.78
V	377.78	360.47	376.61		235.63	230.68	201.78	232.19	239.47	241.83	250.82
Cr	87.20	117.60	48.66		1698.30	1838.78	1550.79	1364.30	2004.57	2447.39	2753.54
Ni	24.98	32.88	21.05		223.16	260.88	283.17	239.86	228.64	216.21	224.72
Cu	112.13	77.66	148.45		49.83	101.47	49.91	54.15	50.07	37.85	43.48
Zn	66.55	59.87	63.59		51.15	54.19	44.34	46.54	50.47	50.98	52.34

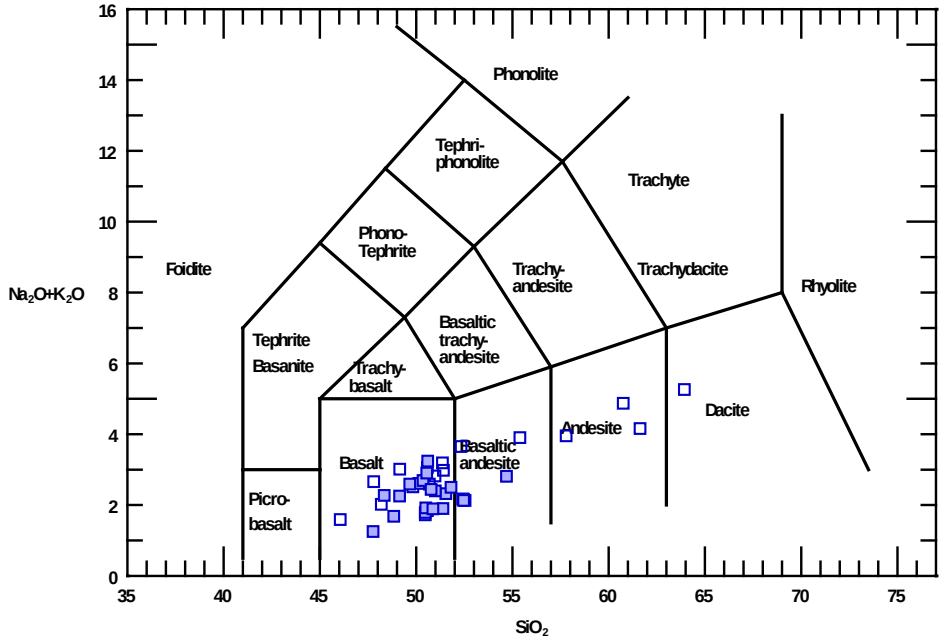


Figure 18 Total-alkalis silica diagram

Samples from Gemini-Oscostar (open squares) and Volsmar (closed squares) volcanic fields are classified according to Le Bas et al. (1986) and range from basalt to basaltic andesite with a small number of andesite and dacite. Basalt is the dominant rock type of both fields, the more intermediate rock types are only found at Gemini-Oscostar volcanic field.

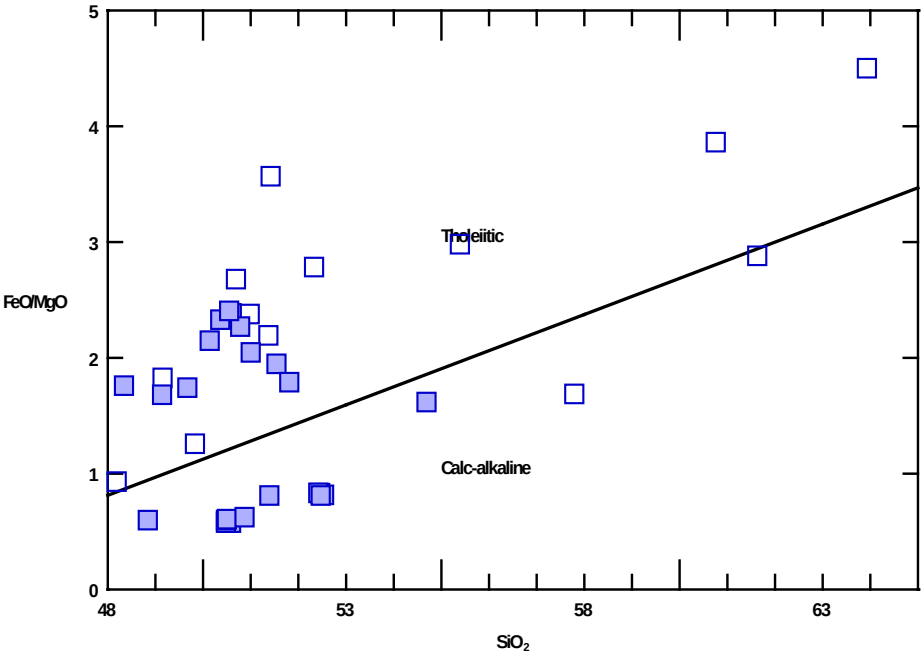


Figure 19 FeO/MgO vs SiO_2 diagram

The majority of lavas from Gemini-Oscostar volcanic field (open squares) are tholeiitic rocks, while samples from Volsmar volcanic field (closed squares) belong to both tholeiitic and calcalkalic series. Classification based on the scheme of Miyashiro (1974).

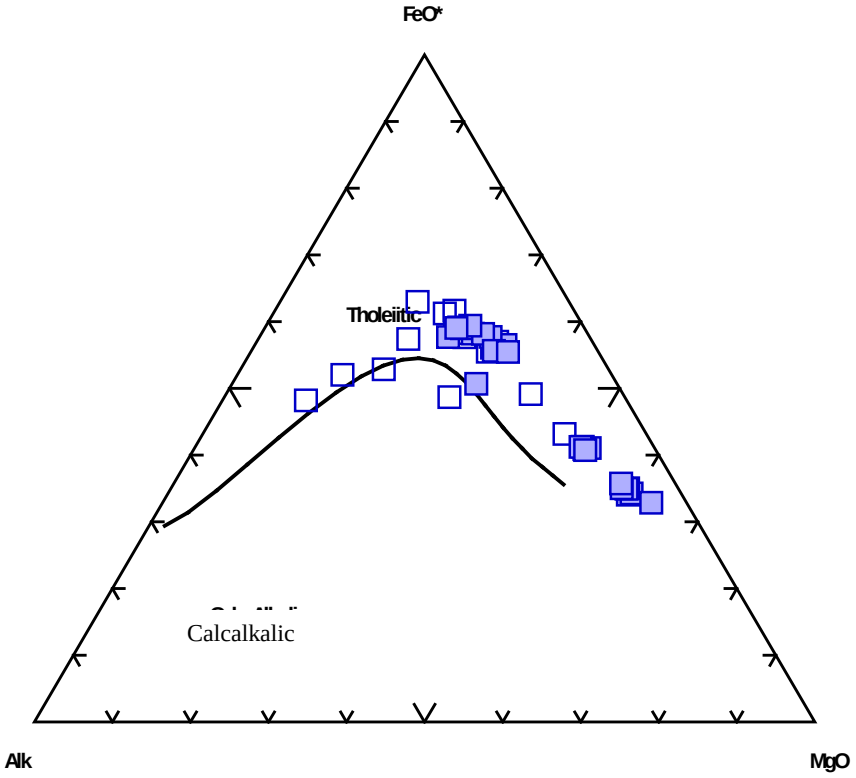


Figure 20 AFM diagram

Volsmar volcanic field (closed squares) belong to the tholeiitic series and only two samples from Gemini-Oscostar volcanic field (open squares) belong to the calcalkalic series. Classification based on scheme of Kuno (1968).

Table 15 Classification of Lavas from Gemini-Oscostar and Volsmar Volcanic Fields

Samples from both volcanic fields are predominantly low-K tholeiite rocks. Magma series is classified according to the AFM diagram (Kuno, 1968), K series is classified according to K_2O vs SiO_2 diagram (Gill, 1981), and rock types are classified according to the TAS diagram (Le Bas et al., 1986).

Sample	Latitude	Longitude	Magma Series	K Series	TAS
CD-01-1	-20.8598	170.029	Tholeiite	Low K	Basalt
CD-02-1	-21.0090	170.051	Tholeiite	Medium K	Dacite
CD-02-5	-21.0090	170.051	Tholeiite	Medium K	Andesite
CD-03-2	-21.0014	170.030	Tholeiite	Low K	Basaltic andesite
CD-04-1	-21.0417	170.069	Calcalkalic	Medium K	Andesite
CD-04-2	-21.0417	170.069	Tholeiite	Low K	Basalt
CD-05-1	-20.9722	170.100	Calcalkalic	Medium K	Andesite
CD-06-1	-20.8598	170.161	Tholeiite	Low K	Basalt
CD-07-1	-21.0532	170.232	Tholeiite	Low K	Basalt
CD-08-1	-20.9868	170.277	Tholeiite	Low K	Basaltic andesite
CD-08-2	-20.9868	170.277	Tholeiite	Low K	Basalt
CD-08-6	-20.9868	170.277	Tholeiite	Low K	Basalt
CD-09-1	-20.9709	170.219	Tholeiite	Low K	Basalt
CD-10-1	-20.9089	170.333	Tholeiite	Low K	Basalt
CD-40-1	-20.9926	170.285	Tholeiite	Low K	Basalt
CD-40-2	-20.9926	170.285	Tholeiite	Low K	Basalt
CD-41-1	-21.4252	170.263	Calcalkalic	Low K	Basaltic andesite
CD-42-3	-21.4908	170.258	Tholeiite	Low K	Basalt
CD-42-4a	-21.4908	170.258	Tholeiite	Low K	Basalt
CD-42-4b	-21.4908	170.258	Tholeiite	Low K	Basalt
CD-43-1	-21.5846	170.281	Calcalkalic	Low K	Basaltic andesite
CD-43-2	-21.5846	170.281	Calcalkalic	Low K	Basalt
CD-43-3	-21.5846	170.281	Calcalkalic	Low K	Basaltic andesite
CD-43-4	-21.5846	170.281	Calcalkalic	Low K	Basaltic andesite
CD-43-5	-21.5846	170.281	Calcalkalic	Low K	Basaltic andesite
CD-44-1	-21.5452	170.194	Tholeiite	Low K	Basalt
CD-44-2	-21.5452	170.194	Tholeiite	Low K	Basalt
CD-45-1	-21.5566	170.201	Tholeiite	Low K	Basalt
CD-45-2	-21.5566	170.201	Tholeiite	Low K	Basalt
CD-46-1	-21.5224	170.185	Tholeiite	Low K	Basalt
CD-46-3	-21.5224	170.185	Tholeiite	Low K	Basalt
CD-47-1	-21.4640	170.219	Tholeiite	Low K	Basalt
CD-47-2	-21.4640	170.219	Tholeiite	Low K	Basalt
CD-48-1	-21.4506	170.190	Calcalkalic	Low K	Basalt
CD-48-2	-21.4506	170.190	Calcalkalic	Low K	Basalt
CD-48-3a	-21.4506	170.190	Calcalkalic	Low K	Basalt
CD-48-3b	-21.4506	170.190	Calcalkalic	Low K	Basalt
CD-48-4	-21.4506	170.190	Calcalkalic	Low K	Basalt
CD-48-6	-21.4506	170.190	Calcalkalic	Low K	Basalt
CD-48-7	-21.4506	170.190	Calcalkalic	Low K	Basalt

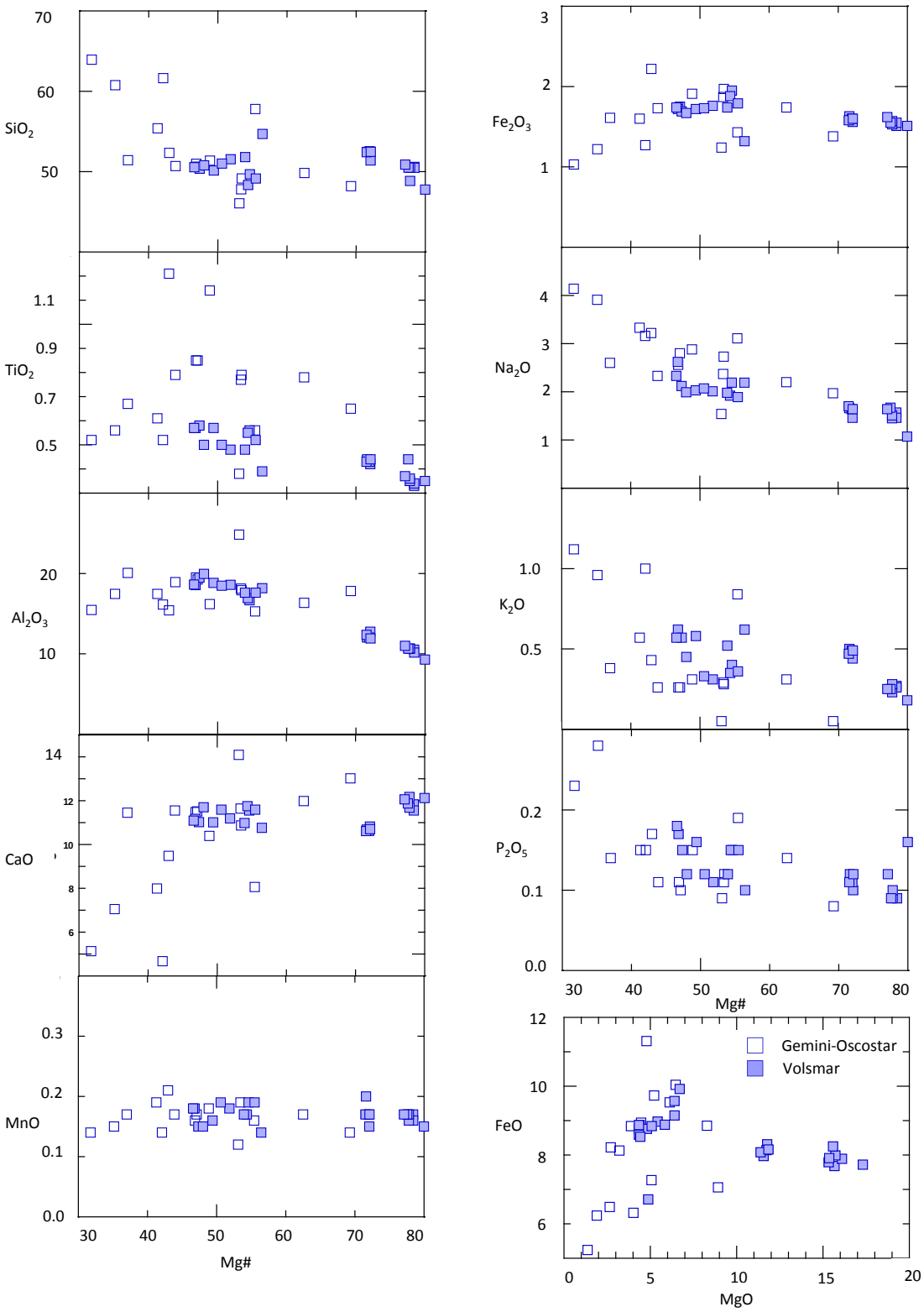


Figure 21 Major Element Results

Results are presented as weight % oxide versus Mg# (Mg/Mg+Fe^{2+}). CaO, MnO, and Fe_2O_3T all show increasing trends; while SiO_2, TiO_2, Al_2O_3, Na_2O, K_2O and P_2O_5 decrease with increasing Mg#.

Trace Elements

Samples from dredge CD-43 and CD-48 showed elevated levels of chromium, CD-43 ranged from 757.19 – 769.02 ppm and CD-48 ranged from 1698.30 – 2753.54 ppm (Table 14). Nickel was also elevated in these samples with values ranging from 154.03-171.30 ppm for CD-43 and 216.21-260.88 ppm for CD-48.

The variation of V with respect to Mg# (Figure 22) shows a small group of lavas from Gemini-Oscostar that increase with increasing Mg#, and two groups of lavas from both volcanic fields that decrease with increasing Mg# - a low-V group and a high-V group. The Rb/Sr ratio versus Mg# shows two distinct groups of lavas which decrease with increasing Mg#, the higher Rb/Sr group occurs over a greater range of Mg# values while the lower Rb/Sr group is clustered across a narrower range of Mg#'s. Two trends are observed on a plot of Sm and Mg#, similar to the trends observed in the Rb/Sr diagram. A group of lavas from GOVF and VVF, composed of relatively high-Mg# lavas, appear to decrease with increasing Mg#. The second group also decreases with increasing Mg# however; this trend occurs over lower Sm values. The variation of Ba/La with respect to Mg# shows two relatively poorly defined trends. A group of lavas with high-Mg# from the VVF increases with increasing Mg#, while the second trend shows a relatively wider range of Ba/La values. The majority of samples from both volcanic fields show Nb/Ta values greater than chondritic.

REE plots from GOVF and VVF have slight LREE enrichments with the exception of CD-04-2, which shows LREE depletion. Europium anomalies are either small or nonexistent. MORB-normalized diagrams for GOVF and VVF are typical for island arc lavas (Figure 24). The volcanic rocks show Nb and Ta depletions, large ion lithophile element (LILE) enrichment relative to the light rare earth elements (LREE), and LILE and LREE enrichment relative to high field strength element (HFSE). A Th depletion and Pb enrichment was also observed in all samples. Samples from dredge CD-48 displayed a significant Ni enrichment. All samples displayed a Cu enrichment with the exception of two-pyroxene andesite CD-02-5.

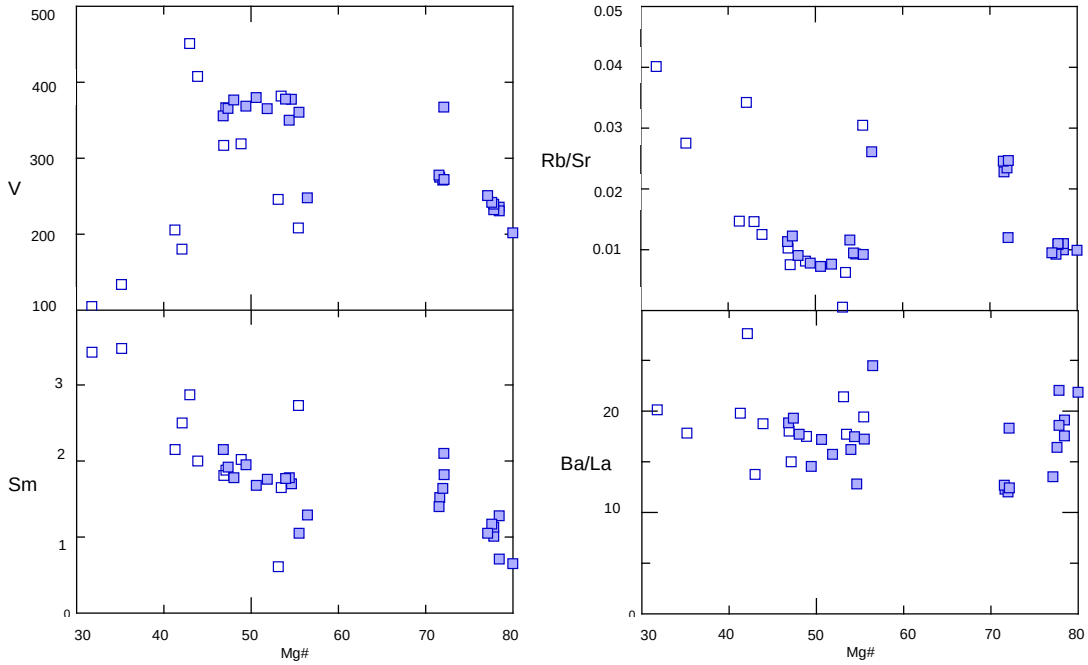


Figure 22 Selected Trace Element Variation

Variation of selected incompatible elements with respect to Mg# ($Mg/Mg+Fe^{2+}$) for Gemini-Oscostar (open squares) and Volsmar (closed squares) volcanic fields. See text for discussion.

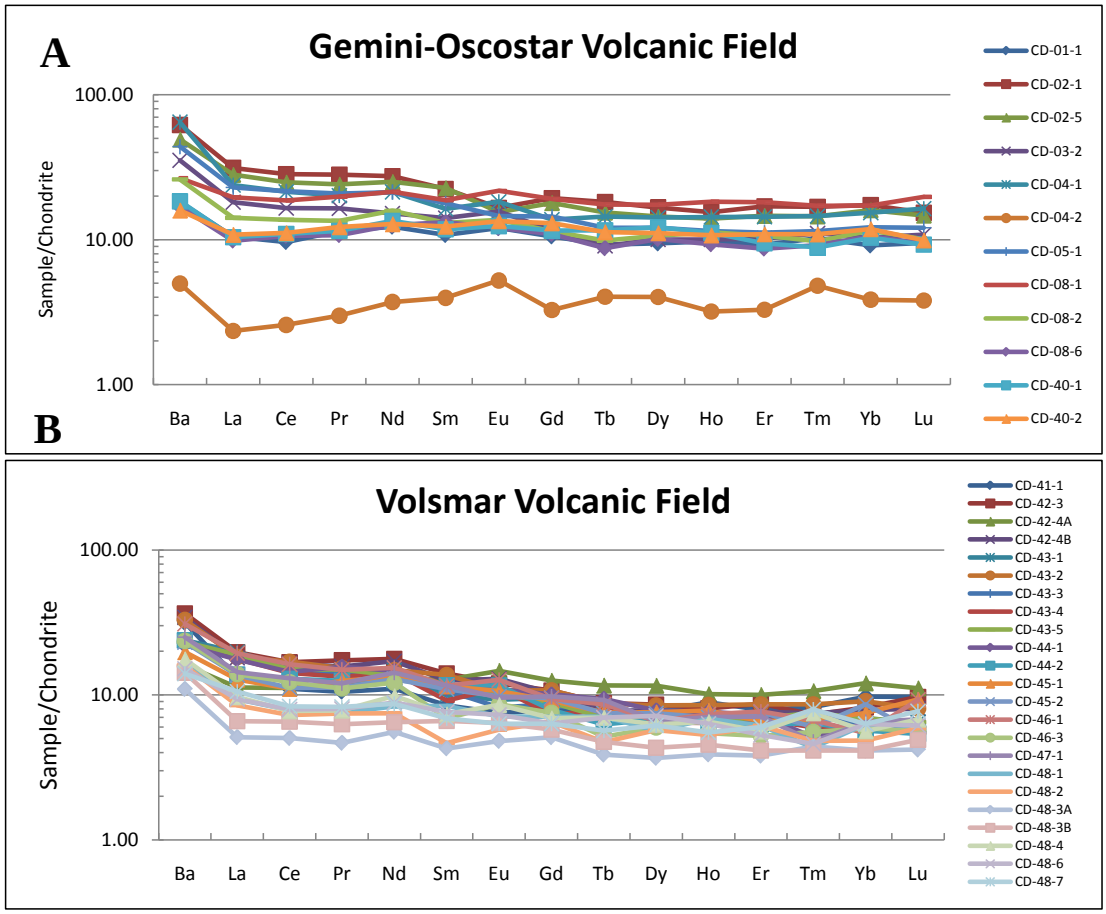


Figure 23 Chondrite Normalized Ba and REE

(A) Chondrite normalized Ba and REE results for samples from Gemini-Oscostar volcanic field (GOVF). These samples show slight light rare earth enrichment, with the exception of CD-04-2, but generally appear relatively flat. (B) Chondrite normalized Ba and REE results for Volsmar volcanic field (VVF). VVF is closer to chondritic abundances than GOVF and also shows a slight light rare earth enrichment trend. Chondrite composition from Sun and McDonough (1989).

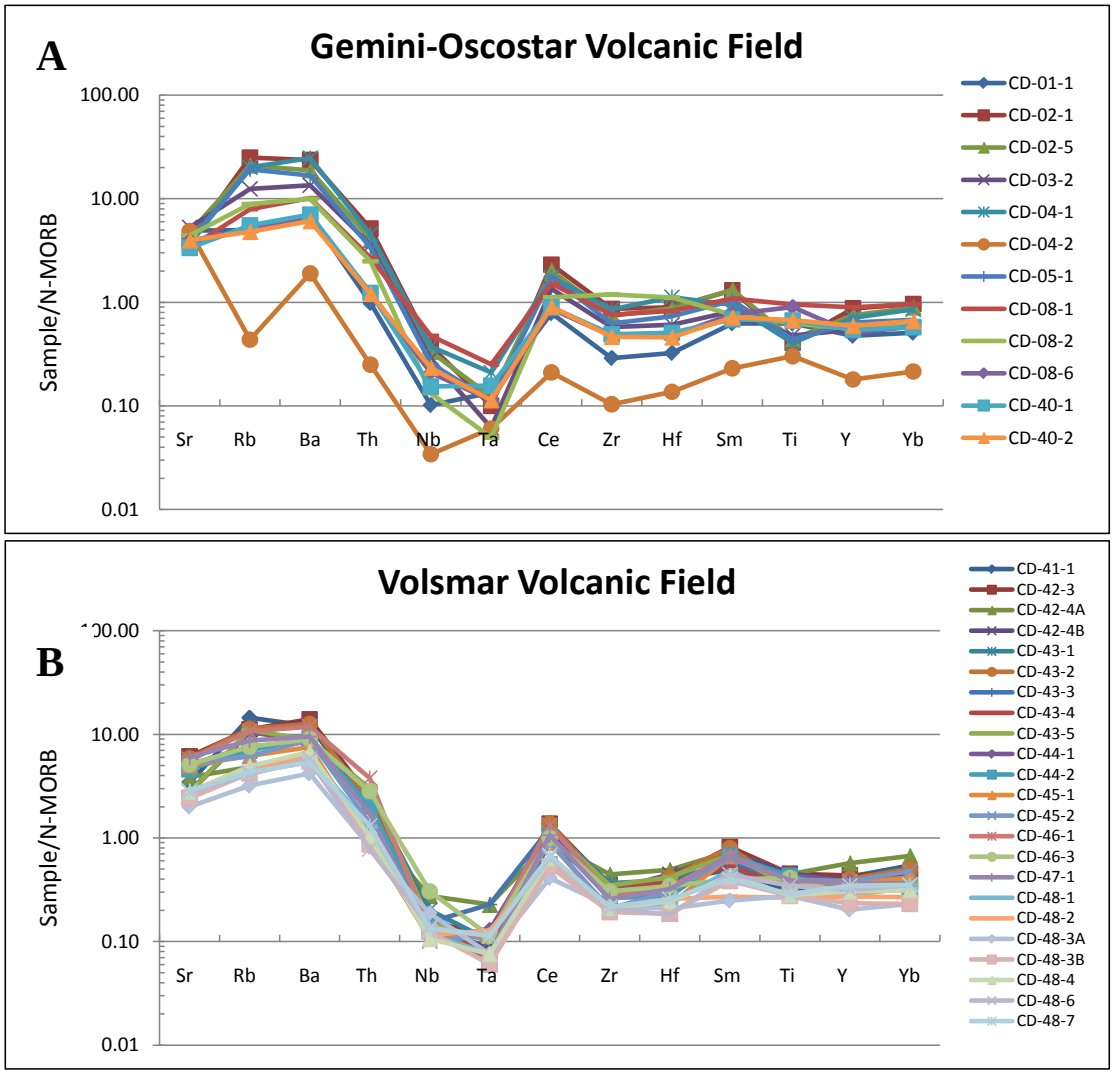


Figure 24 N-MORB Normalized Incompatible Elements

(A) N-MORB normalized lavas from Gemini-Oscostar volcanic field show features of classic island arc lavas, such as Nb and Ta depletion and LILE enrichment. (B) N-MORB normalized lavas from Volsmar volcanic field also show Nb and Ta depletions and enrichment in LILE. N-MORB composition from Sun and McDonough (1989).

Isotopes

Sr, Nd and Pb isotopes were measured for samples CD-01-1, CD-02-1, CD-05-1, CD-08-6, CD-40-1 from the GOVF and samples CD-42-4b, CD-43-3, CD-44-2, CD-45-2 and CD-46-3 from the VVF (Table 16). $^{87}Sr/^{86}Sr$ isotopes occupy a relatively narrow range from 0.70316 – 0.70336 while Nd isotopes range from 0.51302-0.51308 (Table 16). The variation of $^{143}Nd/^{144}Nd$ with respect to $^{87}Sr/^{86}Sr$ shows the volcanic fields are spatially distinct with regards to isotopic signature (Figure 25). The two volcanic fields are also spatially distinct with respect to REE signature, as seen in the variation of $^{143}Nd/^{144}Nd$ with respect to the Sm/Nd ratio (Figure 25). The Pb isotopes also occur over a relatively narrow range; $^{206}Pb/^{204}Pb$ range from 18.59-18.73, $^{207}Pb/^{204}Pb$ range from 15.52-15.54, and $^{208}Pb/^{204}Pb$ range from 38.22-38.33 (Table 16). These lavas show positive correlation trends for the Pb isotopes, with the exception of $^{206}Pb/^{204}Pb$ (Figure 26). Pb isotope results are spatially distinct with samples from VVF generally more radiogenic than samples from GOVF.

Table 16 Sr Nd and Pb Isotope Results Determined by MC-ICP-MS

Ten samples were analysed for Sr, Nd and Pb isotopes, five from Gemini-Oscostar volcanic field and five from Volsmar volcanic field.

Sample	$^{87}Sr/^{86}Sr$	$^{143}Nd/^{144}Nd$	$^{206}Pb/^{204}Pb$	$^{207}Pb/^{204}Pb$	$^{208}Pb/^{204}Pb$
CD-01-1	0.70316	0.513067	18.663	15.529	38.275
CD-02-1	0.70334	0.513057	18.679	15.531	38.290
CD-05-1	0.70336	0.513048	18.682	15.533	38.298
CD-08-6	0.70326	0.513080	18.587	15.524	38.220
CD-40-1	0.70322	0.513079	18.620	15.528	38.248
CD-42-4b	0.70320	0.513040	18.690	15.532	38.295
CD-43-3	0.70335	0.513026	18.708	15.539	38.325
CD-44-2	0.70321	0.513048	18.731	15.540	38.334
CD-45-2	0.70336	0.513047	18.714	15.538	38.323
CD-46-3	0.70329	0.513021	18.723	15.537	38.330

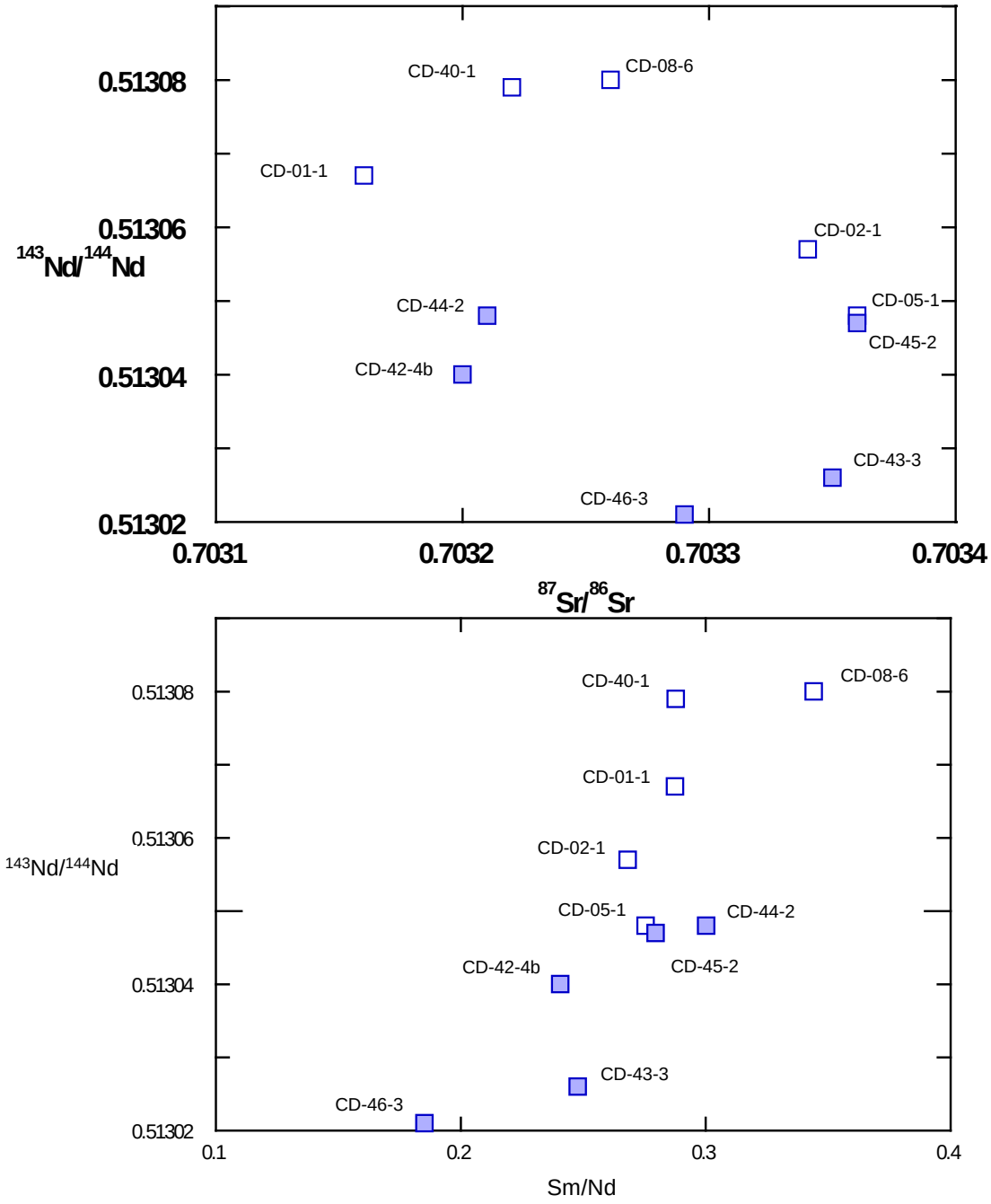


Figure 25 Sr and Nd Isotope Results for Gemini-Oscostar and Volsmar Volcanic Fields

(A) Volsmar volcanic field lavas (closed squares) are slightly less radiogenic than Gemini-Oscostar lavas (open squares) with respect to Sr and Nd isotopes. (B) The variation of $^{143}Nd/^{144}Nd$ with respect to the Sm/Nd ratio highlights that the two volcanic fields are not just distinct with regards to the isotope signature but also the REE signature.

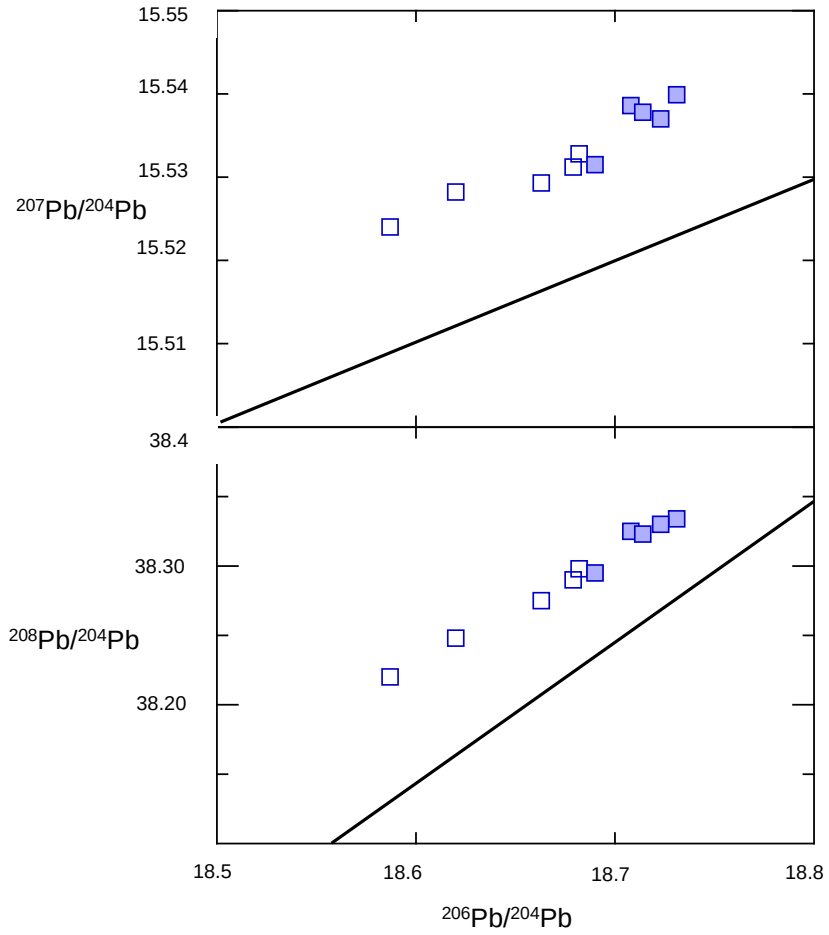


Figure 26 Pb Isotopes for Gemini-Oscostar and Volsmar Volcanic Fields

Pb isotopes for lavas from the volcanic fields are geographically distinct, with Volsmar volcanic field (closed squares) more radiogenic in $^{208}Pb/^{204}Pb$ and $^{207}Pb/^{204}Pb$ compared to Gemini-Oscostar volcanic field (open squares). Northern Hemisphere Reference Line after Hart (Hart, 1984).

Discussion

Geology

Geological maps of submarine volcanoes in various tectonic settings have been produced in a similar manner to the approach used here (Chadwick et al., 2005). Morphometric maps and simplified geological maps are interpreted from multibeam bathymetry and backscatter data (Chadwick et al., 2005; White et al., 2006; Wright, 1996; Wright et al., 2006), while GLORIA data may also be used to produce geological maps of submarine areas (Johnson et al., 1993). These maps however lack complexity due to the inability to 'ground truth' the data. A number of studies of the Mid-Atlantic Ridge have shown that bathymetry and backscatter data in combination with submersible dive operations are able to provide a much more detailed geological map (Gracia et al., 1999; Ondreas et al., 1997). A recent study of the East Pacific Rise by deep-towed imaging surveys collected very high resolution bathymetry profiles (Soule et al., 2007). This enabled mapping of individual flows to provide the most accurate picture of submarine lava flows from a mid-ocean ridge to date.

The GOVF comprises Gemini South volcano (volume of ~55 km^3), which has a large parasitic volcano on its southeastern flank (volume of ~10 km^3) and has a combined volume of ~65 km^3 (Table 17). Gemini South volcano is also an active volcano as venting was observed during collection of the bathymetry data on the RV *Southern Surveyor*. Gemini North is a basaltic stratovolcano located 7 km to the north of Gemini South volcano. This stratovolcano has a crater 220m in length and a calculated volume of ~11 km^3. Oscostar volcano, located 23 km to the northeast of Gemini South volcano, is a coalesced basalt-basaltic andesite stratovolcano comprising three calderas. Oscostar has a calculated volume of material of ~67 km^3 (Table 17).

Table 17 Morphology of Volcanic Features from Gemini-Oscostar and Volsmar Volcanic Field

The measurements listed in this table are derived from the bathymetry data and measured in MapInfo. Volume represents minimum volume determined by calculating volume of a cone. Summit and basal depth are measured from meters below sea level (m bsl).

Lithology	Area km^2	Diameter km	Perimeter km	Summit m bsl	Basal Depth m bsl	Height m	Volume km^3	Slope Angle
Gemini South	108	13	56	60	1300	1240	55	10
Gemini South parasitic cone	24	6	18	132	1160	1028	10	
Gemini North	30	6	19	149	1300	1151	11	19
Oscostar	119	15	41	55	1200	1145	67	9
Mariposa	42	8	24	615	1900	1200	20.1	17
Abeja	23	5	17	700	1800	1170	7.7	25
Volsmar caldera	8	4	10	1370	1900	530	1.70	

Lava flows originating from major stratovolcanoes are common in both the GOVF and VVF. They are identified by their lobate flow outlines, rough and 'blocky' nature in the bathymetry and high acoustic reflectivity in backscatter data. Lava flows originating from Gemini South volcano and Gemini North volcano (Figure 27) have relatively high aspect ratios (7km long and 29 km^2). A single dredge from Gemini South's parasitic volcano recovered both basalt (CD-04-2) and andesite (CD-04-1) from an area mapped as a lava flow. This indicates the volcano has both basalt and andesite flows. An olivine basalt (CD-47-1) and basaltic tephra (CD-47-2) are found within 100m of a lava flow mapped on Abeja volcano (Figure 28), suggesting the lava flows from Abeja are predominantly basaltic pillow lava flows. This suggests that Abeja volcano may be more compositionally immature compared to the stratovolcanoes in the GOVF.

Lava flows originating from scoria cones in the GOVF are mapped predominantly in the central and northwestern section of the field (Figure 27), while in the VVF scoria cone lava flows are found predominantly on eastern margins of the field (Figure 28). These flows range from 0.6 to 3.1km long and are similar in character to lava flows from stratovolcanoes. Dredging of three medium-sized scoria cones in the GOVF recovered predominantly vesicular olivine basalt (CD-06 and CD-07) and basaltic tephra (CD-09). Basaltic tephra (CD-42-3, CD-42-4a, and CD-42-4b) is also found on a scoria cone to the south of Mariposa volcano in the VVF. A two-pyroxene andesite recovered from a track line that traversed a scoria cone and lava flow on the

lower northeastern flanks of Gemini South volcano suggests that some scoria cones associated with this mature volcanic structure are intermediate in composition and that the lava flows originating from scoria cones are comparable to lavas flows from stratovolcanoes.

Satellite imagery of subaerial volcanoes is also used to identify possible analogues to the geological units to help 'ground truth' the data. While andesite flows on subaerial stratovolcanoes are typically short, stubby flows originating from a central vent (Cas and Wright, 1987), relatively extensive flows have been observed at Lascar volcano, Chile. Lascar volcano exhibits two massive andesite flows on its northern flanks, which are steep-sided (10's meters high), with well developed levees that extend for roughly 4 km. These flows are similar in nature to the lava flows originating from Gemini South volcano (Figure 29) and therefore it is reasonable to assume that this flow is also a blocky andesite flow.

Lava flows from scoria cones in both fields are quite similar in appearance to scoria cone flows from the San Francisco volcanic field (Figure 30). Lava flows in this area vary greatly in length and lateral extent; flows may have either a relatively high aspect ratio or a relatively low ratio. Comparing satellite imagery of the San Francisco volcanic field with the high-resolution bathymetry of GOVF and VVF was an aide to the lithological interpretation, as the flows originating from scoria cones are quite variable in lateral extent (Figure 30).

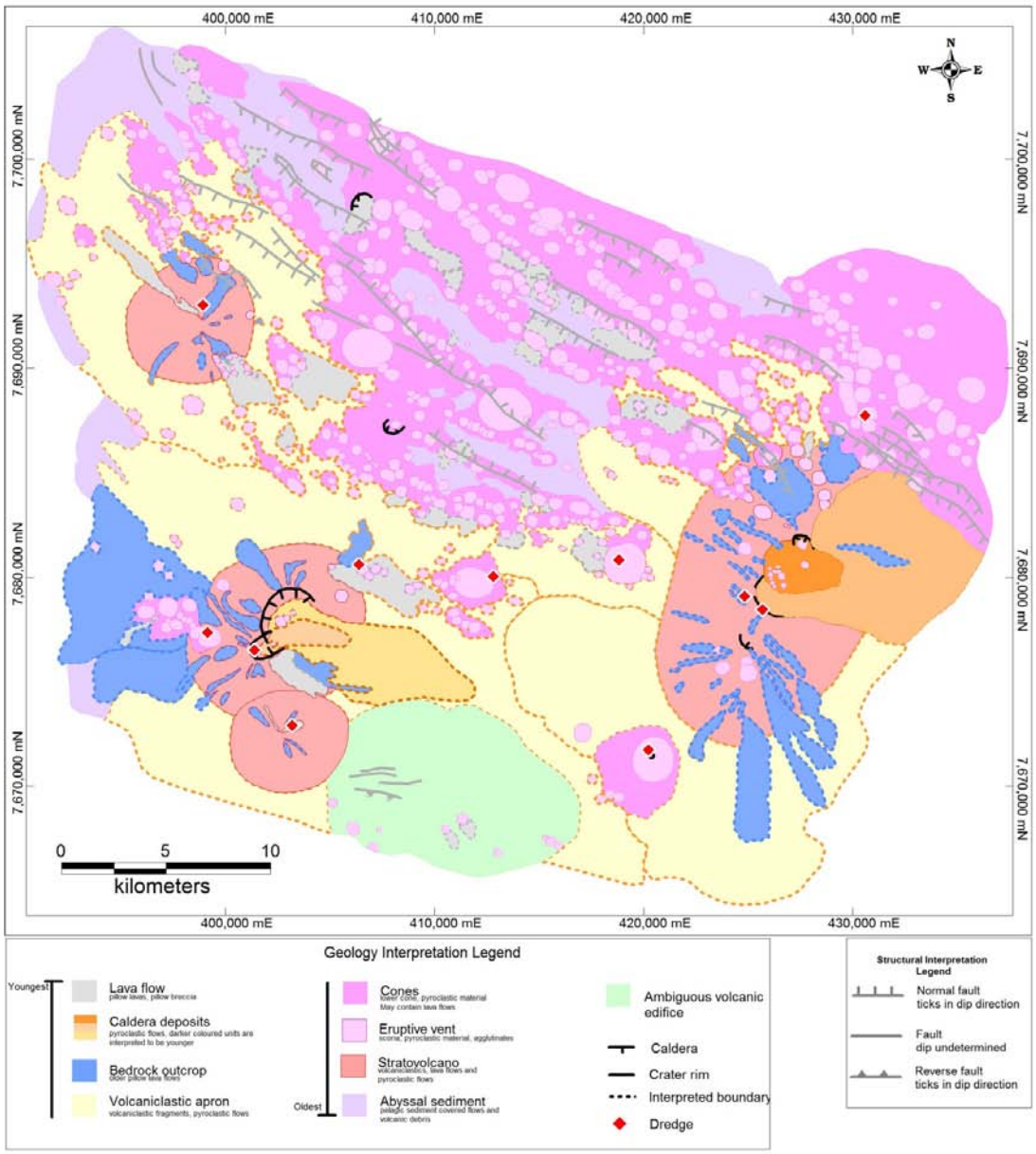


Figure 27 Gemini-Oscostar Volcanic Field Geological Map

The geological map for Gemini-Oscostar volcanic field (GOVF) is a combination of structural and lithological interpretation. The structural fabric is predominantly NW-oriented extensional features largely defined by the occurrence of chains of scoria cones. The lithology of the field comprises (in order of increasing age) lava flows, caldera deposits, bedrock outcrops (lava flows of unknown origin), volcaniclastic apron scoria cone eruptive vents and abyssal sediment.

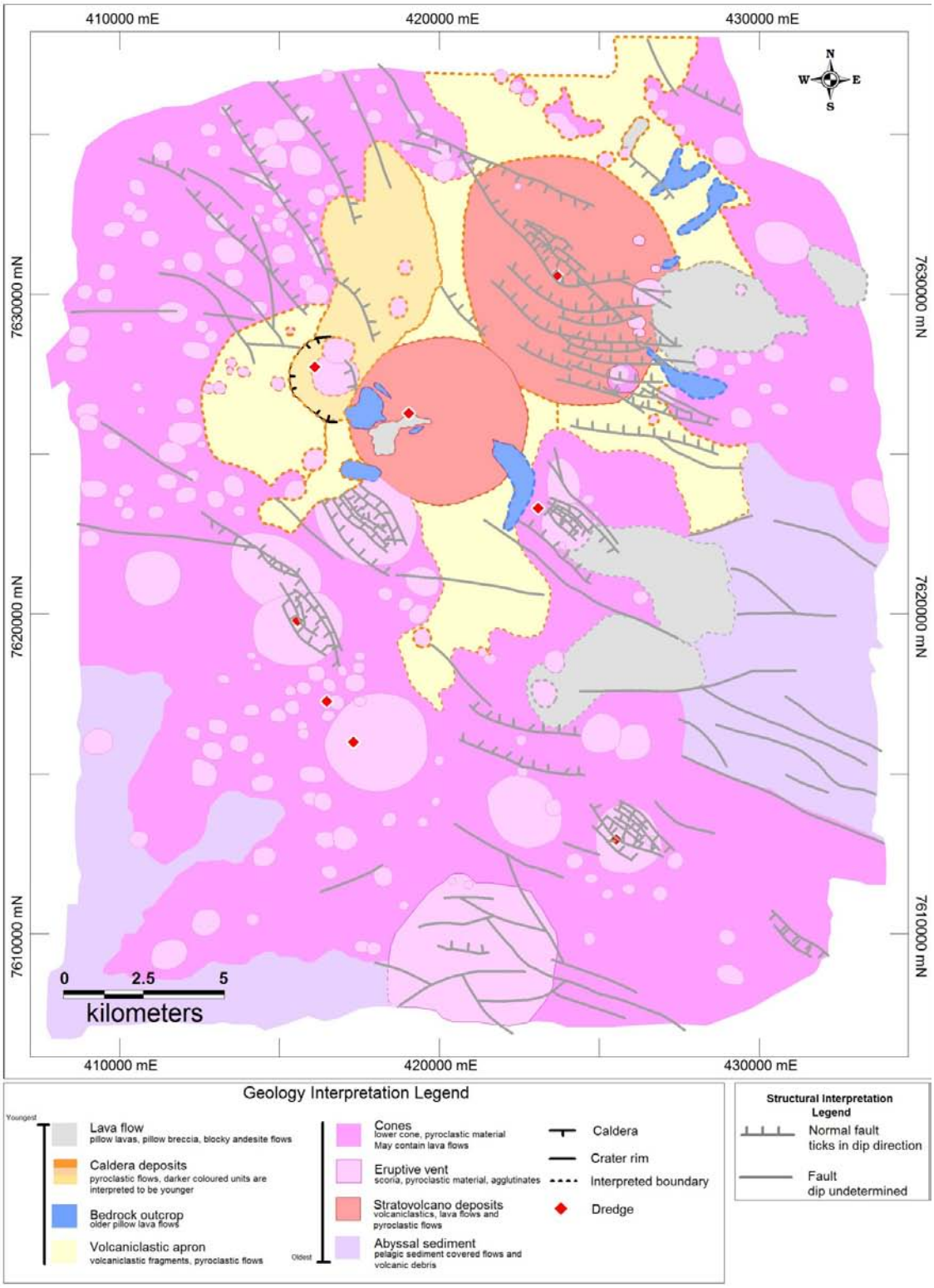


Figure 28 Volsmar Volcanic Field Geological Map

The geological map for VVF is a combination of structural and lithological interpretation. The structural fabric is predominantly extension along a NE axis largely defined by the occurrence of chains of scoria cones. The lithology of the field comprises (in order of increasing age) lava flows, caldera deposits, bedrock outcrops (lava flows of unknown origin), volcaniclastic apron scoria cone eruptive vents and abyssal sediment.

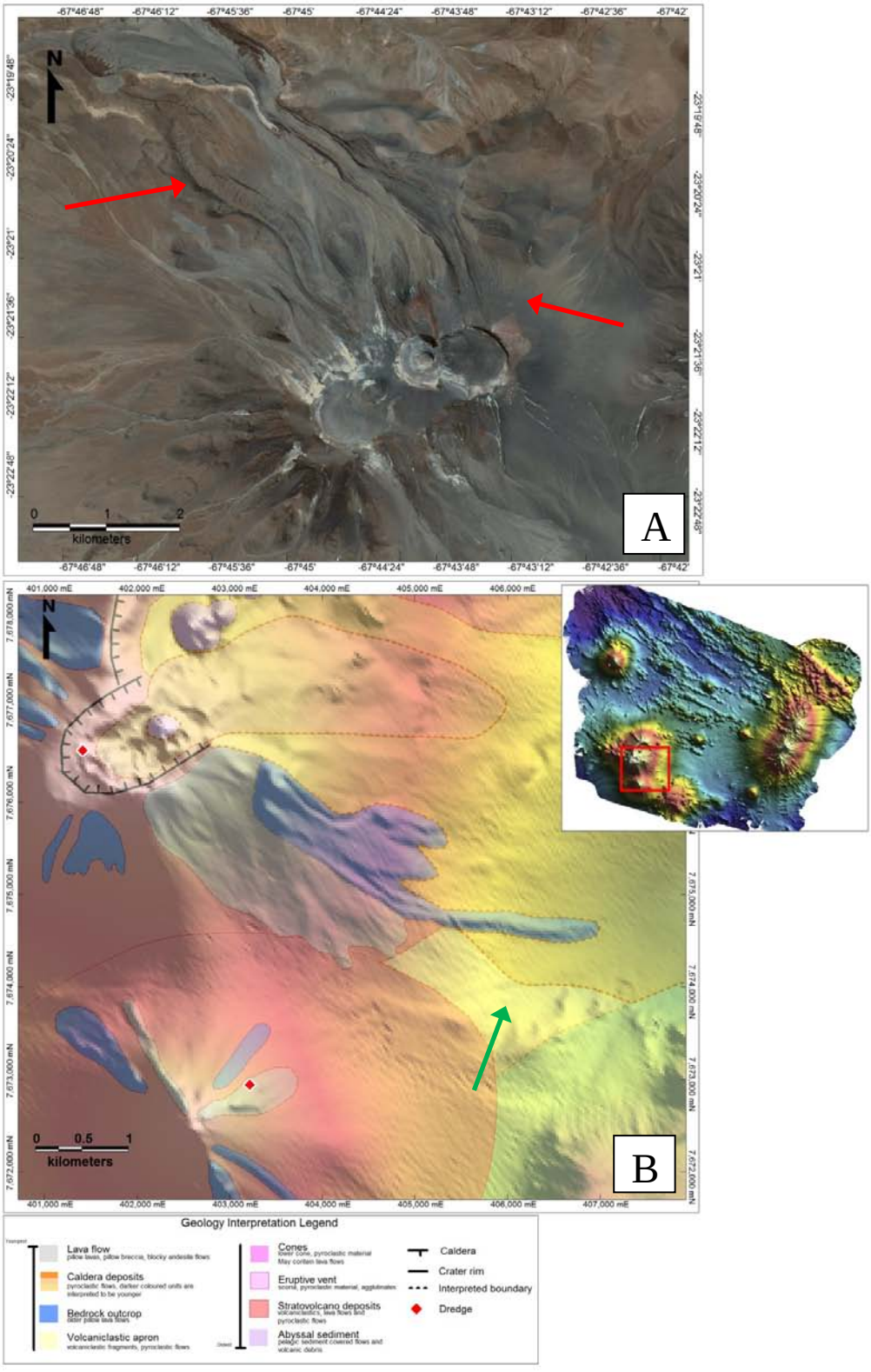


Figure 29 Lascar Volcano, Chile

(A) Lascar volcano is one of the most active stratovolcanoes in the Chilean Andes (image courtesy of Google Earth). Lascar exhibits 4.5km long andesite flows (red arrow) with very steep sides (10's meters high), well developed levees and ogives. (B) The lavas flows observed on the western slopes of Gemini South volcano (green arrow) are interpreted to be comparable to massive, blocky andesite flows on the flanks of Lascar volcano.

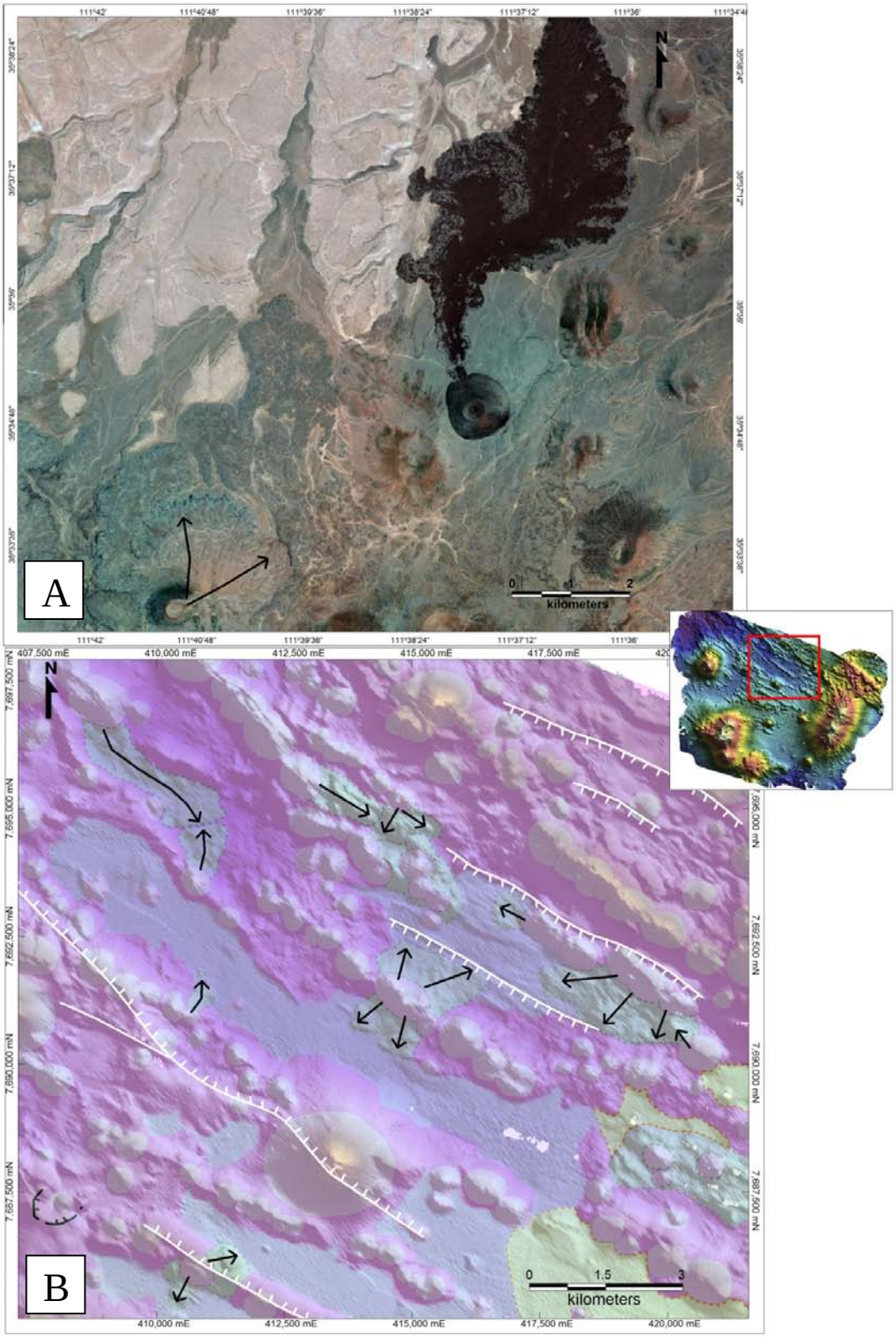


Figure 30 San Francisco Volcanic Field

(A) San Francisco volcanic field (SFVF) comprises a large number of basaltic cinder cones; many of which have associated lava flows (Image courtesy of Google Earth). (B) Lava flows from scoria cones mapped at GOVF appear quite similar in aerial extent to the lava flows in the SFVF. Black arrows are schematic only and indicate possible flow directions.

Calderas in the GOVF are restricted to Gemini South volcano and Oscostar volcano (Figure 27). Two-pyroxene andesite (CD-02-5) and two-pyroxene dacite (CD-02-1) dredged from the caldera rim of Gemini-South volcano suggest that significant magmatic diversity exists in this volcano. Deposits within the caldera most likely comprise coherent pillow lava flows and associated breccias, as well as talus breccias below the escarpment, similar to what is observed in other arc calderas (Stix et al., 2003). Gemini South volcano has an older caldera breached to the east with a 2km long escarpment, and a younger caldera breached to the northeast with a 1km long escarpment. The age relationships imply a southwestern migration of the magma chamber. Oscostar volcano has three eruptive centres all with caldera; the southern-most eruptive centre (OS) is a 900m wide caldera breached to the northeast, OS2 is a 2000m wide caldera also breached to the northeast, and the northern eruptive centre (ON) is an 820m wide caldera breached to the southeast (Figure 31). The age relationships of Oscostar's calderas indicate a northeastern migration of the collapsing magma chamber. The opposing migration vectors for Gemini South and Oscostar volcanoes are suggestive of an extensional or transtensional regime.

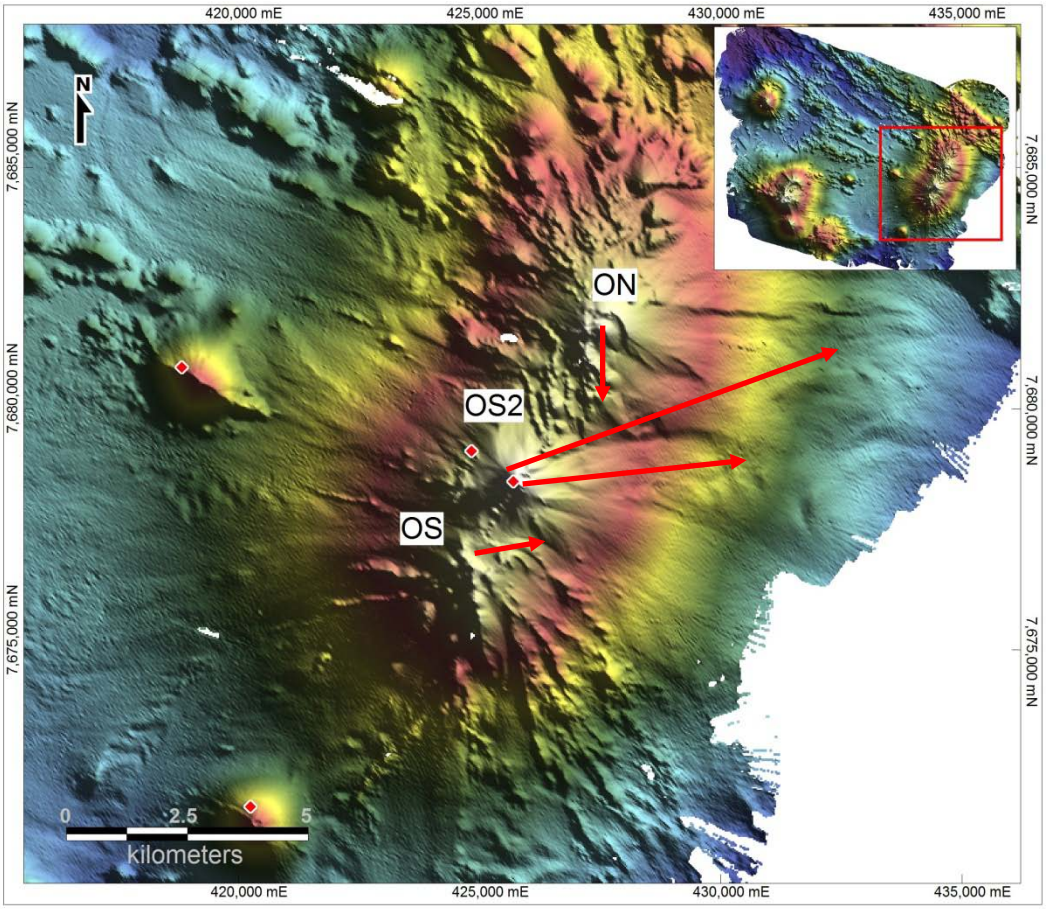


Figure 31 Oscostar Volcano

Oscostar volcano is a basalt-basaltic andesite stratovolcano with three eruptive centres (in order of increasing age) ON, OS2, OS. The interpreted deposits for these caldera are interpreted to be quite extensive, with OS2 extending to the limits of the bathymetry. Red arrows are schematic only and indicate possible outflow paths. Dredge sites are indicate by red diamonds.

In the northwest quadrant of the VVF a caldera is clearly visible in the bathymetry with the caldera rim being 1500m below sea level and the caldera floor 1580m below sea level (Figure 32). There are two basaltic scoria cones within the caldera and two emerging scoria cones on the northeast flanks. Dredging (CD-48) recovered vesicular olivine-clinopyroxene basalts originating from the scoria cones within the caldera. The direction of the caldera breach suggests that much of the pyroclastic material from this eruption lies under Abeja and possibly Mariposa's deposits.

Explosive pyroclastic eruptions were originally thought unlikely in water depths greater than 500m due to high confining pressure (Cas, 1992; McBirney, 1963). However some authors now believe that pyroclastic eruptions can take place in water depths up to 1500m, supported by the discovery that the velocity of submarine

eruption columns does not need to be high (<20m/s) to transport particles (Cashman and Fiske, 1991). A considerable number of calderas in island arcs are found below 500m and up to depths of roughly 1500m. Some of these originated from explosive pyroclastic eruptions followed by evacuation of the magma chamber (Fiske et al., 1995; Fiske et al., 2001; Wright et al., 2006; Yuasa and Kano, 2003), while other calderas formed by the collapse of the magma chamber with no associated explosive activity (Allen and Smellie, 2008; Smellie et al., 1998). The reason explosive eruptions can take place at great depths is still unclear. The deep-water caldera in the VVF is interpreted to be the result of a post-eruptive collapsing magma chamber following successive effusive eruptions of mafic magma. This is inferred from the lack of explosive volcanic products such as pumice, scoria or pyroclastic flow deposits, the presence of relatively coherent olivine basalts dredged from the scoria cones within the caldera floor and the depth of the caldera.

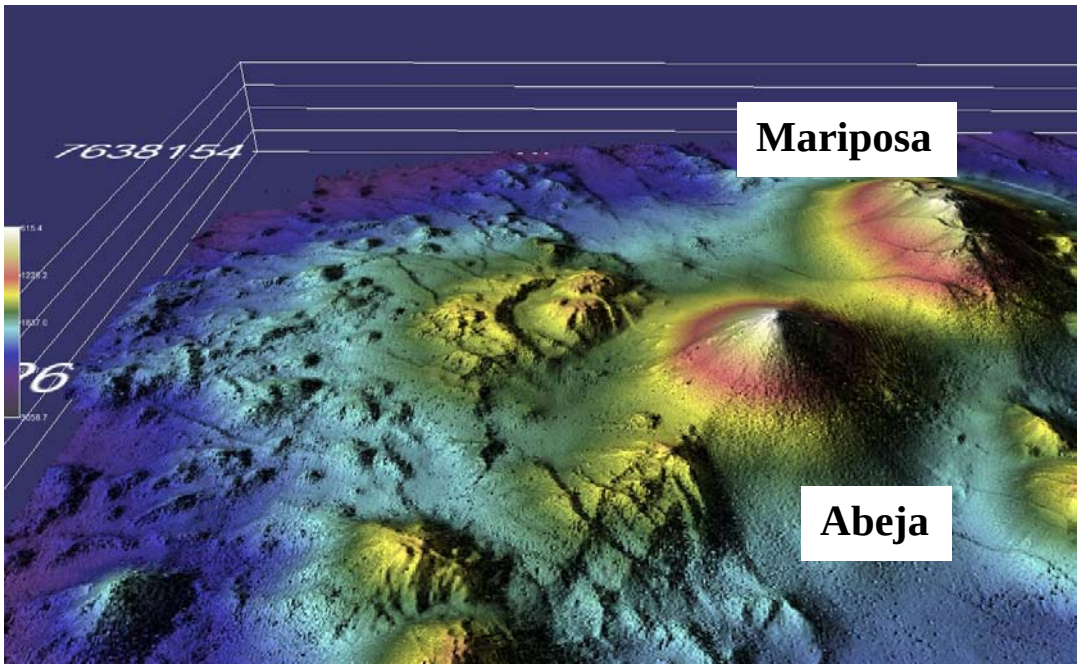


Figure 32 Deep Water Caldera at Volsmar Volcanic Field

A caldera at 1500m below sea level has been found in the Volsmar volcanic field. The caldera rim is 1500m bsl and the caldera floor is 1580m bsl. Two scoria cones are seen in the centre of the caldera.

Outcrops of bedrock in the GOVF (Figure 27) and VVF (Figure 28) are characterised by lobate flow outlines, relatively high relief in the bathymetry, and medium-high reflectivity in backscatter data. Dredging recovered olivine-clinopyroxene basalt (CD-01-1) from the flanks of Gemini North volcano, two-pyroxene andesite (CD-05-1) from Gemini South volcano, and basaltic tephra (CD-08-6), olivine basalt (CD-08-2) and olivine-clinopyroxene basaltic andesite (CD-08-1) from the southern flanks of Oscostar volcano. Similarly in the VVF, dredging operations recovered basalt (CD-47) from Abeja volcano and basaltic andesite (CD-41) from Mariposa volcano. Due to the nature of dredge products and map occurrence of the bedrock outcrop unit, the bedrock outcrop unit is interpreted to represent older coherent pillow basalt flows and basaltic andesite-andesite (GOVF) blocky lava flows that have been subsequently obscured by more recent activity.

Scoria cones and eruptive vents are extremely common in both volcanic fields (586 eruptive vents in the GOVF and 213 eruptive vents in the VVF), occurring either as parasitic clusters on stratovolcanoes, as individual volcanic edifices on the oceanic plain or as coalesced chains with a general northwest trend (Figure 27, Figure 28). Cones are characterised by medium-high acoustic reflectivity and their boundaries are determined by a break in slope. Eruptive vents are the eruptive centres of the scoria cones and are characterised by conical morphology, high relief and medium-high reflectivity. The size of scoria cones varies significantly across the field, basal perimeters range in length from 0.49 to 7.7km; generally the smaller cones form chains while the larger cones are isolated features on the oceanic plain. Several dredges recovered relatively homogeneous olivine basalt (CD-06, CD-07, CD-09 and CD-10) from scoria cones on the oceanic plain in the GOVF, basalt (CD-44, CD-45, CD-46 and CD-48) and basaltic andesites (CD-43) from the VVF. Parasitic scoria cones on Gemini South volcano range from basaltic andesite (CD-03) to andesite (CD-05-1). Scoria cones associated with Gemini South volcano are therefore possibly intermediate and heterogeneous in composition while scoria cones on the oceanic plain are possibly relatively homogeneous basaltic volcanic structures. This may indicate the oceanic plain scoria cones are relatively immature features that represent the early stages of volcanic development.

Volcaniclastic aprons are commonly associated with subaqueous volcanoes and generally comprise three main facies that reflect changes in volcanic products, transport processes and sedimentary processes (Casalbore et al., 2010; McPhie, 1995; Menard, 1956). It is reasonable to assume the major volcanoes of GOVF (Figure 27) and VVF (Figure 28) have volcaniclastic aprons. The interpreted extent of Gemini South volcano's volcaniclastic apron covers a roughly circular area of ~133 km^2 (except on the western flanks where it is obscured by the recent lava flows). Gemini North's volcaniclastic apron covers the area surrounding the lower slopes of the volcano for ~100 km^2, with a maximum extent of 11km to the north; beyond this it is most likely covered either by recent activity from scoria cones or pelagic sediment. The volcaniclastic apron of Oscostar volcano covers a total area of ~156 km^2, mostly on the southern and western side of the volcano due to scoria cones and eruptive vents on the northeastern flanks of the volcano. The volcaniclastic apron of Mariposa volcano is relatively small (44 km^2) due to surrounding scoria cones, which appear to obscure much of the material from the volcano. The volcaniclastic apron of Abeja volcano (23 km^2) extends to the south for roughly 6.5km and is largely obscured by a medium-sized parasitic scoria cone. Volcaniclastic apron deposits of the GOVF and VVF are interpreted to comprise pillow fragment breccia, autoclastic breccia, breccias formed by the re-working of volcanic clasts (bedded volcanic breccia) and breccias formed by the re-working and re-sedimentation of volcanic clasts (Gamberi, 2001; McPhie, 1995).

Stratovolcano deposits form the bulk of material of the major volcanoes in both GOVF (Figure 27) and VVF (Figure 28). They are defined by high relief, high acoustic reflectivity, and conical shape in the bathymetry. Stratovolcanoes are interpreted to range in composition from basaltic (Gemini North and Abeja), basalt-basaltic andesite (Oscostar), basaltic andesite (Mariposa), and the more evolved Gemini South volcano, which is predominantly andesite-dacite. Stratovolcano deposits are interpreted to comprise basaltic pillow lava flows, volcaniclastics derived from the redistribution of material from pyroclastic eruptions, debris flows and hyaloclastites near the crater/caldera rim (Chadwick et al., 2005).

Relatively subdued topography with very low acoustic reflectivity is mapped in the northwest of the GOVF at the limits of Gemini North's volcaniclastic apron, in the

central section of the GOVF at the limits of scoria cone deposits (Figure 27) and on the eastern and southwestern margins of the VVF (Figure 28). This unit is interpreted as abyssal sediment and most likely comprises pelagic sediment-covered lava flows and pyroclastic ash falls/flows (Chadwick et al., 2005).

An ambiguous volcanic edifice is mapped in the GOVF (Figure 27); it is roughly oval shaped with no discernible eruptive vent or caldera and a small number of scoria cones on the southern edge of the edifice. The bathymetry indicates it is an uplifted plateau, the nature of lineaments on the edifice support this as it is the only place in the field where a reverse fault is mapped. It is likely this edifice predates volcanic activity, due to the contrasting stress regime of this edifice and the other volcanoes in the GOVF.

Lineament interpretation in the GOVF shows that mapped fault traces and the alignment of chains of coalesced scoria cones impart a predominantly northwest-oriented structural fabric to the field (Figure 33). The sense of slip of the faults is determined as normal due to the topographic expression of the fault traces over slopes of several volcanic edifices (Figure 34). It is therefore interpreted that the structural fabric of GOVF is defined by predominantly NW trending normal faults. Lineament analysis indicates the strike of the faults range from 300° to 330° (Figure 35), suggesting the nature of crustal deformation of GOVF is predominantly uniform extension with the maximum extension direction (σ_3) oriented N30°E.

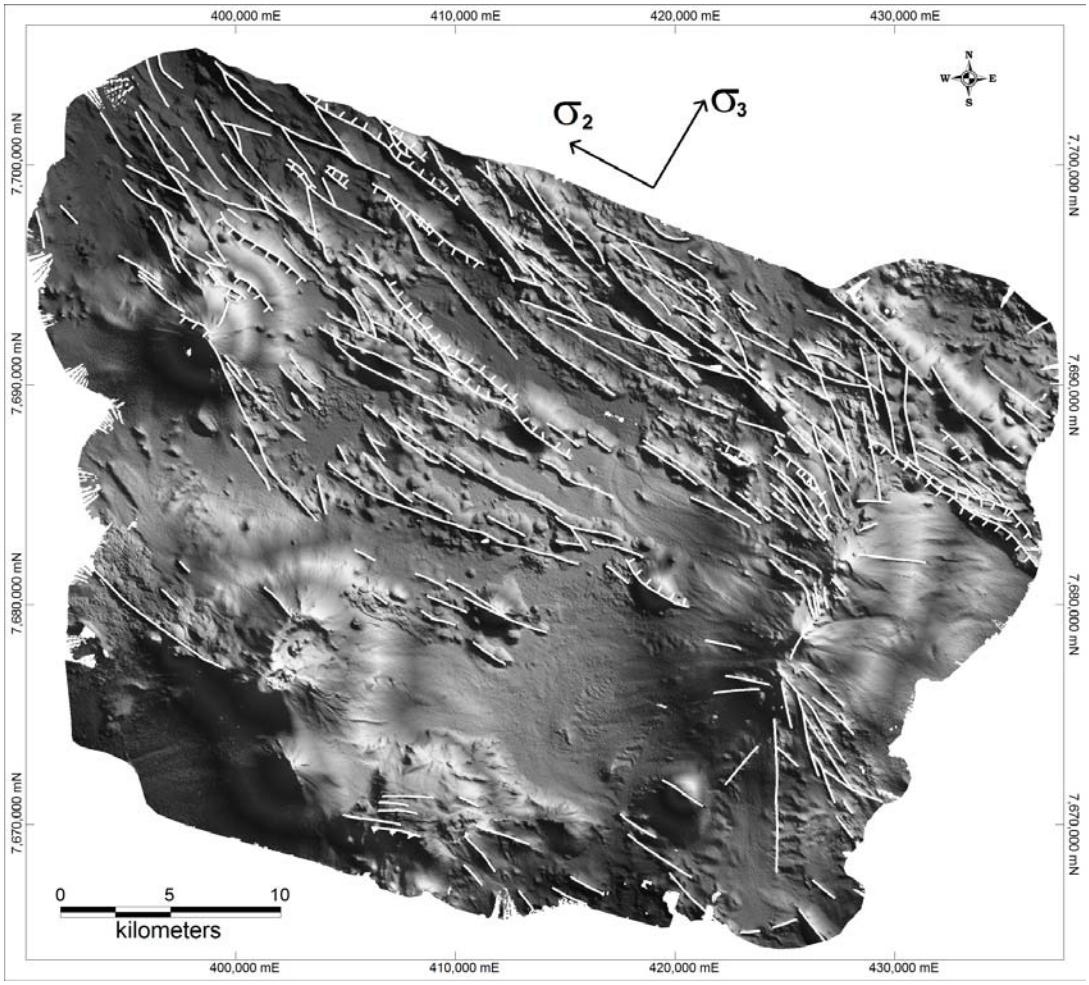


Figure 33 Gemini-Oscostar Volcanic Field Lineament Map

The lineament map is constructed by digitising linear features observed in bathymetric images and consists of both faults and linear features. Where possible dip direction is determined by the topographic expression of fault traces (ticks in down direction).

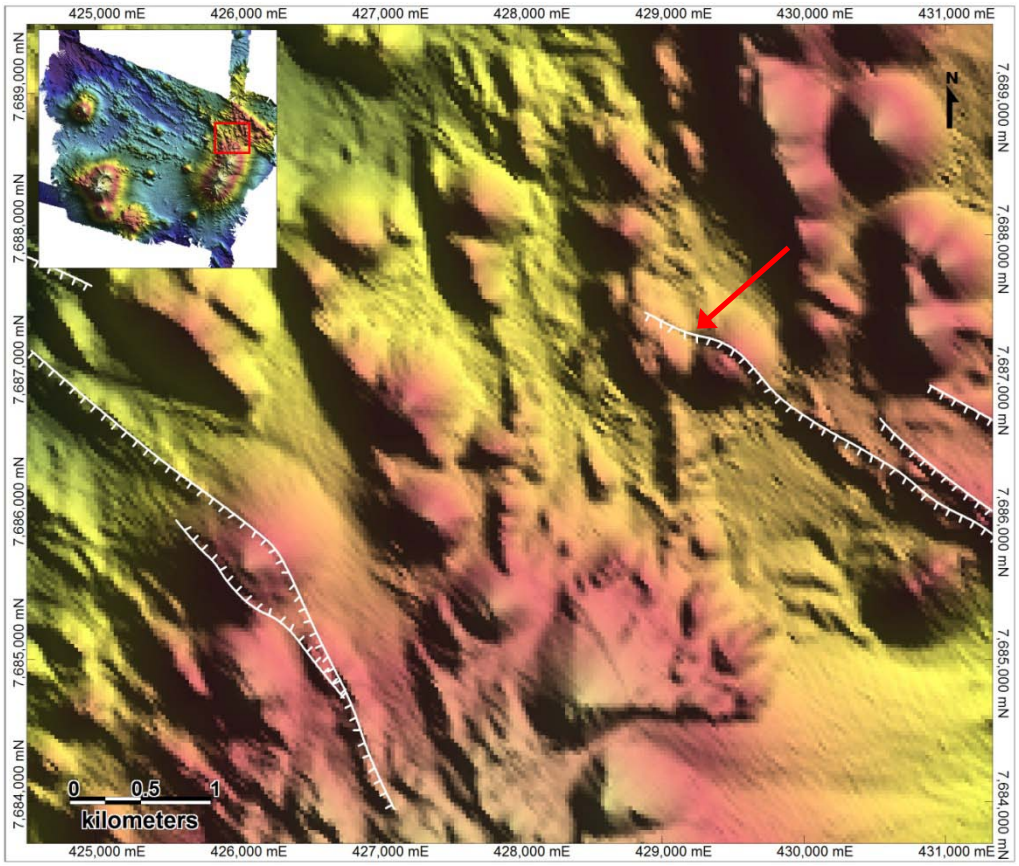


Figure 34 Normal Faults at Gemini-Oscostar Volcanic Field

The topographic expression of fault traces across a number of volcanic edifices at Gemini-Oscostar volcanic field indicates the sense of slip is normal. Arrow points to a fault trace that v's to the north indicating the fault is dipping to the south, down-dropped block is south therefore the fault must be normal.

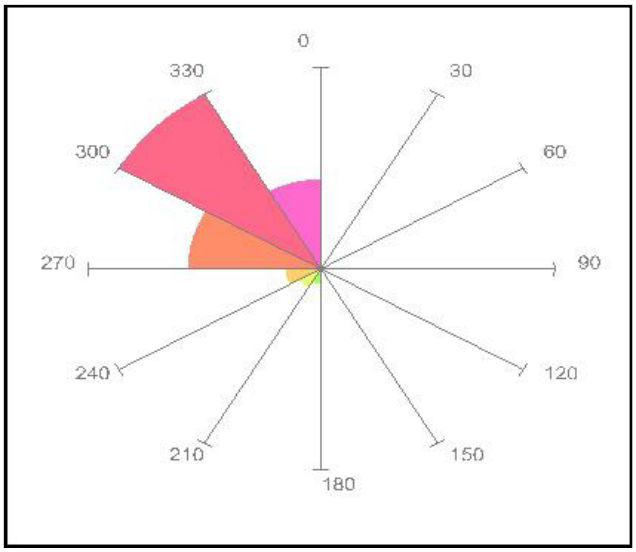


Figure 35 Rose Diagram of Gemini-Oscostar Volcanic Field

The rose diagram comprises the strike of lineaments mapped in the GOVF. It indicates a strong northwest structural fabric with subordinate strikes of 330-360° and 270-300°.

Lineament interpretation in the VVF shows that fault scarps and coalesced chains of scoria cones also impart a predominantly northwest structural fabric to the field. However unlike the GOVF there is also a subordinate east-west fabric (Figure 36). The two systems of faults are identified as normal due to the topographic expression of fault traces over the slopes of Mariposa volcano (Figure 37). The orientation of one set is N45°W and the other set is oriented N90°E (Figure 38), the NW set ranges in dip from 31-50°N and 44-65°S.

The NW system is observed cutting the EW system, and the EW system is observed cutting the NW system, therefore both system of faults are concurrent (Figure 39). It is therefore interpreted that the structural fabric of the VVF is defined by conjugate normal faults that occur contemporaneously. A similar relationship is observed in the Basin and Range province of North America; two sets of faults, one N35°W and one N20°E, disrupt Late Tertiary basalt flows. These sets are contemporaneous normal faults with relatively high dip, >60° to almost vertical (Donath, 1962).

In contrast to scoria cones in the GOVF, several of the medium sized scoria cones in the VVF exhibit north and south dipping normal faults, indicating these are graben structures (Figure 28). This is consistent with the extensional environment of the VVF and suggests a close link between tectonics and magmatism. Abeja volcano is one of the few volcanic edifices in the either VVF or GOVF that is not faulted, this suggests it is the youngest volcanic structure in both fields and has formed during a relatively quiescent tectonic period.

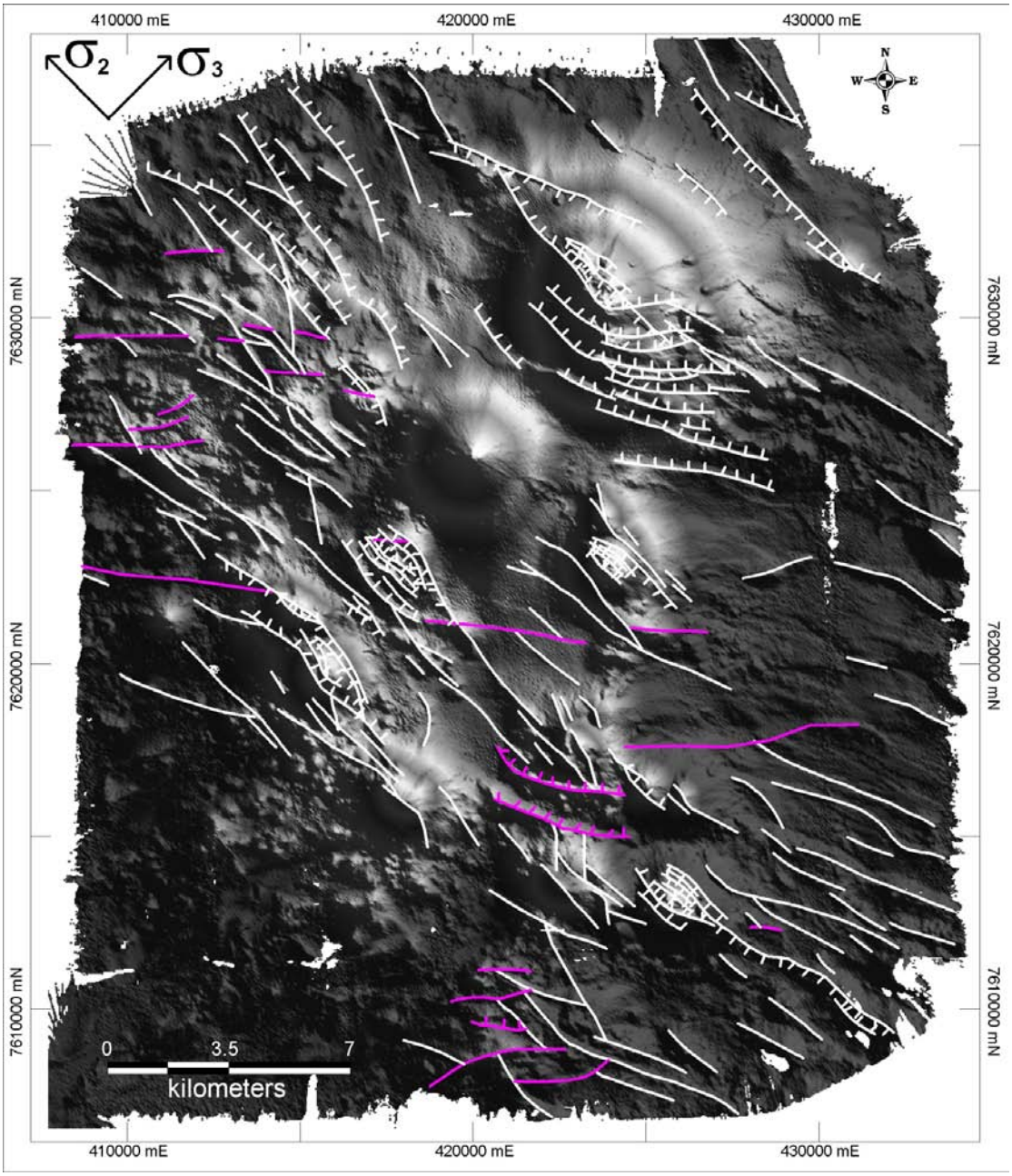


Figure 36 Volsmar Volcanic Field Lineament Map

The lineament map is constructed by digitising linear features observed in bathymetric images. Linear features include fault scarps and aligned scoria cone eruptive vents which may or may not be faulted. Where possible dip direction is determined by topographic expression of fault traces (ticks in down direction). Two sets of concurrent lineaments are present at Volsmar volcanic field, a NW set (grey lines) and an EW set (pink lines).

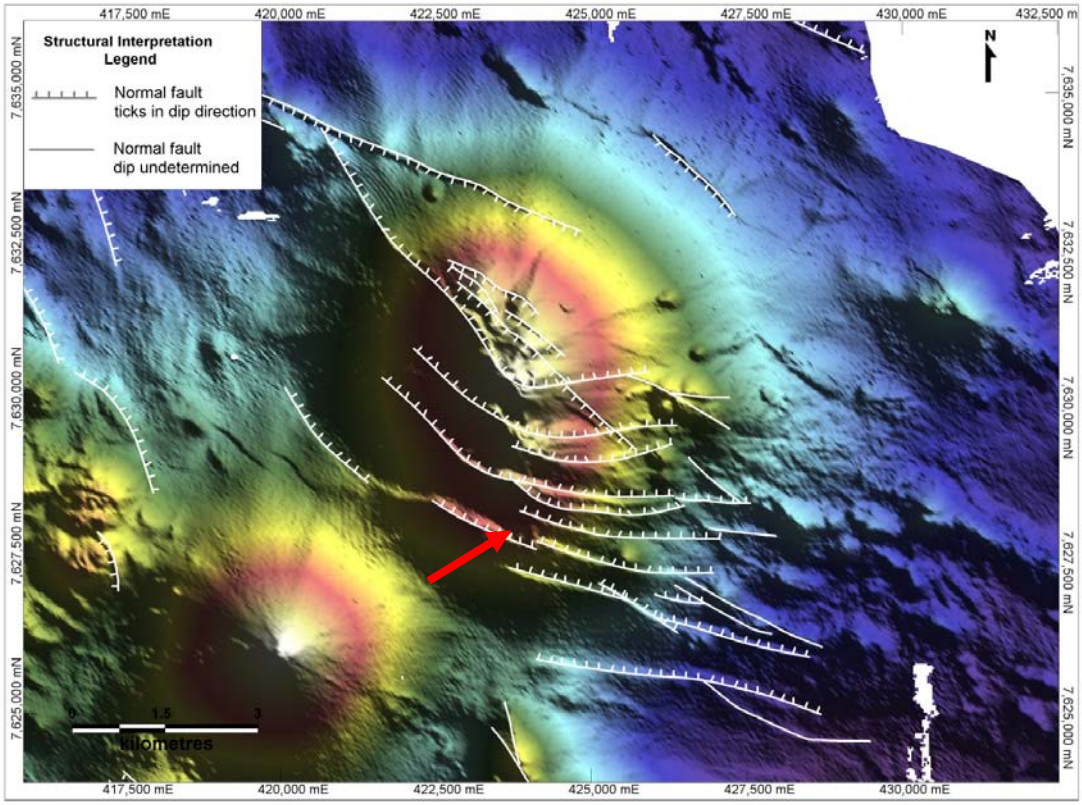


Figure 37 Mariposa Normal Faults

NW set of faults cutting Mariposa volcano in the Volsmar volcanic field v-ing to the south, which therefore indicates the fault dips to the north. The hanging wall block is down (arrow) therefore the sense of slip is normal.

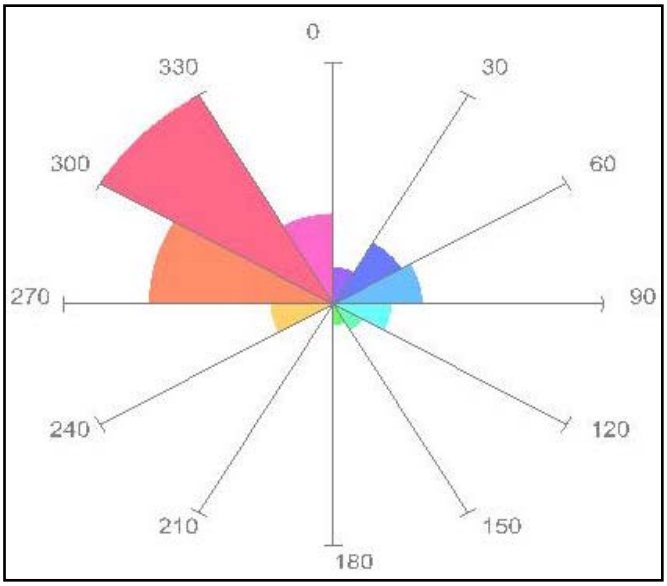


Figure 38 Rose Diagram for Volsmar Volcanic Field

The rose diagram comprises the strike of lineaments mapped in the VVF. It indicates a strong northwest structural fabric with a subordinate east-west system.

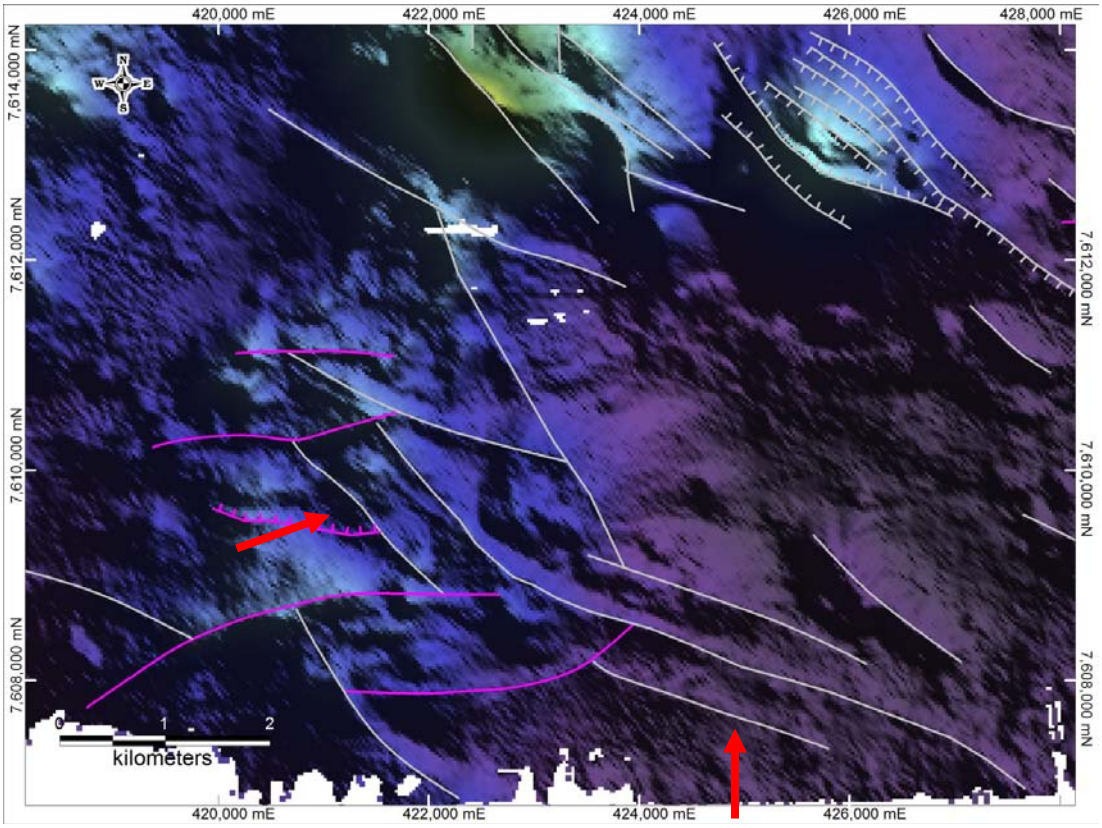


Figure 39 Concurrent Normal Faults in the Volsmar Volcanic Field

Conjugate normal fault set in Volsmar volcanic field, the grey line style represents the NW-oriented lineaments while the pink line style represents the EW-oriented lineaments. Both faults can clearly be seen to cut each other (arrows), therefore they must be contemporaneous.

Petrogenesis

Magmatic Suites

Petrologic and geochemical results of GOVF reveal a diverse suite of lavas ranging from basalt to dacite while the VVF suite is compositionally more homogenous (basalt and basaltic andesite). Trends observed on bivariate plots of major and trace elements suggest that fractional crystallisation may be important in the genesis of each suite, as would be expected for the evolution of mantle derived magmas (Cox, 1980; Thompson et al., 1980).

Three groups are identified in the GOVF from trends clearly expressed in CaO/Al_2O_3 versus Mg# diagram (Figure 40). Group 1 is limited to basalts and basaltic andesites and is defined by a weak positive change in CaO/Al_2O_3 as Mg# increases; Group 2 includes basalt through dacite and exhibits a moderate positive change in CaO/Al_2O_3 as Mg# increases. Group 3, composed entirely of andesite, increases relatively strongly in CaO /Al_2O_3 as Mg# increases. VVF lavas also form three groups however; these groups differ from those of GOVF in that they are not trends, but 'clumps'. Collectively, these groups form a trend of decreasing CaO/Al_2O_3 with lower Mg#.

These trends suggest fractionation of clinopyroxene, olivine and plagioclase have played an important role in the evolution of these magmas. The variation of TiO_2 versus Mg# also supports the fractionation 'groups' observed on the CaO/Al_2O_3 versus Mg# plot (Figure 40). The variation of TiO_2 with respect to Mg# shows that Group 1 lavas from the GOVF are dominated by fractionation of early olivine and clinopyroxene with late stage titanomagnetite becoming significant at ~ Mg# 45. Extrapolation of these trends to more primitive compositions (Mg# 72) suggests a similar primary magma (Figure 40**Error! Reference source not found.**).

Quantitative modelling of fractionation paths of the GOVF suite also supports that fractionation of clinopyroxene, plagioclase (An_{65-80}), olivine (Fo_{74}), and aluminous-titanomagnetite is responsible for the evolution of the GOVF lavas. Fractionation models for Group 1 indicate that CD-08-6 (basalt) is derived from CD-10-1 by fractionation of plagioclase (An75), clinopyroxene (Wo38), olivine (Fo74) and

aluminous-titanomagnetite. CD-08-1 (olivine-clinopyroxene basalt) can be derived from CD-08-6 using similar phases except for aluminous-titanomagnetite. The results of fractional crystallisation models for mafic members of Group 2 yield similar results but differ in that the amount of fractionated titanomagnetite more than doubles from 9 percent to 24 percent. Fractional crystallisation models for Group 3 involve significantly greater amounts of clinopyroxene relative to plagioclase when compared to Group 1 and Group 2 models; fractionation of aluminous-titanomagnetite is less than that in Group 2 but more than Group 1. Quantitative models for VVF differ from those of the GOVF with more clinopyroxene and less plagioclase fractionation (Table 18).

Calculated trace element concentrations using the quantitative fractionation models for both volcanic suites show good agreement with observed abundances of Rb, Sr and Ba for some parent-daughter combinations, while some differences are observed. REE calculated and observed concentrations also showed agreement for some parent-daughter pairs while other combinations differed somewhat (Figure 41, Figure 42). These results support the fractionation models derived from major elements.

Therefore the GOVF and VVF lavas form two separate cogenetic suites of lavas that reflect similar but slightly different fractionation pathways. This is supported by major element variation, quantitative modelling of parent-daughter combinations and the comparison between calculated and observed trace element concentrations for parent-daughter pairs.

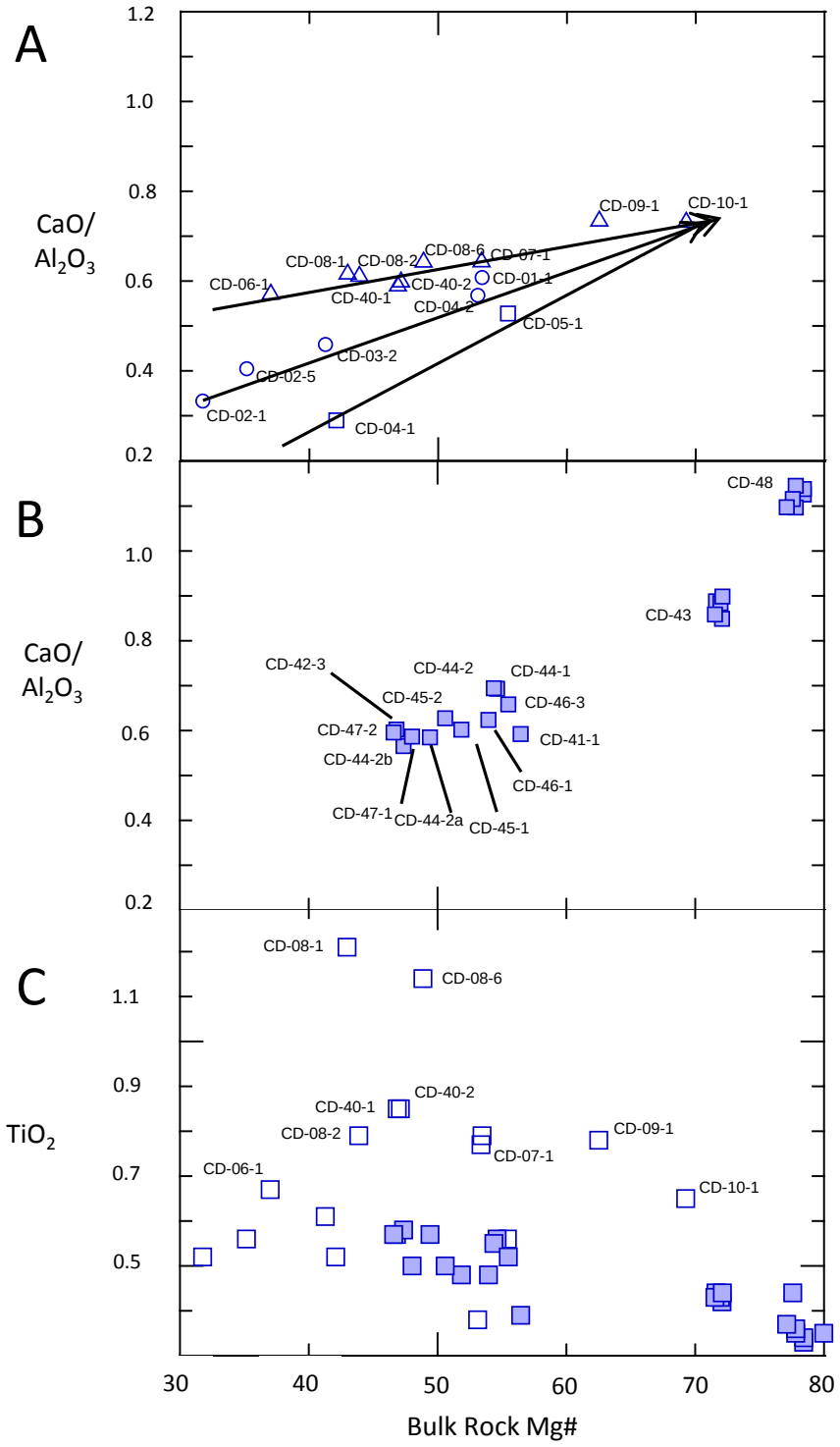


Figure 40 Fractionation Trends

(A) Lavas in the GOVF follow three distinct crystal fractionation paths formed by the variations in the ratio between clinopyroxene and plagioclase. Group 1(triangles) is predominantly plagioclase with a relatively small amount of clinopyroxene; Group 2(circles) has a greater predominance of clinopyroxene than Group 1; and Group 3 (squares) is dominated by the fractionation of clinopyroxene. (B) VVF lavas are restricted to a narrow range of CaO/Al_2O_3 at a given Mg# and form three 'clumps' of lavas that follow the same fractionation path. (C) Group 1lavas from the GOVF are dominated by fractionation of early olivine and clinopyroxene with late stage titanomagnetite becoming significant at ~ Mg # 45.

The most significant difference between the fractionation models for the GOVF suite is the involvement of titanomagnetite. Experimental results (Juster et al., 1989; Presnall, 1966; Snyder et al., 1993) have shown that the crystallisation of magnetite is sensitive to oxygen fugacity in the melt, such that the quantity and order of crystallizing phases in the magnetite series is dependent on fO_2. Variations in the amount of clinopyroxene relative to plagioclase may reflect differences in the depth of fractionation (Gust and Perfit, 1987; Hamada and Fujii, 2006; Presnall et al., 1978; Saxena and Eriksson, 1985), presence of volatiles (Berndt et al., 2005; Holloway and Burnham, 1972; Nicholls and Ringwood, 1973; Yoder and Tilley, 1962), dynamic (open) versus static (closed) systems (Ariskin et al., 1988; Defant and Nielsen, 1990; Gill, 1981; Villiger et al., 2007) as well as subtle variations in magma chemistry.

Experimental studies on anhydrous tholeiitic magma at 0.7 and 1.0 GPa (Villiger et al., 2007) show that at 0.7 GPa the first appearance of clinopyroxene is 30°C higher in fractional experiments compared to equilibrium experiments (Figure 43). When temperature is dropped in 30°C increments olivine, chrome-rich spinel and clinopyroxene coexist as crystallizing phases before olivine disappears at 1240°C. However when temperature is dropped rapidly olivine will stop crystallizing before clinopyroxene joins the liquidus. Villiger et al. (2007) proposed that the tholeiitic liquid line of descent therefore evolves due to equilibrium (closed-system) crystallization and the calcalkalic liquid line of descent evolves due to fractional (open-system) crystallization; and that pressure is not necessarily a controlling factor. These experimental observations are supported by recent work in the Alaska-Aleutian Arc (George et al., 2004).

It is clear from major and trace element modelling that the tholeiitic magmas of GOVF and VVF have not undergone significant mixing or assimilation. Considering the recent work by Villiger et al. (2007) as well as the lack of significant reverse zoning in phenocrysts, the predominance of fractional crystallization in the models and the predominance of less evolved products, it is interpreted that the tholeiitic series is the result of predominantly closed-system fractionation. Closed-system fractionation is also proposed for tholeiitic volcanoes in the Aleutian Arc (George et

al., 2004; Singer et al., 1992). It is also possible that the predominance of tholeiitic products at both fields is due to very little water in the parental magmas, supported by the lack of hydrous phases in GOVF and VVF magmas. Experimental results show that water pressure suppresses plagioclase crystallization and therefore leads to the calcalkalic trend instead of the tholeiitic trend (Devine, 1995; Grove et al., 2003). Taking both these ideas into consideration it is interpreted that the magmas feeding volcanoes in the GOVF and VVF are anhydrous magmas undergoing closed-system fractionation, before the magma chamber is then filled by a new batch of primitive magma, which does not interact and mix with the previous batch of magma.

The presence of calcalkalic andesite and dacite in the GOVF at only one volcano (Gemini South) and the relatively evolved geomorphology of Gemini South volcano suggest a link between the morphology and magmatic chemistry of the volcanoes in this field. The absence of continental crust beneath both volcanic fields (supported by the $^{87}Sr/^{86}Sr$ results of this study) indicates that pressure is not the determining factor in producing both tholeiitic and calcalkalic rocks in the one volcano. It is more likely that the calcalkalic products are a result of open system fractionation in the magma chamber feeding this volcano. The magma chamber for Gemini South volcano is likely to have mixing between relatively evolved magmas and more primitive magmas that are injected into the chamber, a similar scenario to that at Aniakchak in the Alaska-Aleutian Arc (George et al., 2004).

Table 18 Fractionation Models for Gemini-Oscostar and Volsmar Volcanic Field

Group 1 is produced by the fractionation of plagioclase (plag) and clinopyroxene (cpx) with subordinate olivine (ol) and al- titanomagnetite. Group 2 fractionation models show this trend is controlled by the fractionation of cpx, plag and al- titanomagnetite with subordinate ol. Group 3 fractionation models show this trend is dominated by the fractionation of cpx with subordinate plag, ol and al- titanomagnetite. Fractionation models for VVF lavas indicate cpx is the dominant fractionation phase with smaller amounts of plag, ol and al- titanomagnetite.

Group 1	Parent	Daughter	Fractionating Assemblage	% Cumulate	% Liquid	r^2
	CD-10-1	CD-08-6	Plag An75	53.7		
	basalt	basaltic tephra	Ol Fo74	9.7		
			Cpx Wo38	27.8		
			Al-titanomagnetite	8.8	28.1	**0.168**
	CD-10-1	CD-07-1	Plag An70	51.7		
	basalt	Ol basalt	Ol Fo74	9.1		
			Cpx Wo38	30.9		
			Al-titanomagnetite	8.2	36.5	**0.239**
	CD-08-6 basaltic tephra	CD-08-1 Ol-cpx basaltic andesite	Plag An80	66.5		
			Ol Fo74	5.8		
			Cpx Wo40	27.7	86.8	**0.028**
Group 2	**Parent**	**Daughter**	**Fractionating Assemblage**	**% Cumulate**	**% Liquid**	**r^2**
	CD-01-1	CD-03-2	Plag An75	52.7		
	Ol-cpx basalt	basaltic andesite	Ol Fo74	7.7		
			Cpx Wo40	22.8		
			Al-titanomagnetite	16.8	45.9	**0.336**
	CD-03-2	CD-02-5	Plag An75	42.9		
	basaltic andesite	2 pyx andesite	Cpx Wo38	33.3		
			Al-titanomagnetite	23.8	79.6	**0.396**
	CD-03-2	CD-02-1	Plag An60	61.4		
	basaltic andesite	Cpx dacite	Cpx Wo40	21.6		
			Al-titanomagnetite	16.9	53.5	**0.356**
Group 3	**Parent**	**Daughter**	**Fractionating Assemblage**	**% Cumulate**	**% Liquid**	**r^2**
	CD-05-1	CD-04-1	Plag An70	36.1		
	2 pyx andesite	andesite	Cpx Wo40	50.8		
			Al-titanomagnetite	13.1	70.1	**0.306**
VVF	**Parent**	**Daughter**	**Fractionating Assemblage**	**% Cumulate**	**% Liquid**	**r^2**
	CD-46-3	CD-42-4b	Plag An70	21.7		
	basaltic tephra	basaltic tephra	Ol Fo74	9.6		
			Cpx Wo38	52		
			Al-titanomagnetite	16.7	80.8	**0.114**
	CD-46-3	CD-42-4a	Plag An60	39.2		
	basaltic tephra	basaltic tephra	Ol Fo74	5.4		
			Cpx Wo40	40.3		
			Al-titanomagnetite	15.1	75.8	**0.133**
	CD-45-2	CD-42-3	Plag An80	39.4		
	basalt	basaltic tephra	Ol Fo74	8.7		
			Cpx Wo38	39.7		
			Al-titanomagnetite	12.2	91.2	**0.280**
	CD-44-2	CD-47-2	Plag An75	30.9		
	basaltic tephra	basaltic tephra	Ol Fo74	7.4		
			Cpx Wo38	44.4		
			Al-titanomagnetite	17.4	74.5	**0.147**
	CD-43-1 2pyx basaltic andesite	CD-46-1 basaltic tephra	Ol Fo80	2.6		
			Cpx Wo38	45.6		
			Opx En68	41.1		
			Al-titanomagnetite	10.7	64.3	**0.279**

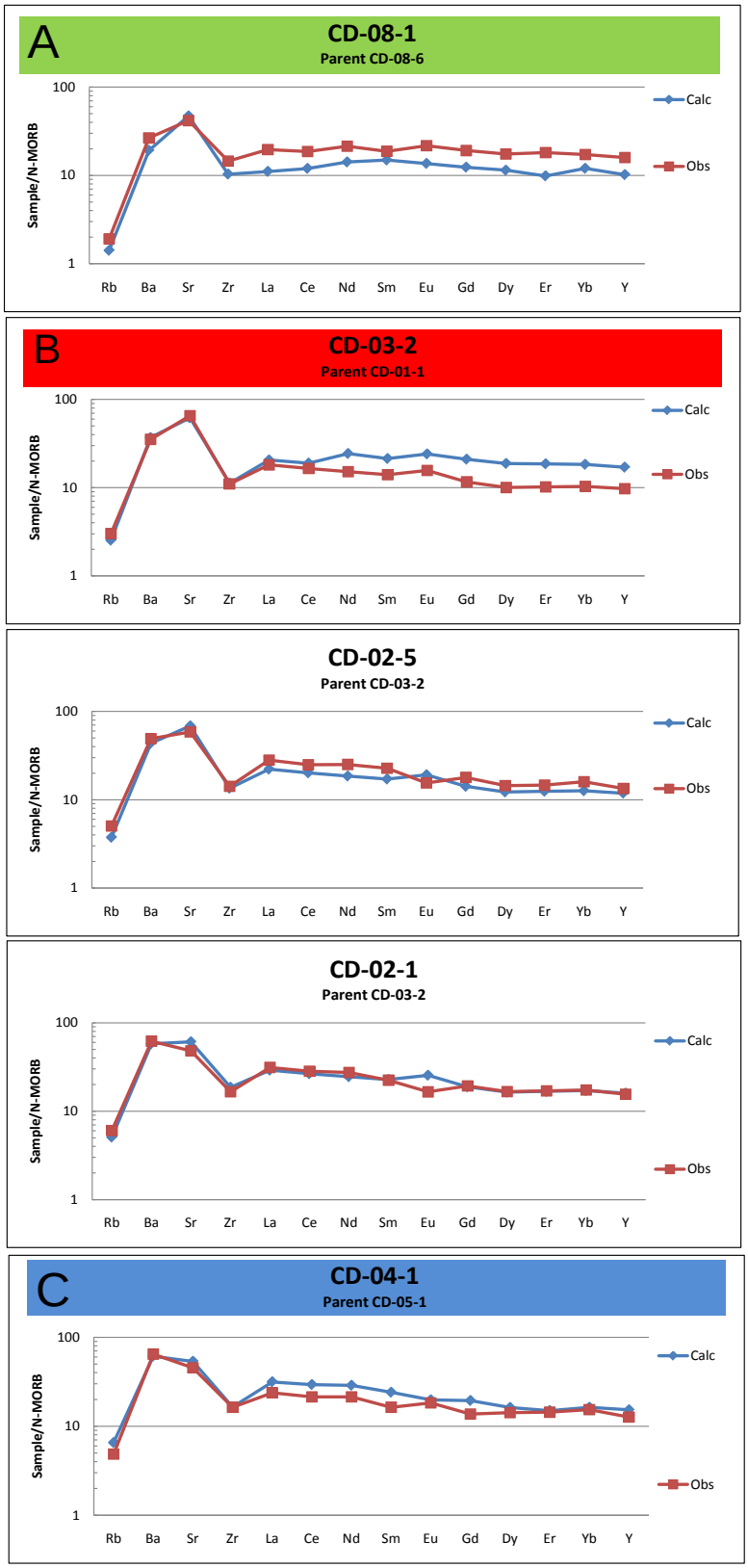


Figure 41 Calculated Daughter Compositions for Gemini-Oscostar Volcanic Field

The calculated (Calc) and observed (Obs) values for daughter compositions, normalized to N-MORB (Sun and McDonough, 1989). (A) Calculated daughter compositions from parent CD-08-6 in Group 1. (B) Calculated daughter compositions in Group 2. (C) Calculated daughter composition from

parental CD-05-1 in Group 3. There was good agreement between calculated and observed values for some daughter samples, however some samples showed differences in the REE.

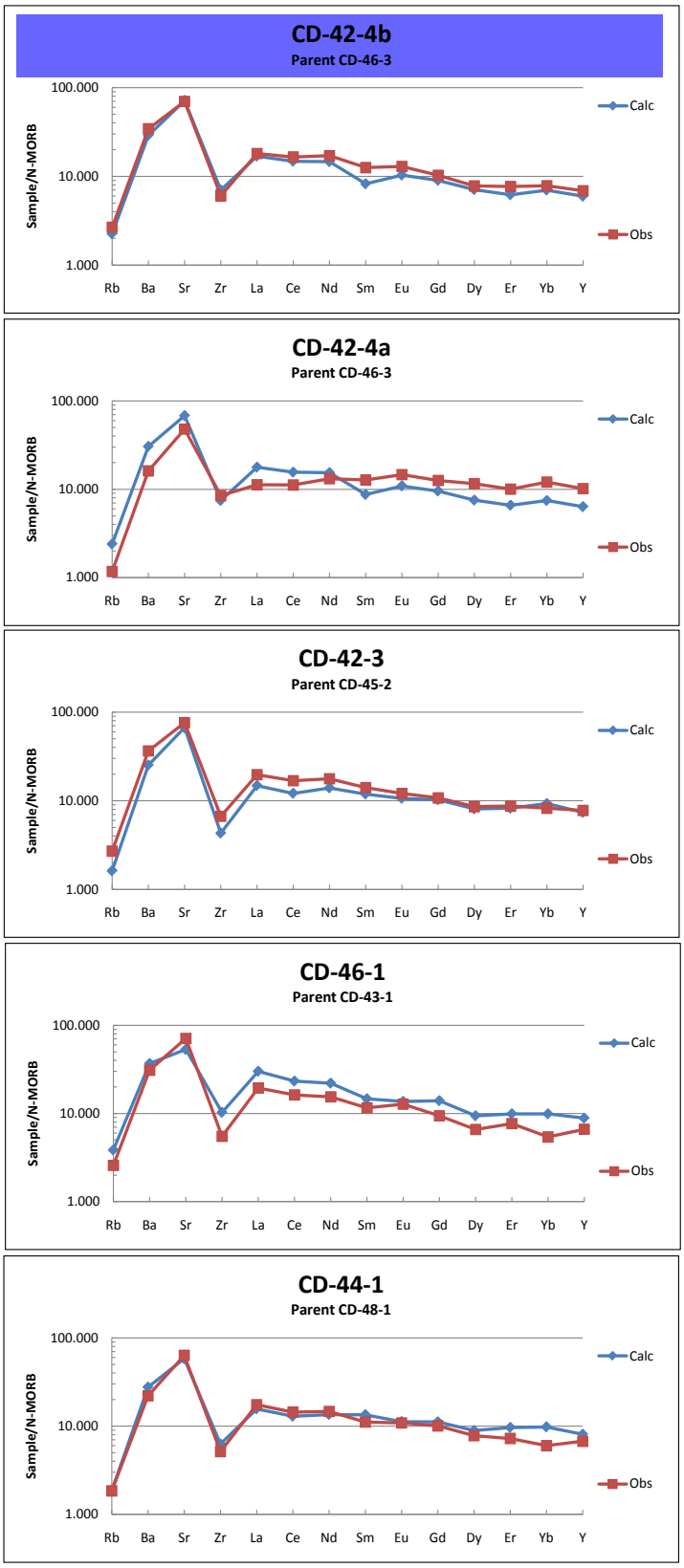


Figure 42 Calculated Daughter Compositions for Volsmar Volcanic Field

The calculated (Calc) and observed (Obs) trace element abundances for daughter compositions from VVF, normalized to N-MORB (Sun and McDonough, 1989), are compared in order to evaluate the

robustness of fractional crystallization models (Table 18). There was good agreement between calculated and observed values for some daughter samples, however some samples showed differences in the REE.

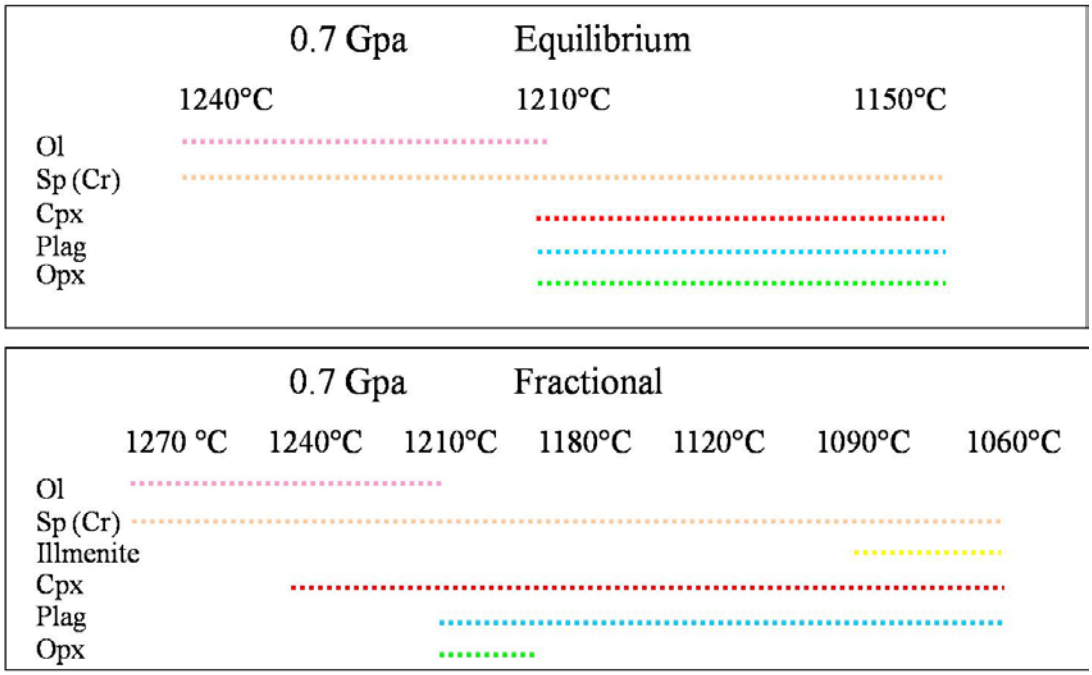


Figure 43 Experimental Results for Tholeiitic Magmas

Villiger et al. (2007) found clinopyroxene precipitated earlier in fractional (open-system) experiments than in equilibrium (closed-system) experiments. (A) Olivine and chrome-rich spinel are the liquidus phases at 1240°C, olivine disappears at 1210°C when clinopyroxene, plagioclase, spinel and orthopyroxene are the stable phases. (B) Olivine and spinel are the liquidus phases between 1270°C and 1240°C, at 1240°C clinopyroxene joins the fractionating assemblage. Olivine disappears at 1210°C when plagioclase and orthopyroxene start precipitating. Between 1180°C and 1090°C spinel, clinopyroxene and plagioclase form the fractionating assemblage. At 1090°C ilmenite begins crystallizing and joins the before mentioned assemblage.

Source Characteristics

The occurrence of primary magmas is rare for many volcanic fields; GOVF and VVF consist primarily of evolved magmas with maximum Mg#'s being less than 60 (except for those lavas which have accumulated olivine). Various attempts are made to 'correct' primitive magmas to yield primary compositions, with olivine being incrementally added to make a more magnesium-rich composition (Frey et al., 1978). The multi-phase fractional crystallisation assemblages of GOVF and VVF restrict the use of such approaches. Similar problems encountered in other arcs (Myers, 1988; Woodhead, 1988) have seen the use of an arbitrary MgO content (6.0 wt %) to discriminate primitive/primary to speculate on source compositions. As most non-

cumulate GOVF and VVF basalts have MgO contents of 6 weight percent or less, basalts with Mg# of 40-55 are used to semi-quantitatively constrain the character of their mantle source.

GOVF basalts have relatively flat rare earth patterns relative to MORB, while VVF are slightly LREE-enriched and HREE-depleted relative to MORB (Figure 44). The source of the GOVF and VVF lavas reflect these patterns, thus indicating that the two sources have slight differences in these incompatible elements. VVF's source LREE enrichment (often referred to as the supra-subduction zone (SSZ) component or the slab contribution (Hawkesworth et al., 1993; McCulloch and Gamble, 1991; Pearce, 1983), is derived from either sediments on the subducting slab or from the slab itself. In contrast, the relatively flat REE signature of the GOVF mantle source suggests a lesser SSZ contribution.

Large-ion lithophile elements (Sr, Rb, Ba, Th) for GOVF and VVF basalts are also enriched relative to MORB with the high-field strength elements (Ta, Nb, Zr, Hf, Ti, Y) being depleted with respect to MORB (Figure 45). Large-ion lithophile elements also form part of the SSZ component and this signature is typical of many IAB (Jakes and Gill, 1970; Miller et al., 1992; Pearce, 1983; Pearce et al., 1995; Perfit et al., 1980). These characteristics are enhanced in the VVF basalts relative to the GOVF basalts, consistent with the interpretation that the VVF mantle has a greater SSZ contribution than the GOVF mantle.

Extrapolation of GOVF lavas on a Ba versus Mg# diagram back to primitive compositions (Mg# 72) suggest that Group 3 (CD-04-1 and CD-05-1) is derived from a source enriched in Ba relative to the sources for Group 1 and Group 2 (Figure 46). The relatively high abundance of Ba suggests that the source of the Group 3 magmas has a slightly greater degree of SSZ enrichment than the other groups. A similar pattern is difficult to detect for the VVF lavas.

Pb isotopes for both volcanic fields are consistent with derivation from a Pacific type mantle with subtle spatial variation between each field. GOVF is slightly less enriched in Pb isotopes than VVF, which suggests geographical variation in source chemistry. The derivation of these lavas from a Pacific mantle source is consistent

with isotopic variation observed in the New Hebrides Island Arc. Peate et al. (1997) found the central part of the arc (facing the DEZ collision) is derived from Indian type mantle while the southern part of the arc is derived from Pacific type mantle; GOVF and VVF therefore continue this along-arc trend. The existence of Pacific type mantle beneath GOVF and VVF supports the mantle isotope model for the New Hebrides Island Arc (Crawford et al., 1995) that suggests a thin wedge of Pacific type mantle exists beneath the southern arc volcanoes while backarc sites and the NFB magmas tap an Indian type mantle source.

Pb isotopes for both volcanic fields also show little to no contamination from a sediment source. GOVF and VVF lavas plot along a linear trend parallel to the Northern Hemisphere Reference Line (Hart, 1984), which is not consistent with mixing between a sediment source and a mantle source. GOVF and VVF Pb isotopes were compared to sediments in the North Loyalty Basin (Peate et al., 1997), sediments east of Japan (Cousens et al., 1994) and south of the Aleutian Arc (Church, 1973, 1976); the linear trend observed shows little evidence for derivation from a sediment source. This has implications for the enrichment trends observed in the rare earth and incompatible element data; these enrichment trends are therefore not derived from sediment contamination and therefore must derived from the subducting slab.

The absence of sediment involvement in the SSZ component of GOVF and VVF is not consistent with the rest of the New Hebrides Island Arc. The southern islands (Erromango, Tanna and Anatom) have the highest sediment contribution of the arc (1-2%) (Peate et al., 1997). This is possibly due to either a change in subduction rate or a change in thickness of the sediment package being subducted in the North Loyalty basin. It is considered more likely that a decrease in subduction rate as the trench curves to the east is responsible; a dramatic change in thickness of sediments on the downgoing plate has not been reported (Peate et al., 1997).

Sr and Nd isotopes for both volcanic fields indicate a depleted mantle source; GOVF and VVF lavas plot in positive epsilon Nd space and within the Sr/Nd mantle array, which is expected of island arc tholeiites. There is also a subtle spatial isotopic variation; lavas from GOVF are slightly less radiogenic than lavas from the VVF.

This is the same relationship as that observed in the Pb isotopes; GOVF lavas are derived from a slightly less radiogenic source than the VVF lavas. This suggests a southerly enrichment trend; from GOVF in the north to VVF in the south that is not consistent with the subaerial islands of the New Hebrides Island Arc. With the exception of the islands facing the DEZ (which show distinct isotopic characteristics) the southern islands of the New Hebridean Arc are slightly less radiogenic than the northern islands (Peate et al., 1997), which is suggestive of a northerly enrichment trend. This trend is possibly due to variable amounts of alteration in the basaltic crust or variable amounts of sediment on the down going slab.

The isotopes appear to be decoupled from the heavy rare earth elements and the high field strength elements. GOVF and VVF lavas have $^{87}Sr/^{86}Sr$ values ranging from 0.70316 – 0.70336 which lies within the isotopic range for the southern islands (Erromango, Tanna and Anatom) as identified by Peate et al. (1997). This apparent decoupling of the isotope and heavy rare earth element data suggests that the trace element enrichment observed in GOVF and VVF lavas is a recent event.

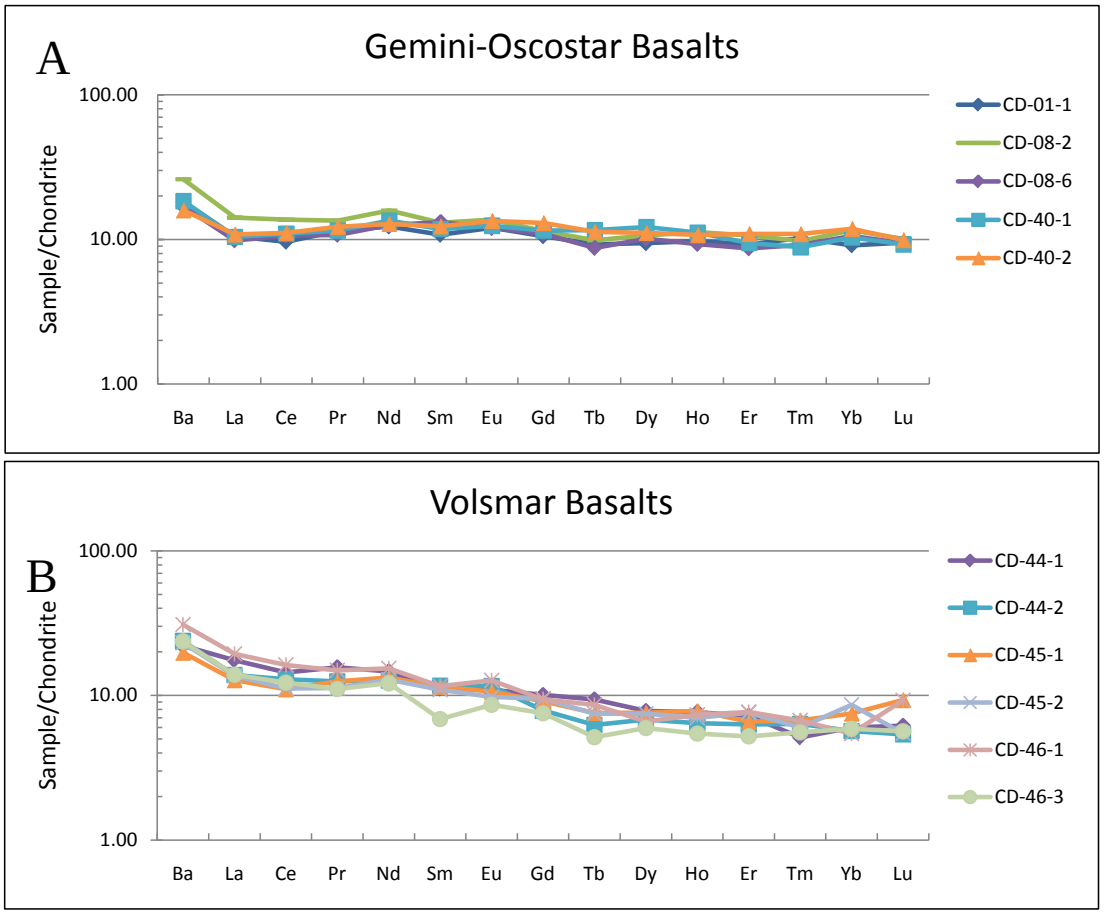


Figure 44 Ba and Rare Earth Element Patterns of Basalts from Gemini-Oscostar and Volsmar Volcanic Fields

The chondrite normalized REE patterns for lavas from both volcanic fields show a slight enrichment in the LREE. (A) GOVF basalts (Mg# 43.88-53.45) display a relatively flat REE pattern with no significant anomalies. (B) VVF basalts (Mg# 50.59-55.49) show a slight LREE enrichment, which is commonly known as the subduction component, and a slight HREE depletion. The VVF basalts are slightly more enriched in LREE and slightly more depleted in HREE compared to the GOVF basalts. Chondrite compositions from Sun and McDonough (1989).

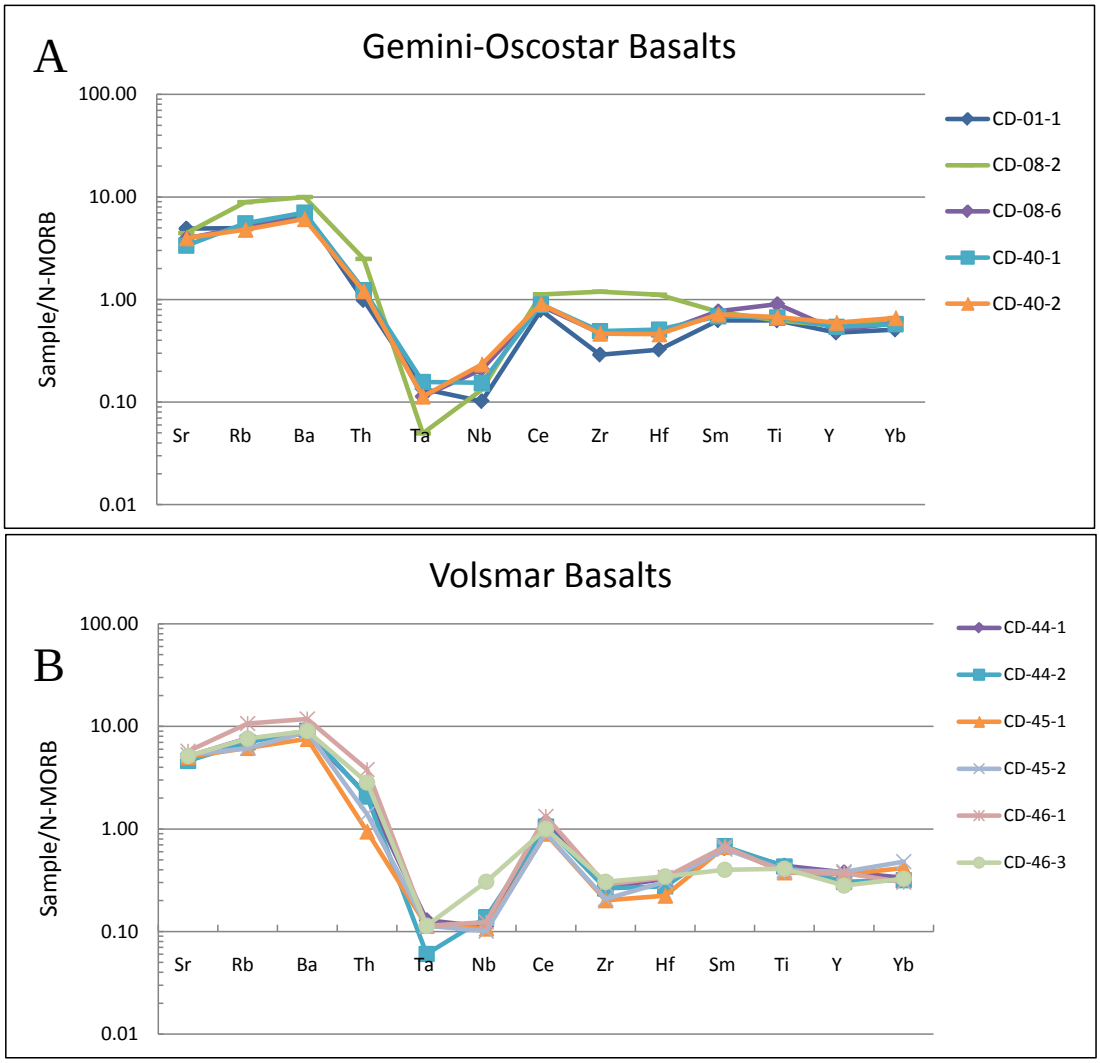


Figure 45 Incompatible Element Systematics of Basalts from Gemini-Oscostar and Volsmar Volcanic Fields

The incompatible element abundances normalized to N-MORB following the element arrangement of Pearce, (1983) show an enrichment in the mobile elements (Sr, Rb, Ba, Th) with respect to the HFSE. (A) GOVF basalts (Mg# 43.88-53.45) show a slight enrichment in the large-ion lithophile elements, or what is commonly known as the subduction component. The HFSE are slightly depleted relative to N-MORB. (B) VVF basalts (Mg# 50.59-55.49) show a slight enrichment in large-ion lithophile elements and a slight depletion in HFSE with respect to N-MORB. The enrichment is slightly greater for VVF basalts compared to the GOVF basalts, and the depletion is also slightly greater in the VVF basalts than the GOVF basalts. N-MORB compositions from Sun and McDonough (1989).

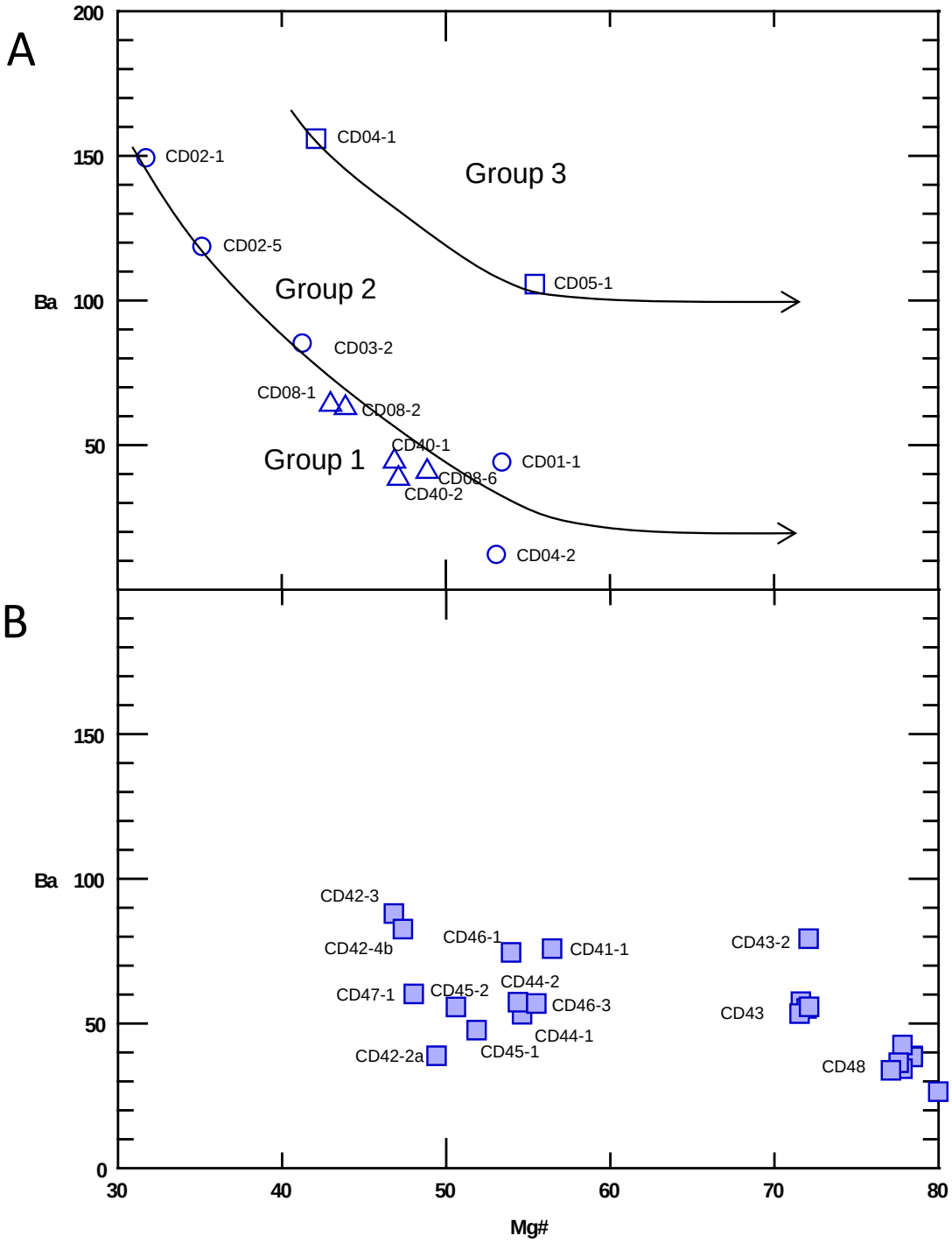


Figure 46 Source Chemistry

(A) This plot of Ba versus Mg# ($Mg/Mg+Fe^{2+}$) highlights the variable trace element concentrations for lavas from GOVF, which suggests the sources from which these lavas is derived is variable enriched in Ba. (B) The range in Ba concentrations for VVF lavas is narrower; suggesting the source from which these lavas is derived is not as variable with respect to Ba.

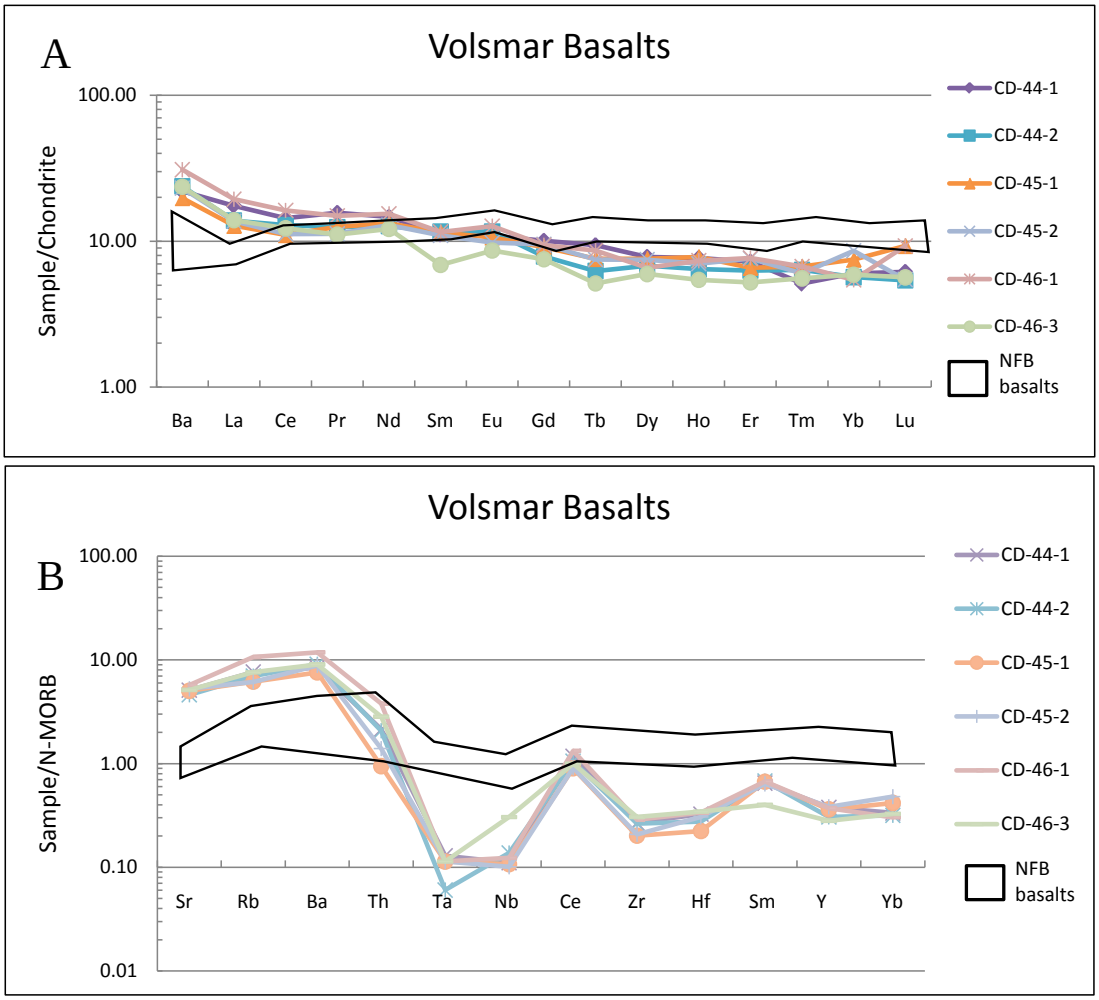


Figure 47 North Fiji Basin Incompatible Element Systematics

Basalts from the N-S spreading ridge of the North Fiji Basin (NFB) normalized to chondrite and N-MORB values. (A) Volsmar volcanic field basalts show an enrichment of the light rare earth elements and depletion of the heavy rare earth elements compared to NFB basalts (data from Eissen et al., 1991; Eissen et al., 1994), which display the classic island arc tholeiite rare earth pattern. (B) Volsmar volcanic field basalts show enrichment of large-ion lithophile elements and depletion of high-field strength elements, and the classic Ta Nb depletions compared to NFB basalts (data from Fleutelot et al., 2005). Chondrite and N-MORB compositions from Sun and McDonough (1989). Appendix B contains the full NFB dataset.

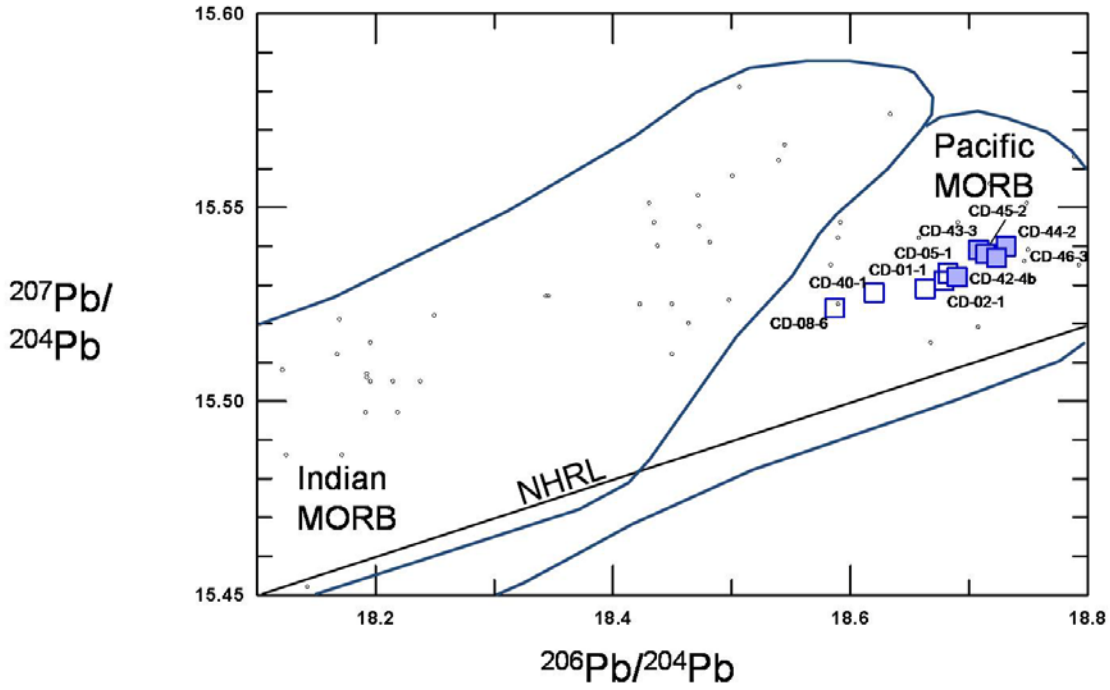


Figure 48 Pb Isotopes and Mantle Source

Pb isotopes for Gemini-Oscostar (open squares) and Volsmar (closed squares) volcanic fields show they plot within Pacific MORB mantle space. This is consistent with isotopic variation in the New Hebrides central chain lavas (circles) (data from Peate et al., 1997) which show Indian MORB mantle sources in the north of the arc and Pacific MORB mantle sources in the south of the arc (Peate et al., 1997). Appendix B contains the isotope dataset for the New Hebrides central chain used in this comparison.

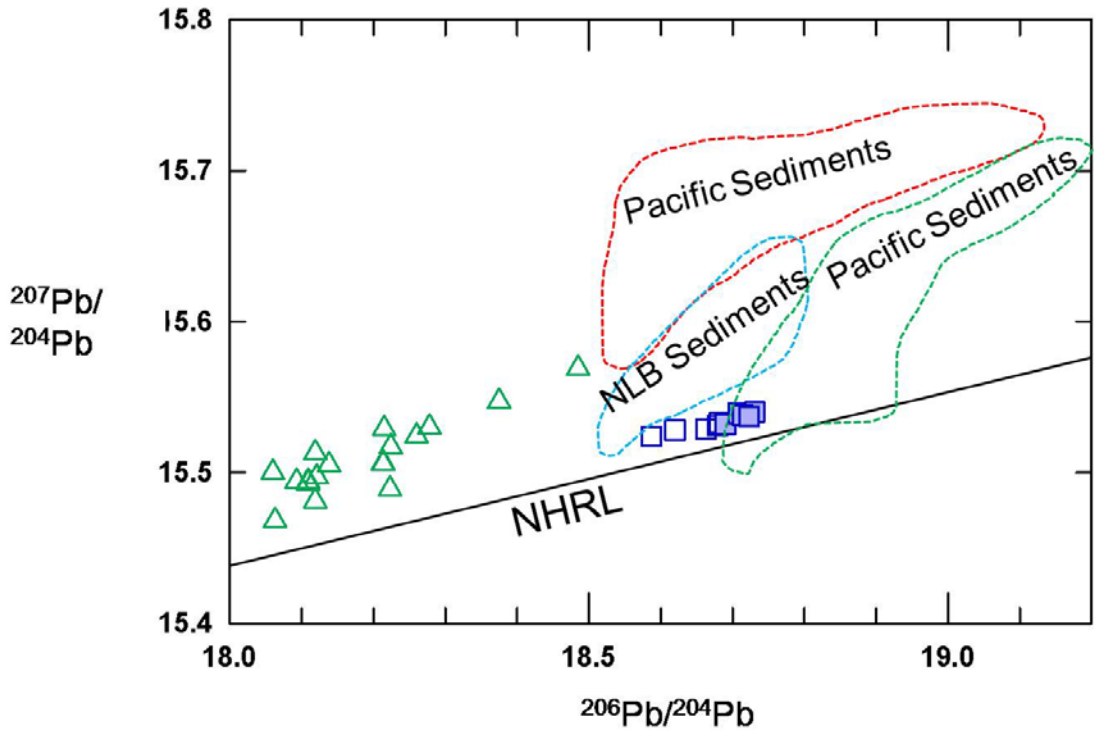


Figure 49 Pb Isotopes and Source Mixing

The lavas from Gemini-Oscostar (open squares) and Volsmar (closed squares) volcanic fields form a relatively linear array parallel to the Northern Hemisphere Reference Line [NHRL - after Hart (1984)]. This indicates a lack of sediment contamination. Sediments fields are from the western Pacific [red field – east of Japan (Cousens et al., 1994); green field – north-east Pacific south of the Aleutians (Church, 1973, 1976)] and the North Loyalty Basin (NLB - Peate et al., 1997). Pb isotopes for North Fiji Basin basalts (triangles) are shown for comparison. Appendix B contains the isotope dataset for the samples used in this comparison.

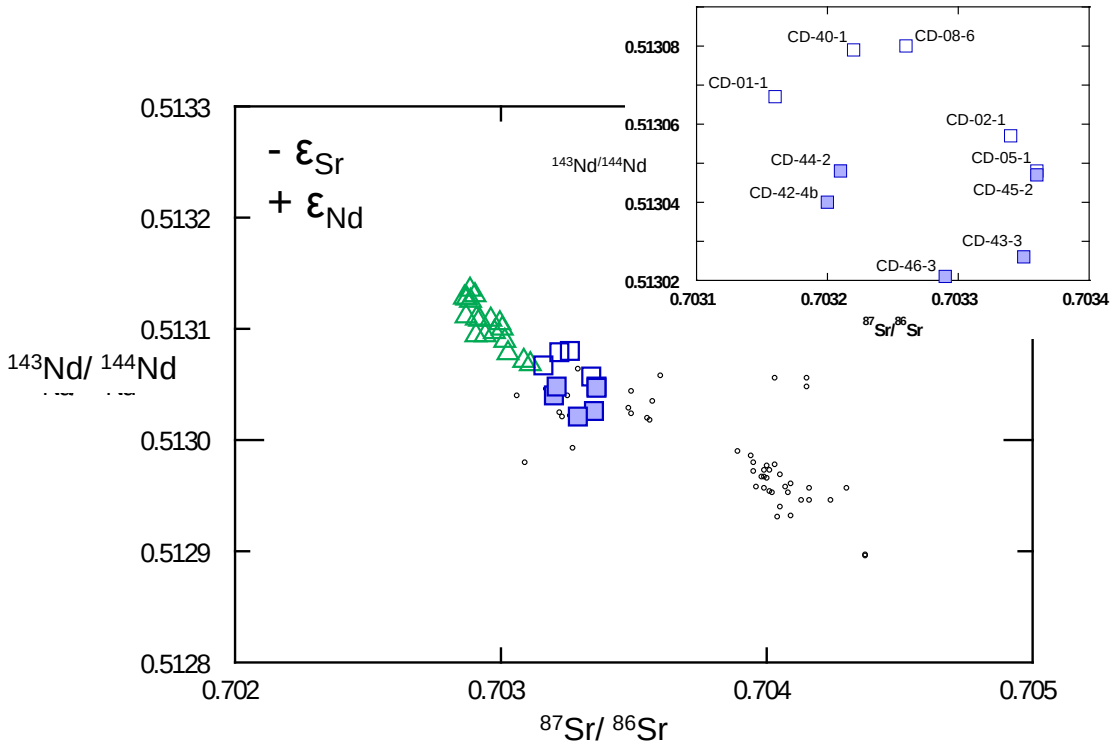


Figure 50 Sr and Nd Isotopes and Mantle Source

Sr and Nd isotopes show that Gemini-Oscostar (open squares) and Volsmar volcanic field lavas (closed squares) occupy positive ε_{Nd} space and are therefore derived from a depleted mantle source. As with the Pb isotopes there is also a distinct spatial distribution for Sr and Nd isotopes; GOVF lavas are slightly more radiogenic than lavas from the VVF and VVF lavas are slightly less radiogenic than GOVF lavas. North Fiji Basin basalts (triangles) and New Hebrides central chain lavas (circles) (data from Briqueu and Lancelot, 1983; Handley et al., 2008; Peate et al., 1997) are plotted for comparison. Appendix B contains the isotope dataset for the North Fiji Basin and New Hebrides central chain.

Tectonic-Magmatic Interpretations

Intra-Arc Comparison

The New Hebrides central chain subaerial volcanoes comprise three magma series; a high-K calcalkalic series, low-K calcalkalic series and an island arc tholeiite series (Peate et al., 1997). The lavas from GOVF and VVF belong to either the island arc tholeiite or the low-K calcalkalic series (Figure 51). It is clear that a significant amount of variation exists in the New Hebrides central chain lavas. Peate et al. (1997) identify a trend of increasing alkalinity from south to north along the arc. GOVF and VVF lavas have relatively low K_2O abundances and are at the bottom of this trend (Figure 51) and are the least enriched of the New Hebrides central chain lavas.

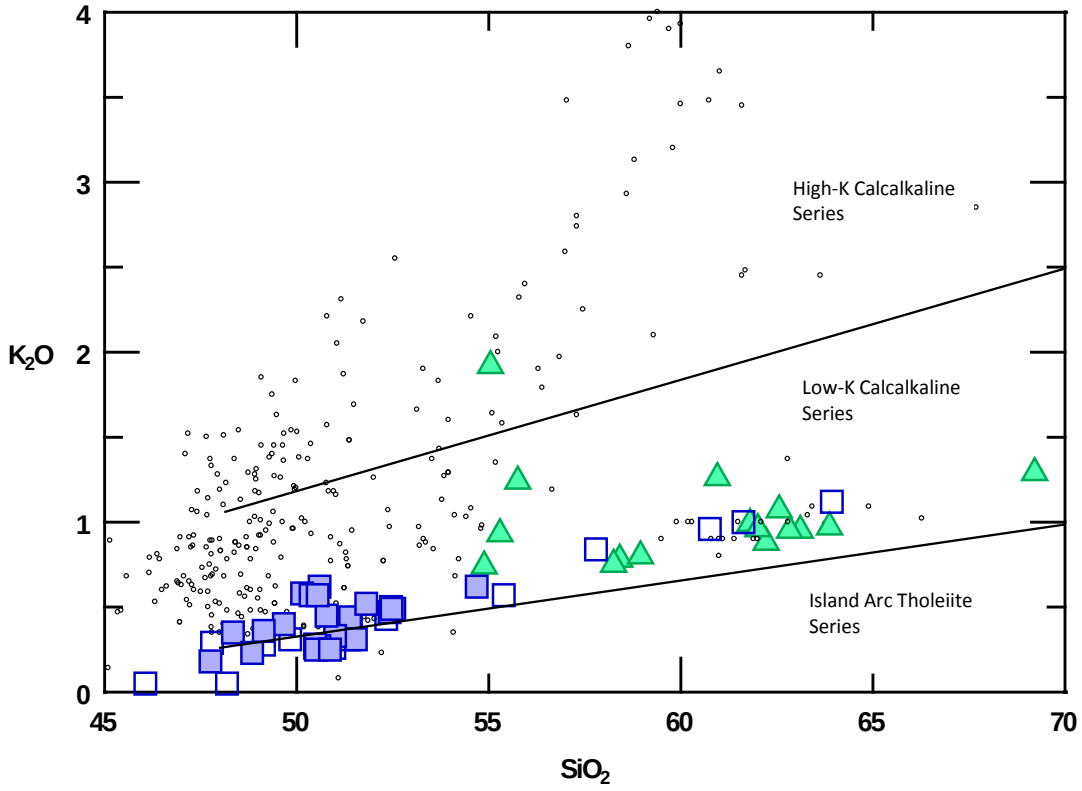


Figure 51 New Hebrides Central Chain Magma Series

Gemini-Oscostar (open squares) and Volsmar (closed squares) volcanic field lavas belong to either the IAT or low-K calcalkalic series. New Hebrides central chain lavas (circles)show significant along-arc variation (data from Barsdell, 1988; Barsdell and Berry, 1990; Barsdell et al., 1982; Dupuy et al., 1982; Eggins, 1993; Gorton, 1977; Maillet et al., 1986; Marcelot, 1981; Marcelot et al., 1983a; Marcelot et al., 1979; Marcelot et al., 1983b; Peate et al., 1997; Raos and Crawford, 2004; Robin et al., 1994) and also includes samples from Gemini South volcano, Oscostar volcano and Volsmar volcanic field collected on the ORSTOM cruise (Monzier et al., 1993). The high-Mg andesite suite (green triangles) of Monzier et al. (1993) is also plotted for comparison. Database for all published data are in Appendix B.

Geochemical results for the southernmost islands and submarine volcanic edifices of the New Hebrides Island Arc provide an interesting contrast to the rest of the arc. Several seamounts and two subaerial volcanic edifices below 22°S (e.g. Eva seamount, La Perouse seamount, Charlotte seamount, Vauban seamount, Matthew island and Hunter island (Figure 2)) are dominated by a high-magnesium andesite suite (HMA) which is derived from fluids from the subducting Indo-Australian slab interacting with depleted mantle (Monzier et al., 1993). Previous work suggests that the Gemini South volcano is related to the HMA suite (trace element evidence) or the New Hebrides central chain suite (major element data) (Monzier et al., 1993). Previous work also suggests both Oscostar volcano and lavas in the VVF display similar characteristics (major and trace element data) (Monzier et al., 1993).

Results from my work demonstrate that the GOVF has a distinctive major element pattern (Figure 52) and compatible element pattern (Figure 53). GOVF and VVF lavas are distinct from the HMA suite in having consistently lower SiO_2, Na_2O and K_2O and higher TiO_2, MnO and CaO. Bivariate major element plots of GOVF and VVF lavas and lavas from the New Hebrides central chain suite show that GOVF and VVF are similar to the NHCC lavas (Figure 52). Incompatible element systematics of GOVF and VVF lavas are also quite distinct from the high-Mg andesite suite. VVF and to some extent GOVF lavas, are more depleted with respect to the high field strength elements than the HMA suite. Both volcanic fields however are not as enriched in the large-ion lithophile elements as the HMA suite (Figure 54). This suggests the mantle source for the HMA suite has experienced a higher degree of enrichment from the SSZ component and is not as depleted as the source for GOVF and VVF lavas.

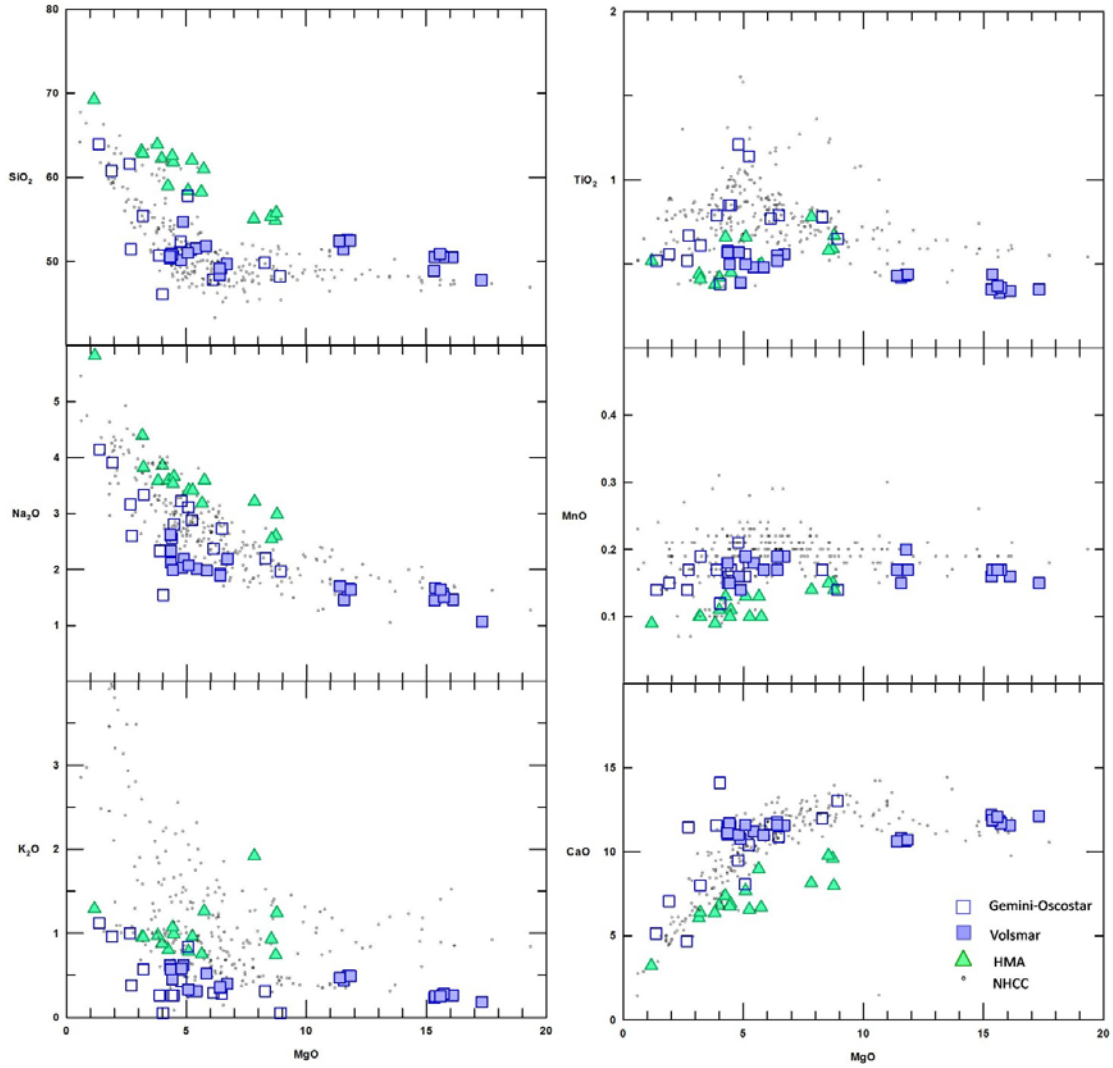


Figure 52 Selected Harker Variation diagrams

The high-Mg andesite suite (HMA) of Monzier et al. (1993) shows consistently higher K_2O, Na_2O and SiO_2, and lower CaO, MnO and TiO_2 than GOVF and VVF. GOVF and VVF consistently overlap the New Hebrides central chain lavas (NHCC) and are therefore interpreted to belong to this suite. NHCC data sources as per Figure 51.

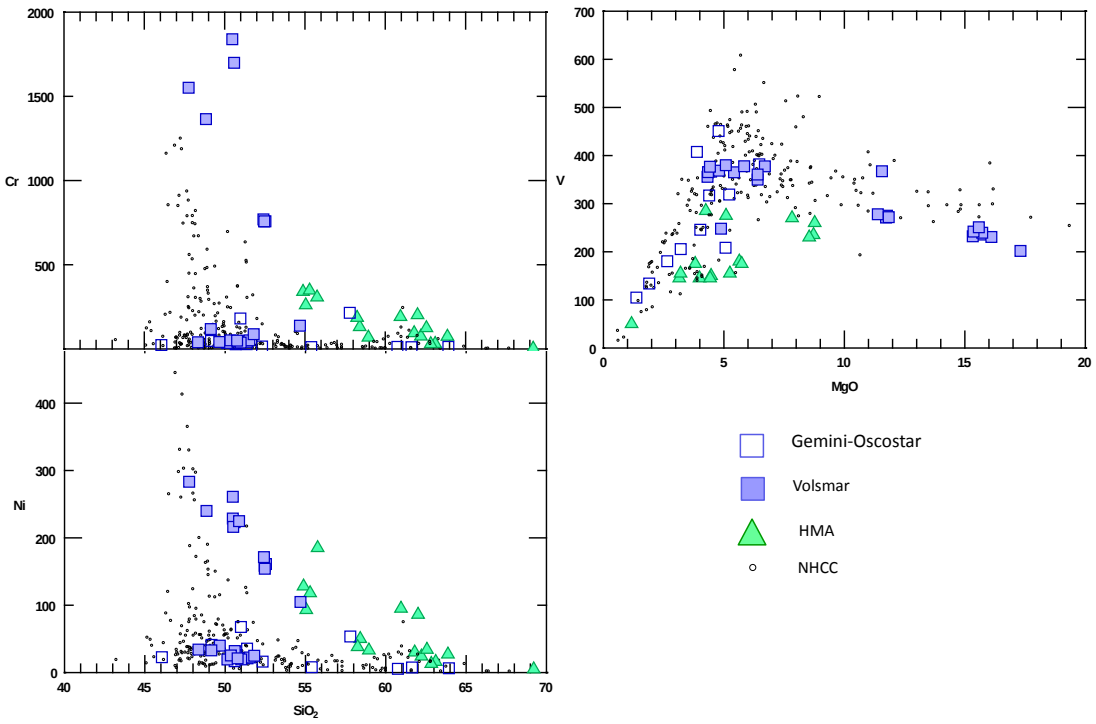


Figure 53 Compatible Element Variation of New Hebrides Lavas

The New Hebrides central chain suite (NHCC) and GOVF are distinct from the high-Mg andesite suite (HMA) of Monzier et al. (1993). Appendix B contains the New Hebrides central chain and HMA database.

Trace element variation of GOVF and VVF basalts is similar to the variation observed in the NHCC islands of Erromango, Tanna and Anatom (Figure 55). These southern islands show the same anomalies as GOVF and VVF, particularly Hf and Zr depletions, which is not commonly observed in island arc rocks (Peate et al., 1997). GOVF and VVF basalts are also enriched in large-ion lithophile elements and depleted in high field strength elements compared to MORB. The high field strength and heavy rare earth abundances for GOVF basalts are comparable to those of the southern islands; with VVF basalts being slightly more depleted (Figure 55). Overall, these similarities indicate that GOVF and VVF are part of the NHCC suite and constitute the southernmost extension of the NHCC.

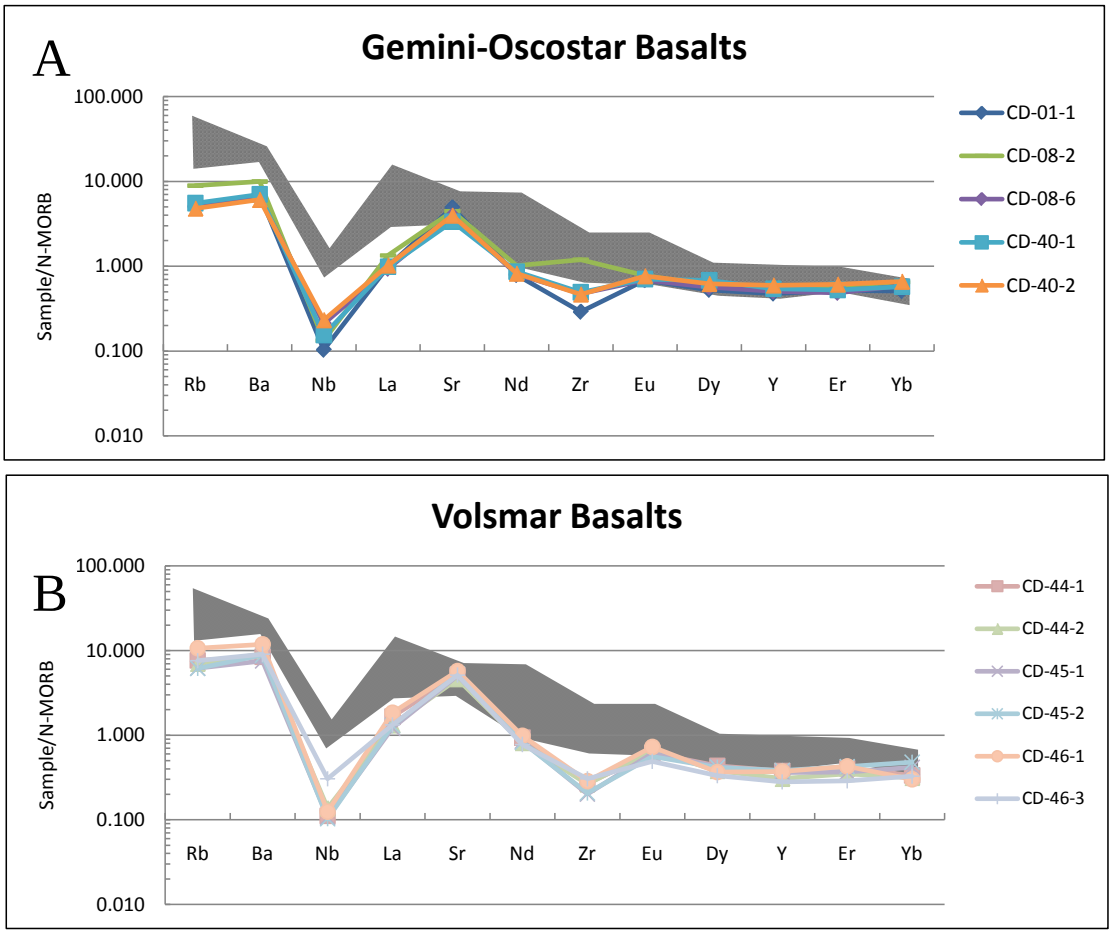


Figure 54 High-Magnesium Andesite Suite

(A) Basalts from the GOVF are less enriched in large-ion lithophile and light rare earth elements compared to basaltic andesites of the high-Mg andesite suite (stippled area); GOVF basalts are also slightly more depleted in high field strength and heavy rare earth elements than the HMA suite (data from Monzier et al., 1993). (B) Basalts from the VVF are also less enriched in the large-ion lithophile and light rare earth elements and more depleted in high field strength and heavy rare earth elements compared to the HMA suite. N-MORB normalizing values after Sun and McDonough (1989) and element order after Monzier et al. (1993). Appendix B contains the HMA suite database.

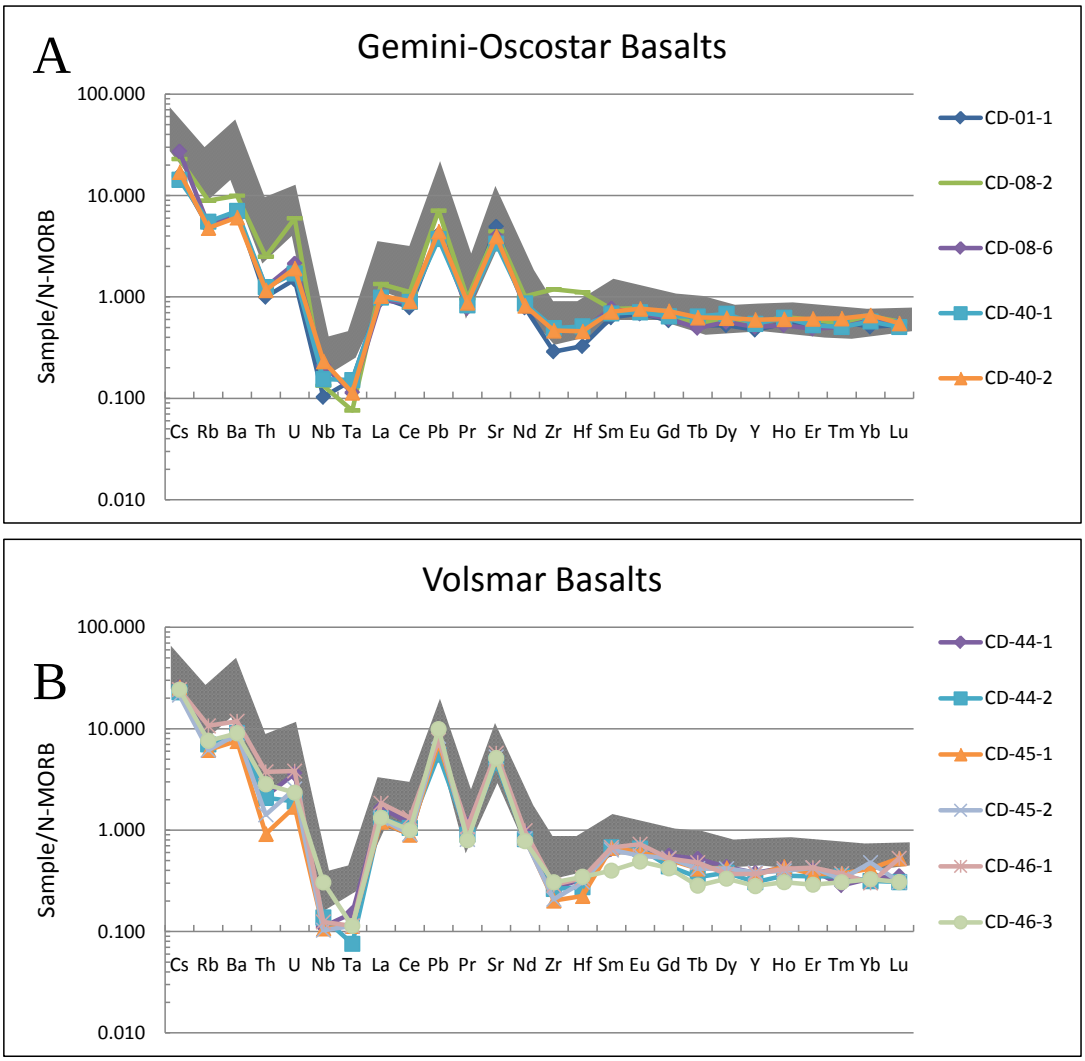


Figure 55 Trace Element Variation of Gemini-Oscostar and Volsmar Fields and New Hebrides Central Chain

Incompatible element variation normalized to N-MORB of Gemini-Oscostar and Volsmar volcanic field lavas are quite similar to the New Hebrides central chain lavas, particularly the southern islands of Erromango, Tanna and Anatom (stippled area). Basalts from Gemini-Oscostar and Volsmar volcanic fields show Hf and Zr depletions with respect to Nd and Sm, which is rare in island arc rocks (Peate et al., 1997). N-MORB compositions from Sun and McDonough (1989). Appendix B contains the New Hebrides central chain dataset.

The North Fiji Basin lies in close proximity to the Vanuatu Arc. A comparison of basalts with comparable Mg# and SiO_2 from the N-S segment of the North Fiji Basin (data from Eissen et al., 1991; Eissen et al., 1994) with basalts from both GOVF and VVF shows that basalts from the VVF are slightly more enriched in light rare earth elements and more depleted in heavy rare earth elements than basalts from the North Fiji Basin. VVF basalts are also more enriched in large-ion lithophile elements and more depleted in high field strength elements than the Fijian basalts (data from Fleutelot et al., 2005). This suggests that the mantle source for GOVF and VVF

lavas is quite different to the suggested NFB N-MORB source (Eissen et al., 1994; Fleutelot et al., 2005) in being substantially enriched in a variety of incompatible elements.

Magmatic-Tectonic Pattern

The previous structural interpretation of the area shows northeast-oriented strike slip motion in both volcanic fields as evidenced by shallow (0-70m) centroid-moment tensor solutions (Dziewonski and Woodhouse, 1983; Giardini et al., 1985; Monzier et al., 1993). The lineament interpretation of this study shows that both fields are dominated by northwest-oriented normal faults with a small east-west component in the VVF. There is no evidence for strike slip motion in either GOVF or VVF. Therefore the structural setting for both volcanic fields is dominated by northwest-oriented extension not northeast-oriented strike slip motion.

The detailed lineament analysis of GOVF and VVF indicates that these volcanic fields are structurally similar to the backarc troughs of the New Hebrides Island Arc (e.g. the Coriolis and Vate troughs in the south and the northern troughs (Pelletier et al., 1998; Price et al., 1993)). The structural fabric of these regions appears to be dominated northwest-oriented normal faults. The magmatic character of the GOVF and VVF is dominantly island arc tholeiites with a SSZ component and therefore GOVF and VVF are not backarc volcanic fields but are a part of the New Hebrides Island Arc chain. The relatively young age of GOVF and VVF therefore suggests that the initial formation of island arc volcanoes structurally resembles spreading in backarc troughs.

The tectonic complexities at the southern end of the New Hebrides Island Arc include a change in strike of the trench before transitioning to the Hunter Fracture Zone (HFZ), a sinistral strike slip fracture oriented N75°E, and a sinistral EW trending boundary for the Matthew-Hunter microplate at 21°S, roughly 10km south of VVF (Figure 56) (Louat and Pelletier, 1989; Monzier et al., 1993). The maximum compressive stress (σ_1) of the HFZ is therefore N35°W, which is incompatible with the stress regime in the GOVF and VVF. The maximum compressive stress for the boundary to the Matthew-Hunter microplate is N07°E, which is also incompatible

with the structural fabric of both fields. There is also no evidence of lateral movement or en echelon structures at either volcanic field, which would be expected if transform faults were present. This study has found no evidence for a sinistral strike slip boundary so close to VVF and GOVF.

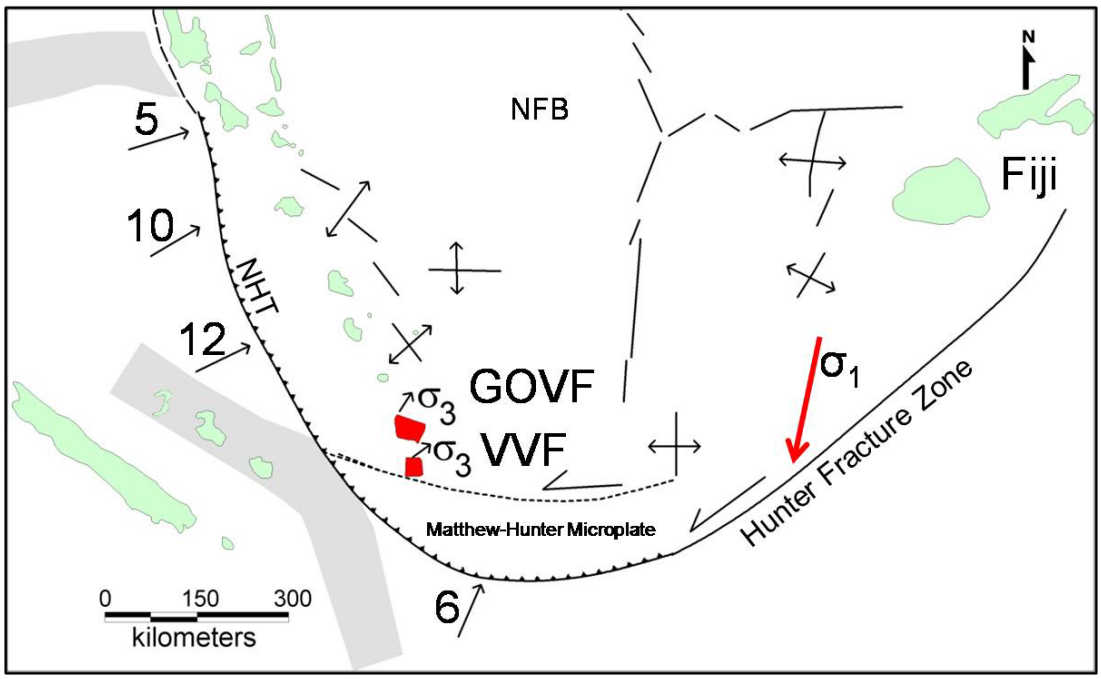


Figure 56 Southern New Hebrides Structural Map

The southern end of the New Hebrides Island Arc is relatively structurally complex with the New Hebrides Trench (NHT) experiencing normal arc subduction before a change in strike and transitioning to a left-lateral strike slip zone (Hunter Fracture Zone). Relative plate motions decrease along the length of the arc (motions are in cm/yr). The stress regime of the Hunter Fracture Zone and the Matthew-Hunter microplate are not compatible with the stress regimes in the Gemini-Oscostar (GOVF) and Volsmar (VVF) volcanic fields.

The regional tectonic setting of both volcanic fields indicates this is a relatively new part of the New Hebridean Arc. The occurrence of the HMA suite on the Matthew-Hunter microplate suggests significant input of slab-related melts. The input of melts and/or incompatible element enriched fluids is much less for the VVF and the GOVF to the north of the Matthew-Hunter microplate, with the GOVF (the most northerly) being less enriched than the VVF. The subtle magmatic variation observed in this section of the New Hebrides Island Arc is due to variable input of fluids from the descending basaltic crust and must reflect the progressive change in slab depth, dip, and thermal regime of the New Hebrides subduction zone.

The absence of compressive structures and the predominance of normal faulting agree with the nature of faulting along the rest of the New Hebridean Arc, particularly in the northern and southern arc segments (Charvis and Pelletier, 1989; Dugas et al., 1977; Louat and Pelletier, 1989; Pelletier et al., 1998). Therefore GOVF and VVF are similar to the structural setting of the New Hebrides Island Arc volcanoes and are not affected by the regional tectonic complexities present at the southern end of the arc (i.e. HFZ and the Matthew-Hunter microplate).

Conclusion

GOVF and VVF provide insight into the magmatic and tectonic characteristics of a young arc. Combined bathymetric and geochemical investigations have shown that both volcanic fields are dominated by northwest-oriented extensional faults, with a concurrent east-west system in the VVF. Both fields exhibit diverse volcanic morphology with explosive eruptions and a caldera at 1500m bsl. GOVF and VVF are dominantly basaltic in composition with limited occurrence of more evolved magmas. The mantle source for GOVF and VVF lavas is characterised by light rare earth and large-ion lithophile element enrichments, and heavy rare earth and high field strength element depletions. The source also reflects depleted Pacific MORB character and shows no contamination by subducted sediments. There is a subtle spatial variation in source chemistry which sees a northerly trend of decreasing enrichment of slab-derived fluids.

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Appendix A

Isotope standard results and reproducibility

The Sr isotope long term 2σ is 0.00003. The $^{208}Pb/^{204}Pb$ isotope long term 2σ is 0.0088, the $^{207}Pb/^{204}Pb$ long term 2σ is 0.0030, the $^{206}Pb/^{204}Pb$ long term 2σ is 0.0034 and the $^{208}Pb/^{206}Pb$ long term 2σ is 0.000088.

Table 19 Pb Isotope Standard Results

	$^{208}Pb/^{204}Pb$	$^{207}Pb/^{204}Pb$	$^{206}Pb/^{204}Pb$	$^{208}Pb/^{206}Pb$
NSB 987	36.68299	15.48570	16.93358	2.166260
NSB 987	36.68445	15.48658	16.93390	2.166367

Table 20 Sr Isotope Reproducibility

	$^{87}Sr/^{86}Sr$
In run reproducibility	0.7102122
Long term reproducibility	0.7102460

Appendix B

Electronic island arc tholeiite dataset

Major and trace elements, and isotopes sourced from the literature

Appendix C

Electronic database for EMP results

Whole rock trace element data (ppm) for low-K island arc tholeiites from island arcs of similar tectonic setting to the New Hebrides arc. Rock types include basalt (B), basaltic andesite (BA) and andesite (A).

	Tonga Arc					Ryukyu Arc								South Sandwich Islands						Aleutian Islands									
Sample	L3	L20	L21	104C	(HH1)HHUF	KR01	KR03	HOKU41	HOKU43	HOKU33	HOKU34	KIM1	OND	SS.86.1	SS.87.9	SS.87.18	SS.87.19	SS.12.1	SS.12.2	96PS01	AK81-35	96PS28	96PS32	96PS30	KG8	KG3	KG1	KG4	KG5	SB87-22	SJ87-79	SJ88-6
Location	Late	Late	Late	Kao	Hunga Ha'apai	South Kyushu	South Kyushu	South Kyushu	South Kyushu	South Kyushu	South Kyushu	South Kyushu	South Kyushu	Candlemas	Candlemas	Candlemas	Candlemas	Vindication	Vindication	Akutan	Akutan	Akutan	Akutan	Akutan	Roundhead	Roundhead	Roundhead	Roundhead	Roundhead	Seguam	Seguam	Seguam
Rock Type	BA	BA	BA	BA	BA	B	B	B	B	B	B	B	B	B	B	B	B	B	B	A	A	A	A	A	B	B	B	B	B	B	B	B
Mg#	56.23	56.77	51.91	54.36	52.43	48.31	49.62	53.15	51.81	51.11	48.24	45.29	52.99	57.9	61.4	59.6	57.7	58.6	56.6	40.25	40.55	40.50	43.06	41.78	50.91	58.44	50.70	53.10	48.21	63.29	58.77	63.96
Reference	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	4	4	4	4	4	5	5	5	5	5	5	5	5
La	1.7	1.43	1.7	2.45	1.09	8.54	7.46	6.17	6.44	5.20	5.14	11.10	11.15	0.8	1.19	1.41	1	0.98	0.77	7.86	7.86	10.47	7.86	7.79	7.48	7.27	10.2	8.73	7.43	3.62	2.45	3.67
Ce	4.81	3.78	4.95	7.25	3.50	19.1	17.13	13.56	15.78	12.27	12.01	28.67	25.45	2.6	3.58	3.97	3.27	3.01	2.46	19.25	19.5	25.54	19.36	19.29	17.4	17.6	23.1	19.4	17.2	8.22	6.11	7.64
Pr	0.795	0.635	0.803	1.29	0.54	2.37	2.18	1.83	2.23	1.80	1.71	3.97	3.37	0.48	0.62	0.61	0.6	0.5	0.45	2.97	3.01	3.85	3.02	3	2.46	2.55	3.08	2.65	2.44	1.19	0.82	1.06
Nd	4.06	3.44	4.06	6.55	3.08	10.38	10.05	8.37	10.47	8.67	8.08	18.21	14.81	2.83	3.46	3.56	3.48	2.85	2.56	14.25	14.28	18.05	14.47	14.17	12.7	12.9	15.4	13.7	12.9	6.28	4.45	5.41
Sm	1.36	1.19	1.36	2.11	1.13	2.63	2.65	2.27	2.88	2.58	2.37	4.81	3.60	1.04	1.23	1.22	1.27	1.03	0.98	4.4	4.45	5.46	4.44	4.43	3.39	3.11	3.83	3.38	3.2	1.72	1.42	1.63
Eu	0.483	0.441	0.487	0.80	0.47	0.84	0.9	0.9	1	0.99	0.97	1.46	1.11	0.45	0.55	0.53	0.56	0.46	0.48	1.42	1.42	1.62	1.42	1.45	1.12	1.12	1.15	1.09	1.11	0.732	0.652	0.702
Gd	1.81	1.51	1.79	2.75	1.60	2.84	2.97	2.52	3.19	2.96	2.71	5.38	3.61	1.59	1.8	1.8	1.9	1.45	1.46	5.05	5.17	6.25	5.24	5.1	3.53	3.02	3.53	3.27	3.38	1.98	1.76	2.01
Tb	0.301	0.278	0.301	0.45	0.28	0.48	0.49	0.43	0.54	0.51	0.48	0.89	0.58	0.3	0.34	0.33	0.35	0.28	0.28	0.87	0.88	1.04	0.88	0.88	0.57	0.52	0.57	0.52	0.56	0.39	0.32	0.38
Dy	2.08	1.89	2.06	3.05	2.00	2.97	3.01	2.74	3.44	3.15	2.98	5.58	3.55	1.93	2.14	2.12	2.23	1.89	1.87	5.54	5.57	6.69	5.6	5.57	3.28	3.14	3.23	3.11	3.34	2.53	2.15	2.29
Ho	0.455	0.427	0.457	0.66	0.45	0.64	0.65	0.59	0.73	0.68	0.65	1.18	0.75	0.43	0.48	0.46	0.5	0.42	0.42	1.2	1.18	1.44	1.19	1.19	0.67	0.63	0.67	0.64	0.71	0.52	0.46	0.5
Er	1.38	1.24	1.37	1.97	1.40	1.87	1.93	1.73	2.15	1.96	1.89	3.47	2.16	1.32	1.35	1.28	1.4	1.22	1.25	3.43	3.43	4.14	3.47	3.46	2.03	1.78	2	1.88	2.04	1.48	1.38	1.49
Tm	0.197	0.19	0.201	0.29	0.21	0.3	0.3	0.27	0.33	0.29	0.29	0.54	0.34	0.209	0.233	0.226	0.243	0.2	0.197	0.54	0.53	0.66	0.54	0.53	0.282	0.25	0.279	0.265	0.304	0.225	0.206	0.216
Yb	1.42	1.3	1.44	1.97	1.52	1.94	1.92	1.7	2.07	1.83	1.83	3.41	2.10	1.26	1.42	1.37	1.47	1.24	1.27	3.44	3.47	4.25	3.45	3.46	1.78	1.64	1.86	1.73	1.87	1.41	1.35	1.45
Lu	0.22	0.203	0.213	0.30	0.24	0.3	0.29	0.26	0.32	0.27	0.28	0.53	0.32	0.22	0.24	0.23	0.25	0.19	0.2	0.55	0.54	0.66	0.54	0.55	0.275	0.252	0.27	0.247	0.28	0.234	0.201	0.211
Pb	2.11	1.76	2.32	2.47	1.80	5.96	6	3.97	3.83	2.17	2.36	5.77	5.23	0.89	0.83	0.61	0.68	1.39	0.79	9.45	9.34	10.11	9.51	9.06	0	0	0	0	0	0		5
Sr	219	211	228	266	179	313	343	316	304	336.00	355	267.00	592.00	117	148	124	123	111	115	419	407	345	418	416	574	581	614	620	548	315	304	289
Rb	7.23	5.73	6.88	6.57	5.88	33	18.7	13.8	12.8	9.20	8.4	17.90	20.40	1.48	2.1	4.41	2.82	3.67	2.1	20.4	20.74	30.48	20.68	20.5	15	13	20	14	15	12	6	7
Ba	106	84.3	92	113	126	196	153	126	105	100.00	113	134.00	174.00	30.8	41.2	50.7	34.7	38.8	27	344	344	464	347	346	357	274	442	346	368	176	130	184
Th	0.169	0.147	0.157	0.21	0.14	2.95	1.73	1.16	0.89	0.80	0.9	1.89	2.43	0.11	0.2	0.25	0.13	0.16	0.09	1.865	1.872	2.83	1.847	1.857	1.88	2.38	2.89	2.39	1.85	0.84	0.52	0.71
U	0.161	0.125	0.158	0.18	0.14	0.73	0.42	0.28	0.23	0.18	0.2	0.43	0.59	0.038	0.064	0.07	0.045	0.052	0.031	1.027	0.979	1.481	0.98	0.98	0.78	0.75	1.23	0.98	0.76	0.45	0.27	0.39
Ta	0.022	0.054	0.031	0.04	0.02	0.24	0.18	0.23	0.15	0.22	0.21	0.31	0.21	0.025	0.032	0.025	0.029	0.028	0.025	0.14	0	0.19	0.14	0.13	0.11	0.06	0.1	0.08	0.1	0.07	0.04	0.06
Nb	0.27	0.29	0.37	0.42	0.28	2.9	2.3	3.8	2.7	3.60	3.3	5.00	2.90	0.21	0.3	0.31	0.26	0.26	0.23	1.8	4.57	2.59	1.81	1.8	1.6	1.4	1.6	1.3	1.5	1.2	0.5	0.8
Zr	22.7	21.4	21.9	41.30	22.50	70	52	59	66	45.00	59	107.00	74.00	19.4	23.7	23.7	23.1	19.7	18	98	99.3	140.4	98.7	98.4	64	66	77	68	66	48	31	38
Y	12.7	12.8	12.7	18.20	12.60	15.9	16.3	16.9	21.4	19.40	18.6	33.10	21.60	12.6	14.2	13	14.5	12	12.3	34.8	34.3	41.9	35.3	35.2	17.8	16.7	17.8	16.5	18.1	13.8	11.5	13.6

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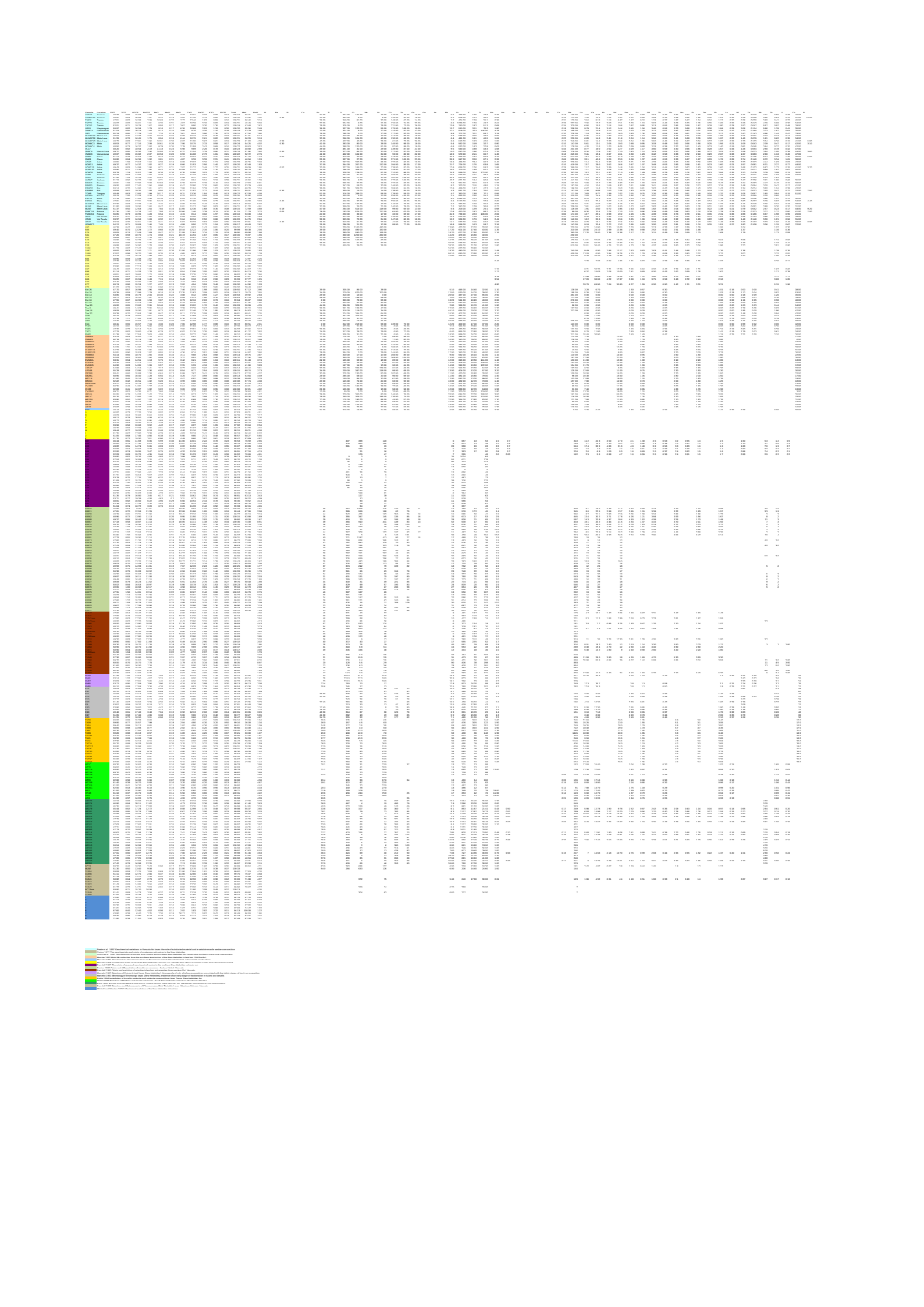

Sample	S1-1	S1-2	S1-6	SDT-2	SDT-3	SDT-4	S4-1	S4-3	S4-4	S3-1	S3-3	S3-4	S5-2	S5-3	S5-4	S2-2
Rock Type	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Mg#	59.24	58.52	58.48	59.81	59.81	57.37	57.11	58.18	58.37	54.25	63.23	63.19	64.26	63.21	62.09	55.78
La	1.81	1.80	1.90	1.75	1.88	2.15	1.66	1.55	1.74	1.14	0.82	1.74	4.55	5.22	4.61	2.59
Ce	6.54	6.62	6.86	6.18	6.56	7.74	6.23	6.35	6.91	4.41	3.88	6.91	12.48	13.80	12.97	8.49
Pr	1.10	1.05	1.10	0.95	1.07	1.32	1.00	1.01	1.08	0.70	0.66	1.08	1.75	2.05	1.73	1.31
Nd	5.49	5.59	5.88	4.95	5.32	6.48	5.55	5.73	5.95	3.97	3.76	5.95	7.61	8.83	7.80	6.66
Sm	1.76	1.71	1.95	1.68	1.72	2.19	1.94	1.90	2.01	1.34	1.20	2.01	2.05	2.47	2.07	2.29
Eu	0.86	0.79	0.88	0.75	0.80	0.94	0.83	0.85	0.86	0.72	0.62	0.86	0.93	1.11	0.92	0.92
Gd	2.03	2.34	2.54	2.18	1.92	2.48	2.36	2.24	2.49	1.59	1.47	2.49	2.34	2.45	2.00	2.87
Tb	0.44	0.43	0.47	0.40	0.44	0.54	0.47	0.45	0.49	0.32	0.28	0.49	0.45	0.61	0.44	0.55
Dy	2.86	2.92	3.22	2.70	2.78	3.37	3.02	3.23	3.45	2.21	1.88	3.45	2.72	3.06	2.53	3.56
Ho	0.65	0.59	0.70	0.58	0.64	0.78	0.64	0.69	0.72	0.45	0.44	0.72	0.61	0.76	0.53	0.76
er	1.65	1.76	1.99	1.57	1.65	2.00	1.81	1.91	2.14	1.25	1.13	2.02	1.49	1.81	1.49	2.17
Tm	0.32	0.27	0.31	0.28	0.32	0.37	0.29	0.30	0.33	0.21	0.20	0.33	0.30	0.34	0.25	0.33
Yb	1.76	1.66	2.03	1.78	1.77	2.12	1.81	1.97	2.23	1.40	1.31	2.23	1.60	1.92	1.50	2.28
Lu	0.30	0.24	0.28	0.29	0.31	0.34	0.25	0.24	0.28	0.17	0.18	0.32	0.28	0.32	0.24	0.32

References

Eissen, J.-P., Lefevre, C., Maillet, P., Morvan, G., and Nohara, M., 1991, Petrology and geochemistry of the central North Fiji Basin spreading centre (Southwest Pacific) between 16 degrees S and 22 degrees S: Marine Geology, v. 98, p. 201-239.

Eissen, J.-P., Nohara, M., Cotten, J., and Hirose, K., 1994, North Fiji Basin basalts and their magma sources: Part I. Incompatible element constraints: Marine Geology, v. 116, p. 153-178.

Sample	D12-1	D13-2g	D14-1	D15-1g	D16-1g	D17A-1g	D17B-1g
Rock Type	B	B	B	B	B	B	B
Mg#	49.34	49.21	59.94	51.44	59.59	54.90	58.72
La	3.56	6.05	2.34	3.21	2.35	3.33	2.25
Ce	11.36	15.69	7.56	10.49	7.24	10.18	7.33
Pr	2.06	2.68	1.33	1.84	1.29	1.81	1.31
Nd	11.99	14.63	7.73	10.74	7.36	10.32	7.73
Sm	4.32	4.87	2.82	3.73	2.61	3.55	2.77
Eu	1.53	1.63	1.04	1.36	1.03	1.29	1.04
Gd	6.39	6.88	4.12	5.50	3.94	5.14	4.16
Tb	1.16	1.22	0.75	1.01	0.71	0.93	0.76
Dy	8.04	8.33	5.25	6.98	5.03	6.52	5.32
Ho	1.75	1.82	1.14	1.52	1.10	1.41	1.16
er	5.14	5.33	3.35	4.37	3.13	4.08	3.36
Tm	0.75	0.78	0.49	0.66	0.48	0.61	0.51
Yb	4.86	5.06	3.15	4.16	2.95	3.84	3.18
Lu	0.778	0.811	0.511	0.667	0.476	0.622	0.516
Pb	1.27	4.51	0.54	0.79	0.64	0.98	0.71
Sr	71.7	99.35	75.30	82.10	84.10	82.40	71.30
Rb	1.11	1.48	0.86	1.97	1.09	1.80	0.82
Ba	11.9	30.85	8.30	10.80	10.10	12.00	7.50
Th	0.16	0.26	0.15	0.58	0.20	0.47	0.12
U	0.1	0.17	0.05	0.09	0.05	0.11	0.04
Ta	0.14	0.17	0.09	0.12	0.15	0.13	0.10
Nb	1.8	2.60	1.30	1.80	1.40	1.90	1.40
Ce	11.36	15.69	7.56	10.49	7.24	10.18	7.33
Zr	115.8	134.65	72.80	108.90	73.30	104.30	76.20
Sm	4.32	4.87	2.82	3.73	2.61	3.55	2.77
Nd	11.99	14.63	7.73	10.74	7.36	10.32	7.73
Y	46.8	49.60	30.50	42.80	30.80	40.00	32.80

Reference

Fleutelot, C., Eissen, J.P., Dosso, L., Juteau, T., Launeau, P., Bollinger, C., Cotten, J., Danyushevsky, L., and Savoyant, L., 2005, Petrogenetic variability along the North-South Propagating Spreading Center of the North Fiji Basin: Mineralogy and Petrology, v. 83, p. 55-86.

Sample	SiO2	87Sr/86Sr	143Nd/144Nd	208Pb/204Pb	207Pb/204Pb	206Pb/204Pb	Pb	Ba	Rb	Sr
D11-1A	49.8	0.702976	0.513097	37.899	15.505	18.138		17	2.3	85
D12-2g	50.3	0.702869	0.513111	37.85	15.493	18.109		8.5	1.3	72
D13-2g	49.3	0.703015	0.513089	38.359	15.569	18.485	4.505	31	1.75	100
D14-1	50.2	0.702886	0.513125	37.81	15.5	18.06	0.54	7.5	1	78
D14-2	49.5	0.70292	0.513108	37.874	15.494	18.093		13	1.6	84
D15-1g	50.5	0.702941	0.513094	37.987	15.506	18.213	0.79	10	1.9	82
D16-1g	50.3	0.703027	0.513078	37.979	15.506	18.214	0.64	9	1.3	84
D17A-1g	50.5	0.702872	0.513127	37.983	15.513	18.119	0.98	10.5	1.9	81
D17B-1g	50.1	0.702863	0.513128	37.75	15.468	18.063	0.71	6.5	0.7	68.5
D18-2	49.9	0.703086	0.513071	38.992	15.517	18.224		13	1.3	92
D19-1g	50	0.702903	0.51313	37.864	15.494	18.109	0.43	4.5	0.8	47
D20-1A	49.8	0.702906	0.513094	38.012	15.489	18.223	0.82	10	5.2	85
D20-1E	50.2	0.702884	0.513135	37.856	15.497	18.121		5	1.4	88
D22-2g	49.5	0.702962	0.513108	38.056	15.524	18.26	0.78	7	1.3	81
D24A-1g	50	0.702908	0.513109	37.826	15.481	18.119	0.87	16	2.2	83
D25-1g	49.6	0.702996	0.513105	38.104	15.53	18.278	1.07	18.5	2.2	100
D25-3	49.7	0.703111	0.513068	38.057	15.529	18.215	0.7	25	3.4	130
D27-1g	49.5	0.703005	0.5131	38.213	15.547	18.375	2.72	31	3	130

Reference

Fleutelot, C., Eissen, J.P., Dosso, L., Juteau, T., Launeau, P., Bollinger, C., Cotten, J., Danyushevsky, L., and Savoyant, L., 2005, Petrogenetic variability along the North-South Propagating Spreading Center of the North Fiji Basin: Mineralogy and Petrology, v. 83, p. 55-86.

Geochemical results from the ORSTOM cruise of 1989, data is from both the New Hebrides central chain suite (NHCC) and the high-Mg andesite suite (HMA). Samples were collected by dredge bucket (Dredge), scuba dive (SC) or as a field sample from an island (subaerial). Depth is in meters below sea level (m bsl), except where + indicates a subaerial sample. Latitude and longitude is in WGS84. Oxides are in wt %, trace element data is ppm. Gemini South volcano and Oscostar volcano were formerly known as Gemini West and Gemini East respectively.

Sample	GMW 55	GMW 54	GME 56C	GME 56A	GME 60	VSM 36A	VSM 36B	EVA35A	EVA35B	EVA35D	LP34C	LP34B	GB29B	GB29C	MT11A	MT24C	MTSM25B	HR11A	HR4B	HR10	HR15	CH19D	CH22	CH19A1	VB16A	VB11C
Suite	NHCC	NHCC	NHCC	NHCC	NHCC	NHCC	NHCC	NHCC	NHCC	NHCC	HMA	HMA	HMA	HMA	HMA	HMA	HMA	HMA	HMA	HMA	HMA	HMA	HMA	HMA	HMA	HMA
Location	Gemini Sth Volcano	Gemini Sth Volcano	Oscostar Volcano	Oscostar Volcano	Oscostar Volcano	Volsmar Volcanic Field	Volsmar Volcanic Field	Eva Seamount	Eva Seamount	Eva Seamount	La Perouse Seamount	La Perouse Seamount	Gilbert Seamount	Gilbert Seamount	Matthew Island	Matthew Island	Matthew Island	Hunter Island	Hunter Island	Hunter Island	Hunter Island	Charlotte Seamount	Charlotte Seamount	Charlotte Seamount	Vauban Seamount	Vauban Seamount
Sample type	Dredge	Sc	Dredge	Dredge	Dredge	Dredge	Dredge	Dredge	Dredge	Dredge	Dredge	Dredge	Dredge	Dredge	Subaerial	Subaerial	Dredge	Subaerial	Subaerial	Subaerial	Subaerial	Dredge	Dredge	Dredge	Dredge	Dredge
Depth m bsl	710	40	630	630	190	1700	1700	1500	1500	1500	1600	1600	800	800	+177	+177	940	+260	+260	+260	+260	850	440	850	500	1000
Longitude	170.019	170.051	170.252	170.252	170.268	170.167	170.167	170.735	170.735	170.735	171.100	171.100	171.284	171.284	171.351	171.351	171.351	172.084	172.084	172.084	172.084	171.401	171.385	171.401	171.669	171.718
Latitude	-20.9839	-21.0019	-20.9836	-20.9836	-20.9858	-21.5003	-21.5003	-21.9842	-21.9842	-21.9842	-22.3006	-22.3006	-22.2686	-22.2686	-22.3350	-22.3350	-22.3689	-22.3850	-22.3850	-22.3850	-22.3850	-22.3333	-22.3339	-22.3333	-22.4194	-22.3842
SiO2	63.43	66.28	51.10	52.22	54.09	54.14	54.83	63.31	63.76	64.90	54.88	55.29	58.41	58.95	61.80	62.22	63.11	60.95	62.01	62.56	63.87	58.25	62.83	69.21	55.05	55.76
TiO2	0.64	0.57	0.85	1.05	1.31	0.65	0.82	0.64	0.58	0.63	0.59	0.58	0.66	0.66	0.45	0.42	0.44	0.50	0.49	0.56	0.38	0.49	0.41	0.52	0.78	0.67
Al2O3	15.50	15.18	19.10	16.21	14.90	18.70	16.65	14.51	14.17	14.85	14.19	13.95	15.88	16.40	15.16	15.51	15.73	14.97	15.10	15.04	15.37	14.85	16.07	14.35	14.02	13.66
Fe2O3	1.22	1.00	1.69	1.99	2.13	1.65	1.94	1.13	1.11	1.09	1.41	1.36	1.30	1.28	1.06	1.02	1.00	1.02	1.01	0.98	0.92	1.27	1.02	0.71	1.42	1.44
FeO	6.21	5.10	8.60	10.15	10.88	8.40	9.89	5.75	5.67	5.57	7.17	6.92	6.64	6.55	5.38	5.20	5.09	5.19	5.13	5.00	4.68	6.48	5.22	3.60	7.24	7.33
MnO	0.15	0.14	0.17	0.21	0.22	0.16	0.19	0.11	0.11	0.10	0.15	0.15	0.13	0.13	0.11	0.11	0.10	0.10	0.10	0.10	0.09	0.13	0.10	0.09	0.14	0.14
MgO	2.11	1.58	4.50	5.07	4.35	3.11	3.27	3.42	3.59	2.25	8.72	8.54	5.09	4.25	4.47	3.99	3.15	5.74	5.25	4.43	3.81	5.64	3.20	1.17	7.83	8.77
CaO	5.82	4.96	11.61	10.27	8.68	9.88	8.54	6.21	6.14	5.29	9.60	9.77	7.67	7.37	6.91	6.80	6.05	6.69	6.56	6.75	6.35	8.96	6.38	3.22	8.13	7.97
Na2O	3.77	4.07	2.42	2.69	3.18	2.63	2.84	3.89	3.89	4.18	2.60	2.54	3.41	3.59	3.66	3.85	4.39	3.59	3.41	3.53	3.58	3.18	3.82	5.82	3.21	2.98
K2O	1.09	1.02	0.08	0.23	0.35	0.68	0.98	1.04	0.99	1.09	0.74	0.93	0.78	0.80	0.99	0.88	0.95	1.26	0.96	1.07	0.97	0.75	0.95	1.29	1.92	1.24
P2O5	0.20	0.20	0.05	0.08	0.12	0.15	0.25	0.10	0.10	0.15	0.10	0.12	0.15	0.15	0.10	0.08	0.08	0.10	0.08	0.08	0.08	0.10	0.08	0.10	0.41	0.20
Total	100.13	100.10	100.17	100.17	100.21	100.14	100.20	100.11	100.11	100.10	100.14	100.15	100.12	100.13	100.09	100.08	100.09	100.10	100.09	100.10	100.10	100.10	100.08	100.08	100.15	100.15
La	7.20	7.20	2.00	3.00	3.70	10.20	17.00	11.80	10.20	11.70	9.20	12.60	10.00	10.30	12.80	7.80	9.20	7.80	6.60	7.30	6.50	9.10	7.40	13.20	40.00	16.00
Nd	13.50	12.00	5.50	7.50	10.00	14.00	21.00	15.00	14.00	14.50	9.00	11.00	16.00	15.50	19.00	12.00	12.50	11.50	10.00	9.50	9.50	11.20	12.00	19.00	55.00	23.00
Eu	1.05	1.20	0.80	0.95	1.20	0.95	1.35	1.00	1.00	1.00	0.80	0.75	1.00	1.05	1.15	0.70	0.90	0.85	0.60	0.70	0.65	0.95	0.85	1.15	2.70	1.25
Dy	4.30	4.60	2.70	3.60	4.50	2.60	3.00	3.10	2.70	2.90	2.30	2.30	2.70	2.80	2.20	2.00	2.20	2.10	2.00	1.50	1.80	2.00	1.80	3.00	4.80	3.10
Er	2.90	2.80	2.10	2.50	3.10	1.90	2.30	2.20	2.10	2.10	1.50	1.50	1.90	2.00	1.60	1.60	1.40	1.60	1.30	1.30	1.40	1.50	1.70	2.20	2.80	2.20
Yb	2.55	2.85	1.80	2.20	2.75	1.60	1.80	1.80	1.85	1.85	1.20	1.30	1.50	1.50	1.25	1.25	1.40	1.25	1.20	1.00	1.20	1.20	1.30	1.75	2.05	1.55
Rb	17	16	2	5	5	9	13	12	13	14	11	13	11	11	12	10	11	22	16	18	16	10	12	11	33	19
Sr	386	340	310	284	295	562	643	345	308	318	345	404	470	481	597	432	401	354	301	323	319	505	398	320	684	432
Ba	124	138	25	50	30	110	167	153	152	154	153	125	100	96	103	197	91	131	90	100	115	85	91	155	161	116
Y	27	29	18	23	29	16	20	20	18	20	13	13	16	16	13	13	13	13	12	11	11	12	13	19	27	18
Zr	66	69	31	41	60	41	63	111	109	122	54	57	78	79	99	73	86	83	72	48	72	68	84	119	188	110
Nb	0	1	0	0	1	1	2	1	2	2	2	3	2	1	1	1	1	1	1	1	1	2	2	2	4	2
Sc	21	19	37	42	42	28	31	22	23	19	33	34	30	29	23	23	21	22	22	23	23	32	21	13	28	28
V	125	75	300	330	460	320	350	165	165	167	235	230	275	285	150	145	145	175	155	145	175	180	155	50	270	260
Cr	2	2	38	30	4	17	10	59	79	14	339	347	130	68	94	74	30	190	201	124	73	185	29	2	260	306
Ni	2	2	16	15	9	13	10	18	9	13	128	118	50	33	30	24	16	95	86	34	27	38	13	5	93	185
Cu	59	11	102	144	198	166	268	89	91	90	81	98	102	96	61	63	68	44	68	67	31	77	58	33	146	136
Co	11	6	24	30	28	22	26	13	15	12	33	30	22	17	18	18	14	21	19	16	16	22	13	3	25	33
Zn	88	93	79	93	105	85	104	63	63	64	69	68	69	69	58	55	58	57	57	55	53	65	58	69	76	74

Reference

Monzier, M., Danyushevsky, L.V., Crawford, A.J., Bellon, H., and Cotten, J., 1993, High-Mg andesites from the southern termination of the New Hebrides island arc (SW Pacific): Journal of Volcanology and Geothermal Research, v. 57, p. 193-217.

Sample	Location	$^{87}Sr/^{86}Sr$	$^{143}Nd/^{144}Nd$	$^{208}Pb/^{204}Pb$	$^{207}Pb/^{204}Pb$	$^{206}Pb/^{204}Pb$
AYC42	Anatom	0.70330		38.349	15.535	18.793
AYMAC20	Anatom	0.70317	0.513046	38.321	15.539	18.750
E11	Erromango	0.70332		38.374	15.551	18.749
E46	Erromango	0.70389		38.386	15.546	18.592
TA93*	Tanna			38.305	15.535	18.584
TAC75	Tanna	0.70329	0.513064	38.575	15.581	18.507
TAC82	Tanna	0.70360	0.513058	38.462	15.574	18.634
UA10	Ureparapara	0.70356	0.513018	38.294	15.542	18.590
UMAC4	Ureparapara	0.70349	0.513024	38.297	15.525	18.590
MLMAC23	Mota Lava	0.70357	0.513035	38.121	15.507	18.193
MLMAC43	Mota Lava	0.70349	0.513044	38.304	15.525	18.423
MOMAC3	Mota	0.70355	0.513020	38.334	15.536	18.747
MOMAC4	Mota	0.70348	0.513029	38.238	15.512	18.450
VMAC5	Vanua Lava	0.70394	0.512986	38.312	15.522	18.250
VMAC6	Vanua Lava	0.70395	0.512972	38.214	15.497	18.219
GM60	Gaua	0.70401	0.512973	38.263	15.505	18.196
GM61	Gaua			38.186	15.486	18.172
AOW1	Aoba	0.70409	0.512961	38.275	15.497	18.192
AOW25	Aoba	0.70411		38.174	15.486	18.125
AOW115	Aoba	0.70405	0.512969	38.249	15.508	18.122
AM039	Ambym	0.70430	0.512957	38.282	15.505	18.238
AM27	Ambym	0.70437	0.512897	38.388	15.527	18.344
AM39C	Ambym	0.70437	0.512896	38.391	15.527	18.346
PAM10	Paama	0.70402		38.420	15.551	18.431
PAM20	Paama	0.70399	0.512957	38.415	15.546	18.435
EPW70	Epi	0.70415		38.411	15.525	18.450
EPW99	Epi	0.70412		38.442	15.545	18.473
TOW5	Tongoa	0.70416	0.512957	38.466	15.562	18.540
NGA23	Nguna	0.70414		38.436	15.540	18.438
EA143	Efate	0.70413	0.512946	38.476	15.520	18.464
EA258	Efate	0.70416	0.512946	38.609	15.558	18.501
MLM6	Mere Lava	0.70403	0.513056	38.036	15.452	18.143
MLM7	Mere Lava	0.70415	0.513056	38.240	15.515	18.196
MLM10A	Mere Lava	0.70415	0.513048	38.235	15.505	18.215
FMAC18	Futuna	0.70326	0.513022	38.249	15.515	18.668
FMAC64	Futuna	0.70327	0.512993	38.336	15.546	18.691
VGA1	Vot Tande	0.70322	0.513025	38.318	15.519	18.708
VGA7	Vot Tande	0.70323	0.513021	38.398	15.556	18.718

Reference

Peate, D.W., Pearce, J.A., Hawkesworth, C.J., Colley, H., Edwards, C.M.H., and Hirose, K., 1997, Geochemical variations in Vanuatu Arc lavas; the role of subducted material and a variable mantle wedge composition: Journal of Petrology, v. 38, p. 1331-1358.

Sample	Location	87Sr/86Sr	143Nd/144Nd	208Pb/204Pb	207Pb/204Pb	206Pb/204Pb	Reference
10809-10	Western Pacific seds	0.70950	0.51249	38.79	15.67	18.82	1
10836-37	Western Pacific seds	0.70967	0.51237	38.98	15.72	18.94	1
10856-57	Western Pacific seds	0.71100	0.51239	38.97	15.71	18.87	1
10880-81	Western Pacific seds	0.71090	0.51239	38.82	15.67	18.75	1
10893-94	Western Pacific seds	0.71167	0.51222	38.86	15.73	19.11	1
11017-18	Western Pacific seds	0.71161	0.51223	38.85	15.66	18.63	1
11056	Western Pacific seds	0.71467	0.51230	38.87	15.67	18.66	1
11069	Western Pacific seds	0.71191	0.51238	38.95	15.69	18.61	1
11078	Western Pacific seds	0.71238	0.51234	38.90	15.68	18.59	1
11079	Western Pacific seds	0.71197	0.51235	38.90	15.70	18.83	1
11087	Western Pacific seds	0.72057	0.51232	38.26	15.58	18.56	1
MUK B4	NE Pacific seds			38.88	15.62	18.74	2
No. 48a	NE Pacific seds			38.53	15.59	18.73	2
Cusp 17	NE Pacific seds			38.93	15.64	18.77	2
LFGS 42	NE Pacific seds			39.06	15.66	19.09	2
LFGS 43	NE Pacific seds			38.73	15.63	18.91	2
MUK B31	NE Pacific seds			38.86	15.64	19.03	2
NMNH 111235/102	NE Pacific seds			38.56	15.59	18.83	2
NMNH 111227/5L	NE Pacific seds			38.8	15.63	18.82	2
NMNH 111245/95L	NE Pacific seds			38.98	15.62	18.9	2
NMNH 111247/L	NE Pacific seds			38.86	15.64	18.88	2
NMNH 111247/R	NE Pacific seds			38.78	15.62	18.89	2
NMNH 111245/95B	NE Pacific seds			37.69	15.45	18.28	2
B-68-2	NE Pacific seds			38.21	15.53	18.71	3
B-68-13	NE Pacific seds			38.43	15.55	18.9	3
GP-I	NE Pacific seds			38.62	15.61	18.89	3
SH-28-I	NE Pacific seds			38.73	15.65	18.86	3
SM-3	NE Pacific seds			39.01	15.71	19.17	3
H-68-1	NE Pacific seds			38.38	15.51	18.72	3
MS-68-6	NE Pacific seds			38.25	15.54	18.76	3
MS-68-12	NE Pacific seds			38.72	15.65	18.92	3
1.-68-1	NE Pacific seds			38.42	15.55	18.84	3
L-68-14	NE Pacific seds			38.78	15.64	18.95	3
ACW-I	NE Pacific seds			38.75	15.6	18.79	3
BCR-I	NE Pacific seds			38.68	15.62	18.8	3
AGV-1	NE Pacific seds			38.46	15.59	18.91	3
2-5,109–111	NLB - Site 286 seds	0.70605	0.51274	38.581	15.587	18.644	4
5-2,144–146	NLB - Site 286 seds	0.70775	0.512461	38.781	15.646	18.765	4
6-4,139–141	NLB - Site 286 seds	0.70398	0.51281	38.485	15.583	18.662	4
9-3,64–66	NLB - Site 286 seds	0.70701	0.512767	38.457	15.563	18.599	4
12-2,137–139	NLB - Site 286 seds	0.70759	0.512548	38.594	15.594	18.771	4
17-4,123–125	NLB - Site 286 seds	0.70359	0.513061	38.33	15.557	18.614	4
19-1,98–100	NLB - Site 286 seds	0.70422	0.512972	38.363	15.57	18.576	4
20-2,97–99	NLB - Site 286 seds	0.70376	0.513152	38.245	15.536	18.54	4
32-2,60–62	NLB - Site 286 seds	0.70416	0.51308	38.141	15.527	18.549	4
35-1,118–120	NLB - Site 286 seds	0.70698	0.51295	38.46	15.582	18.76	4

References

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Analysis No. 321

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.43	60.084	0.856	0.856	1.936	3.873	1.936	Si
TiO2	0.28	79.866	0.004	0.004	0.008	0.016	0.008	Ti
Al2O3	1.62	101.961	0.016	0.032	0.072	0.108	0.072	Al
Cr2O3	0.01	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.060	Fe^{3+}
FeO	10.77	71.844	0.150	0.150	0.339	0.339	0.279	Fe^{2+}
MnO	0.51	70.937	0.007	0.007	0.016	0.016	0.016	Mn
MgO	14.22	40.304	0.353	0.353	0.798	0.798	0.798	Mg
CaO	20.07	56.077	0.358	0.358	0.810	0.810	0.810	Ca
Na2O	0.28	61.979	0.005	0.009	0.021	0.010	0.021	Na
Total	99.19		1.748	1.768	4.000	5.970	4.000	

No of Oxygens 6 No of Cation 4
F 1.0050

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.936	0.856	0.856	60.084	51.43
TiO2	0.008	0.004	0.004	79.866	0.28
Al2O3	0.072	0.032	0.016	101.961	1.62
Cr2O3	0.000	0.000	0.000	151.990	0.01
Fe2O3	0.060	0.026	0.013	159.688	2.11
FeO	0.279	0.123	0.123	71.844	8.87
MnO	0.016	0.007	0.007	70.937	0.51
MgO	0.798	0.353	0.353	40.304	14.22
CaO	0.810	0.358	0.358	56.077	20.07
Na2O	0.021	0.009	0.005	61.979	0.28
		1.768	1.735		99.40

Check! Fe2O3 as FeO 1.90
FeO* 10.77

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.944	2
4	Tet	Al	0.056	
6	Oct	Al	0.016	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.355	
6	Oct	Mg	0.628	
8	Cubic	Mg	0.170	1
8	Cubic	Ca	0.810	
8	Cubic	Na	0.021	
			4.000	

end member*		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.90
En	Mg/(Ca+Mg+Fe2+)	42.30
Fs	Fe2+/(Ca+Mg+Fe2+)	14.80
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.211
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-4.721
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.510
		100.000

FeT/FeT+Mg 0.30
Fe2/Fe2+Mg 0.26

Analysis No. 322

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.41	60.084	0.856	0.856	1.937	3.874	1.937	Si
TiO2	0.29	79.866	0.004	0.004	0.008	0.016	0.008	Ti
Al2O3	1.45	101.961	0.014	0.028	0.064	0.096	0.064	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.067	Fe^{3+}
FeO	12.07	71.844	0.168	0.168	0.380	0.380	0.313	Fe^{2+}
MnO	0.55	70.937	0.008	0.008	0.018	0.018	0.018	Mn
MgO	13.81	40.304	0.343	0.343	0.776	0.776	0.776	Mg
CaO	19.72	56.077	0.352	0.352	0.796	0.796	0.796	Ca
Na2O	0.29	61.979	0.005	0.009	0.021	0.011	0.021	Na
Total	99.59		1.748	1.767	4.000	5.966	4.000	

No of Oxygens 6 No of Cation 4
F 1.0056

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.937	0.856	0.856	60.084	51.41
TiO2	0.008	0.004	0.004	79.866	0.29
Al2O3	0.064	0.028	0.014	101.961	1.45
Cr2O3	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.067	0.030	0.015	159.688	2.37
FeO	0.313	0.138	0.138	71.844	9.94
MnO	0.018	0.008	0.008	70.937	0.55
MgO	0.776	0.343	0.343	40.304	13.81
CaO	0.796	0.352	0.352	56.077	19.72
Na2O	0.021	0.009	0.005	61.979	0.29
		1.767	1.733		99.82

Check! Fe2O3 as FeO 2.13
FeO* 12.07

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.945	2
4	Tet	Al	0.055	
6	Oct	Al	0.009	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.398	
6	Oct	Mg	0.593	
8	Cubic	Mg	0.183	1
8	Cubic	Ca	0.796	
8	Cubic	Na	0.021	
			4.000	

end member*		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.24
En	Mg/(Ca+Mg+Fe2+)	41.15
Fs	Fe2+/(Ca+Mg+Fe2+)	16.61
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.213
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.591
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.378
		100.000

FeT/FeT+Mg 0.33
Fe2/Fe2+Mg 0.29

Analysis No. 340

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.32	60.084	0.854	0.854	1.951	3.902	1.951	Si
TiO2	0.18	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	1.26	101.961	0.012	0.025	0.056	0.084	0.056	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.050	Fe^{3+}
FeO	12.22	71.844	0.170	0.170	0.388	0.388	0.338	Fe^{2+}
MnO	0.62	70.937	0.009	0.009	0.020	0.020	0.020	Mn
MgO	13.56	40.304	0.337	0.337	0.769	0.769	0.769	Mg
CaO	19.44	56.077	0.347	0.347	0.792	0.792	0.792	Ca
Na2O	0.25	61.979	0.004	0.008	0.019	0.009	0.019	Na
Total	98.86		1.735	1.751	4.000	5.975	4.000	

No of Oxygens 6 No of Cation 4
F 1.0042

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.951	0.854	0.854	60.084	51.32
TiO2	0.005	0.002	0.002	79.866	0.18
Al2O3	0.056	0.025	0.012	101.961	1.26
Cr2O3	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.050	0.022	0.011	159.688	1.76
FeO	0.338	0.148	0.148	71.844	10.64
MnO	0.020	0.009	0.009	70.937	0.62
MgO	0.769	0.337	0.337	40.304	13.56
CaO	0.792	0.347	0.347	56.077	19.44
Na2O	0.019	0.008	0.004	61.979	0.25
		1.751	1.724		99.04

Check! Fe2O3 as FeO 1.58
FeO* 12.22

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.956	2
4	Tet	Al	0.044	
6	Oct	Al	0.012	1

end member*		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.71
En	Mg/(Ca+Mg+Fe2+)	40.48

			Fe^{3+}+Cr						
	6	Oct	$+Fe^{2+}$+Mn	0.408			Fs	Fe2+/(Ca+Mg+Fe2+)	17.81
	6	Oct	Mg	0.579				total	100.00
	8	Cubic	Mg	0.189	1				
	8	Cubic	Ca	0.792			**Sodic and Calcic CPX**		
	8	Cubic	Na	0.019			Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	6.209
				4.000			Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.901
							Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.692
									100.000
							FeT/FeT+Mg		0.34
							Fe2/Fe2+Mg		0.31

Analysis No.	341								**Calculate Fe2O3 Wt %**				
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.40	60.084	0.856	0.856	1.939	3.878	1.939	Si	1.939	0.856	0.856	60.084	51.40
TiO2	0.23	79.866	0.003	0.003	0.006	0.013	0.006	Ti	0.006	0.003	0.003	79.866	0.23
Al2O3	1.24	101.961	0.012	0.024	0.055	0.083	0.055	Al	0.055	0.024	0.012	101.961	1.24
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.074	Fe^{3+}	0.074	0.033	0.016	159.688	2.60
FeO	12.12	71.844	0.169	0.169	0.382	0.382	0.308	Fe^{2+}	0.308	0.136	0.136	71.844	9.78
MnO	0.61	70.937	0.009	0.009	0.020	0.020	0.020	Mn	0.020	0.009	0.009	70.937	0.61
MgO	13.76	40.304	0.341	0.341	0.774	0.774	0.774	Mg	0.774	0.341	0.341	40.304	13.76
CaO	19.89	56.077	0.355	0.355	0.804	0.804	0.804	Ca	0.804	0.355	0.355	56.077	19.89
Na2O	0.27	61.979	0.004	0.009	0.020	0.010	0.020	Na	0.020	0.009	0.004	61.979	0.27
Total	99.53		1.748	1.765	4.000	5.963	4.000			1.765	1.732		99.79
No of Oxygens	6		No of Cation	4					Check!	Fe2O3 as FeO	2.34		
F	1.0062									FeO*	12.12		

			Cation Site Occupancy				end	
C.N.	Site	Elements		Ideal Cations/Site			member	%
4	Tet	Si+Ti	1.945	2		**Ortho and Calcic CPX**		
4	Tet	Al	0.055			Wo	Ca/(Ca+Mg+Fe2+)	42.63
6	Oct	Al	0.001	1		En	Mg/(Ca+Mg+Fe2+)	41.02
		Fe^{3+}+Cr						
6	Oct	$+Fe^{2+}$+Mn	0.402			Fs	Fe2+/(Ca+Mg+Fe2+)	16.35
6	Oct	Mg	0.598				total	100.00
8	Cubic	Mg	0.176	1				
8	Cubic	Ca	0.804			**Sodic and Calcic CPX**		
8	Cubic	Na	0.020			Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.956
			4.000			Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.552
						Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.596
								100.000
						FeT/FeT+Mg		0.33
						Fe2/Fe2+Mg		0.29

Analysis No.	99								**Calculate Fe2O3 Wt %**				
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.02	60.084	0.833	0.833	1.860	3.720	1.860	Si	1.860	0.833	0.833	60.084	50.02
TiO2	0.29	79.866	0.004	0.004	0.008	0.016	0.008	Ti	0.008	0.004	0.004	79.866	0.29
Al2O3	4.36	101.961	0.043	0.086	0.191	0.287	0.191	Al	0.191	0.086	0.043	101.961	4.36
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.083	Fe^{3+}	0.083	0.037	0.019	159.688	2.97
FeO	6.14	71.844	0.085	0.085	0.191	0.191	0.108	Fe^{2+}	0.108	0.048	0.048	71.844	3.47
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.16
MgO	14.91	40.304	0.370	0.370	0.827	0.827	0.827	Mg	0.827	0.370	0.370	40.304	14.91
CaO	22.78	56.077	0.406	0.406	0.908	0.908	0.908	Ca	0.908	0.406	0.406	56.077	22.78
Na2O	0.14	61.979	0.002	0.005	0.010	0.005	0.010	Na	0.010	0.005	0.002	61.979	0.14
Total	98.80		1.745	1.790	4.000	5.958	4.000			1.790	1.727		99.10
No of Oxygens	6		No of Cation	4					Check!	Fe2O3 as FeO	2.67		
F	1.0070									FeO*	6.14		

			Cation Site Occupancy				end	
C.N.	Site	Elements		Ideal Cations/Site			member	%
4	Tet	Si+Ti	1.868	2		**Ortho and Calcic CPX**		
4	Tet	Al	0.132			Wo	Ca/(Ca+Mg+Fe2+)	49.27
6	Oct	Al	0.059	1		En	Mg/(Ca+Mg+Fe2+)	44.87
		Fe^{3+}+Cr						
6	Oct	$+Fe^{2+}$+Mn	0.196			Fs	Fe2+/(Ca+Mg+Fe2+)	5.86
6	Oct	Mg	0.745				total	100.00
8	Cubic	Mg	0.082	1				
8	Cubic	Ca	0.908			**Sodic and Calcic CPX**		
8	Cubic	Na	0.010			Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.043
			4.000			Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.911
						Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.868
								100.000
						FeT/FeT+Mg		0.19
						Fe2/Fe2+Mg		0.12

Analysis No.	100								**Calculate Fe2O3 Wt %**				
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	49.69	60.084	0.827	0.827	1.870	3.739	1.870	Si	1.870	0.827	0.827	60.084	49.69
TiO2	0.51	79.866	0.006	0.006	0.015	0.029	0.015	Ti	0.015	0.006	0.006	79.866	0.51
Al2O3	3.64	101.961	0.036	0.071	0.161	0.242	0.161	Al	0.161	0.071	0.036	101.961	3.64
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.089	Fe^{3+}	0.089	0.039	0.020	159.688	3.13
FeO	10.61	71.844	0.148	0.148	0.334	0.334	0.245	Fe^{2+}	0.245	0.108	0.108	71.844	7.79
MnO	0.28	70.937	0.004	0.004	0.009	0.009	0.009	Mn	0.009	0.004	0.004	70.937	0.28

MgO	14.15	40.304	0.351	0.351	0.794	0.794	0.794	Mg		0.794	0.351	0.351	40.304	14.15
CaO	19.83	56.077	0.354	0.354	0.799	0.799	0.799	Ca		0.799	0.354	0.354	56.077	19.83
Na2O	0.25	61.979	0.004	0.008	0.019	0.009	0.019	Na		0.019	0.008	0.004	61.979	0.25
Total	98.96		1.730	1.769	4.000	5.956	4.000				1.769	1.710		99.28
No of Oxygens	6		No of Cation	4						Check!	Fe2O3 as FeO	2.82			
F	1.0075										FeO*	10.61			

Cation Site Occupancy						end	
C.N.	Site	Elements		Ideal Cations/Site		member	%
4	Tet	Si+Ti	1.884	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.116		Wo	Ca/(Ca+Mg+Fe2+)	43.49
6	Oct	Al	0.046	1	En	Mg/(Ca+Mg+Fe2+)	43.18
		Fe^{3+}+Cr					
6	Oct	+Fe^{2+}+Mn	0.343		Fs	Fe2+/(Ca+Mg+Fe2+)	13.33
6	Oct	Mg	0.612			total	100.00
8	Cubic	Mg	0.182	1			
8	Cubic	Ca	0.799		**Sodic and Calcic CPX**		
8	Cubic	Na	0.019		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.851
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.578
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.728
							100.000
					FeT/FeT+Mg		0.30
					Fe2/Fe2+Mg		0.24

Analysis No.	101								**Calculate Fe2O3 Wt %**				
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.25	60.084	0.836	0.836	1.864	3.727	1.864	Si	1.864	0.836	0.836	60.084	50.25
TiO2	0.18	79.866	0.002	0.002	0.005	0.010	0.005	Ti	0.005	0.002	0.002	79.866	0.18
Al2O3	3.93	101.961	0.039	0.077	0.172	0.258	0.172	Al	0.172	0.077	0.039	101.961	3.93
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.102	Fe^{3+}	0.102	0.046	0.023	159.688	3.66
FeO	6.52	71.844	0.091	0.091	0.202	0.202	0.100	Fe^{2+}	0.100	0.045	0.045	71.844	3.23
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	15.05	40.304	0.373	0.373	0.832	0.832	0.832	Mg	0.832	0.373	0.373	40.304	15.05
CaO	22.88	56.077	0.408	0.408	0.909	0.909	0.909	Ca	0.909	0.408	0.408	56.077	22.88
Na2O	0.16	61.979	0.003	0.005	0.011	0.006	0.011	Na	0.011	0.005	0.003	61.979	0.16
Total	99.12		1.754	1.795	4.000	5.949	4.000			1.795	1.731		99.48
No of Oxygens	6		No of Cation	4					Check!	Fe2O3 as FeO	3.29		
F	1.0086									FeO*	6.52		

Cation Site Occupancy						end	
C.N.	Site	Elements		Ideal Cations/Site		member	%
4	Tet	Si+Ti	1.869	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.131		Wo	Ca/(Ca+Mg+Fe2+)	49.38
6	Oct	Al	0.040	1	En	Mg/(Ca+Mg+Fe2+)	45.19
		Fe^{3+}+Cr					
6	Oct	+Fe^{2+}+Mn	0.207		Fs	Fe2+/(Ca+Mg+Fe2+)	5.44
6	Oct	Mg	0.753			total	100.00
8	Cubic	Mg	0.080	1			
8	Cubic	Ca	0.909		**Sodic and Calcic CPX**		
8	Cubic	Na	0.011		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.094
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.872
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.778
							100.000
					FeT/FeT+Mg		0.20
					Fe2/Fe2+Mg		0.11

Analysis No.	103								**Calculate Fe2O3 Wt %**				
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	49.86	60.084	0.830	0.830	1.857	3.714	1.857	Si	1.857	0.830	0.830	60.084	49.86
TiO2	0.23	79.866	0.003	0.003	0.006	0.013	0.006	Ti	0.006	0.003	0.003	79.866	0.23
Al2O3	4.16	101.961	0.041	0.082	0.183	0.274	0.183	Al	0.183	0.082	0.041	101.961	4.16
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.099	Fe^{3+}	0.099	0.044	0.022	159.688	3.54
FeO	6.23	71.844	0.087	0.087	0.194	0.194	0.095	Fe^{2+}	0.095	0.042	0.042	71.844	3.04
MnO	0.05	70.937	0.001	0.001	0.002	0.002	0.002	Mn	0.002	0.001	0.001	70.937	0.05
MgO	14.96	40.304	0.371	0.371	0.831	0.831	0.831	Mg	0.831	0.371	0.371	40.304	14.96
CaO	23.04	56.077	0.411	0.411	0.919	0.919	0.919	Ca	0.919	0.411	0.411	56.077	23.04
Na2O	0.12	61.979	0.002	0.004	0.008	0.004	0.008	Na	0.008	0.004	0.002	61.979	0.12
Total	98.65		1.745	1.788	4.000	5.950	4.000			1.788	1.723		99.01
No of Oxygens	6		No of Cation	4					Check!	Fe2O3 as FeO	3.19		
F	1.0083									FeO*	6.23		

Cation Site Occupancy						end	
C.N.	Site	Elements		Ideal Cations/Site		member	%
4	Tet	Si+Ti	1.863	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.137		Wo	Ca/(Ca+Mg+Fe2+)	49.84
6	Oct	Al	0.046	1	En	Mg/(Ca+Mg+Fe2+)	45.02
		Fe^{3+}+Cr					
6	Oct	+Fe^{2+}+Mn	0.196		Fs	Fe2+/(Ca+Mg+Fe2+)	5.14
6	Oct	Mg	0.758			total	100.00
8	Cubic	Mg	0.072	1			
8	Cubic	Ca	0.919		**Sodic and Calcic CPX**		
8	Cubic	Na	0.008		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.700
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.787
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	99.087
							100.000

FeT/FeT+Mg	0.19
Fe2/Fe2+Mg	0.10

Analysis No. 68

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.28	60.084	0.853	0.853	1.948	3.895	1.948	Si
TiO2	0.16	79.866	0.002	0.002	0.005	0.009	0.005	Ti
Al2O3	1.45	101.961	0.014	0.028	0.065	0.097	0.065	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.049	Fe^{3+}
FeO	11.84	71.844	0.165	0.165	0.376	0.376	0.327	Fe^{2+}
MnO	0.54	70.937	0.008	0.008	0.017	0.017	0.017	Mn
MgO	13.93	40.304	0.346	0.346	0.789	0.789	0.789	Mg
CaO	19.21	56.077	0.343	0.343	0.782	0.782	0.782	Ca
Na2O	0.26	61.979	0.004	0.008	0.019	0.009	0.019	Na
Total	98.67		1.734	1.753	4.000	5.975	4.000	

No of Oxygens 6 No of Cation 4
F 1.0041

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.948	0.853	0.853	60.084	51.28
0.005	0.002	0.002	79.866	0.16
0.065	0.028	0.014	101.961	1.45
0.000	0.000	0.000	151.990	0.00
0.049	0.022	0.011	159.688	1.73
0.327	0.143	0.143	71.844	10.28
0.017	0.008	0.008	70.937	0.54
0.789	0.346	0.346	40.304	13.93
0.782	0.343	0.343	56.077	19.21
0.019	0.008	0.004	61.979	0.26
	1.753	1.724		98.84

Check! Fe2O3 as FeO 1.56
FeO* 11.84

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.952	2
4	Tet	Al	0.048	
6	Oct	Al	0.017	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.393	
6	Oct	Mg	0.589	
8	Cubic	Mg	0.199	1
8	Cubic	Ca	0.782	
8	Cubic	Na	0.019	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.21
En	Mg/(Ca+Mg+Fe2+)	41.57
Fs	Fe2+/(Ca+Mg+Fe2+)	17.22
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	6.173
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.814
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.641
		100.000

FeT/FeT+Mg	0.32
Fe2/Fe2+Mg	0.29

Analysis No. 69

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.09	60.084	0.850	0.850	1.950	3.900	1.950	Si
TiO2	0.18	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	1.49	101.961	0.015	0.029	0.067	0.100	0.067	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.039	Fe^{3+}
FeO	12.02	71.844	0.167	0.167	0.384	0.384	0.345	Fe^{2+}
MnO	0.55	70.937	0.008	0.008	0.018	0.018	0.018	Mn
MgO	13.84	40.304	0.343	0.343	0.788	0.788	0.788	Mg
CaO	18.89	56.077	0.337	0.337	0.773	0.773	0.773	Ca
Na2O	0.22	61.979	0.003	0.007	0.016	0.008	0.016	Na
Total	98.27		1.726	1.744	4.000	5.981	4.000	

No of Oxygens 6 No of Cation 4
F 1.0032

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.950	0.850	0.850	60.084	51.09
0.005	0.002	0.002	79.866	0.18
0.067	0.029	0.015	101.961	1.49
0.000	0.000	0.000	151.990	0.00
0.039	0.017	0.008	159.688	1.34
0.345	0.150	0.150	71.844	10.81
0.018	0.008	0.008	70.937	0.55
0.788	0.343	0.343	40.304	13.84
0.773	0.337	0.337	56.077	18.89
0.016	0.007	0.003	61.979	0.22
	1.744	1.718		98.41

Check! Fe2O3 as FeO 1.21
FeO* 12.02

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.955	2
4	Tet	Al	0.045	
6	Oct	Al	0.022	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.402	
6	Oct	Mg	0.576	
8	Cubic	Mg	0.211	1
8	Cubic	Ca	0.773	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.55
En	Mg/(Ca+Mg+Fe2+)	41.34
Fs	Fe2+/(Ca+Mg+Fe2+)	18.12
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.889
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-2.854
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.965
		100.000

FeT/FeT+Mg	0.33
Fe2/Fe2+Mg	0.30

Analysis No. 77

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.44	60.084	0.856	0.856	1.958	3.915	1.958	Si
TiO2	0.20	79.866	0.003	0.003	0.006	0.011	0.006	Ti
Al2O3	1.09	101.961	0.011	0.021	0.049	0.073	0.049	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.042	Fe^{3+}
FeO	11.66	71.844	0.162	0.162	0.371	0.371	0.329	Fe^{2+}
MnO	0.56	70.937	0.008	0.008	0.018	0.018	0.018	Mn
MgO	13.68	40.304	0.339	0.339	0.776	0.776	0.776	Mg
CaO	19.73	56.077	0.352	0.352	0.805	0.805	0.805	Ca
Na2O	0.24	61.979	0.004	0.008	0.018	0.009	0.018	Na
Total	98.60		1.735	1.749	4.000	5.979	4.000	

No of Oxygens 6 No of Cation 4
F 1.0035

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.958	0.856	0.856	60.084	51.44
0.006	0.003	0.003	79.866	0.20
0.049	0.021	0.011	101.961	1.09
0.000	0.000	0.000	151.990	0.00
0.042	0.018	0.009	159.688	1.47
0.329	0.144	0.144	71.844	10.34
0.018	0.008	0.008	70.937	0.56
0.776	0.339	0.339	40.304	13.68
0.805	0.352	0.352	56.077	19.73
0.018	0.008	0.004	61.979	0.24
	1.749	1.725		98.75

Check! Fe2O3 as FeO 1.32
FeO* 11.66

Cation Site Occupancy end

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.963	2
4	Tet	Al	0.037	
6	Oct	Al	0.012	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.389	
6	Oct	Mg	0.599	
8	Cubic	Mg	0.178	1
8	Cubic	Ca	0.805	
8	Cubic	Na	0.018	
			4.000	

	member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.13
En	Mg/(Ca+Mg+Fe2+)	40.64
Fs	Fe2+/(Ca+Mg+Fe2+)	17.23
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	5.126
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-2.949
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.823
		100.000
FeT/FeT+Mg		0.32
Fe2/Fe2+Mg		0.30

Analysis No. 78

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.04	60.084	0.849	0.849	1.949	3.898	1.949	Si
TiO2	0.13	79.866	0.002	0.002	0.004	0.008	0.004	Ti
Al2O3	1.22	101.961	0.012	0.024	0.055	0.082	0.055	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.059	Fe^{3+}
FeO	12.39	71.844	0.172	0.172	0.396	0.396	0.337	Fe^{2+}
MnO	0.61	70.937	0.009	0.009	0.020	0.020	0.020	Mn
MgO	13.20	40.304	0.328	0.328	0.752	0.752	0.752	Mg
CaO	19.69	56.077	0.351	0.351	0.806	0.806	0.806	Ca
Na2O	0.27	61.979	0.004	0.009	0.020	0.010	0.020	Na
Total	98.54		1.727	1.743	4.000	5.971	4.000	

No of Oxygens 6 No of Cation 4
F 1.0049

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.949	0.849	0.849	60.084	51.04
0.004	0.002	0.002	79.866	0.13
0.055	0.024	0.012	101.961	1.22
0.000	0.000	0.000	151.990	0.00
0.059	0.026	0.013	159.688	2.05
0.337	0.147	0.147	71.844	10.55
0.020	0.009	0.009	70.937	0.61
0.752	0.328	0.328	40.304	13.20
0.806	0.351	0.351	56.077	19.69
0.020	0.009	0.004	61.979	0.27
	1.743	1.714		98.75

Check! Fe2O3 as FeO 1.84
FeO* 12.39

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.953	2
4	Tet	Al	0.047	
6	Oct	Al	0.008	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.415	
6	Oct	Mg	0.577	
8	Cubic	Mg	0.175	1
8	Cubic	Ca	0.806	
8	Cubic	Na	0.020	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.54
En	Mg/(Ca+Mg+Fe2+)	39.68
Fs	Fe2+/(Ca+Mg+Fe2+)	17.78
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.135
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-4.753
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.618
		100.000
FeT/FeT+Mg		0.34
Fe2/Fe2+Mg		0.31

Analysis No. 121

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.01	60.084	0.832	0.832	1.910	3.820	1.910	Si
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti
Al2O3	0.32	101.961	0.003	0.006	0.015	0.022	0.015	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.496	Fe^{3+}
FeO	30.86	71.844	0.430	0.430	0.986	0.986	0.490	Fe^{2+}
MnO	1.57	70.937	0.022	0.022	0.051	0.051	0.051	Mn
MgO	12.89	40.304	0.320	0.320	0.734	0.734	0.734	Mg
CaO	3.29	56.077	0.059	0.059	0.135	0.135	0.135	Ca
Na2O	0.10	61.979	0.002	0.003	0.008	0.004	0.008	Na
Total	99.08		1.668	1.673	3.838	5.752	3.838	

Cation Deficiency

No of Oxygens 6 No of Cation 4
F 1.0431

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.910	0.832	0.832	60.084	50.01
0.001	0.000	0.000	79.866	0.03
0.015	0.006	0.003	101.961	0.32
0.000	0.000	0.000	151.990	0.00
0.496	0.207	0.104	159.688	16.54
0.490	0.214	0.214	71.844	15.35
0.051	0.022	0.022	70.937	1.57
0.734	0.320	0.320	40.304	12.89
0.135	0.059	0.059	56.077	3.29
0.008	0.003	0.002	61.979	0.10
	1.664	1.555		100.11

Check! Fe2O3 as FeO 14.89
FeO* 30.23

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.911	2
4	Tet	Al	0.089	
6	Oct	Al	-0.075	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	1.036	
6	Oct	Mg	0.038	
8	Cubic	Mg	0.696	1
8	Cubic	Ca	0.135	
8	Cubic	Na	0.008	
			3.838	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	9.91
En	Mg/(Ca+Mg+Fe2+)	54.02
Fs	Fe2+/(Ca+Mg+Fe2+)	36.07
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	348.404
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-343.057
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	94.653
		100.000
FeT/FeT+Mg		0.57
Fe2/Fe2+Mg		0.40

Analysis No. 214

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.53	60.084	0.858	0.858	1.911	3.823	1.911	Si
TiO2	0.31	79.866	0.004	0.004	0.009	0.017	0.009	Ti
Al2O3	1.97	101.961	0.019	0.039	0.086	0.129	0.086	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.097	Fe^{3+}
FeO	11.85	71.844	0.165	0.165	0.368	0.368	0.271	Fe^{2+}
MnO	0.50	70.937	0.007	0.007	0.016	0.016	0.016	Mn
MgO	14.61	40.304	0.362	0.362	0.808	0.808	0.808	Mg
CaO	19.63	56.077	0.350	0.350	0.780	0.780	0.780	Ca
Na2O	0.32	61.979	0.005	0.010	0.023	0.011	0.023	Na
Total	100.72		1.770	1.795	4.000	5.952	4.000	

No of Oxygens 6 No of Cation 4
F 1.0081

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.911	0.858	0.858	60.084	51.53
0.009	0.004	0.004	79.866	0.31
0.086	0.039	0.019	101.961	1.97
0.000	0.000	0.000	151.990	0.00
0.097	0.043	0.022	159.688	3.47
0.271	0.121	0.121	71.844	8.73
0.016	0.007	0.007	70.937	0.50
0.808	0.362	0.362	40.304	14.61
0.780	0.350	0.350	56.077	19.63
0.023	0.010	0.005	61.979	0.32
	1.795	1.749		101.06

Check! Fe2O3 as FeO 3.121
FeO* 11.85

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.920	2
4	Tet	Al	0.080	
6	Oct	Al	0.006	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.383	
6	Oct	Mg	0.611	
8	Cubic	Mg	0.197	1
8	Cubic	Ca	0.780	
8	Cubic	Na	0.023	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.97
En	Mg/(Ca+Mg+Fe2+)	43.46
Fs	Fe2+/(Ca+Mg+Fe2+)	14.57
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	12.058
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.220
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.162
		100.000
FeT/FeT+Mg		0.31
Fe2/Fe2+Mg		0.25

Analysis No. 215

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.65	60.084	0.860	0.860	1.908	3.815	1.908	Si
TiO2	0.27	79.866	0.003	0.003	0.007	0.015	0.007	Ti
Al2O3	2.69	101.961	0.026	0.053	0.117	0.176	0.117	Al
Cr2O3	0.04	151.990	0.000	0.000	0.001	0.002	0.001	Cr
Fe2O3	0.00	159.688					0.068	Fe^{3+}
FeO	9.72	71.844	0.135	0.135	0.300	0.300	0.232	Fe^{2+}
MnO	0.29	70.937	0.004	0.004	0.009	0.009	0.009	Mn
MgO	15.54	40.304	0.386	0.386	0.856	0.856	0.856	Mg
CaO	19.85	56.077	0.354	0.354	0.786	0.786	0.786	Ca
Na2O	0.23	61.979	0.004	0.007	0.016	0.008	0.016	Na
Total	100.27		1.772	1.802	4.000	5.966	4.000	

No of Oxygens 6 No of Cation 4
F 1.0057

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.908	0.860	0.860	60.084	51.65
0.007	0.003	0.003	79.866	0.27
0.117	0.053	0.026	101.961	2.69
0.001	0.000	0.000	151.990	0.04
0.068	0.031	0.015	159.688	2.45
0.232	0.105	0.105	71.844	7.52
0.009	0.004	0.004	70.937	0.29
0.856	0.386	0.386	40.304	15.54
0.786	0.354	0.354	56.077	19.85
0.016	0.007	0.004	61.979	0.23
	1.802	1.757		100.51

Check! Fe2O3 as FeO 2.203
FeO* 9.72

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.915	2
4	Tet	Al	0.085	
6	Oct	Al	0.032	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.310	
6	Oct	Mg	0.658	
8	Cubic	Mg	0.198	1
8	Cubic	Ca	0.786	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.93
En	Mg/(Ca+Mg+Fe2+)	45.67
Fs	Fe2+/(Ca+Mg+Fe2+)	12.39
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.487
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.444
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.957
		100.000
FeT/FeT+Mg		0.26
Fe2/Fe2+Mg		0.21

Analysis No. 216

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.64	60.084	0.843	0.843	1.875	3.751	1.875	Si
TiO2	0.32	79.866	0.004	0.004	0.009	0.018	0.009	Ti
Al2O3	3.38	101.961	0.033	0.066	0.148	0.221	0.148	Al
Cr2O3	0.06	151.990	0.000	0.001	0.002	0.003	0.002	Cr
Fe2O3	0.00	159.688					0.098	Fe^{3+}
FeO	8.79	71.844	0.122	0.122	0.272	0.272	0.175	Fe^{2+}
MnO	0.25	70.937	0.004	0.004	0.008	0.008	0.008	Mn
MgO	15.69	40.304	0.389	0.389	0.866	0.866	0.866	Mg
CaO	20.28	56.077	0.362	0.362	0.805	0.805	0.805	Ca
Na2O	0.22	61.979	0.003	0.007	0.015	0.008	0.015	Na
Total	99.62		1.761	1.798	4.000	5.951	4.000	

No of Oxygens 6 No of Cation 4
F 1.0082

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.875	0.843	0.843	60.084	50.64
0.009	0.004	0.004	79.866	0.32
0.148	0.066	0.033	101.961	3.38
0.002	0.001	0.000	151.990	0.06
0.098	0.044	0.022	159.688	3.51
0.175	0.078	0.078	71.844	5.63
0.008	0.004	0.004	70.937	0.25
0.866	0.389	0.389	40.304	15.69
0.805	0.362	0.362	56.077	20.28
0.015	0.007	0.003	61.979	0.22
	1.798	1.739		99.97

Check! Fe2O3 as FeO 3.16
FeO* 8.79

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.884	2
4	Tet	Al	0.116	
6	Oct	Al	0.032	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.282	
6	Oct	Mg	0.686	
8	Cubic	Mg	0.180	1
8	Cubic	Ca	0.805	
8	Cubic	Na	0.015	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.60
En	Mg/(Ca+Mg+Fe2+)	46.94
Fs	Fe2+/(Ca+Mg+Fe2+)	9.46
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.915
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-10.032

Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.117
		100.000
FeT/FeT+Mg		0.24
Fe2/Fe2+Mg		0.17

Analysis No. 217

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.82	60.084	0.862	0.862	1.911	3.822	1.911	Si	1.911	0.862	0.862	60.084	51.82
TiO2	0.25	79.866	0.003	0.003	0.007	0.014	0.007	Ti	0.007	0.003	0.003	79.866	0.25
Al2O3	2.26	101.961	0.022	0.044	0.098	0.147	0.098	Al	0.098	0.044	0.022	101.961	2.26
Cr2O3	0.03	151.990	0.000	0.000	0.001	0.001	0.001	Cr	0.001	0.000	0.000	151.990	0.03
Fe2O3	0.00	159.688					0.087	Fe^{3+}	0.087	0.039	0.020	159.688	3.12
FeO	10.19	71.844	0.142	0.142	0.314	0.314	0.228	Fe^{2+}	0.228	0.103	0.103	71.844	7.38
MnO	0.31	70.937	0.004	0.004	0.010	0.010	0.010	Mn	0.010	0.004	0.004	70.937	0.31
MgO	15.44	40.304	0.383	0.383	0.849	0.849	0.849	Mg	0.849	0.383	0.383	40.304	15.44
CaO	19.97	56.077	0.356	0.356	0.789	0.789	0.789	Ca	0.789	0.356	0.356	56.077	19.97
Na2O	0.30	61.979	0.005	0.010	0.021	0.011	0.021	Na	0.021	0.010	0.005	61.979	0.30
Total	100.57		1.778	1.805	4.000	5.957	4.000			1.805	1.759		100.88

No of Oxygens 6 No of Cation 4
F 1.0073

Check! Fe2O3 as FeO 2.81
FeO* 10.19

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.918	2
4	Tet	Al	0.082	
6	Oct	Al	0.016	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.325	
6	Oct	Mg	0.659	
8	Cubic	Mg	0.190	1
8	Cubic	Ca	0.789	
8	Cubic	Na	0.021	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.29
En	Mg/(Ca+Mg+Fe2+)	45.50
Fs	Fe2+/(Ca+Mg+Fe2+)	12.21
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.678
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.041
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.363
		100.000
FeT/FeT+Mg		0.27
Fe2/Fe2+Mg		0.21

Analysis No. 218

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.08	60.084	0.850	0.850	1.902	3.804	1.902	Si	1.902	0.850	0.850	60.084	51.08
TiO2	0.32	79.866	0.004	0.004	0.009	0.018	0.009	Ti	0.009	0.004	0.004	79.866	0.32
Al2O3	2.65	101.961	0.026	0.052	0.116	0.174	0.116	Al	0.116	0.052	0.026	101.961	2.65
Cr2O3	0.06	151.990	0.000	0.001	0.002	0.003	0.002	Cr	0.002	0.001	0.000	151.990	0.06
Fe2O3	0.00	159.688					0.076	Fe^{3+}	0.076	0.034	0.017	159.688	2.71
FeO	8.78	71.844	0.122	0.122	0.273	0.273	0.197	Fe^{2+}	0.197	0.088	0.088	71.844	6.34
MnO	0.31	70.937	0.004	0.004	0.010	0.010	0.010	Mn	0.010	0.004	0.004	70.937	0.31
MgO	15.89	40.304	0.394	0.394	0.882	0.882	0.882	Mg	0.882	0.394	0.394	40.304	15.89
CaO	19.81	56.077	0.353	0.353	0.790	0.790	0.790	Ca	0.790	0.353	0.353	56.077	19.81
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.22
Total	99.12		1.758	1.788	4.000	5.962	4.000			1.788	1.741		99.39

No of Oxygens 6 No of Cation 4
F 1.0064

Check! Fe2O3 as FeO 2.44
FeO* 8.78

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.911	2
4	Tet	Al	0.089	
6	Oct	Al	0.027	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.285	
6	Oct	Mg	0.688	
8	Cubic	Mg	0.194	1
8	Cubic	Ca	0.790	
8	Cubic	Na	0.016	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.27
En	Mg/(Ca+Mg+Fe2+)	47.17
Fs	Fe2+/(Ca+Mg+Fe2+)	10.56
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.435
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.484
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.049
		100.000
FeT/FeT+Mg		0.24
Fe2/Fe2+Mg		0.18

Analysis No. 233

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.13	60.084	0.851	0.851	1.915	3.831	1.915	Si	1.915	0.851	0.851	60.084	51.13
TiO2	0.35	79.866	0.004	0.004	0.010	0.020	0.010	Ti	0.010	0.004	0.004	79.866	0.35
Al2O3	1.80	101.961	0.018	0.035	0.080	0.120	0.080	Al	0.080	0.035	0.018	101.961	1.80
Cr2O3	0.04	151.990	0.000	0.001	0.001	0.002	0.001	Cr	0.001	0.001	0.000	151.990	0.04
Fe2O3	0.00	159.688					0.089	Fe^{3+}	0.089	0.040	0.020	159.688	3.16
FeO	10.61	71.844	0.148	0.148	0.332	0.332	0.243	Fe^{2+}	0.243	0.108	0.108	71.844	7.77
MnO	0.44	70.937	0.006	0.006	0.014	0.014	0.014	Mn	0.014	0.006	0.006	70.937	0.44
MgO	14.53	40.304	0.361	0.361	0.811	0.811	0.811	Mg	0.811	0.361	0.361	40.304	14.53
CaO	20.33	56.077	0.363	0.363	0.816	0.816	0.816	Ca	0.816	0.363	0.363	56.077	20.33
Na2O	0.28	61.979	0.005	0.009	0.020	0.010	0.020	Na	0.020	0.009	0.005	61.979	0.28
Total	99.51		1.755	1.777	4.000	5.955	4.000			1.777	1.735		99.83

No of Oxygens 6 No of Cation 4
F 1.0075

Check! Fe2O3 as FeO 2.84
FeO* 10.61

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.925	2
4	Tet	Al	0.075	
6	Oct	Al	0.005	1

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.62
En	Mg/(Ca+Mg+Fe2+)	43.38

		Fe^{3+}+Cr +					
6	Oct	Fe^{2+}+ Mn	0.348		Fs	Fe2+/(Ca+Mg+Fe2+)	13.01
6	Oct	Mg	0.648			total	100.00
8	Cubic	Mg	0.164	1			
8	Cubic	Ca	0.816		**Sodic and Calcic CPX**		
8	Cubic	Na	0.020		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.654
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.231
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.577
							100.000
					FeT/FeT+Mg		0.29
					Fe2/Fe2+Mg		0.23

Analysis No. 234

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.42	60.084	0.839	0.839	1.863	3.726	1.863	Si	1.863	0.839	0.839	60.084	50.42
TiO2	0.35	79.866	0.004	0.004	0.010	0.019	0.010	Ti	0.010	0.004	0.004	79.866	0.35
Al2O3	4.04	101.961	0.040	0.079	0.176	0.264	0.176	Al	0.176	0.079	0.040	101.961	4.04
Cr2O3	0.06	151.990	0.000	0.001	0.002	0.003	0.002	Cr	0.002	0.001	0.000	151.990	0.06
Fe2O3	0.00	159.688					0.093	Fe^{3+}	0.093	0.042	0.021	159.688	3.34
FeO	7.65	71.844	0.106	0.106	0.236	0.236	0.144	Fe^{2+}	0.144	0.065	0.065	71.844	4.65
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.16
MgO	15.30	40.304	0.380	0.380	0.843	0.843	0.843	Mg	0.843	0.380	0.380	40.304	15.30
CaO	21.47	56.077	0.383	0.383	0.850	0.850	0.850	Ca	0.850	0.383	0.383	56.077	21.47
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.22
Total	99.66		1.758	1.802	4.000	5.954	4.000			1.802	1.737		100.00

No of Oxygen: 6 No of Cation 4

F 1.0078

Check! Fe2O3 as FeO 3.00

FeO* 7.65

Calculate Fe2O3 Wt %

C.N.	Site	Elements		Ideal Cations/Site	end member		%
		Cation Site Occupancy					
4	Tet	Si+Ti	1.873	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.127		Wo	Ca/(Ca+Mg+Fe2+)	46.29
6	Oct	Al	0.049	1	En	Mg/(Ca+Mg+Fe2+)	45.89
		Fe^{3+}+Cr +					
6	Oct	Fe^{2+}+ Mn	0.243		Fs	Fe2+/(Ca+Mg+Fe2+)	7.82
6	Oct	Mg	0.708			total	100.00
8	Cubic	Mg	0.134	1			
8	Cubic	Ca	0.850		**Sodic and Calcic CPX**		
8	Cubic	Na	0.016		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.724
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.911
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.187
							100.000
					FeT/FeT+Mg		0.22
					Fe2/Fe2+Mg		0.15

Analysis No. 235

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.29	60.084	0.854	0.854	1.927	3.854	1.927	Si	1.927	0.854	0.854	60.084	51.29
TiO2	0.36	79.866	0.004	0.004	0.010	0.020	0.010	Ti	0.010	0.004	0.004	79.866	0.36
Al2O3	1.71	101.961	0.017	0.034	0.076	0.114	0.076	Al	0.076	0.034	0.017	101.961	1.71
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.074	Fe^{3+}	0.074	0.033	0.016	159.688	2.60
FeO	11.26	71.844	0.157	0.157	0.354	0.354	0.280	Fe^{2+}	0.280	0.124	0.124	71.844	8.92
MnO	0.48	70.937	0.007	0.007	0.015	0.015	0.015	Mn	0.015	0.007	0.007	70.937	0.48
MgO	14.36	40.304	0.356	0.356	0.804	0.804	0.804	Mg	0.804	0.356	0.356	40.304	14.36
CaO	19.61	56.077	0.350	0.350	0.789	0.789	0.789	Ca	0.789	0.350	0.350	56.077	19.61
Na2O	0.33	61.979	0.005	0.011	0.024	0.012	0.024	Na	0.024	0.011	0.005	61.979	0.33
Total	99.40		1.750	1.772	4.000	5.963	4.000			1.772	1.733		99.66

No of Oxygen: 6 No of Cation 4

F 1.0062

Check! Fe2O3 as FeO 2.34

FeO* 11.26

Calculate Fe2O3 Wt %

C.N.	Site	Elements		Ideal Cations/Site	end member		%
		Cation Site Occupancy					
4	Tet	Si+Ti	1.937	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.063		Wo	Ca/(Ca+Mg+Fe2+)	42.13
6	Oct	Al	0.013	1	En	Mg/(Ca+Mg+Fe2+)	42.92
		Fe^{3+}+Cr +					
6	Oct	Fe^{2+}+ Mn	0.369		Fs	Fe2+/(Ca+Mg+Fe2+)	14.95
6	Oct	Mg	0.618			total	100.00
8	Cubic	Mg	0.187	1			
8	Cubic	Ca	0.789		**Sodic and Calcic CPX**		
8	Cubic	Na	0.024		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.048
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.108
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.060
							100.000
					FeT/FeT+Mg		0.31
					Fe2/Fe2+Mg		0.26

Analysis No. 244

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.25	60.084	0.853	0.853	1.904	3.809	1.904	Si	1.904	0.853	0.853	60.084	51.25
TiO2	0.27	79.866	0.003	0.003	0.008	0.015	0.008	Ti	0.008	0.003	0.003	79.866	0.27
Al2O3	2.08	101.961	0.020	0.041	0.091	0.137	0.091	Al	0.091	0.041	0.020	101.961	2.08
Cr2O3	0.04	151.990	0.000	0.000	0.001	0.002	0.001	Cr	0.001	0.000	0.000	151.990	0.04
Fe2O3	0.00	159.688					0.104	Fe^{3+}	0.104	0.047	0.023	159.688	3.72
FeO	10.97	71.844	0.153	0.153	0.341	0.341	0.237	Fe^{2+}	0.237	0.106	0.106	71.844	7.62
MnO	0.40	70.937	0.006	0.006	0.012	0.012	0.012	Mn	0.012	0.006	0.006	70.937	0.40
MgO	15.18	40.304	0.377	0.377	0.841	0.841	0.841	Mg	0.841	0.377	0.377	40.304	15.18
CaO	19.62	56.077	0.350	0.350	0.781	0.781	0.781	Ca	0.781	0.350	0.350	56.077	19.62
Na2O	0.28	61.979	0.005	0.009	0.020	0.010	0.020	Na	0.020	0.009	0.005	61.979	0.28
Total	100.08		1.766	1.792	4.000	5.948	4.000			1.792	1.743		100.46

Oxygen Unit Deficiency

No of Oxygen: 6 No of Cation 4

F 1.0088

Check! Fe2O3 as FeO 3.35

FeO* 10.97

Calculate Fe2O3 Wt %

Cation Site Occupancy						end	
C.N.	Site	Elements		Ideal Cations/Site		member	%
4	Tet	Si+Ti	1.912	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.088		Wo	Ca/(Ca+Mg+Fe2+)	42.02
6	Oct	Al	0.003	1	En	Mg/(Ca+Mg+Fe2+)	45.24
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.354		Fs	Fe2+/(Ca+Mg+Fe2+)	12.74
6	Oct	Mg	0.642			total	100.00
8	Cubic	Mg	0.199	1			
8	Cubic	Ca	0.781		**Sodic and Calcic CPX**		
8	Cubic	Na	0.020		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	12.993
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-10.459
					Diopside	Ca(Fe3+ +(Na-Fe3+)+	97.467
							100.000
					FeT/FeT+Mg		0.29
					Fe2/Fe2+Mg		0.22

Analysis No.	245								**Calculate Fe2O3 Wt %**				
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.46	60.084	0.856	0.856	1.909	3.818	1.909	Si	1.909	0.856	0.856	60.084	51.46
TiO2	0.28	79.866	0.004	0.004	0.008	0.016	0.008	Ti	0.008	0.004	0.004	79.866	0.28
Al2O3	2.31	101.961	0.023	0.045	0.101	0.152	0.101	Al	0.101	0.045	0.023	101.961	2.31
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr	0.001	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.080	Fe^{3+}	0.080	0.036	0.018	159.688	2.86
FeO	10.18	71.844	0.142	0.142	0.316	0.316	0.236	Fe^{2+}	0.236	0.106	0.106	71.844	7.60
MnO	0.31	70.937	0.004	0.004	0.010	0.010	0.010	Mn	0.010	0.004	0.004	70.937	0.31
MgO	16.41	40.304	0.407	0.407	0.908	0.908	0.908	Mg	0.908	0.407	0.407	40.304	16.41
CaO	18.42	56.077	0.328	0.328	0.732	0.732	0.732	Ca	0.732	0.328	0.328	56.077	18.42
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.22
Total	99.62		1.768	1.794	4.000	5.960	4.000			1.794	1.750		99.90
No of Oxygen:	6		No of Cation	4					Check!	Fe2O3 as FeO	2.58		
F	1.0067									FeO*	10.18		

Cation Site Occupancy						end	
C.N.	Site	Elements		Ideal Cations/Site		member	%
4	Tet	Si+Ti	1.917	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.083		Wo	Ca/(Ca+Mg+Fe2+)	39.04
6	Oct	Al	0.018	1	En	Mg/(Ca+Mg+Fe2+)	48.39
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.326		Fs	Fe2+/(Ca+Mg+Fe2+)	12.58
6	Oct	Mg	0.656			total	100.00
8	Cubic	Mg	0.252	1			
8	Cubic	Ca	0.732		**Sodic and Calcic CPX**		
8	Cubic	Na	0.016		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.684
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.587
					Diopside	Ca(Fe3+ +(Na-Fe3+)+	97.903
							100.000
					FeT/FeT+Mg		0.26
					Fe2/Fe2+Mg		0.21

Analysis No.	247								**Calculate Fe2O3 Wt %**				
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.31	60.084	0.854	0.854	1.927	3.853	1.927	Si	1.927	0.854	0.854	60.084	51.31
TiO2	0.31	79.866	0.004	0.004	0.009	0.017	0.009	Ti	0.009	0.004	0.004	79.866	0.31
Al2O3	1.64	101.961	0.016	0.032	0.073	0.109	0.073	Al	0.073	0.032	0.016	101.961	1.64
Cr2O3	0.02	151.990	0.000	0.000	0.000	0.001	0.000	Cr	0.000	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.075	Fe^{3+}	0.075	0.033	0.017	159.688	2.66
FeO	10.45	71.844	0.145	0.145	0.328	0.328	0.253	Fe^{2+}	0.253	0.112	0.112	71.844	8.06
MnO	0.45	70.937	0.006	0.006	0.014	0.014	0.014	Mn	0.014	0.006	0.006	70.937	0.45
MgO	14.85	40.304	0.368	0.368	0.831	0.831	0.831	Mg	0.831	0.368	0.368	40.304	14.85
CaO	19.85	56.077	0.354	0.354	0.799	0.799	0.799	Ca	0.799	0.354	0.354	56.077	19.85
Na2O	0.26	61.979	0.004	0.008	0.019	0.010	0.019	Na	0.019	0.008	0.004	61.979	0.26
Total	99.14		1.753	1.773	4.000	5.962	4.000			1.773	1.736		99.41
No of Oxygen:	6		No of Cation	4					Check!	Fe2O3 as FeO	2.39		
F	1.0063									FeO*	10.45		

Cation Site Occupancy						end	
C.N.	Site	Elements		Ideal Cations/Site		member	%
4	Tet	Si+Ti	1.935	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.065		Wo	Ca/(Ca+Mg+Fe2+)	42.41
6	Oct	Al	0.008	1	En	Mg/(Ca+Mg+Fe2+)	44.15
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.343		Fs	Fe2+/(Ca+Mg+Fe2+)	13.44
6	Oct	Mg	0.649			total	100.00
8	Cubic	Mg	0.182	1			
8	Cubic	Ca	0.799		**Sodic and Calcic CPX**		
8	Cubic	Na	0.019		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.192
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.859
					Diopside	Ca(Fe3+ +(Na-Fe3+)+	97.667
							100.000
					FeT/FeT+Mg		0.28
					Fe2/Fe2+Mg		0.23

Analysis No.	248								**Calculate Fe2O3 Wt %**				
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.96	60.084	0.848	0.848	1.911	3.823	1.911	Si	1.911	0.848	0.848	60.084	50.96
TiO2	0.35	79.866	0.004	0.004	0.010	0.020	0.010	Ti	0.010	0.004	0.004	79.866	0.35
Al2O3	1.88	101.961	0.018	0.037	0.083	0.125	0.083	Al	0.083	0.037	0.018	101.961	1.88
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr	0.001	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.096	Fe^{3+}	0.096	0.043	0.021	159.688	3.39
FeO	11.56	71.844	0.161	0.161	0.363	0.363	0.267	Fe^{2+}	0.267	0.118	0.118	71.844	8.51
MnO	0.47	70.937	0.007	0.007	0.015	0.015	0.015	Mn	0.015	0.007	0.007	70.937	0.47

MgO	14.33	40.304	0.356	0.356	0.801	0.801	0.801	Mg		0.801	0.356	0.356	40.304	14.33
CaO	19.76	56.077	0.352	0.352	0.794	0.794	0.794	Ca		0.794	0.352	0.352	56.077	19.76
Na2O	0.30	61.979	0.005	0.010	0.022	0.011	0.022	Na		0.022	0.010	0.005	61.979	0.30
Total	99.63		1.751	1.775	4.000	5.952	4.000				1.775	1.730		99.97

No of Oxygens 6 No of Cation 4

F 1.0080

Check! Fe2O3 as FeO 3.05

FeO* 11.56

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.921	2
4	Tet	Al	0.079	
6	Oct	Al	0.004	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.378	
6	Oct	Mg	0.618	
8	Cubic	Mg	0.184	1
8	Cubic	Ca	0.794	
8	Cubic	Na	0.022	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.64
En	Mg/(Ca+Mg+Fe2+)	43.03
Fs	Fe2+/(Ca+Mg+Fe2+)	14.33
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.737
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.034
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.297
		100.000

FeT/FeT+Mg 0.31

Fe2/Fe2+Mg 0.25

Analysis No. 264

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.45	60.084	0.856	0.856	1.922	3.844	1.922	Si	1.922	0.856	0.856	60.084	51.45
TiO2	0.32	79.866	0.004	0.004	0.009	0.018	0.009	Ti	0.009	0.004	0.004	79.866	0.32
Al2O3	1.58	101.961	0.016	0.031	0.070	0.105	0.070	Al	0.070	0.031	0.016	101.961	1.58
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.089	Fe^{3+}	0.089	0.040	0.020	159.688	3.18
FeO	10.84	71.844	0.151	0.151	0.339	0.339	0.249	Fe^{2+}	0.249	0.111	0.111	71.844	7.98
MnO	0.43	70.937	0.006	0.006	0.014	0.014	0.014	Mn	0.014	0.006	0.006	70.937	0.43
MgO	14.97	40.304	0.371	0.371	0.834	0.834	0.834	Mg	0.834	0.371	0.371	40.304	14.97
CaO	19.80	56.077	0.353	0.353	0.793	0.793	0.793	Ca	0.793	0.353	0.353	56.077	19.80
Na2O	0.29	61.979	0.005	0.009	0.021	0.010	0.021	Na	0.021	0.009	0.005	61.979	0.29
Total	99.68		1.762	1.782	4.000	5.955	4.000			1.782	1.742		100.00

No of Oxygens 6 No of Cation 4

F 1.0075

Check! Fe2O3 as FeO 2.86

FeO* 10.84

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.931	2
4	Tet	Al	0.069	
6	Oct	Al	0.001	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.352	
6	Oct	Mg	0.647	
8	Cubic	Mg	0.187	1
8	Cubic	Ca	0.793	
8	Cubic	Na	0.021	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.25
En	Mg/(Ca+Mg+Fe2+)	44.45
Fs	Fe2+/(Ca+Mg+Fe2+)	13.30
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.978
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.406
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.428
		100.000

FeT/FeT+Mg 0.29

Fe2/Fe2+Mg 0.23

Analysis No. 265

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.29	60.084	0.854	0.854	1.925	3.851	1.925	Si	1.925	0.854	0.854	60.084	51.29
TiO2	0.33	79.866	0.004	0.004	0.009	0.019	0.009	Ti	0.009	0.004	0.004	79.866	0.33
Al2O3	1.64	101.961	0.016	0.032	0.073	0.109	0.073	Al	0.073	0.032	0.016	101.961	1.64
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.077	Fe^{3+}	0.077	0.034	0.017	159.688	2.74
FeO	11.48	71.844	0.160	0.160	0.360	0.360	0.283	Fe^{2+}	0.283	0.126	0.126	71.844	9.02
MnO	0.55	70.937	0.008	0.008	0.017	0.017	0.017	Mn	0.017	0.008	0.008	70.937	0.55
MgO	14.35	40.304	0.356	0.356	0.803	0.803	0.803	Mg	0.803	0.356	0.356	40.304	14.35
CaO	19.71	56.077	0.351	0.351	0.793	0.793	0.793	Ca	0.793	0.351	0.351	56.077	19.71
Na2O	0.26	61.979	0.004	0.009	0.019	0.010	0.019	Na	0.019	0.009	0.004	61.979	0.26
Total	99.61		1.753	1.774	4.000	5.961	4.000			1.774	1.736		99.89

No of Oxygens 6 No of Cation 4

F 1.0065

Check! Fe2O3 as FeO 2.46

FeO* 11.48

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.935	2
4	Tet	Al	0.065	
6	Oct	Al	0.007	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.378	
6	Oct	Mg	0.615	
8	Cubic	Mg	0.188	1
8	Cubic	Ca	0.793	
8	Cubic	Na	0.019	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.19
En	Mg/(Ca+Mg+Fe2+)	42.74
Fs	Fe2+/(Ca+Mg+Fe2+)	15.07
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.524
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.153
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.629
		100.000

FeT/FeT+Mg 0.31

Fe2/Fe2+Mg 0.26

Analysis No. 280

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	Atom Units	Cation Units	Moles	MW	Wt %

Calculate Fe2O3 Wt %

SiO2	50.89	60.084	0.847	0.847	1.925	3.849	1.925	Si	1.925	0.847	0.847	60.084	50.89
TiO2	0.30	79.866	0.004	0.004	0.009	0.017	0.009	Ti	0.009	0.004	0.004	79.866	0.30
Al2O3	1.65	101.961	0.016	0.032	0.074	0.110	0.074	Al	0.074	0.032	0.016	101.961	1.65
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.084	Fe^{3+}	0.084	0.037	0.019	159.688	2.96
FeO	11.63	71.844	0.162	0.162	0.368	0.368	0.284	Fe^{2+}	0.284	0.125	0.125	71.844	8.97
MnO	0.51	70.937	0.007	0.007	0.016	0.016	0.016	Mn	0.016	0.007	0.007	70.937	0.51
MgO	14.19	40.304	0.352	0.352	0.800	0.800	0.800	Mg	0.800	0.352	0.352	40.304	14.19
CaO	19.37	56.077	0.345	0.345	0.785	0.785	0.785	Ca	0.785	0.345	0.345	56.077	19.37
Na2O	0.33	61.979	0.005	0.011	0.024	0.012	0.024	Na	0.024	0.011	0.005	61.979	0.33
Total	98.88		1.739	1.760	4.000	5.958	4.000			1.760	1.720		99.17

No of Oxygens: 6 No of Cation 4

F 1.0071

Check! Fe2O3 as FeO 2.66

FeO* 11.63

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.933	2
4	Tet	Al	0.067	
6	Oct	Al	0.007	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.384	
6	Oct	Mg	0.609	
8	Cubic	Mg	0.191	1
8	Cubic	Ca	0.785	
8	Cubic	Na	0.024	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.00
En	Mg/(Ca+Mg+Fe2+)	42.81
Fs	Fe2+/(Ca+Mg+Fe2+)	15.18
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.404
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.423
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.019
		100.000

FeT/FeT+Mg 0.31

Fe2/Fe2+Mg 0.26

Analysis No. 281

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.33	60.084	0.854	0.854	1.924	3.848	1.924	Si	1.924	0.854	0.854	60.084	51.33
TiO2	0.28	79.866	0.003	0.003	0.008	0.016	0.008	Ti	0.008	0.003	0.003	79.866	0.28
Al2O3	1.82	101.961	0.018	0.036	0.080	0.121	0.080	Al	0.080	0.036	0.018	101.961	1.82
Cr2O3	0.01	151.990	0.000	0.000	0.000	0.001	0.000	Cr	0.000	0.000	0.000	151.990	0.01
Fe2O3	0.00	159.688					0.076	Fe^{3+}	0.076	0.034	0.017	159.688	2.71
FeO	10.13	71.844	0.141	0.141	0.318	0.318	0.241	Fe^{2+}	0.241	0.107	0.107	71.844	7.70
MnO	0.34	70.937	0.005	0.005	0.011	0.011	0.011	Mn	0.011	0.005	0.005	70.937	0.34
MgO	15.02	40.304	0.373	0.373	0.839	0.839	0.839	Mg	0.839	0.373	0.373	40.304	15.02
CaO	19.91	56.077	0.355	0.355	0.800	0.800	0.800	Ca	0.800	0.355	0.355	56.077	19.91
Na2O	0.28	61.979	0.005	0.009	0.021	0.010	0.021	Na	0.021	0.009	0.005	61.979	0.28
Total	99.12		1.754	1.776	4.000	5.962	4.000			1.776	1.737		99.39

Calculate Fe2O3 Wt %

No of Oxygens: 6 No of Cation 4

F 1.0064

Check! Fe2O3 as FeO 2.43

FeO* 10.13

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.932	2
4	Tet	Al	0.068	
6	Oct	Al	0.012	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.329	
6	Oct	Mg	0.659	
8	Cubic	Mg	0.180	1
8	Cubic	Ca	0.800	
8	Cubic	Na	0.021	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.53
En	Mg/(Ca+Mg+Fe2+)	44.64
Fs	Fe2+/(Ca+Mg+Fe2+)	12.83
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.307
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.806
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.499
		100.000

FeT/FeT+Mg 0.27

Fe2/Fe2+Mg 0.22

Analysis No. 287

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.64	60.084	0.859	0.859	1.922	3.843	1.922	Si	1.922	0.859	0.859	60.084	51.64
TiO2	0.11	79.866	0.001	0.001	0.003	0.006	0.003	Ti	0.003	0.001	0.001	79.866	0.11
Al2O3	2.24	101.961	0.022	0.044	0.098	0.147	0.098	Al	0.098	0.044	0.022	101.961	2.24
Cr2O3	0.37	151.990	0.002	0.005	0.011	0.016	0.011	Cr	0.011	0.005	0.002	151.990	0.37
Fe2O3	0.00	159.688					0.050	Fe^{3+}	0.050	0.023	0.011	159.688	1.80
FeO	4.93	71.844	0.069	0.069	0.153	0.153	0.103	Fe^{2+}	0.103	0.046	0.046	71.844	3.31
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	16.87	40.304	0.419	0.419	0.936	0.936	0.936	Mg	0.936	0.419	0.419	40.304	16.87
CaO	21.65	56.077	0.386	0.386	0.863	0.863	0.863	Ca	0.863	0.386	0.386	56.077	21.65
Na2O	0.12	61.979	0.002	0.004	0.009	0.004	0.009	Na	0.009	0.004	0.002	61.979	0.12
Total	98.08		1.763	1.789	4.000	5.975	4.000			1.789	1.751		98.26

Calculate Fe2O3 Wt %

No of Oxygens: 6 No of Cation 4

F 1.0042

Check! Fe2O3 as FeO 1.62

FeO* 4.93

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.925	2
4	Tet	Al	0.075	
6	Oct	Al	0.023	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.169	
6	Oct	Mg	0.808	
8	Cubic	Mg	0.128	1
8	Cubic	Ca	0.863	
8	Cubic	Na	0.009	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.38
En	Mg/(Ca+Mg+Fe2+)	49.20
Fs	Fe2+/(Ca+Mg+Fe2+)	5.41
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	5.787
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-4.760
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.973
		100.000

FeT/FeT+Mg	0.14
Fe2/Fe2+Mg	0.10

Analysis No. 288

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.46	60.084	0.856	0.856	1.901	3.803	1.901	Si	1.901	0.856	0.856	60.084	51.46
TiO2	0.13	79.866	0.002	0.002	0.004	0.007	0.004	Ti	0.004	0.002	0.002	79.866	0.13
Al2O3	2.73	101.961	0.027	0.054	0.119	0.178	0.119	Al	0.119	0.054	0.027	101.961	2.73
Cr2O3	0.63	151.990	0.004	0.008	0.018	0.028	0.018	Cr	0.018	0.008	0.004	151.990	0.63
Fe2O3	0.00	159.688					0.065	Fe^{3+}	0.065	0.029	0.015	159.688	2.34
FeO	4.30	71.844	0.060	0.060	0.133	0.133	0.068	Fe^{2+}	0.068	0.031	0.031	71.844	2.19
MnO	0.12	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.12
MgO	16.53	40.304	0.410	0.410	0.911	0.911	0.911	Mg	0.911	0.410	0.410	40.304	16.53
CaO	22.68	56.077	0.404	0.404	0.898	0.898	0.898	Ca	0.898	0.404	0.404	56.077	22.68
Na2O	0.18	61.979	0.003	0.006	0.013	0.006	0.013	Na	0.013	0.006	0.003	61.979	0.18
Total	98.76		1.768	1.802	4.000	5.967	4.000			1.802	1.753		98.99

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Cation 4
F 1.0055

Check! Fe2O3 as FeO 2.11
FeO* 4.30

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.905	2
4	Tet	Al	0.095	
6	Oct	Al	0.024	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.155	
6	Oct	Mg	0.821	
8	Cubic	Mg	0.090	1
8	Cubic	Ca	0.898	
8	Cubic	Na	0.013	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	47.86
En	Mg/(Ca+Mg+Fe2+)	48.53
Fs	Fe2+/(Ca+Mg+Fe2+)	3.61
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.153
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.768
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.615
		100.000

FeT/FeT+Mg	0.13
Fe2/Fe2+Mg	0.07

Analysis No. 289

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.83	60.084	0.863	0.863	1.918	3.836	1.918	Si	1.918	0.863	0.863	60.084	51.83
TiO2	0.14	79.866	0.002	0.002	0.004	0.008	0.004	Ti	0.004	0.002	0.002	79.866	0.14
Al2O3	2.18	101.961	0.021	0.043	0.095	0.143	0.095	Al	0.095	0.043	0.021	101.961	2.18
Cr2O3	0.25	151.990	0.002	0.003	0.007	0.011	0.007	Cr	0.007	0.003	0.002	151.990	0.25
Fe2O3	0.00	159.688					0.063	Fe^{3+}	0.063	0.028	0.014	159.688	2.26
FeO	5.16	71.844	0.072	0.072	0.160	0.160	0.097	Fe^{2+}	0.097	0.044	0.044	71.844	3.13
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	16.88	40.304	0.419	0.419	0.931	0.931	0.931	Mg	0.931	0.419	0.419	40.304	16.88
CaO	21.96	56.077	0.392	0.392	0.871	0.871	0.871	Ca	0.871	0.392	0.392	56.077	21.96
Na2O	0.13	61.979	0.002	0.004	0.009	0.005	0.009	Na	0.009	0.004	0.002	61.979	0.13
Total	98.68		1.774	1.799	4.000	5.969	4.000			1.799	1.760		98.91

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Cation 4
F 1.0053

Check! Fe2O3 as FeO 2.03
FeO* 5.16

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.922	2
4	Tet	Al	0.078	
6	Oct	Al	0.017	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.172	
6	Oct	Mg	0.811	
8	Cubic	Mg	0.120	1
8	Cubic	Ca	0.871	
8	Cubic	Na	0.009	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.86
En	Mg/(Ca+Mg+Fe2+)	49.04
Fs	Fe2+/(Ca+Mg+Fe2+)	5.10
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.147
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.091
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.944
		100.000

FeT/FeT+Mg	0.15
Fe2/Fe2+Mg	0.09

Analysis No. 295

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.59	60.084	0.842	0.842	1.898	3.797	1.898	Si	1.898	0.842	0.842	60.084	50.59
TiO2	0.34	79.866	0.004	0.004	0.010	0.019	0.010	Ti	0.010	0.004	0.004	79.866	0.34
Al2O3	2.27	101.961	0.022	0.045	0.100	0.151	0.100	Al	0.100	0.045	0.022	101.961	2.27
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr	0.001	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.101	Fe^{3+}	0.101	0.045	0.022	159.688	3.57
FeO	9.56	71.844	0.133	0.133	0.300	0.300	0.199	Fe^{2+}	0.199	0.088	0.088	71.844	6.35
MnO	0.32	70.937	0.004	0.004	0.010	0.010	0.010	Mn	0.010	0.004	0.004	70.937	0.32
MgO	15.69	40.304	0.389	0.389	0.878	0.878	0.878	Mg	0.878	0.389	0.389	40.304	15.69
CaO	19.52	56.077	0.348	0.348	0.785	0.785	0.785	Ca	0.785	0.348	0.348	56.077	19.52
Na2O	0.25	61.979	0.004	0.008	0.018	0.009	0.018	Na	0.018	0.008	0.004	61.979	0.25
Total	98.57		1.748	1.774	4.000	5.950	4.000			1.774	1.725		98.92
							Oxygen Unit Deficiency						

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Cation 4
F 1.0085

Check! Fe2O3 as FeO 3.21
FeO* 9.56

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.908	2
4	Tet	Al	0.092	
6	Oct	Al	0.008	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.311	
6	Oct	Mg	0.681	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.16
En	Mg/(Ca+Mg+Fe2+)	47.15
Fs	Fe2+/(Ca+Mg+Fe2+)	10.70
	total	100.00

8	Cubic	Mg	0.197	1			
8	Cubic	Ca	0.785				
8	Cubic	Na	0.018				
			4.000				

Sodic and Calcic CPX

Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	12.563
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-10.303
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.740
		100.000

FeT/FeT+Mg	0.25
Fe2/Fe2+Mg	0.18

Analysis No. 296

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.85	60.084	0.846	0.846	1.916	3.833	1.916	Si
TiO2	0.27	79.866	0.003	0.003	0.008	0.015	0.008	Ti
Al2O3	1.86	101.961	0.018	0.037	0.083	0.124	0.083	Al
Cr2O3	0.02	151.990	0.000	0.000	0.000	0.001	0.000	Cr
Fe2O3	0.00	159.688					0.090	Fe^{3+}
FeO	10.04	71.844	0.140	0.140	0.316	0.316	0.227	Fe^{2+}
MnO	0.36	70.937	0.005	0.005	0.011	0.011	0.011	Mn
MgO	15.11	40.304	0.375	0.375	0.849	0.849	0.849	Mg
CaO	19.70	56.077	0.351	0.351	0.795	0.795	0.795	Ca
Na2O	0.28	61.979	0.005	0.009	0.021	0.010	0.021	Na
Total	98.49		1.744	1.767	4.000	5.955	4.000	

No of Oxygens 6 No of Cation 4
F 1.0075

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.916	0.846	0.846	60.084	50.85
0.008	0.003	0.003	79.866	0.27
0.083	0.037	0.018	101.961	1.86
0.000	0.000	0.000	151.990	0.02
0.090	0.040	0.020	159.688	3.16
0.227	0.100	0.100	71.844	7.19
0.011	0.005	0.005	70.937	0.36
0.849	0.375	0.375	40.304	15.11
0.795	0.351	0.351	56.077	19.70
0.021	0.009	0.005	61.979	0.28
	1.767	1.724		98.81

Check! Fe2O3 as FeO 2.85
FeO* 10.04

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.924	2
4	Tet	Al	0.076	
6	Oct	Al	0.007	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.328	
6	Oct	Mg	0.665	
8	Cubic	Mg	0.184	1
8	Cubic	Ca	0.795	
8	Cubic	Na	0.021	
			4.000	

end member %

Ortho and Calcic CPX

Wo	Ca/(Ca+Mg+Fe2+)	42.51
En	Mg/(Ca+Mg+Fe2+)	45.37
Fs	Fe2+/(Ca+Mg+Fe2+)	12.12
	total	100.00

Sodic and Calcic CPX

Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.993
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.452
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.459
		100.000

FeT/FeT+Mg	0.27
Fe2/Fe2+Mg	0.21

Analysis No. 269

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.39	60.084	0.839	0.839	1.856	3.712	1.856	Si
TiO2	0.42	79.866	0.005	0.005	0.012	0.023	0.012	Ti
Al2O3	4.14	101.961	0.041	0.081	0.180	0.270	0.180	Al
Cr2O3	0.08	151.990	0.001	0.001	0.002	0.003	0.002	Cr
Fe2O3	0.00	159.688					0.097	Fe^{3+}
FeO	9.36	71.844	0.130	0.130	0.288	0.288	0.191	Fe^{2+}
MnO	0.27	70.937	0.004	0.004	0.008	0.008	0.008	Mn
MgO	17.24	40.304	0.428	0.428	0.947	0.947	0.947	Mg
CaO	17.54	56.077	0.313	0.313	0.692	0.692	0.692	Ca
Na2O	0.20	61.979	0.003	0.007	0.015	0.007	0.015	Na
Total	99.64		1.763	1.807	4.000	5.951	4.000	

No of Oxygens 6 No of Cation 4
F 1.0082

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.856	0.839	0.839	60.084	50.39
0.012	0.005	0.005	79.866	0.42
0.180	0.081	0.041	101.961	4.14
0.002	0.001	0.001	151.990	0.08
0.097	0.044	0.022	159.688	3.50
0.191	0.086	0.086	71.844	6.21
0.008	0.004	0.004	70.937	0.27
0.947	0.428	0.428	40.304	17.24
0.692	0.313	0.313	56.077	17.54
0.015	0.007	0.003	61.979	0.20
	1.807	1.741		99.99

Check! Fe2O3 as FeO 3.15
FeO* 9.36

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.868	2
4	Tet	Al	0.132	
6	Oct	Al	0.047	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.299	
6	Oct	Mg	0.654	
8	Cubic	Mg	0.293	1
8	Cubic	Ca	0.692	
8	Cubic	Na	0.015	
			4.000	

end member %

Ortho and Calcic CPX

Wo	Ca/(Ca+Mg+Fe2+)	37.82
En	Mg/(Ca+Mg+Fe2+)	51.73
Fs	Fe2+/(Ca+Mg+Fe2+)	10.45
	total	100.00

Sodic and Calcic CPX

Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	13.740
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-11.671
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.931
		100.000

FeT/FeT+Mg	0.23
Fe2/Fe2+Mg	0.17

Analysis No. 275

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.27	60.084	0.853	0.853	1.892	3.783	1.892	Si
TiO2	0.19	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	2.89	101.961	0.028	0.057	0.126	0.189	0.126	Al
Cr2O3	0.54	151.990	0.004	0.007	0.016	0.024	0.016	Cr
Fe2O3	0.00	159.688					0.080	Fe^{3+}
FeO	5.06	71.844	0.070	0.070	0.156	0.156	0.076	Fe^{2+}
MnO	0.14	70.937	0.002	0.002	0.004	0.004	0.004	Mn
MgO	16.82	40.304	0.417	0.417	0.925	0.925	0.925	Mg
CaO	21.78	56.077	0.388	0.388	0.861	0.861	0.861	Ca
Na2O	0.21	61.979	0.003	0.007	0.015	0.008	0.015	Na
Total	98.90		1.769	1.804	4.000	5.960	4.000	

No of Oxygens 6 No of Cation 4
F 1.0067

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.892	0.853	0.853	60.084	51.27
0.005	0.002	0.002	79.866	0.19
0.126	0.057	0.028	101.961	2.89
0.016	0.007	0.004	151.990	0.54
0.080	0.036	0.018	159.688	2.88
0.076	0.034	0.034	71.844	2.47
0.004	0.002	0.002	70.937	0.14
0.925	0.417	0.417	40.304	16.82
0.861	0.388	0.388	56.077	21.78
0.015	0.007	0.003	61.979	0.21
	1.804	1.751		99.19

Check! Fe2O3 as FeO 2.59
FeO* 5.06

Cation Site Occupancy end

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.897	2
4	Tet	Al	0.103	
6	Oct	Al	0.022	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.176	
6	Oct	Mg	0.801	
8	Cubic	Mg	0.124	1
8	Cubic	Ca	0.861	
8	Cubic	Na	0.015	
			4.000	

member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	46.24
En	Mg/(Ca+Mg+Fe2+)	49.68
Fs	Fe2+/(Ca+Mg+Fe2+)	4.08
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.138
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.414
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.276
		100.000
FeT/FeT+Mg		0.14
Fe2/Fe2+Mg		0.08

Analysis No. 282

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.00	60.084	0.882	0.882	1.944	3.889	1.944	Si	1.944	0.882	0.882	60.084	53.00
TiO2	0.14	79.866	0.002	0.002	0.004	0.008	0.004	Ti	0.004	0.002	0.002	79.866	0.14
Al2O3	1.31	101.961	0.013	0.026	0.057	0.085	0.057	Al	0.057	0.026	0.013	101.961	1.31
Cr2O3	0.28	151.990	0.002	0.004	0.008	0.012	0.008	Cr	0.008	0.004	0.002	151.990	0.28
Fe2O3	0.00	159.688					0.046	Fe^{3+}	0.046	0.021	0.010	159.688	1.67
FeO	4.81	71.844	0.067	0.067	0.148	0.148	0.101	Fe^{2+}	0.101	0.046	0.046	71.844	3.30
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	18.19	40.304	0.451	0.451	0.995	0.995	0.995	Mg	0.995	0.451	0.451	40.304	18.19
CaO	21.17	56.077	0.378	0.378	0.832	0.832	0.832	Ca	0.832	0.378	0.378	56.077	21.17
Na2O	0.11	61.979	0.002	0.003	0.008	0.004	0.008	Na	0.008	0.003	0.002	61.979	0.11
Total	99.16		1.798	1.815	4.000	5.977	4.000			1.815	1.788		99.33

No of Oxygen: 6 No of Cation 4
F 1.0039

Calculate Fe2O3 Wt %

Check! Fe2O3 as FeO 1.51
FeO* 4.81

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.948	2
4	Tet	Al	0.052	
6	Oct	Al	0.005	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.160	
6	Oct	Mg	0.835	
8	Cubic	Mg	0.160	1
8	Cubic	Ca	0.832	
8	Cubic	Na	0.008	
			4.000	

Cation Site Occupancy

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.15
En	Mg/(Ca+Mg+Fe2+)	51.59
Fs	Fe2+/(Ca+Mg+Fe2+)	5.26
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	5.506
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-4.599
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	99.093
		100.000
FeT/FeT+Mg		0.13
Fe2/Fe2+Mg		0.09

Analysis No. 286

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.93	60.084	0.881	0.881	1.943	3.885	1.943	Si	1.943	0.881	0.881	60.084	52.93
TiO2	0.11	79.866	0.001	0.001	0.003	0.006	0.003	Ti	0.003	0.001	0.001	79.866	0.11
Al2O3	1.34	101.961	0.013	0.026	0.058	0.087	0.058	Al	0.058	0.026	0.013	101.961	1.34
Cr2O3	0.40	151.990	0.003	0.005	0.012	0.017	0.012	Cr	0.012	0.005	0.003	151.990	0.40
Fe2O3	0.00	159.688					0.049	Fe^{3+}	0.049	0.022	0.011	159.688	1.76
FeO	5.01	71.844	0.070	0.070	0.154	0.154	0.105	Fe^{2+}	0.105	0.048	0.048	71.844	3.43
MnO	0.14	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.14
MgO	18.32	40.304	0.455	0.455	1.002	1.002	1.002	Mg	1.002	0.455	0.455	40.304	18.32
CaO	20.71	56.077	0.369	0.369	0.814	0.814	0.814	Ca	0.814	0.369	0.369	56.077	20.71
Na2O	0.14	61.979	0.002	0.004	0.010	0.005	0.010	Na	0.010	0.004	0.002	61.979	0.14
Total	99.10		1.796	1.814	4.000	5.976	4.000			1.814	1.785		99.27

No of Oxygen: 6 No of Cation 4
F 1.0041

Calculate Fe2O3 Wt %

Check! Fe2O3 as FeO 1.58
FeO* 5.01

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.946	2
4	Tet	Al	0.054	
6	Oct	Al	0.004	1
6	Oct	Fe^{3+}+Cr + Fe^{2+}+ Mn	0.170	
6	Oct	Mg	0.827	
8	Cubic	Mg	0.176	1
8	Cubic	Ca	0.814	
8	Cubic	Na	0.010	
			4.000	

Cation Site Occupancy

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.37
En	Mg/(Ca+Mg+Fe2+)	52.15
Fs	Fe2+/(Ca+Mg+Fe2+)	5.47
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	5.897
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-4.725
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.828
		100.000
FeT/FeT+Mg		0.13
Fe2/Fe2+Mg		0.09

Analysis No. 188

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.21	60.084	0.836	0.836	1.902	3.804	1.902	Si
TiO2	0.18	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	2.75	101.961	0.027	0.054	0.123	0.184	0.123	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.085	Fe^{3+}
FeO	9.49	71.844	0.132	0.132	0.301	0.301	0.215	Fe^{2+}
MnO	0.27	70.937	0.004	0.004	0.009	0.009	0.009	Mn
MgO	14.83	40.304	0.368	0.368	0.838	0.838	0.838	Mg
CaO	19.73	56.077	0.352	0.352	0.801	0.801	0.801	Ca
Na2O	0.30	61.979	0.005	0.010	0.022	0.011	0.022	Na
Total	97.76		1.725	1.757	4.000	5.957	4.000	

No of Oxygens 6 No of Cation 4
F 1.0072

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.902	0.836	0.836	60.084	50.21
0.005	0.002	0.002	79.866	0.18
0.123	0.054	0.027	101.961	2.75
0.000	0.000	0.000	151.990	0.00
0.085	0.037	0.019	159.688	2.99
0.215	0.095	0.095	71.844	6.80
0.009	0.004	0.004	70.937	0.27
0.838	0.368	0.368	40.304	14.83
0.801	0.352	0.352	56.077	19.73
0.022	0.010	0.005	61.979	0.30
		1.757	1.707	98.06

Check! Fe2O3 as FeO 2.69
FeO* 9.49

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.907	2
4	Tet	Al	0.093	
6	Oct	Al	0.030	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.309	
6	Oct	Mg	0.661	
8	Cubic	Mg	0.177	1
8	Cubic	Ca	0.801	
8	Cubic	Na	0.022	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.20
En	Mg/(Ca+Mg+Fe2+)	45.18
Fs	Fe2+/(Ca+Mg+Fe2+)	11.62
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.360
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.651
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.291
		100.000
FeT/FeT+Mg		0.26
Fe2/Fe2+Mg		0.20

Analysis No. 189

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	49.98	60.084	0.832	0.832	1.896	3.791	1.896	Si
TiO2	0.09	79.866	0.001	0.001	0.003	0.005	0.003	Ti
Al2O3	2.83	101.961	0.028	0.056	0.126	0.190	0.126	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.095	Fe^{3+}
FeO	9.45	71.844	0.132	0.132	0.300	0.300	0.205	Fe^{2+}
MnO	0.25	70.937	0.004	0.004	0.008	0.008	0.008	Mn
MgO	14.49	40.304	0.360	0.360	0.819	0.819	0.819	Mg
CaO	20.45	56.077	0.365	0.365	0.831	0.831	0.831	Ca
Na2O	0.24	61.979	0.004	0.008	0.017	0.009	0.017	Na
Total	97.77		1.724	1.755	4.000	5.953	4.000	

No of Oxygens 6 No of Cation 4
F 1.0079

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.896	0.832	0.832	60.084	49.98
0.003	0.001	0.001	79.866	0.09
0.126	0.056	0.028	101.961	2.83
0.000	0.000	0.000	151.990	0.00
0.095	0.041	0.021	159.688	3.31
0.205	0.090	0.090	71.844	6.47
0.008	0.004	0.004	70.937	0.25
0.819	0.360	0.360	40.304	14.49
0.831	0.365	0.365	56.077	20.45
0.017	0.008	0.004	61.979	0.24
		1.755	1.703	98.11

Check! Fe2O3 as FeO 2.98
FeO* 9.45

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.898	2
4	Tet	Al	0.102	
6	Oct	Al	0.025	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.308	
6	Oct	Mg	0.668	
8	Cubic	Mg	0.152	1
8	Cubic	Ca	0.831	
8	Cubic	Na	0.017	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.79
En	Mg/(Ca+Mg+Fe2+)	44.15
Fs	Fe2+/(Ca+Mg+Fe2+)	11.06
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.142
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.102
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.960
		100.000
FeT/FeT+Mg		0.27
Fe2/Fe2+Mg		0.20

Analysis No. 190

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.78	60.084	0.845	0.845	1.907	3.814	1.907	Si
TiO2	0.10	79.866	0.001	0.001	0.003	0.006	0.003	Ti
Al2O3	2.80	101.961	0.027	0.055	0.124	0.186	0.124	Al
Cr2O3	0.20	151.990	0.001	0.003	0.006	0.009	0.006	Cr
Fe2O3	0.00	159.688					0.066	Fe^{3+}
FeO	7.05	71.844	0.098	0.098	0.221	0.221	0.155	Fe^{2+}
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	15.38	40.304	0.382	0.382	0.861	0.861	0.861	Mg
CaO	21.27	56.077	0.379	0.379	0.856	0.856	0.856	Ca
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na
Total	97.98		1.740	1.773	4.000	5.967	4.000	

No of Oxygens 6 No of Cation 4
F 1.0056

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.907	0.845	0.845	60.084	50.78
0.003	0.001	0.001	79.866	0.10
0.124	0.055	0.027	101.961	2.80
0.006	0.003	0.001	151.990	0.20
0.066	0.029	0.015	159.688	2.35
0.155	0.069	0.069	71.844	4.94
0.006	0.003	0.003	70.937	0.19
0.861	0.382	0.382	40.304	15.38
0.856	0.379	0.379	56.077	21.27
0.016	0.007	0.004	61.979	0.22
		1.773	1.726	98.22

Check! Fe2O3 as FeO 2.11
FeO* 7.05

Cation Site Occupancy end

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.910	2
4	Tet	Al	0.090	
6	Oct	Al	0.034	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.233	
6	Oct	Mg	0.733	
8	Cubic	Mg	0.128	1
8	Cubic	Ca	0.856	
8	Cubic	Na	0.016	
			4.000	

	member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.72
En	Mg/(Ca+Mg+Fe2+)	46.00
Fs	Fe2+/(Ca+Mg+Fe2+)	8.29
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.604
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.791
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.187
		100.000
FeT/FeT+Mg		0.20
Fe2/Fe2+Mg		0.15

Analysis No. 191

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	48.97	60.084	0.815	0.815	1.865	3.731	1.865	Si
TiO2	0.16	79.866	0.002	0.002	0.005	0.009	0.005	Ti
Al2O3	4.18	101.961	0.041	0.082	0.188	0.281	0.188	Al
Cr2O3	0.14	151.990	0.001	0.002	0.004	0.006	0.004	Cr
Fe2O3	0.00	159.688					0.088	Fe^{3+}
FeO	8.76	71.844	0.122	0.122	0.279	0.279	0.191	Fe^{2+}
MnO	0.17	70.937	0.002	0.002	0.006	0.006	0.006	Mn
MgO	14.17	40.304	0.352	0.352	0.805	0.805	0.805	Mg
CaO	20.33	56.077	0.363	0.363	0.830	0.830	0.830	Ca
Na2O	0.26	61.979	0.004	0.008	0.019	0.010	0.019	Na
Total	97.14		1.702	1.748	4.000	5.956	4.000	

No of Oxygens 6 No of Cation 4
F 1.0074

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.865	0.815	0.815	60.084	48.97
0.005	0.002	0.002	79.866	0.16
0.188	0.082	0.041	101.961	4.18
0.004	0.002	0.001	151.990	0.14
0.088	0.038	0.019	159.688	3.07
0.191	0.084	0.084	71.844	6.00
0.006	0.002	0.002	70.937	0.17
0.805	0.352	0.352	40.304	14.17
0.830	0.363	0.363	56.077	20.33
0.019	0.008	0.004	61.979	0.26
	1.748	1.682		97.45

Check! Fe2O3 as FeO 2.76
FeO* 8.76

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.870	2
4	Tet	Al	0.130	
6	Oct	Al	0.058	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.289	
6	Oct	Mg	0.654	
8	Cubic	Mg	0.151	1
8	Cubic	Ca	0.830	
8	Cubic	Na	0.019	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.45
En	Mg/(Ca+Mg+Fe2+)	44.08
Fs	Fe2+/(Ca+Mg+Fe2+)	10.47
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.357
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.073
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.717
		100.000
FeT/FeT+Mg		0.26
Fe2/Fe2+Mg		0.19

Analysis No. 176

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.28	60.084	0.837	0.837	1.874	3.747	1.874	Si
TiO2	0.15	79.866	0.002	0.002	0.004	0.009	0.004	Ti
Al2O3	3.78	101.961	0.037	0.074	0.166	0.249	0.166	Al
Cr2O3	0.08	151.990	0.001	0.001	0.002	0.004	0.002	Cr
Fe2O3	0.00	159.688					0.091	Fe^{3+}
FeO	10.38	71.844	0.144	0.144	0.323	0.323	0.233	Fe^{2+}
MnO	0.24	70.937	0.003	0.003	0.007	0.007	0.007	Mn
MgO	15.56	40.304	0.386	0.386	0.864	0.864	0.864	Mg
CaO	18.61	56.077	0.332	0.332	0.743	0.743	0.743	Ca
Na2O	0.21	61.979	0.003	0.007	0.015	0.008	0.015	Na
Total	99.29		1.745	1.786	4.000	5.955	4.000	

No of Oxygens 6 No of Cation 4
F 1.0076

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.874	0.837	0.837	60.084	50.28
0.004	0.002	0.002	79.866	0.15
0.166	0.074	0.037	101.961	3.78
0.002	0.001	0.001	151.990	0.08
0.091	0.041	0.020	159.688	3.24
0.233	0.104	0.104	71.844	7.46
0.007	0.003	0.003	70.937	0.24
0.864	0.386	0.386	40.304	15.56
0.743	0.332	0.332	56.077	18.61
0.015	0.007	0.003	61.979	0.21
	1.786	1.725		99.61

Check! Fe2O3 as FeO 2.92
FeO* 10.38

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.878	2
4	Tet	Al	0.122	
6	Oct	Al	0.044	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.333	
6	Oct	Mg	0.623	
8	Cubic	Mg	0.242	1
8	Cubic	Ca	0.743	
8	Cubic	Na	0.015	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.38
En	Mg/(Ca+Mg+Fe2+)	46.98
Fs	Fe2+/(Ca+Mg+Fe2+)	12.64
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.995
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.984
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.990
		100.000
FeT/FeT+Mg		0.27
Fe2/Fe2+Mg		0.21

Analysis No. 178

Calculate Fe2O3 Wt %

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	48.54	60.084	0.808	0.808	1.840	3.679	1.840	Si	1.840	0.808	0.808	60.084	48.54
TiO2	0.25	79.866	0.003	0.003	0.007	0.014	0.007	Ti	0.007	0.003	0.003	79.866	0.25
Al2O3	4.32	101.961	0.042	0.085	0.193	0.289	0.193	Al	0.193	0.085	0.042	101.961	4.32
Cr2O3	0.02	151.990	0.000	0.000	0.000	0.001	0.000	Cr	0.000	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.133	Fe^{3+}	0.133	0.059	0.029	159.688	4.68
FeO	12.65	71.844	0.176	0.176	0.401	0.401	0.268	Fe^{2+}	0.268	0.117	0.117	71.844	8.44
MnO	0.34	70.937	0.005	0.005	0.011	0.011	0.011	Mn	0.011	0.005	0.005	70.937	0.34
MgO	14.48	40.304	0.359	0.359	0.818	0.818	0.818	Mg	0.818	0.359	0.359	40.304	14.48
CaO	17.47	56.077	0.312	0.312	0.709	0.709	0.709	Ca	0.709	0.312	0.312	56.077	17.47
Na2O	0.28	61.979	0.004	0.009	0.020	0.010	0.020	Na	0.020	0.009	0.004	61.979	0.28
Total	98.34		1.710	1.757	4.000	5.933	4.000				1.757	1.680	98.81

No of Oxygens 6 No of Cation 4
F 1.0112

Check! Fe2O3 as FeO 4.21
FeO* 12.65

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.847	2
4	Tet	Al	0.153	
6	Oct	Al	0.040	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.412	
6	Oct	Mg	0.548	
8	Cubic	Mg	0.270	1
8	Cubic	Ca	0.709	
8	Cubic	Na	0.020	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	39.52
En	Mg/(Ca+Mg+Fe2+)	45.58
Fs	Fe2+/(Ca+Mg+Fe2+)	14.90
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	18.281
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-15.476
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.194
		100.000
FeT/FeT+Mg		0.33
Fe2/Fe2+Mg		0.25

Analysis No. 181

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.44	60.084	0.839	0.839	1.912	3.824	1.912	Si	1.912	0.839	0.839	60.084	50.44
TiO2	0.12	79.866	0.001	0.001	0.003	0.007	0.003	Ti	0.003	0.001	0.001	79.866	0.12
Al2O3	2.31	101.961	0.023	0.045	0.103	0.155	0.103	Al	0.103	0.045	0.023	101.961	2.31
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.081	Fe^{3+}	0.081	0.036	0.018	159.688	2.85
FeO	11.86	71.844	0.165	0.165	0.376	0.376	0.295	Fe^{2+}	0.295	0.129	0.129	71.844	9.30
MnO	0.41	70.937	0.006	0.006	0.013	0.013	0.013	Mn	0.013	0.006	0.006	70.937	0.41
MgO	16.58	40.304	0.411	0.411	0.937	0.937	0.937	Mg	0.937	0.411	0.411	40.304	16.58
CaO	15.76	56.077	0.281	0.281	0.640	0.640	0.640	Ca	0.640	0.281	0.281	56.077	15.76
Na2O	0.21	61.979	0.003	0.007	0.015	0.008	0.015	Na	0.015	0.007	0.003	61.979	0.21
Total	97.69		1.730	1.756	4.000	5.959	4.000				1.756	1.712	97.98

No of Oxygens 6 No of Cation 4
F 1.0068

Check! Fe2O3 as FeO 2.56
FeO* 11.86

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.915	2
4	Tet	Al	0.085	
6	Oct	Al	0.019	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.389	
6	Oct	Mg	0.592	
8	Cubic	Mg	0.345	1
8	Cubic	Ca	0.640	
8	Cubic	Na	0.015	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	34.20
En	Mg/(Ca+Mg+Fe2+)	50.06
Fs	Fe2+/(Ca+Mg+Fe2+)	15.75
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	12.402
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-10.081
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.680
		100.000
FeT/FeT+Mg		0.29
Fe2/Fe2+Mg		0.24

Analysis No. 185

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	48.86	60.084	0.813	0.813	1.874	3.748	1.874	Si	1.874	0.813	0.813	60.084	48.86
TiO2	0.14	79.866	0.002	0.002	0.004	0.008	0.004	Ti	0.004	0.002	0.002	79.866	0.14
Al2O3	3.87	101.961	0.038	0.076	0.175	0.262	0.175	Al	0.175	0.076	0.038	101.961	3.87
Cr2O3	0.04	151.990	0.000	0.001	0.001	0.002	0.001	Cr	0.001	0.001	0.000	151.990	0.04
Fe2O3	0.00	159.688					0.086	Fe^{3+}	0.086	0.037	0.019	159.688	2.98
FeO	10.39	71.844	0.145	0.145	0.333	0.333	0.247	Fe^{2+}	0.247	0.107	0.107	71.844	7.70
MnO	0.27	70.937	0.004	0.004	0.009	0.009	0.009	Mn	0.009	0.004	0.004	70.937	0.27
MgO	14.70	40.304	0.365	0.365	0.841	0.841	0.841	Mg	0.841	0.365	0.365	40.304	14.70
CaO	18.10	56.077	0.323	0.323	0.744	0.744	0.744	Ca	0.744	0.323	0.323	56.077	18.10
Na2O	0.25	61.979	0.004	0.008	0.019	0.009	0.019	Na	0.019	0.008	0.004	61.979	0.25
Total	96.63		1.693	1.736	4.000	5.957	4.000				1.736	1.675	96.93

No of Oxygens 6 No of Cation 4
F 1.0072

Check! Fe2O3 as FeO 2.69
FeO* 10.39

Cation Site Occupancy

C.N.	Site	Elements	Ideal Cations/Site

end member	%

4	Tet	Si+Ti	1.878	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.122		Wo	Ca/(Ca+Mg+Fe2+)	40.61
6	Oct	Al	0.053	1	En	Mg/(Ca+Mg+Fe2+)	45.89
		Fe^{3+}+Cr					
6	Oct	+Fe^{2+}+Mn	0.343		Fs	Fe2+/(Ca+Mg+Fe2+)	13.49
6	Oct	Mg	0.603			total	100.00
8	Cubic	Mg	0.237	1			
8	Cubic	Ca	0.744		**Sodic and Calcic CPX**		
8	Cubic	Na	0.019		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.295
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.816
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.521
							100.000
					FeT/FeT+Mg		0.28
					Fe2/Fe2+Mg		0.23

Analysis No. 187

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	49.60	60.084	0.826	0.826	1.879	3.758	1.879	Si
TiO2	0.16	79.866	0.002	0.002	0.005	0.009	0.005	Ti
Al2O3	3.54	101.961	0.035	0.069	0.158	0.237	0.158	Al
Cr2O3	0.14	151.990	0.001	0.002	0.004	0.006	0.004	Cr
Fe2O3	0.00	159.688					0.087	Fe^{3+}
FeO	9.10	71.844	0.127	0.127	0.288	0.288	0.201	Fe^{2+}
MnO	0.20	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	14.33	40.304	0.356	0.356	0.809	0.809	0.809	Mg
CaO	20.52	56.077	0.366	0.366	0.833	0.833	0.833	Ca
Na2O	0.23	61.979	0.004	0.008	0.017	0.009	0.017	Na
Total	97.82		1.718	1.757	4.000	5.956	4.000	

No of Oxygens 6 No of Cation 4
F 1.0073

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.879	0.826	0.826	60.084	49.60
0.005	0.002	0.002	79.866	0.16
0.158	0.069	0.035	101.961	3.54
0.004	0.002	0.001	151.990	0.14
0.087	0.038	0.019	159.688	3.06
0.201	0.088	0.088	71.844	6.35
0.006	0.003	0.003	70.937	0.20
0.809	0.356	0.356	40.304	14.33
0.833	0.366	0.366	56.077	20.52
0.017	0.008	0.004	61.979	0.23
	1.757	1.699		98.13

Check! Fe2O3 as FeO 2.75
FeO* 9.10

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	end member		%
4	Tet	Si+Ti	1.884	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.116		Wo	Ca/(Ca+Mg+Fe2+)	45.19
6	Oct	Al	0.042	1	En	Mg/(Ca+Mg+Fe2+)	43.91
		Fe^{3+}+Cr					
6	Oct	+Fe^{2+}+Mn	0.299		Fs	Fe2+/(Ca+Mg+Fe2+)	10.91
6	Oct	Mg	0.659			total	100.00
8	Cubic	Mg	0.150	1			
8	Cubic	Ca	0.833		**Sodic and Calcic CPX**		
8	Cubic	Na	0.017		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.265
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.256
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.991
							100.000
					FeT/FeT+Mg		0.26
					Fe2/Fe2+Mg		0.20

Analysis No. 195

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.41	60.084	0.856	0.856	1.924	3.848	1.924	Si
TiO2	0.07	79.866	0.001	0.001	0.002	0.004	0.002	Ti
Al2O3	2.15	101.961	0.021	0.042	0.095	0.142	0.095	Al
Cr2O3	0.20	151.990	0.001	0.003	0.006	0.009	0.006	Cr
Fe2O3	0.00	159.688					0.060	Fe^{3+}
FeO	6.79	71.844	0.095	0.095	0.213	0.213	0.152	Fe^{2+}
MnO	0.21	70.937	0.003	0.003	0.007	0.007	0.007	Mn
MgO	16.11	40.304	0.400	0.400	0.899	0.899	0.899	Mg
CaO	20.99	56.077	0.374	0.374	0.842	0.842	0.842	Ca
Na2O	0.19	61.979	0.003	0.006	0.013	0.007	0.013	Na
Total	98.11		1.753	1.779	4.000	5.970	4.000	

No of Oxygens 6 No of Cation 4
F 1.0051

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.924	0.856	0.856	60.084	51.41
0.002	0.001	0.001	79.866	0.07
0.095	0.042	0.021	101.961	2.15
0.006	0.003	0.001	151.990	0.20
0.060	0.027	0.013	159.688	2.14
0.152	0.068	0.068	71.844	4.86
0.007	0.003	0.003	70.937	0.21
0.899	0.400	0.400	40.304	16.11
0.842	0.374	0.374	56.077	20.99
0.013	0.006	0.003	61.979	0.19
	1.779	1.740		98.32

Check! Fe2O3 as FeO 1.93
FeO* 6.79

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	end member		%
4	Tet	Si+Ti	1.926	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.074		Wo	Ca/(Ca+Mg+Fe2+)	44.47
6	Oct	Al	0.021	1	En	Mg/(Ca+Mg+Fe2+)	47.49
		Fe^{3+}+Cr					
6	Oct	+Fe^{2+}+Mn	0.225		Fs	Fe2+/(Ca+Mg+Fe2+)	8.04
6	Oct	Mg	0.754			total	100.00
8	Cubic	Mg	0.145	1			
8	Cubic	Ca	0.842		**Sodic and Calcic CPX**		
8	Cubic	Na	0.013		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.064
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.493
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.428
							100.000
					FeT/FeT+Mg		0.19
					Fe2/Fe2+Mg		0.14

Analysis No. 196

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %

SiO2	48.57	60.084	0.808	0.808	1.849	3.698	1.849	Si	1.849	0.808	0.808	60.084	48.57
TiO2	0.24	79.866	0.003	0.003	0.007	0.014	0.007	Ti	0.007	0.003	0.003	79.866	0.24
Al2O3	5.24	101.961	0.051	0.103	0.235	0.353	0.235	Al	0.235	0.103	0.051	101.961	5.24
Cr2O3	0.01	151.990	0.000	0.000	0.000	0.001	0.000	Cr	0.000	0.000	0.000	151.990	0.01
Fe2O3	0.00	159.688					0.084	Fe^{3+}	0.084	0.037	0.018	159.688	2.95
FeO	12.29	71.844	0.171	0.171	0.391	0.391	0.307	Fe^{2+}	0.307	0.134	0.134	71.844	9.64
MnO	0.37	70.937	0.005	0.005	0.012	0.012	0.012	Mn	0.012	0.005	0.005	70.937	0.37
MgO	13.90	40.304	0.345	0.345	0.789	0.789	0.789	Mg	0.789	0.345	0.345	40.304	13.90
CaO	16.79	56.077	0.299	0.299	0.685	0.685	0.685	Ca	0.685	0.299	0.299	56.077	16.79
Na2O	0.43	61.979	0.007	0.014	0.032	0.016	0.032	Na	0.032	0.014	0.007	61.979	0.43
Total	97.85		1.690	1.749	4.000	5.958	4.000			1.749	1.672		98.14

No of Oxygens 6 No of Cation 4
F 1.0071

Check! Fe2O3 as FeO 2.65
FeO* 12.29

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.856	2
4	Tet	Al	0.144	
6	Oct	Al	0.091	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.404	
6	Oct	Mg	0.505	
8	Cubic	Mg	0.283	1
8	Cubic	Ca	0.685	
8	Cubic	Na	0.032	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	38.46
En	Mg/(Ca+Mg+Fe2+)	44.30
Fs	Fe2+/(Ca+Mg+Fe2+)	17.24
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.778
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.354
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	95.576
		100.000
FeT/FeT+Mg		0.33
Fe2/Fe2+Mg		0.28

Analysis No. 198

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.24	60.084	0.853	0.853	1.934	3.869	1.934	Si	1.934	0.853	0.853	60.084	51.24
TiO2	0.16	79.866	0.002	0.002	0.004	0.009	0.004	Ti	0.004	0.002	0.002	79.866	0.16
Al2O3	2.25	101.961	0.022	0.044	0.100	0.150	0.100	Al	0.100	0.044	0.022	101.961	2.25
Cr2O3	0.07	151.990	0.000	0.001	0.002	0.003	0.002	Cr	0.002	0.001	0.000	151.990	0.07
Fe2O3	0.00	159.688					0.034	Fe^{3+}	0.034	0.015	0.008	159.688	1.20
FeO	9.58	71.844	0.133	0.133	0.302	0.302	0.268	Fe^{2+}	0.268	0.118	0.118	71.844	8.50
MnO	0.29	70.937	0.004	0.004	0.009	0.009	0.009	Mn	0.009	0.004	0.004	70.937	0.29
MgO	16.08	40.304	0.399	0.399	0.905	0.905	0.905	Mg	0.905	0.399	0.399	40.304	16.08
CaO	18.02	56.077	0.321	0.321	0.729	0.729	0.729	Ca	0.729	0.321	0.321	56.077	18.02
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.19
Total	97.87		1.738	1.764	4.000	5.983	4.000			1.764	1.730		97.99

No of Oxygens 6 No of Cation 4
F 1.0029

Check! Fe2O3 as FeO 1.08
FeO* 9.58

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.939	2
4	Tet	Al	0.061	
6	Oct	Al	0.039	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.314	
6	Oct	Mg	0.647	
8	Cubic	Mg	0.257	1
8	Cubic	Ca	0.729	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	38.32
En	Mg/(Ca+Mg+Fe2+)	47.58
Fs	Fe2+/(Ca+Mg+Fe2+)	14.10
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.603
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-2.754
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.151
		100.000
FeT/FeT+Mg		0.25
Fe2/Fe2+Mg		0.23

Analysis No. 203

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.89	60.084	0.864	0.864	1.930	3.860	1.930	Si	1.930	0.864	0.864	60.084	51.89
TiO2	0.12	79.866	0.001	0.001	0.003	0.006	0.003	Ti	0.003	0.001	0.001	79.866	0.12
Al2O3	1.81	101.961	0.018	0.036	0.080	0.119	0.080	Al	0.080	0.036	0.018	101.961	1.81
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr	0.001	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.066	Fe^{3+}	0.066	0.029	0.015	159.688	2.35
FeO	12.13	71.844	0.169	0.169	0.377	0.377	0.312	Fe^{2+}	0.312	0.139	0.139	71.844	10.02
MnO	0.36	70.937	0.005	0.005	0.011	0.011	0.011	Mn	0.011	0.005	0.005	70.937	0.36
MgO	17.36	40.304	0.431	0.431	0.962	0.962	0.962	Mg	0.962	0.431	0.431	40.304	17.36
CaO	15.65	56.077	0.279	0.279	0.624	0.624	0.624	Ca	0.624	0.279	0.279	56.077	15.65
Na2O	0.17	61.979	0.003	0.005	0.012	0.006	0.012	Na	0.012	0.005	0.003	61.979	0.17
Total	99.51		1.769	1.790	4.000	5.967	4.000			1.790	1.755		99.75

No of Oxygens 6 No of Cation 4
F 1.0055

Check! Fe2O3 as FeO 2.11
FeO* 12.13

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.933	2
4	Tet	Al	0.067	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	32.86

6	Oct	Al	0.013	1	En	Mg/(Ca+Mg+Fe2+)	50.72
		Fe^{3+}+Cr					
6	Oct	+Fe^{2+}+Mn	0.389		Fs	Fe2+/(Ca+Mg+Fe2+)	16.42
6	Oct	Mg	0.598			total	100.00
8	Cubic	Mg	0.364	1			
8	Cubic	Ca	0.624		**Sodic and Calcic CPX**		
8	Cubic	Na	0.012		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.339
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.441
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.101
							100.000
					FeT/FeT+Mg		0.28
					Fe2/Fe2+Mg		0.24

Analysis No. 211

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.15	60.084	0.835	0.835	1.869	3.737	1.869	Si	1.869	0.835	0.835	60.084	50.15
TiO2	0.20	79.866	0.002	0.002	0.006	0.011	0.006	Ti	0.006	0.002	0.002	79.866	0.20
Al2O3	3.78	101.961	0.037	0.074	0.166	0.249	0.166	Al	0.166	0.074	0.037	101.961	3.78
Cr2O3	0.10	151.990	0.001	0.001	0.003	0.004	0.003	Cr	0.003	0.001	0.001	151.990	0.10
Fe2O3	0.00	159.688					0.104	Fe^{3+}	0.104	0.047	0.023	159.688	3.71
FeO	10.15	71.844	0.141	0.141	0.316	0.316	0.212	Fe^{2+}	0.212	0.095	0.095	71.844	6.81
MnO	0.26	70.937	0.004	0.004	0.008	0.008	0.008	Mn	0.008	0.004	0.004	70.937	0.26
MgO	14.59	40.304	0.362	0.362	0.810	0.810	0.810	Mg	0.810	0.362	0.362	40.304	14.59
CaO	20.06	56.077	0.358	0.358	0.801	0.801	0.801	Ca	0.801	0.358	0.358	56.077	20.06
Na2O	0.29	61.979	0.005	0.009	0.021	0.011	0.021	Na	0.021	0.009	0.005	61.979	0.29
Total	99.59		1.744	1.787	4.000	5.948	4.000			1.787	1.721		99.96

No of Oxygens 6 No of Cation 4
F 1.0088

Calculate Fe2O3 Wt %

Check! Fe2O3 as FeO 3.34
FeO* 10.15

Cation Site Occupancy

C.N.		Site	Elements		Ideal Cations/Site		end member		%
	4	Tet	Si+Ti	1.874	2		**Ortho and Calcic CPX**		
	4	Tet	Al	0.126		Wo	Ca/(Ca+Mg+Fe2+)		43.92
	6	Oct	Al	0.040	1	En	Mg/(Ca+Mg+Fe2+)		44.45
			Fe^{3+}+Cr						
	6	Oct	+Fe^{2+}+Mn	0.328		Fs	Fe2+/(Ca+Mg+Fe2+)		11.63
	6	Oct	Mg	0.632			total		100.00
	8	Cubic	Mg	0.178	1				
	8	Cubic	Ca	0.801		**Sodic and Calcic CPX**			
	8	Cubic	Na	0.021		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+		12.668
				4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F		-10.090
						Diopside	Ca/(Fe3+ +(Na-Fe3+)+		97.422
									100.000
						FeT/FeT+Mg			0.28
						Fe2/Fe2+Mg			0.21

Analysis No. 212

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	49.84	60.084	0.830	0.830	1.861	3.722	1.861	Si	1.861	0.830	0.830	60.084	49.84
TiO2	0.12	79.866	0.001	0.001	0.003	0.007	0.003	Ti	0.003	0.001	0.001	79.866	0.12
Al2O3	4.08	101.961	0.040	0.080	0.180	0.269	0.180	Al	0.180	0.080	0.040	101.961	4.08
Cr2O3	0.13	151.990	0.001	0.002	0.004	0.006	0.004	Cr	0.004	0.002	0.001	151.990	0.13
Fe2O3	0.00	159.688					0.108	Fe^{3+}	0.108	0.048	0.024	159.688	3.84
FeO	9.82	71.844	0.137	0.137	0.307	0.307	0.199	Fe^{2+}	0.199	0.089	0.089	71.844	6.37
MnO	0.27	70.937	0.004	0.004	0.008	0.008	0.008	Mn	0.008	0.004	0.004	70.937	0.27
MgO	14.75	40.304	0.366	0.366	0.821	0.821	0.821	Mg	0.821	0.366	0.366	40.304	14.75
CaO	19.89	56.077	0.355	0.355	0.796	0.796	0.796	Ca	0.796	0.355	0.355	56.077	19.89
Na2O	0.28	61.979	0.004	0.009	0.020	0.010	0.020	Na	0.020	0.009	0.004	61.979	0.28
Total	99.17		1.737	1.783	4.000	5.946	4.000			1.783	1.713		99.55

No of Oxygens 6 No of Cation 4
F 1.0091

Calculate Fe2O3 Wt %

Check! Fe2O3 as FeO 3.45
FeO* 9.82

Cation Site Occupancy

C.N.		Site	Elements		Ideal Cations/Site		end member		%
	4	Tet	Si+Ti	1.864	2		**Ortho and Calcic CPX**		
	4	Tet	Al	0.136		Wo	Ca/(Ca+Mg+Fe2+)		43.83
	6	Oct	Al	0.044	1	En	Mg/(Ca+Mg+Fe2+)		45.22
			Fe^{3+}+Cr						
	6	Oct	+Fe^{2+}+Mn	0.319		Fs	Fe2+/(Ca+Mg+Fe2+)		10.95
	6	Oct	Mg	0.637			total		100.00
	8	Cubic	Mg	0.184	1				
	8	Cubic	Ca	0.796		**Sodic and Calcic CPX**			
	8	Cubic	Na	0.020		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+		13.217
				4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F		-10.752
						Diopside	Ca/(Fe3+ +(Na-Fe3+)+		97.535
									100.000
						FeT/FeT+Mg			0.27
						Fe2/Fe2+Mg			0.19

Analysis No. 27

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.54	60.084	0.858	0.858	1.926	3.851	1.926	Si
TiO2	0.18	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	2.17	101.961	0.021	0.043	0.096	0.143	0.096	Al
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr
Fe2O3	0.00	159.688					0.062	Fe^{3+}
FeO	10.40	71.844	0.145	0.145	0.325	0.325	0.263	Fe^{2+}
MnO	0.32	70.937	0.005	0.005	0.010	0.010	0.010	Mn
MgO	14.61	40.304	0.362	0.362	0.814	0.814	0.814	Mg
CaO	20.10	56.077	0.358	0.358	0.805	0.805	0.805	Ca
Na2O	0.27	61.979	0.004	0.009	0.020	0.010	0.020	Na
Total	99.62		1.756	1.782	4.000	5.969	4.000	

No of Oxygens 6 No of Cation 4
F 1.0052

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.926	0.858	0.858	60.084	51.54
0.005	0.002	0.002	79.866	0.18
0.096	0.043	0.021	101.961	2.17
0.001	0.000	0.000	151.990	0.02
0.062	0.028	0.014	159.688	2.20
0.263	0.117	0.117	71.844	8.42
0.010	0.005	0.005	70.937	0.32
0.814	0.362	0.362	40.304	14.61
0.805	0.358	0.358	56.077	20.10
0.020	0.009	0.004	61.979	0.27
	1.782	1.742		99.84

Check! Fe2O3 as FeO 1.98
FeO* 10.40

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.931	2
4	Tet	Al	0.069	
6	Oct	Al	0.026	1
		$+Fe^{2+}+M$		
6	Oct	n	0.336	
6	Oct	Mg	0.638	
8	Cubic	Mg	0.176	1
8	Cubic	Ca	0.805	
8	Cubic	Na	0.020	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.77
En	Mg/(Ca+Mg+Fe2+)	43.25
Fs	Fe2+/(Ca+Mg+Fe2+)	13.98
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.509
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.135
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.626
		100.000
FeT/FeT+Mg		0.29
Fe2/Fe2+Mg		0.24

Analysis No. 28

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.62	60.084	0.859	0.859	1.926	3.853	1.926	Si
TiO2	0.18	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	2.13	101.961	0.021	0.042	0.094	0.141	0.094	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.057	Fe^{3+}
FeO	10.38	71.844	0.144	0.144	0.324	0.324	0.267	Fe^{2+}
MnO	0.29	70.937	0.004	0.004	0.009	0.009	0.009	Mn
MgO	14.68	40.304	0.364	0.364	0.817	0.817	0.817	Mg
CaO	20.29	56.077	0.362	0.362	0.811	0.811	0.811	Ca
Na2O	0.19	61.979	0.003	0.006	0.013	0.007	0.013	Na
Total	99.76		1.760	1.784	4.000	5.972	4.000	

No of Oxygens 6 No of Cation 4
F 1.0047

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.926	0.859	0.859	60.084	51.62
0.005	0.002	0.002	79.866	0.18
0.094	0.042	0.021	101.961	2.13
0.000	0.000	0.000	151.990	0.00
0.057	0.025	0.013	159.688	2.01
0.267	0.119	0.119	71.844	8.57
0.009	0.004	0.004	70.937	0.29
0.817	0.364	0.364	40.304	14.68
0.811	0.362	0.362	56.077	20.29
0.013	0.006	0.003	61.979	0.19
	1.784	1.747		99.97

Check! Fe2O3 as FeO 1.81
FeO* 10.38

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.932	2
4	Tet	Al	0.068	
6	Oct	Al	0.025	1
		$+Fe^{2+}+M$		
6	Oct	n	0.333	
6	Oct	Mg	0.641	
8	Cubic	Mg	0.175	1
8	Cubic	Ca	0.811	
8	Cubic	Na	0.013	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.80
En	Mg/(Ca+Mg+Fe2+)	43.09
Fs	Fe2+/(Ca+Mg+Fe2+)	14.11
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	6.852
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.219
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.367
		100.000
FeT/FeT+Mg		0.28
Fe2/Fe2+Mg		0.25

Analysis No. 29

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.04	60.084	0.849	0.849	1.909	3.819	1.909	Si
TiO2	0.33	79.866	0.004	0.004	0.009	0.018	0.009	Ti
Al2O3	2.42	101.961	0.024	0.047	0.107	0.160	0.107	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.072	Fe^{3+}
FeO	11.06	71.844	0.154	0.154	0.346	0.346	0.274	Fe^{2+}
MnO	0.35	70.937	0.005	0.005	0.011	0.011	0.011	Mn
MgO	14.55	40.304	0.361	0.361	0.811	0.811	0.811	Mg
CaO	19.72	56.077	0.352	0.352	0.790	0.790	0.790	Ca
Na2O	0.22	61.979	0.003	0.007	0.016	0.008	0.016	Na
Total	99.68		1.752	1.780	4.000	5.964	4.000	

No of Oxygens 6 No of Cation 4
F 1.0060

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.909	0.849	0.849	60.084	51.04
0.009	0.004	0.004	79.866	0.33
0.107	0.047	0.024	101.961	2.42
0.000	0.000	0.000	151.990	0.00
0.072	0.032	0.016	159.688	2.55
0.274	0.122	0.122	71.844	8.76
0.011	0.005	0.005	70.937	0.35
0.811	0.361	0.361	40.304	14.55
0.790	0.352	0.352	56.077	19.72
0.016	0.007	0.003	61.979	0.22
	1.780	1.736		99.94

Check! Fe2O3 as FeO 2.30
FeO* 11.06

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.919	2
4	Tet	Al	0.081	
6	Oct	Al	0.025	1
		$+Fe^{2+}+M$		
6	Oct	n	0.357	
6	Oct	Mg	0.618	
8	Cubic	Mg	0.194	1
8	Cubic	Ca	0.790	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.13
En	Mg/(Ca+Mg+Fe2+)	43.25
Fs	Fe2+/(Ca+Mg+Fe2+)	14.62
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.910
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.960
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.050
		100.000
FeT/FeT+Mg		0.30
Fe2/Fe2+Mg		0.25

Analysis No. 30

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.69	60.084	0.860	0.860	1.911	3.823	1.911	Si
TiO2	0.19	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	2.16	101.961	0.021	0.042	0.094	0.141	0.094	Al
Cr2O3	0.09	151.990	0.001	0.001	0.003	0.004	0.003	Cr
Fe2O3	0.00	159.688					0.085	Fe^{3+}
FeO	9.70	71.844	0.135	0.135	0.300	0.300	0.215	Fe^{2+}
MnO	0.27	70.937	0.004	0.004	0.008	0.008	0.008	Mn
MgO	16.14	40.304	0.400	0.400	0.890	0.890	0.890	Mg

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.911	0.860	0.860	60.084	51.69
0.005	0.002	0.002	79.866	0.19
0.094	0.042	0.021	101.961	2.16
0.003	0.001	0.001	151.990	0.09
0.085	0.038	0.019	159.688	3.06
0.215	0.097	0.097	71.844	6.95
0.008	0.004	0.004	70.937	0.27
0.890	0.400	0.400	40.304	16.14

CaO	19.53	56.077	0.348	0.348	0.774	0.774	0.774	Ca		0.774	0.348	0.348	56.077	19.53
Na2O	0.21	61.979	0.003	0.007	0.015	0.007	0.015	Na		0.015	0.007	0.003	61.979	0.21
Total	99.97		1.775	1.800	4.000	5.957	4.000				1.800	1.756		100.28

No of Oxygens 6 No of Cation 4
F 1.0071

Check! Fe2O3 as FeO 2.75
FeO* 9.70

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	1.917	2	
4	Tet	Al	0.083		
6	Oct	Al +Fe^{2+}+M	0.011	1	
6	Oct	n	0.311		
6	Oct	Mg	0.678		
8	Cubic	Mg	0.211	1	
8	Cubic	Ca	0.774		
8	Cubic	Na	0.015		
			4.000		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.19
En	Mg/(Ca+Mg+Fe2+)	47.37
Fs	Fe2+/(Ca+Mg+Fe2+)	11.44
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.785
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.892
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.107
		100.000
FeT/FeT+Mg		0.25
Fe2/Fe2+Mg		0.19

Analysis No. 35

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.64	60.084	0.859	0.859	1.924	3.848	1.924	Si	1.924	0.859	0.859	60.084	51.64
TiO2	0.23	79.866	0.003	0.003	0.006	0.013	0.006	Ti	0.006	0.003	0.003	79.866	0.23
Al2O3	2.02	101.961	0.020	0.040	0.089	0.133	0.089	Al	0.089	0.040	0.020	101.961	2.02
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.073	Fe^{3+}	0.073	0.033	0.016	159.688	2.60
FeO	10.93	71.844	0.152	0.152	0.341	0.341	0.268	Fe^{2+}	0.268	0.120	0.120	71.844	8.59
MnO	0.36	70.937	0.005	0.005	0.011	0.011	0.011	Mn	0.011	0.005	0.005	70.937	0.36
MgO	14.52	40.304	0.360	0.360	0.806	0.806	0.806	Mg	0.806	0.360	0.360	40.304	14.52
CaO	20.07	56.077	0.358	0.358	0.801	0.801	0.801	Ca	0.801	0.358	0.358	56.077	20.07
Na2O	0.30	61.979	0.005	0.010	0.022	0.011	0.022	Na	0.022	0.010	0.005	61.979	0.30
Total	100.07		1.762	1.787	4.000	5.964	4.000			1.787	1.746		100.33

No of Oxygens 6 No of Cation 4
F 1.0061

Check! Fe2O3 as FeO 2.34
FeO* 10.93

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	1.930	2	
4	Tet	Al	0.070		
6	Oct	Al +Fe^{2+}+M	0.019	1	
6	Oct	n	0.352		
6	Oct	Mg	0.629		
8	Cubic	Mg	0.177	1	
8	Cubic	Ca	0.801		
8	Cubic	Na	0.022		
			4.000		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.72
En	Mg/(Ca+Mg+Fe2+)	43.00
Fs	Fe2+/(Ca+Mg+Fe2+)	14.28
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.845
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.192
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.348
		100.000
FeT/FeT+Mg		0.30
Fe2/Fe2+Mg		0.25

Analysis No. 36

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.39	60.084	0.855	0.855	1.920	3.839	1.920	Si	1.920	0.855	0.855	60.084	51.39
TiO2	0.20	79.866	0.002	0.002	0.006	0.011	0.006	Ti	0.006	0.002	0.002	79.866	0.20
Al2O3	2.13	101.961	0.021	0.042	0.094	0.141	0.094	Al	0.094	0.042	0.021	101.961	2.13
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr	0.001	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.074	Fe^{3+}	0.074	0.033	0.017	159.688	2.64
FeO	11.52	71.844	0.160	0.160	0.360	0.360	0.286	Fe^{2+}	0.286	0.127	0.127	71.844	9.14
MnO	0.34	70.937	0.005	0.005	0.011	0.011	0.011	Mn	0.011	0.005	0.005	70.937	0.34
MgO	14.55	40.304	0.361	0.361	0.810	0.810	0.810	Mg	0.810	0.361	0.361	40.304	14.55
CaO	19.51	56.077	0.348	0.348	0.781	0.781	0.781	Ca	0.781	0.348	0.348	56.077	19.51
Na2O	0.26	61.979	0.004	0.008	0.019	0.009	0.019	Na	0.019	0.008	0.004	61.979	0.26
Total	99.92		1.757	1.782	4.000	5.963	4.000			1.782	1.741		100.18

No of Oxygens 6 No of Cation 4
F 1.0062

Check! Fe2O3 as FeO 2.38
FeO* 11.52

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	1.925	2	
4	Tet	Al	0.075		
6	Oct	Al +Fe^{2+}+M	0.019	1	
6	Oct	n	0.371		
6	Oct	Mg	0.610		
8	Cubic	Mg	0.200	1	
8	Cubic	Ca	0.781		
8	Cubic	Na	0.019		
			4.000		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.61
En	Mg/(Ca+Mg+Fe2+)	43.17
Fs	Fe2+/(Ca+Mg+Fe2+)	15.22
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.292
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.925
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.633
		100.000
FeT/FeT+Mg		0.31
Fe2/Fe2+Mg		0.26

Analysis No. 37

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.93	60.084	0.881	0.881	1.998	3.995	1.998	Si	1.998	0.881	0.881	60.084	52.93
TiO2	0.34	79.866	0.004	0.004	0.010	0.019	0.010	Ti	0.010	0.004	0.004	79.866	0.34
Al2O3	3.30	101.961	0.032	0.065	0.147	0.220	0.147	Al	0.147	0.065	0.032	101.961	3.30
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	12.80	71.844	0.178	0.178	0.404	0.404	0.404	Fe^{2+}	0.404	0.178	0.178	71.844	12.80
MnO	0.38	70.937	0.005	0.005	0.012	0.012	0.012	Mn	0.012	0.005	0.005	70.937	0.38
MgO	13.25	40.304	0.329	0.329	0.745	0.745	0.745	Mg	0.745	0.329	0.329	40.304	13.25
CaO	16.31	56.077	0.291	0.291	0.660	0.660	0.660	Ca	0.660	0.291	0.291	56.077	16.31
Na2O	0.34	61.979	0.005	0.011	0.025	0.012	0.025	Na	0.025	0.011	0.005	61.979	0.34
Total	99.65		1.726	1.764	4.000	6.069	4.000			1.764	1.726		99.65

No of Oxygens 6 No of Cation 4
F 0.9887

Check! Fe2O3 as FeO 0.00
FeO* 12.80

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	2.007	2	excess tet

end member		%
Ortho and Calcic CPX		

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Al		
6	Oct	Al +Fe^{2+}+M	0.147	1
6	Oct	n	0.416	
6	Oct	Mg	0.437	
8	Cubic	Mg	0.308	1
8	Cubic	Ca	0.660	
8	Cubic	Na	0.025	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	36.46
En	Mg/(Ca+Mg+Fe2+)	41.21
Fs	Fe2+/(Ca+Mg+Fe2+)	22.33
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	3.598
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	96.402
		100.000
FeT/FeT+Mg		0.35
Fe2/Fe2+Mg		0.35

Analysis No. 55

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.83	60.084	0.846	0.846	1.904	3.808	1.904	Si
TiO2	0.20	79.866	0.002	0.002	0.006	0.011	0.006	Ti
Al2O3	2.41	101.961	0.024	0.047	0.106	0.160	0.106	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688				0.093	0.093	Fe^{3+}
FeO	10.88	71.844	0.151	0.151	0.341	0.341	0.248	Fe^{2+}
MnO	0.35	70.937	0.005	0.005	0.011	0.011	0.011	Mn
MgO	14.54	40.304	0.361	0.361	0.812	0.812	0.812	Mg
CaO	20.00	56.077	0.357	0.357	0.803	0.803	0.803	Ca
Na2O	0.25	61.979	0.004	0.008	0.018	0.009	0.018	Na
Total	99.45		1.750	1.777	4.000	5.954	4.000	

No of Oxygens 6 No of Cation 4
F 1.0078

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.904	0.846	0.846	60.084	50.83
0.006	0.002	0.002	79.866	0.20
0.106	0.047	0.024	101.961	2.41
0.000	0.000	0.000	151.990	0.00
0.093	0.041	0.021	159.688	3.29
0.248	0.110	0.110	71.844	7.92
0.011	0.005	0.005	70.937	0.35
0.812	0.361	0.361	40.304	14.54
0.803	0.357	0.357	56.077	20.00
0.018	0.008	0.004	61.979	0.25
	1.777	1.729		99.78

Check! Fe2O3 as FeO 2.96
FeO* 10.88

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.909	2
4	Tet	Al	0.091	
6	Oct	Al +Fe^{2+}+M	0.016	1
6	Oct	n	0.352	
6	Oct	Mg	0.632	
8	Cubic	Mg	0.180	1
8	Cubic	Ca	0.803	
8	Cubic	Na	0.018	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.09
En	Mg/(Ca+Mg+Fe2+)	43.59
Fs	Fe2+/(Ca+Mg+Fe2+)	13.32
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.303
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.132
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.830
		100.000
FeT/FeT+Mg		0.30
Fe2/Fe2+Mg		0.23

Analysis No. 56

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.05	60.084	0.833	0.833	1.864	3.728	1.864	Si
TiO2	0.14	79.866	0.002	0.002	0.004	0.008	0.004	Ti
Al2O3	3.85	101.961	0.038	0.076	0.169	0.253	0.169	Al
Cr2O3	0.03	151.990	0.000	0.000	0.001	0.002	0.001	Cr
Fe2O3	0.00	159.688					0.107	Fe^{3+}
FeO	9.00	71.844	0.125	0.125	0.280	0.280	0.173	Fe^{2+}
MnO	0.22	70.937	0.003	0.003	0.007	0.007	0.007	Mn
MgO	15.35	40.304	0.381	0.381	0.852	0.852	0.852	Mg
CaO	20.31	56.077	0.362	0.362	0.810	0.810	0.810	Ca
Na2O	0.17	61.979	0.003	0.006	0.012	0.006	0.012	Na
Total	99.13		1.747	1.788	4.000	5.947	4.000	

No of Oxygens 6 No of Cation 4
F 1.0090

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.864	0.833	0.833	60.084	50.05
0.004	0.002	0.002	79.866	0.14
0.169	0.076	0.038	101.961	3.85
0.001	0.000	0.000	151.990	0.03
0.107	0.048	0.024	159.688	3.81
0.173	0.078	0.078	71.844	5.57
0.007	0.003	0.003	70.937	0.22
0.852	0.381	0.381	40.304	15.35
0.810	0.362	0.362	56.077	20.31
0.012	0.006	0.003	61.979	0.17
	1.788	1.723		99.51

Check! Fe2O3 as FeO 3.43
FeO* 9.00

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.868	2
4	Tet	Al	0.132	
6	Oct	Al +Fe^{2+}+M	0.037	1
6	Oct	n	0.288	
6	Oct	Mg	0.675	
8	Cubic	Mg	0.177	1
8	Cubic	Ca	0.810	
8	Cubic	Na	0.012	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.14
En	Mg/(Ca+Mg+Fe2+)	46.41
Fs	Fe2+/(Ca+Mg+Fe2+)	9.45
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	12.988
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-11.491
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.504
		100.000
FeT/FeT+Mg		0.25
Fe2/Fe2+Mg		0.17

Analysis No. 57

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.01	60.084	0.866	0.866	1.925	3.851	1.925	Si
TiO2	0.04	79.866	0.000	0.000	0.001	0.002	0.001	Ti
Al2O3	2.23	101.961	0.022	0.044	0.097	0.146	0.097	Al
Cr2O3	0.11	151.990	0.001	0.001	0.003	0.005	0.003	Cr
Fe2O3	0.00	159.688					0.059	Fe^{3+}
FeO	6.53	71.844	0.091	0.091	0.202	0.202	0.143	Fe^{2+}
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	16.51	40.304	0.410	0.410	0.911	0.911	0.911	Mg
CaO	21.23	56.077	0.379	0.379	0.842	0.842	0.842	Ca
Na2O	0.17	61.979	0.003	0.005	0.012	0.006	0.012	Na
Total	99.01		1.773	1.798	4.000	5.970	4.000	

No of Oxygens 6 No of Cation 4
F 1.0049

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.925	0.866	0.866	60.084	52.01
0.001	0.000	0.000	79.866	0.04
0.097	0.044	0.022	101.961	2.23
0.003	0.001	0.001	151.990	0.11
0.059	0.027	0.013	159.688	2.12
0.143	0.064	0.064	71.844	4.62
0.006	0.003	0.003	70.937	0.18
0.911	0.410	0.410	40.304	16.51
0.842	0.379	0.379	56.077	21.23
0.012	0.005	0.003	61.979	0.17
	1.798	1.760		99.22

Check! Fe2O3 as FeO 1.91
FeO* 6.53

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.926	2
4	Tet	Al	0.074	
6	Oct	Al +Fe^{2+}+M	0.024	1
6	Oct	n	0.211	
6	Oct	Mg	0.765	
8	Cubic	Mg	0.146	1
8	Cubic	Ca	0.842	
8	Cubic	Na	0.012	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.41
En	Mg/(Ca+Mg+Fe2+)	48.05
Fs	Fe2+/(Ca+Mg+Fe2+)	7.55
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	6.913
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.488
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.575
		100.000

FeT/FeT+Mg	0.18
Fe2/Fe2+Mg	0.14

Analysis No. 58

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.67	60.084	0.843	0.843	1.880	3.760	1.880	Si
TiO2	0.23	79.866	0.003	0.003	0.006	0.013	0.006	Ti
Al2O3	3.61	101.961	0.035	0.071	0.158	0.237	0.158	Al
Cr2O3	0.04	151.990	0.000	0.001	0.001	0.002	0.001	Cr
Fe2O3	0.00	159.688				0.082	0.082	Fe^{3+}
FeO	8.74	71.844	0.122	0.122	0.271	0.271	0.189	Fe^{2+}
MnO	0.20	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	15.41	40.304	0.382	0.382	0.852	0.852	0.852	Mg
CaO	20.40	56.077	0.364	0.364	0.811	0.811	0.811	Ca
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na
Total	99.49		1.756	1.794	4.000	5.959	4.000	

No of Oxygens 6 No of Cation 4
F 1.0069

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.880	0.843	0.843	60.084	50.67
0.006	0.003	0.003	79.866	0.23
0.158	0.071	0.035	101.961	3.61
0.001	0.001	0.000	151.990	0.04
0.082	0.037	0.018	159.688	2.95
0.189	0.085	0.085	71.844	6.08
0.006	0.003	0.003	70.937	0.20
0.852	0.382	0.382	40.304	15.41
0.811	0.364	0.364	56.077	20.40
0.014	0.006	0.003	61.979	0.19
	1.794	1.737		99.79

Check! Fe2O3 as FeO 2.66
FeO* 8.74

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.886	2
4	Tet	Al	0.114	
6	Oct	Al	0.044	1
		+Fe^{2+}+M		
6	Oct	n	0.279	
6	Oct	Mg	0.677	
8	Cubic	Mg	0.175	1
8	Cubic	Ca	0.811	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.79
En	Mg/(Ca+Mg+Fe2+)	46.02
Fs	Fe2+/(Ca+Mg+Fe2+)	10.19
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.996
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.300
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.304
		100.000

FeT/FeT+Mg	0.24
Fe2/Fe2+Mg	0.18

Analysis No. 59

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.34	60.084	0.854	0.854	1.916	3.832	1.916	Si
TiO2	0.16	79.866	0.002	0.002	0.005	0.009	0.005	Ti
Al2O3	2.02	101.961	0.020	0.040	0.089	0.133	0.089	Al
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.090	Fe^{3+}
FeO	10.81	71.844	0.150	0.150	0.337	0.337	0.247	Fe^{2+}
MnO	0.33	70.937	0.005	0.005	0.010	0.010	0.010	Mn
MgO	14.66	40.304	0.364	0.364	0.816	0.816	0.816	Mg
CaO	20.21	56.077	0.360	0.360	0.808	0.808	0.808	Ca
Na2O	0.27	61.979	0.004	0.009	0.020	0.010	0.020	Na
Total	99.80		1.760	1.784	4.000	5.955	4.000	

No of Oxygens 6 No of Cation 4
F 1.0076

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.916	0.854	0.854	60.084	51.34
0.005	0.002	0.002	79.866	0.16
0.089	0.040	0.020	101.961	2.02
0.000	0.000	0.000	151.990	0.00
0.090	0.040	0.020	159.688	3.21
0.247	0.110	0.110	71.844	7.92
0.010	0.005	0.005	70.937	0.33
0.816	0.364	0.364	40.304	14.66
0.808	0.360	0.360	56.077	20.21
0.020	0.009	0.004	61.979	0.27
	1.784	1.740		100.12

Check! Fe2O3 as FeO 2.89
FeO* 10.81

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.920	2
4	Tet	Al	0.080	
6	Oct	Al	0.009	1
		+Fe^{2+}+M		
6	Oct	n	0.348	
6	Oct	Mg	0.643	
8	Cubic	Mg	0.172	1
8	Cubic	Ca	0.808	
8	Cubic	Na	0.020	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.20
En	Mg/(Ca+Mg+Fe2+)	43.60
Fs	Fe2+/(Ca+Mg+Fe2+)	13.21
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.907
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.532
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.625
		100.000

FeT/FeT+Mg	0.29
Fe2/Fe2+Mg	0.23

Analysis No. 65

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.50	60.084	0.857	0.857	1.906	3.812	1.906	Si
TiO2	0.21	79.866	0.003	0.003	0.006	0.012	0.006	Ti
Al2O3	2.93	101.961	0.029	0.057	0.128	0.192	0.128	Al
Cr2O3	0.11	151.990	0.001	0.002	0.003	0.005	0.003	Cr
Fe2O3	0.00	159.688					0.059	Fe^{3+}
FeO	8.79	71.844	0.122	0.122	0.272	0.272	0.213	Fe^{2+}
MnO	0.26	70.937	0.004	0.004	0.008	0.008	0.008	Mn
MgO	15.94	40.304	0.395	0.395	0.880	0.880	0.880	Mg
CaO	19.75	56.077	0.352	0.352	0.783	0.783	0.783	Ca
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na
Total	99.68		1.766	1.799	4.000	5.971	4.000	

No of Oxygens 6 No of Cation 4
F 1.0049

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.906	0.857	0.857	60.084	51.50
0.006	0.003	0.003	79.866	0.21
0.128	0.057	0.029	101.961	2.93
0.003	0.002	0.001	151.990	0.11
0.059	0.026	0.013	159.688	2.11
0.213	0.096	0.096	71.844	6.89
0.008	0.004	0.004	70.937	0.26
0.880	0.395	0.395	40.304	15.94
0.783	0.352	0.352	56.077	19.75
0.014	0.006	0.003	61.979	0.19
	1.799	1.753		99.90

Check! Fe2O3 as FeO 1.90
FeO* 8.79

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.912	2
4	Tet	Al	0.088	
6	Oct	Al	0.040	1
		+Fe^{2+}+M		
6	Oct	n	0.284	
6	Oct	Mg	0.677	
8	Cubic	Mg	0.203	1
8	Cubic	Ca	0.783	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.75
En	Mg/(Ca+Mg+Fe2+)	46.88
Fs	Fe2+/(Ca+Mg+Fe2+)	11.37
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.379
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.635
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.255
		100.000

FeT/FeT+Mg	0.24
Fe2/Fe2+Mg	0.20

Analysis No. 90

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.53	60.084	0.858	0.858	1.948	3.895	1.948	Si
TiO2	0.02	79.866	0.000	0.000	0.001	0.001	0.001	Ti
Al2O3	1.55	101.961	0.015	0.030	0.069	0.103	0.069	Al

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.948	0.858	0.858	60.084	51.53
0.001	0.000	0.000	79.866	0.02
0.069	0.030	0.015	101.961	1.55

Cr2O3	0.01	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.01
Fe2O3	0.00	159.688					0.051	Fe^{3+}	0.051	0.023	0.011	159.688	1.81
FeO	10.15	71.844	0.141	0.141	0.321	0.321	0.269	Fe^{2+}	0.269	0.119	0.119	71.844	8.52
MnO	0.37	70.937	0.005	0.005	0.012	0.012	0.012	Mn	0.012	0.005	0.005	70.937	0.37
MgO	14.75	40.304	0.366	0.366	0.831	0.831	0.831	Mg	0.831	0.366	0.366	40.304	14.75
CaO	19.79	56.077	0.353	0.353	0.801	0.801	0.801	Ca	0.801	0.353	0.353	56.077	19.79
Na2O	0.24	61.979	0.004	0.008	0.017	0.009	0.017	Na	0.017	0.008	0.004	61.979	0.24
Total	98.40		1.742	1.761	4.000	5.974	4.000			1.761	1.731		98.59

No of Oxygens 6 No of Cation 4
F 1.0043

Check! Fe2O3 as FeO 1.63
FeO* 10.15

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.948	2
4	Tet	Al	0.052	
6	Oct	Al +Fe^{2+}+M	0.017	1
6	Oct	n	0.333	
6	Oct	Mg	0.650	
8	Cubic	Mg	0.181	1
8	Cubic	Ca	0.801	
8	Cubic	Na	0.017	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.14
En	Mg/(Ca+Mg+Fe2+)	43.70
Fs	Fe2+/(Ca+Mg+Fe2+)	14.16
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	6.289
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-4.171
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.882
		100.000
FeT/FeT+Mg		0.28
Fe2/Fe2+Mg		0.24

Analysis No. 91

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.57	60.084	0.842	0.842	1.908	3.817	1.908	Si	1.908	0.842	0.842	60.084	50.57
TiO2	0.08	79.866	0.001	0.001	0.002	0.004	0.002	Ti	0.002	0.001	0.001	79.866	0.08
Al2O3	2.57	101.961	0.025	0.050	0.114	0.171	0.114	Al	0.114	0.050	0.025	101.961	2.57
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.081	Fe^{3+}	0.081	0.036	0.018	159.688	2.84
FeO	10.86	71.844	0.151	0.151	0.343	0.343	0.262	Fe^{2+}	0.262	0.116	0.116	71.844	8.30
MnO	0.37	70.937	0.005	0.005	0.012	0.012	0.012	Mn	0.012	0.005	0.005	70.937	0.37
MgO	14.43	40.304	0.358	0.358	0.812	0.812	0.812	Mg	0.812	0.358	0.358	40.304	14.43
CaO	19.61	56.077	0.350	0.350	0.793	0.793	0.793	Ca	0.793	0.350	0.350	56.077	19.61
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.22
Total	98.71		1.735	1.764	4.000	5.960	4.000			1.764	1.718		98.99

No of Oxygens 6 No of Cation 4
F 1.0068

Check! Fe2O3 as FeO 2.56
FeO* 10.86

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.911	2
4	Tet	Al	0.089	
6	Oct	Al +Fe^{2+}+M	0.025	1
6	Oct	n	0.355	
6	Oct	Mg	0.621	
8	Cubic	Mg	0.191	1
8	Cubic	Ca	0.793	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.47
En	Mg/(Ca+Mg+Fe2+)	43.49
Fs	Fe2+/(Ca+Mg+Fe2+)	14.04
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.969
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.983
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.014
		100.000
FeT/FeT+Mg		0.30
Fe2/Fe2+Mg		0.24

Analysis No. 92

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.17	60.084	0.852	0.852	1.926	3.852	1.926	Si	1.926	0.852	0.852	60.084	51.17
TiO2	0.07	79.866	0.001	0.001	0.002	0.004	0.002	Ti	0.002	0.001	0.001	79.866	0.07
Al2O3	2.26	101.961	0.022	0.044	0.100	0.150	0.100	Al	0.100	0.044	0.022	101.961	2.26
Cr2O3	0.04	151.990	0.000	0.000	0.001	0.002	0.001	Cr	0.001	0.000	0.000	151.990	0.04
Fe2O3	0.00	159.688					0.059	Fe^{3+}	0.059	0.026	0.013	159.688	2.09
FeO	10.13	71.844	0.141	0.141	0.319	0.319	0.260	Fe^{2+}	0.260	0.115	0.115	71.844	8.25
MnO	0.29	70.937	0.004	0.004	0.009	0.009	0.009	Mn	0.009	0.004	0.004	70.937	0.29
MgO	14.71	40.304	0.365	0.365	0.825	0.825	0.825	Mg	0.825	0.365	0.365	40.304	14.71
CaO	19.84	56.077	0.354	0.354	0.800	0.800	0.800	Ca	0.800	0.354	0.354	56.077	19.84
Na2O	0.23	61.979	0.004	0.007	0.017	0.008	0.017	Na	0.017	0.007	0.004	61.979	0.23
Total	98.74		1.742	1.769	4.000	5.970	4.000			1.769	1.729		98.95

No of Oxygens 6 No of Cation 4
F 1.0050

Check! Fe2O3 as FeO 1.88
FeO* 10.13

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.928	2
4	Tet	Al	0.072	
6	Oct	Al +Fe^{2+}+M	0.028	1
6	Oct	n	0.329	
6	Oct	Mg	0.642	
8	Cubic	Mg	0.183	1
8	Cubic	Ca	0.800	
8	Cubic	Na	0.017	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.44
En	Mg/(Ca+Mg+Fe2+)	43.78
Fs	Fe2+/(Ca+Mg+Fe2+)	13.77
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.247
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.210
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.963
		100.000
FeT/FeT+Mg		0.28
Fe2/Fe2+Mg		0.24

Analysis No. 93

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.04	60.084	0.849	0.849	1.925	3.851	1.925	Si	1.925	0.849	0.849	60.084	51.04
TiO2	0.08	79.866	0.001	0.001	0.002	0.004	0.002	Ti	0.002	0.001	0.001	79.866	0.08
Al2O3	2.16	101.961	0.021	0.042	0.096	0.144	0.096	Al	0.096	0.042	0.021	101.961	2.16
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.065	Fe^{3+}	0.065	0.029	0.014	159.688	2.29
FeO	10.52	71.844	0.146	0.146	0.332	0.332	0.267	Fe^{2+}	0.267	0.118	0.118	71.844	8.46
MnO	0.33	70.937	0.005	0.005	0.011	0.011	0.011	Mn	0.011	0.005	0.005	70.937	0.33
MgO	14.79	40.304	0.367	0.367	0.832	0.832	0.832	Mg	0.832	0.367	0.367	40.304	14.79
CaO	19.44	56.077	0.347	0.347	0.786	0.786	0.786	Ca	0.786	0.347	0.347	56.077	19.44
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.22
Total	98.58		1.740	1.765	4.000	5.967	4.000			1.765	1.726		98.81

No of Oxygens 6 No of Cation 4
F 1.0055

Check! Fe2O3 as FeO 2.06
FeO* 10.52

Cation Site Occupancy						end	
C.N.	Site	Elements		Ideal Cations/Site		member	%
4	Tet	Si+Ti	1.928	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.072		Wo	Ca/(Ca+Mg+Fe2+)	41.70
6	Oct	Al +Fe^{2+}+M	0.024	1	En	Mg/(Ca+Mg+Fe2+)	44.14
6	Oct	n	0.342		Fs	Fe2+/(Ca+Mg+Fe2+)	14.16
6	Oct	Mg	0.634			total	100.00
8	Cubic	Mg	0.198	1			
8	Cubic	Ca	0.786		**Sodic and Calcic CPX**		
8	Cubic	Na	0.016		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.114
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.068
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.954
							100.000
					FeT/FeT+Mg		0.29
					Fe2/Fe2+Mg		0.24

Analysis No.	94								
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		
SiO2	50.69	60.084	0.844	0.844	1.919	3.838	1.919	Si	
TiO2	0.12	79.866	0.002	0.002	0.004	0.007	0.004	Ti	
Al2O3	2.41	101.961	0.024	0.047	0.108	0.161	0.108	Al	
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr	
Fe2O3	0.00	159.688					0.061	Fe^{3+}	
FeO	12.21	71.844	0.170	0.170	0.387	0.387	0.326	Fe^{2+}	
MnO	0.34	70.937	0.005	0.005	0.011	0.011	0.011	Mn	
MgO	14.38	40.304	0.357	0.357	0.812	0.812	0.812	Mg	
CaO	18.40	56.077	0.328	0.328	0.746	0.746	0.746	Ca	
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na	
Total	98.77		1.732	1.759	4.000	5.970	4.000		

No of Oxygens 6 No of Cation 4
F 1.0051

Calculate Fe2O3 Wt %				
Atom Units	Cation Units	Moles	MW	Wt %
1.919	0.844	0.844	60.084	50.69
0.004	0.002	0.002	79.866	0.12
0.108	0.047	0.024	101.961	2.41
0.001	0.000	0.000	151.990	0.02
0.061	0.027	0.013	159.688	2.14
0.326	0.143	0.143	71.844	10.29
0.011	0.005	0.005	70.937	0.34
0.812	0.357	0.357	40.304	14.38
0.746	0.328	0.328	56.077	18.40
0.014	0.006	0.003	61.979	0.19
	1.759	1.718		98.98

Check! Fe2O3 as FeO 1.92
FeO* 12.21

Cation Site Occupancy						end	
C.N.	Site	Elements		Ideal Cations/Site		member	%
4	Tet	Si+Ti	1.922	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.078		Wo	Ca/(Ca+Mg+Fe2+)	39.62
6	Oct	Al +Fe^{2+}+M	0.030	1	En	Mg/(Ca+Mg+Fe2+)	43.08
6	Oct	n	0.398		Fs	Fe2+/(Ca+Mg+Fe2+)	17.29
6	Oct	Mg	0.572			total	100.00
8	Cubic	Mg	0.240	1			
8	Cubic	Ca	0.746		**Sodic and Calcic CPX**		
8	Cubic	Na	0.014		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.000
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.168
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.168
							100.000
					FeT/FeT+Mg		0.32
					Fe2/Fe2+Mg		0.29

Analysis No.	109								
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		
SiO2	51.56	60.084	0.858	0.858	1.941	3.882	1.941	Si	
TiO2	0.02	79.866	0.000	0.000	0.001	0.001	0.001	Ti	
Al2O3	2.48	101.961	0.024	0.049	0.110	0.165	0.110	Al	
Cr2O3	0.20	151.990	0.001	0.003	0.006	0.009	0.006	Cr	
Fe2O3	0.00	159.688					0.013	Fe^{3+}	
FeO	6.44	71.844	0.090	0.090	0.203	0.203	0.190	Fe^{2+}	
MnO	0.21	70.937	0.003	0.003	0.007	0.007	0.007	Mn	
MgO	16.28	40.304	0.404	0.404	0.914	0.914	0.914	Mg	
CaO	20.02	56.077	0.357	0.357	0.807	0.807	0.807	Ca	
Na2O	0.17	61.979	0.003	0.005	0.012	0.006	0.012	Na	
Total	97.37		1.740	1.769	4.000	5.993	4.000		

No of Oxygens 6 No of Cation 4
F 1.0011

Calculate Fe2O3 Wt %				
Atom Units	Cation Units	Moles	MW	Wt %
1.941	0.858	0.858	60.084	51.56
0.001	0.000	0.000	79.866	0.02
0.110	0.049	0.024	101.961	2.48
0.006	0.003	0.001	151.990	0.20
0.013	0.006	0.003	159.688	0.46
0.190	0.084	0.084	71.844	6.03
0.007	0.003	0.003	70.937	0.21
0.914	0.404	0.404	40.304	16.28
0.807	0.357	0.357	56.077	20.02
0.012	0.005	0.003	61.979	0.17
	1.769	1.737		97.42

Check! Fe2O3 as FeO 0.41
FeO* 6.44

Cation Site Occupancy						end	
C.N.	Site	Elements		Ideal Cations/Site		member	%
4	Tet	Si+Ti	1.942	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.058		Wo	Ca/(Ca+Mg+Fe2+)	42.26
6	Oct	Al +Fe^{2+}+M	0.052	1	En	Mg/(Ca+Mg+Fe2+)	47.81
6	Oct	n	0.215		Fs	Fe2+/(Ca+Mg+Fe2+)	9.93
6	Oct	Mg	0.733			total	100.00
8	Cubic	Mg	0.180	1			
8	Cubic	Ca	0.807		**Sodic and Calcic CPX**		
8	Cubic	Na	0.012		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	1.590
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-0.112
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.522
							100.000
					FeT/FeT+Mg		0.18
					Fe2/Fe2+Mg		0.17

Analysis No.	110								
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		
SiO2	50.49	60.084	0.840	0.840	1.905	3.809	1.905	Si	
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti	
Al2O3	2.91	101.961	0.029	0.057	0.129	0.194	0.129	Al	
Cr2O3	0.04	151.990	0.000	0.000	0.001	0.002	0.001	Cr	
Fe2O3	0.00	159.688					0.077	Fe^{3+}	
FeO	10.45	71.844	0.145	0.145	0.330	0.330	0.252	Fe^{2+}	
MnO	0.29	70.937	0.004	0.004	0.009	0.009	0.009	Mn	
MgO	14.40	40.304	0.357	0.357	0.810	0.810	0.810	Mg	
CaO	19.72	56.077	0.352	0.352	0.797	0.797	0.797	Ca	
Na2O	0.25	61.979	0.004	0.008	0.019	0.009	0.019	Na	
Total	98.58		1.732	1.765	4.000	5.961	4.000		

No of Oxygens 6 No of Cation 4
F 1.0065

Calculate Fe2O3 Wt %				
Atom Units	Cation Units	Moles	MW	Wt %
1.905	0.840	0.840	60.084	50.49
0.001	0.000	0.000	79.866	0.03
0.129	0.057	0.029	101.961	2.91
0.001	0.000	0.000	151.990	0.04
0.077	0.034	0.017	159.688	2.73
0.252	0.111	0.111	71.844	7.99
0.009	0.004	0.004	70.937	0.29
0.810	0.357	0.357	40.304	14.40
0.797	0.352	0.352	56.077	19.72
0.019	0.008	0.004	61.979	0.25
	1.765	1.715		98.85

Check! Fe2O3 as FeO 2.46
FeO* 10.45

Cation Site Occupancy						end	
C.N.	Site	Elements		Ideal Cations/Site		member	%
4	Tet	Si+Ti	1.905	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.095		Wo	Ca/(Ca+Mg+Fe2+)	42.87
6	Oct	Al +Fe^{2+}+M	0.035	1	En	Mg/(Ca+Mg+Fe2+)	43.56
6	Oct	n	0.340		Fs	Fe2+/(Ca+Mg+Fe2+)	13.57
6	Oct	Mg	0.625			total	100.00
8	Cubic	Mg	0.184	1			

8	Cubic	Ca	0.797		
8	Cubic	Na	0.019		
			4.000		

Sodic and Calcic CPX

Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.501
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.226
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.724
		100.000

FeT/FeT+Mg	0.29
Fe2/Fe2+Mg	0.24

Analysis No. 111

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.58	60.084	0.842	0.842	1.889	3.778	1.889	Si	1.889	0.842	0.842	60.084	50.58
TiO2	0.11	79.866	0.001	0.001	0.003	0.006	0.003	Ti	0.003	0.001	0.001	79.866	0.11
Al2O3	3.53	101.961	0.035	0.069	0.155	0.233	0.155	Al	0.155	0.069	0.035	101.961	3.53
Cr2O3	0.22	151.990	0.001	0.003	0.006	0.010	0.006	Cr	0.006	0.003	0.001	151.990	0.22
Fe2O3	0.00	159.688					0.070	Fe^{3+}	0.070	0.031	0.016	159.688	2.48
FeO	8.09	71.844	0.113	0.113	0.253	0.253	0.183	Fe^{2+}	0.183	0.082	0.082	71.844	5.86
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.18
MgO	15.45	40.304	0.383	0.383	0.860	0.860	0.860	Mg	0.860	0.383	0.383	40.304	15.45
CaO	20.27	56.077	0.361	0.361	0.811	0.811	0.811	Ca	0.811	0.361	0.361	56.077	20.27
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.22
Total	98.65		1.743	1.782	4.000	5.965	4.000			1.782	1.727		98.90

No of Oxygens	6	No of Cation	4
F	1.0058		

Calculate Fe2O3 Wt %

Check!	Fe2O3 as FeO	2.23
	FeO*	8.09

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.892	2
4	Tet	Al	0.108	
6	Oct	Al	0.048	1
		+Fe^{2+}+M		
6	Oct	n	0.265	
6	Oct	Mg	0.688	
8	Cubic	Mg	0.173	1
8	Cubic	Ca	0.811	
8	Cubic	Na	0.016	
			4.000	

		end member	%
Ortho and Calcic CPX			
Wo	Ca/(Ca+Mg+Fe2+)		43.74
En	Mg/(Ca+Mg+Fe2+)		46.39
Fs	Fe2+/(Ca+Mg+Fe2+)		9.87
	total		100.00

Sodic and Calcic CPX

Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.416
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.476
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.059
		100.000

FeT/FeT+Mg	0.23
Fe2/Fe2+Mg	0.18

Ti	Al IV	Al VI	Wo	En	Fs
0.003	0.108	0.048	43.74	46.39	9.87

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total
50.58	0.11	3.53	0.22	2.48	5.86	0.18	15.45	20.27	0.22	98.90

Analysis No. 112

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.24	60.084	0.836	0.836	1.886	3.771	1.886	Si	1.886	0.836	0.836	60.084	50.24
TiO2	0.11	79.866	0.001	0.001	0.003	0.006	0.003	Ti	0.003	0.001	0.001	79.866	0.11
Al2O3	3.12	101.961	0.031	0.061	0.138	0.207	0.138	Al	0.138	0.061	0.031	101.961	3.12
Cr2O3	0.17	151.990	0.001	0.002	0.005	0.008	0.005	Cr	0.005	0.002	0.001	151.990	0.17
Fe2O3	0.00	159.688					0.097	Fe^{3+}	0.097	0.043	0.021	159.688	3.43
FeO	9.06	71.844	0.126	0.126	0.284	0.284	0.187	Fe^{2+}	0.187	0.083	0.083	71.844	5.97
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.18
MgO	15.25	40.304	0.378	0.378	0.853	0.853	0.853	Mg	0.853	0.378	0.378	40.304	15.25
CaO	20.09	56.077	0.358	0.358	0.808	0.808	0.808	Ca	0.808	0.358	0.358	56.077	20.09
Na2O	0.23	61.979	0.004	0.008	0.017	0.009	0.017	Na	0.017	0.008	0.004	61.979	0.23
Total	98.45		1.738	1.774	4.000	5.952	4.000			1.774	1.717		98.80

No of Oxygens	6	No of Cation	4
F	1.0081		

Calculate Fe2O3 Wt %

Check!	Fe2O3 as FeO	3.09
	FeO*	9.06

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.889	2
4	Tet	Al	0.111	
6	Oct	Al	0.027	1
		+Fe^{2+}+M		
6	Oct	n	0.295	
6	Oct	Mg	0.678	
8	Cubic	Mg	0.175	1
8	Cubic	Ca	0.808	
8	Cubic	Na	0.017	
			4.000	

		end member	%
Ortho and Calcic CPX			
Wo	Ca/(Ca+Mg+Fe2+)		43.70
En	Mg/(Ca+Mg+Fe2+)		46.16
Fs	Fe2+/(Ca+Mg+Fe2+)		10.14
	total		100.00

Sodic and Calcic CPX

Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.751
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.681
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.930
		100.000

FeT/FeT+Mg	0.25
Fe2/Fe2+Mg	0.18

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.24	0.11	3.12	0.17	3.43	5.97	0.18	15.25	20.09	0.23	98.80	0.003	0.111	0.027	43.70	46.16	10.14

Analysis No. 123

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.66	60.084	0.843	0.843	1.908	3.817	1.908	Si	1.908	0.843	0.843	60.084	50.66
TiO2	0.12	79.866	0.002	0.002	0.003	0.007	0.003	Ti	0.003	0.002	0.002	79.866	0.12
Al2O3	2.89	101.961	0.028	0.057	0.128	0.192	0.128	Al	0.128	0.057	0.028	101.961	2.89
Cr2O3	0.09	151.990	0.001	0.001	0.003	0.004	0.003	Cr	0.003	0.001	0.001	151.990	0.09
Fe2O3	0.00	159.688					0.066	Fe^{3+}	0.066	0.029	0.015	159.688	2.34
FeO	9.21	71.844	0.128	0.128	0.290	0.290	0.224	Fe^{2+}	0.224	0.099	0.099	71.844	7.11
MnO	0.27	70.937	0.004	0.004	0.009	0.009	0.009	Mn	0.009	0.004	0.004	70.937	0.27
MgO	14.58	40.304	0.362	0.362	0.819	0.819	0.819	Mg	0.819	0.362	0.362	40.304	14.58
CaO	20.28	56.077	0.362	0.362	0.819	0.819	0.819	Ca	0.819	0.362	0.362	56.077	20.28
Na2O	0.29	61.979	0.005	0.009	0.021	0.010	0.021	Na	0.021	0.009	0.005	61.979	0.29
Total	98.39		1.734	1.767	4.000	5.967	4.000			1.767	1.719		98.62

No of Oxygens	6	No of Cation	4
F	1.0055		

Calculate Fe2O3 Wt %

Check!	Fe2O3 as FeO	2.10
	FeO*	9.21

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.912	2
4	Tet	Al	0.088	
6	Oct	Al	0.040	1
		+Fe^{2+}+M		
6	Oct	n	0.301	
6	Oct	Mg	0.658	
8	Cubic	Mg	0.161	1
8	Cubic	Ca	0.819	
8	Cubic	Na	0.021	
			4.000	

		end member	%
Ortho and Calcic CPX			
Wo	Ca/(Ca+Mg+Fe2+)		43.98
En	Mg/(Ca+Mg+Fe2+)		43.99
Fs	Fe2+/(Ca+Mg+Fe2+)		12.03
	total		100.00

Sodic and Calcic CPX

Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.886
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.397
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.511
		100.000

FeT/FeT+Mg	0.26
Fe2/Fe2+Mg	0.21

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.66	0.12	2.89	0.09	2.34	7.11	0.27	14.58	20.28	0.29	98.62	0.003	0.088	0.040	43.98	43.99	12.03

Analysis No. 124

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.13	60.084	0.851	0.851	1.925	3.851	1.925	Si	1.925	0.851	0.851	60.084	51.13
TiO2	0.12	79.866	0.002	0.002	0.003	0.007	0.003	Ti	0.003	0.002	0.002	79.866	0.12
Al2O3	2.06	101.961	0.020	0.040	0.091	0.137	0.091	Al	0.091	0.040	0.020	101.961	2.06
Cr2O3	0.00	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.00
Fe2O3	0.00	159.688					0.067	Fe^{3+}	0.067	0.030	0.015	159.688	2.37
FeO	10.12	71.844	0.141	0.141	0.319	0.319	0.252	Fe^{2+}	0.252	0.111	0.111	71.844	7.99
MnO	0.32	70.937	0.004	0.004	0.010	0.010	0.010	Mn	0.010	0.004	0.004	70.937	0.32
MgO	14.85	40.304	0.368	0.368	0.834	0.834	0.834	Mg	0.834	0.368	0.368	40.304	14.85
CaO	19.87	56.077	0.354	0.354	0.802	0.802	0.802	Ca	0.802	0.354	0.354	56.077	19.87
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.22
Total	98.68		1.744	1.768	4.000	5.966	4.000			1.768	1.729		98.92

No of Oxygens 6 No of Cation 4
F 1.0056

Check! Fe2O3 as FeO 2.13
FeO* 10.12

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.929	2
4	Tet	Al	0.071	
6	Oct	Al +Fe^{2+}+M	0.020	1
6	Oct	n	0.329	
6	Oct	Mg	0.651	
8	Cubic	Mg	0.182	1
8	Cubic	Ca	0.802	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.49
En	Mg/(Ca+Mg+Fe2+)	44.18
Fs	Fe2+/(Ca+Mg+Fe2+)	13.33
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.205
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.263
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.058
		100.000
FeT/FeT+Mg		0.28
Fe2/Fe2+Mg		0.23

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.13	0.12	2.06	0.00	2.37	7.99	0.32	14.85	19.87	0.22	98.92	0.003	0.071	0.020	42.49	44.18	13.33

Analysis No. 125

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.07	60.084	0.850	0.850	1.923	3.846	1.923	Si	1.923	0.850	0.850	60.084	51.07
TiO2	0.08	79.866	0.001	0.001	0.002	0.005	0.002	Ti	0.002	0.001	0.001	79.866	0.08
Al2O3	2.13	101.961	0.021	0.042	0.095	0.142	0.095	Al	0.095	0.042	0.021	101.961	2.13
Cr2O3	0.01	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.01
Fe2O3	0.00	159.688					0.075	Fe^{3+}	0.075	0.033	0.017	159.688	2.64
FeO	10.92	71.844	0.152	0.152	0.344	0.344	0.269	Fe^{2+}	0.269	0.119	0.119	71.844	8.54
MnO	0.34	70.937	0.005	0.005	0.011	0.011	0.011	Mn	0.011	0.005	0.005	70.937	0.34
MgO	14.35	40.304	0.356	0.356	0.805	0.805	0.805	Mg	0.805	0.356	0.356	40.304	14.35
CaO	19.83	56.077	0.354	0.354	0.800	0.800	0.800	Ca	0.800	0.354	0.354	56.077	19.83
Na2O	0.27	61.979	0.004	0.009	0.020	0.010	0.020	Na	0.020	0.009	0.004	61.979	0.27
Total	99.00		1.743	1.768	4.000	5.963	4.000			1.768	1.726		99.27

No of Oxygens 6 No of Cation 4
F 1.0063

Check! Fe2O3 as FeO 2.38
FeO* 10.92

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.925	2
4	Tet	Al	0.075	
6	Oct	Al +Fe^{2+}+M	0.020	1
6	Oct	n	0.355	
6	Oct	Mg	0.625	
8	Cubic	Mg	0.180	1
8	Cubic	Ca	0.800	
8	Cubic	Na	0.020	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.68
En	Mg/(Ca+Mg+Fe2+)	42.97
Fs	Fe2+/(Ca+Mg+Fe2+)	14.35
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.133
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.692
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.559
		100.000
FeT/FeT+Mg		0.30
Fe2/Fe2+Mg		0.25

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.07	0.08	2.13	0.01	2.64	8.54	0.34	14.35	19.83	0.27	99.27	0.002	0.075	0.020	42.68	42.97	14.35

Analysis No. 89

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.34	60.084	0.854	0.854	1.897	3.794	1.897	Si	1.897	0.854	0.854	60.084	51.34
TiO2	0.12	79.866	0.001	0.001	0.003	0.007	0.003	Ti	0.003	0.001	0.001	79.866	0.12
Al2O3	2.60	101.961	0.025	0.051	0.113	0.170	0.113	Al	0.113	0.051	0.025	101.961	2.60
Cr2O3	0.07	151.990	0.000	0.001	0.002	0.003	0.002	Cr	0.002	0.001	0.000	151.990	0.07
Fe2O3	0.00	159.688					0.100	Fe^{3+}	0.100	0.045	0.022	159.688	3.58
FeO	10.47	71.844	0.146	0.146	0.324	0.324	0.224	Fe^{2+}	0.224	0.101	0.101	71.844	7.25
MnO	0.27	70.937	0.004	0.004	0.009	0.009	0.009	Mn	0.009	0.004	0.004	70.937	0.27
MgO	16.14	40.304	0.400	0.400	0.889	0.889	0.889	Mg	0.889	0.400	0.400	40.304	16.14
CaO	18.87	56.077	0.337	0.337	0.747	0.747	0.747	Ca	0.747	0.337	0.337	56.077	18.87
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.22
Total	100.10		1.772	1.802	4.000	5.950	4.000			1.802	1.750		100.46

No of Oxygens 6 No of Cation 4
F 1.0084

Check! Fe2O3 as FeO 3.22
FeO* 10.47

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.900	2
4	Tet	Al	0.100	
6	Oct	Al +Fe^{2+}+M	0.014	1
6	Oct	n	0.334	
6	Oct	Mg	0.652	
8	Cubic	Mg	0.237	1
8	Cubic	Ca	0.747	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.16
En	Mg/(Ca+Mg+Fe2+)	47.80
Fs	Fe2+/(Ca+Mg+Fe2+)	12.04
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	13.061
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-10.983
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.922
		100.000
FeT/FeT+Mg		0.27
Fe2/Fe2+Mg		0.20

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.34	0.12	2.60	0.07	3.58	7.25	0.27	16.14	18.87	0.22	100.46	0.003	0.100	0.014	40.16	47.80	12.04

Analysis No. 43

Calculate Fe2O3 Wt %

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.21	60.084	0.886	0.886	1.966	3.933	1.966	Si	1.966	0.886	0.886	60.084	53.21
TiO2	0.16	79.866	0.002	0.002	0.004	0.009	0.004	Ti	0.004	0.002	0.002	79.866	0.16
Al2O3	2.95	101.961	0.029	0.058	0.128	0.193	0.128	Al	0.128	0.058	0.029	101.961	2.95
Cr2O3	0.02	151.990	0.000	0.000	0.000	0.001	0.000	Cr	0.000	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	19.37	71.844	0.270	0.270	0.599	0.599	0.599	Fe^{2+}	0.599	0.270	0.270	71.844	19.37
MnO	0.47	70.937	0.007	0.007	0.015	0.015	0.015	Mn	0.015	0.007	0.007	70.937	0.47
MgO	21.70	40.304	0.538	0.538	1.195	1.195	1.195	Mg	1.195	0.538	0.538	40.304	21.70
CaO	2.69	56.077	0.048	0.048	0.107	0.107	0.107	Ca	0.107	0.048	0.048	56.077	2.69
Na2O	0.17	61.979	0.003	0.006	0.012	0.006	0.012	Na	0.012	0.006	0.003	61.979	0.17
Total	100.73		1.782	1.814	4.027	6.056	4.027			1.814	1.782		100.73

No of Oxygens 6 No of Cation 4

F 0.9908

Check! Fe2O3 as FeO 0.00

FeO* 19.37

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.971	2
4	Tet	Al	0.029	
6	Oct	Al	0.099	1
6	Oct	$+Fe^{2+}+M$ n	0.614	
6	Oct	Mg	0.287	
8	Cubic	Mg	0.908	1
8	Cubic	Ca	0.107	
8	Cubic	Na	0.012	
			4.027	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	5.60
En	Mg/(Ca+Mg+Fe2+)	62.90
Fs	Fe2+/(Ca+Mg+Fe2+)	31.50
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	10.457
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	89.543
		100.000
FeT/FeT+Mg		0.33
Fe2/Fe2+Mg		0.33

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.21	0.16	2.95	0.02	0.00	19.37	0.47	21.70	2.69	0.17	100.73	0.004	0.029	0.099	5.60	62.90	31.50

Analysis No. 470

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.23	60.084	0.853	0.853	1.983	3.966	1.983	Si
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti
Al2O3	1.07	101.961	0.011	0.021	0.049	0.073	0.049	Al
Cr2O3	0.07	151.990	0.000	0.001	0.002	0.003	0.002	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	3.72	71.844	0.052	0.052	0.120	0.120	0.120	Fe^{2+}
MnO	0.09	70.937	0.001	0.001	0.003	0.003	0.003	Mn
MgO	17.08	40.304	0.424	0.424	0.986	0.986	0.986	Mg
CaO	20.44	56.077	0.364	0.364	0.848	0.848	0.848	Ca
Na2O	0.13	61.979	0.002	0.004	0.009	0.005	0.009	Na
Total	93.82		1.707	1.720	4.000	6.004	4.000	

No of Oxygens 6 No of Cation 4
F 0.9994

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.983	0.853	0.853	60.084	51.23
0.000	0.000	0.000	79.866	0.00
0.049	0.021	0.011	101.961	1.07
0.002	0.001	0.000	151.990	0.07
0.000	0.000	0.000	159.688	0.00
0.120	0.052	0.052	71.844	3.72
0.003	0.001	0.001	70.937	0.09
0.986	0.424	0.424	40.304	17.08
0.848	0.364	0.364	56.077	20.44
0.009	0.004	0.002	61.979	0.13
	1.720	1.707		93.82

Check! Fe2O3 as FeO 0.00
FeO* 3.72

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.983	2
4	Tet	Al	0.017	
6	Oct	Al	0.032	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.125	
6	Oct	Mg	0.843	
8	Cubic	Mg	0.143	1
8	Cubic	Ca	0.848	
8	Cubic	Na	0.009	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.39
En	Mg/(Ca+Mg+Fe2+)	50.45
Fs	Fe2+/(Ca+Mg+Fe2+)	6.16
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	1.103
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.897
		100.000

FeT/FeT+Mg 0.11
Fe2/Fe2+Mg 0.11

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.23	0.00	1.07	0.07	0.00	3.72	0.09	17.08	20.44	0.13	93.82	0.000	0.017	0.032	43.39	50.45	6.16

Analysis No. 471

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.54	60.084	0.858	0.858	1.994	3.988	1.994	Si
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti
Al2O3	0.73	101.961	0.007	0.014	0.033	0.050	0.033	Al
Cr2O3	0.12	151.990	0.001	0.002	0.004	0.006	0.004	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	3.09	71.844	0.043	0.043	0.100	0.100	0.100	Fe^{2+}
MnO	0.10	70.937	0.001	0.001	0.003	0.003	0.003	Mn
MgO	17.50	40.304	0.434	0.434	1.009	1.009	1.009	Mg
CaO	20.45	56.077	0.365	0.365	0.848	0.848	0.848	Ca
Na2O	0.12	61.979	0.002	0.004	0.009	0.004	0.009	Na
Total	93.66		1.711	1.721	4.000	6.008	4.000	

No of Oxygens 6 No of Cation 4
F 0.9987

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.994	0.858	0.858	60.084	51.54
0.000	0.000	0.000	79.866	0.00
0.033	0.014	0.007	101.961	0.73
0.004	0.002	0.001	151.990	0.12
0.000	0.000	0.000	159.688	0.00
0.100	0.043	0.043	71.844	3.09
0.003	0.001	0.001	70.937	0.10
1.009	0.434	0.434	40.304	17.50
0.848	0.365	0.365	56.077	20.45
0.009	0.004	0.002	61.979	0.12
	1.721	1.711		93.66

Check! Fe2O3 as FeO 0.00
FeO* 3.09

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.994	2
4	Tet	Al	0.006	
6	Oct	Al	0.027	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.107	
6	Oct	Mg	0.866	
8	Cubic	Mg	0.144	1
8	Cubic	Ca	0.848	
8	Cubic	Na	0.009	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.32
En	Mg/(Ca+Mg+Fe2+)	51.57
Fs	Fe2+/(Ca+Mg+Fe2+)	5.11
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	1.032
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.968
		100.000

FeT/FeT+Mg 0.09
Fe2/Fe2+Mg 0.09

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.54	0.00	0.73	0.12	0.00	3.09	0.10	17.50	20.45	0.12	93.66	0.000	0.006	0.027	43.32	51.57	5.11

Analysis No. 472

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	48.72	60.084	0.811	0.811	1.940	3.880	1.940	Si
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti
Al2O3	2.47	101.961	0.024	0.048	0.116	0.174	0.116	Al
Cr2O3	0.30	151.990	0.002	0.004	0.009	0.014	0.009	Cr
Fe2O3	0.00	159.688					0.010	Fe^{3+}
FeO	4.47	71.844	0.062	0.062	0.149	0.149	0.139	Fe^{2+}
MnO	0.11	70.937	0.002	0.002	0.004	0.004	0.004	Mn
MgO	16.63	40.304	0.413	0.413	0.987	0.987	0.987	Mg
CaO	18.29	56.077	0.326	0.326	0.780	0.780	0.780	Ca
Na2O	0.19	61.979	0.003	0.006	0.015	0.007	0.015	Na
Total	91.18		1.643	1.672	4.000	5.995	4.000	

No of Oxygens 6 No of Cation 4
F 1.0008

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.940	0.811	0.811	60.084	48.72
0.000	0.000	0.000	79.866	0.00
0.116	0.048	0.024	101.961	2.47
0.009	0.004	0.002	151.990	0.30
0.010	0.004	0.002	159.688	0.32
0.139	0.058	0.058	71.844	4.18
0.004	0.002	0.002	70.937	0.11
0.987	0.413	0.413	40.304	16.63
0.780	0.326	0.326	56.077	18.29
0.015	0.006	0.003	61.979	0.19
	1.672	1.641		91.22

Check! Fe2O3 as FeO 0.29
FeO* 4.47

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.940	2
4	Tet	Al	0.060	
6	Oct	Al	0.056	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.162	
6	Oct	Mg	0.782	
8	Cubic	Mg	0.205	1
8	Cubic	Ca	0.780	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.92
En	Mg/(Ca+Mg+Fe2+)	51.77
Fs	Fe2+/(Ca+Mg+Fe2+)	7.31
	total	100.00
Sodic and Calcic CPX		

8	Cubic	Na	0.015		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	1.200
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	0.642
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.158
							100.000
					FeT/FeT+Mg		0.13
					Fe2/Fe2+Mg		0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
48.72	0.00	2.47	0.30	0.32	4.18	0.11	16.63	18.29	0.19	91.22	0.000	0.060	0.056	40.92	51.77	7.31

Analysis No. 473

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.07	60.084	0.833	0.833	1.949	3.899	1.949	Si	1.949	0.833	0.833	60.084	50.07
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti	0.001	0.000	0.000	79.866	0.03
Al2O3	2.20	101.961	0.022	0.043	0.101	0.151	0.101	Al	0.101	0.043	0.022	101.961	2.20
Cr2O3	0.30	151.990	0.002	0.004	0.009	0.014	0.009	Cr	0.009	0.004	0.002	151.990	0.30
Fe2O3	0.00	159.688					0.004	Fe^{3+}	0.004	0.002	0.001	159.688	0.14
FeO	4.38	71.844	0.061	0.061	0.143	0.143	0.138	Fe^{2+}	0.138	0.059	0.059	71.844	4.25
MnO	0.11	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.11
MgO	17.17	40.304	0.426	0.426	0.997	0.997	0.997	Mg	0.997	0.426	0.426	40.304	17.17
CaO	18.75	56.077	0.334	0.334	0.782	0.782	0.782	Ca	0.782	0.334	0.334	56.077	18.75
Na2O	0.19	61.979	0.003	0.006	0.015	0.007	0.015	Na	0.015	0.006	0.003	61.979	0.19
Total	93.21		1.683	1.710	4.000	5.998	4.000			1.710	1.682		93.22

No of Oxygens 6 No of Cation 4
F 1.0003

Check! Fe2O3 as FeO 0.13
FeO* 4.38

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site		end member		%
4	Tet	Si+Ti	1.950	2	**Ortho and Calcic CPX**			
4	Tet	Al	0.050		Wo	Ca/(Ca+Mg+Fe2+)		40.80
6	Oct	Al	0.051	1	En	Mg/(Ca+Mg+Fe2+)		51.98
		Fe^{3+}+Cr						
6	Oct	+Fe^{2+}+Mn	0.156		Fs	Fe2+/(Ca+Mg+Fe2+)		7.22
6	Oct	Mg	0.793			total		100.00
8	Cubic	Mg	0.203	1				
8	Cubic	Ca	0.782		**Sodic and Calcic CPX**			
8	Cubic	Na	0.015		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)		0.519
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe		1.320
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+C		98.160
								100.000
					FeT/FeT+Mg			0.13
					Fe2/Fe2+Mg			0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.07	0.03	2.20	0.30	0.14	4.25	0.11	17.17	18.75	0.19	93.22	0.001	0.050	0.051	40.80	51.98	7.22

Analysis No. 474

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	47.47	60.084	0.790	0.790	1.977	3.953	1.977	Si	1.977	0.790	0.790	60.084	47.47
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti	0.001	0.000	0.000	79.866	0.03
Al2O3	1.91	101.961	0.019	0.037	0.094	0.141	0.094	Al	0.094	0.037	0.019	101.961	1.91
Cr2O3	0.12	151.990	0.001	0.002	0.004	0.006	0.004	Cr	0.004	0.002	0.001	151.990	0.12
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	3.67	71.844	0.051	0.051	0.128	0.128	0.128	Fe^{2+}	0.128	0.051	0.051	71.844	3.67
MnO	0.11	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.11
MgO	15.60	40.304	0.387	0.387	0.968	0.968	0.968	Mg	0.968	0.387	0.387	40.304	15.60
CaO	18.18	56.077	0.324	0.324	0.811	0.811	0.811	Ca	0.811	0.324	0.324	56.077	18.18
Na2O	0.17	61.979	0.003	0.005	0.014	0.007	0.014	Na	0.014	0.005	0.003	61.979	0.17
Total	87.25		1.577	1.599	4.000	6.020	4.000			1.599	1.577		87.25

No of Oxygens 6 No of Cation 4
F 0.9967

Check! Fe2O3 as FeO 0.00
FeO* 3.67

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site		end member		%
4	Tet	Si+Ti	1.978	2	**Ortho and Calcic CPX**			
4	Tet	Al	0.022		Wo	Ca/(Ca+Mg+Fe2+)		42.53
6	Oct	Al	0.071	1	En	Mg/(Ca+Mg+Fe2+)		50.77
		Fe^{3+}+Cr						
6	Oct	+Fe^{2+}+Mn	0.135		Fs	Fe2+/(Ca+Mg+Fe2+)		6.70
6	Oct	Mg	0.793			total		100.00
8	Cubic	Mg	0.175	1				
8	Cubic	Ca	0.811		**Sodic and Calcic CPX**			
8	Cubic	Na	0.014		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)		0.000
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe		1.654
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+C		98.346
								100.000
					FeT/FeT+Mg			0.12
					Fe2/Fe2+Mg			0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
47.47	0.03	1.91	0.12	0.00	3.67	0.11	15.60	18.18	0.17	87.25	0.001	0.022	0.071	42.53	50.77	6.70

Analysis No. 475

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.01	60.084	0.849	0.849	1.966	3.932	1.966	Si	1.966	0.849	0.849	60.084	51.01
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti	0.001	0.000	0.000	79.866	0.03
Al2O3	1.67	101.961	0.016	0.033	0.076	0.114	0.076	Al	0.076	0.033	0.016	101.961	1.67
Cr2O3	0.25	151.990	0.002	0.003	0.008	0.011	0.008	Cr	0.008	0.003	0.002	151.990	0.25
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	4.80	71.844	0.067	0.067	0.155	0.155	0.155	Fe^{2+}	0.155	0.067	0.067	71.844	4.80
MnO	0.14	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.14
MgO	19.20	40.304	0.476	0.476	1.103	1.103	1.103	Mg	1.103	0.476	0.476	40.304	19.20
CaO	16.32	56.077	0.291	0.291	0.674	0.674	0.674	Ca	0.674	0.291	0.291	56.077	16.32
Na2O	0.17	61.979	0.003	0.006	0.013	0.007	0.013	Na	0.013	0.006	0.003	61.979	0.17
Total	93.59		1.706	1.727	4.000	6.002	4.000			1.727	1.706		93.59

No of Oxygens 6 No of Cation 4
F 0.9996

Check! Fe2O3 as FeO 0.00
FeO* 4.80

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.967	2
4	Tet	Al	0.033	
6	Oct	Al	0.043	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.167	
6	Oct	Mg	0.790	
8	Cubic	Mg	0.313	1
8	Cubic	Ca	0.674	
8	Cubic	Na	0.013	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	34.89
En	Mg/(Ca+Mg+Fe2+)	57.10
Fs	Fe2+/(Ca+Mg+Fe2+)	8.01
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	1.902
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.098
		100.000
FeT/FeT+Mg		0.12
Fe2/Fe2+Mg		0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.01	0.03	1.67	0.25	0.00	4.80	0.14	19.20	16.32	0.17	93.59	0.001	0.033	0.043	34.89	57.10	8.01

Analysis No. 476

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	49.33	60.084	0.821	0.821	1.933	3.866	1.933	Si
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti
Al2O3	2.94	101.961	0.029	0.058	0.136	0.204	0.136	Al
Cr2O3	0.21	151.990	0.001	0.003	0.006	0.010	0.006	Cr
Fe2O3	0.00	159.688					0.005	Fe^{3+}
FeO	5.78	71.844	0.080	0.080	0.189	0.189	0.184	Fe^{2+}
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	15.99	40.304	0.397	0.397	0.934	0.934	0.934	Mg
CaO	18.61	56.077	0.332	0.332	0.781	0.781	0.781	Ca
Na2O	0.19	61.979	0.003	0.006	0.015	0.007	0.015	Na
Total	93.22		1.666	1.699	4.000	5.997	4.000	

No of Oxygens 6 No of Cation 4
F 1.0004

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.933	0.821	0.821	60.084	49.33
TiO2	0.001	0.000	0.000	79.866	0.03
Al2O3	0.136	0.058	0.029	101.961	2.94
Cr2O3	0.006	0.003	0.001	151.990	0.21
Fe2O3	0.005	0.002	0.001	159.688	0.18
FeO	0.184	0.078	0.078	71.844	5.62
MnO	0.005	0.002	0.002	70.937	0.15
MgO	0.934	0.397	0.397	40.304	15.99
CaO	0.781	0.332	0.332	56.077	18.61
Na2O	0.015	0.006	0.003	61.979	0.19
		1.699	1.665		93.24

Check! Fe2O3 as FeO 0.16
FeO* 5.78

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.934	2
4	Tet	Al	0.066	
6	Oct	Al	0.069	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.201	
6	Oct	Mg	0.730	
8	Cubic	Mg	0.204	1
8	Cubic	Ca	0.781	
8	Cubic	Na	0.015	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.13
En	Mg/(Ca+Mg+Fe2+)	49.17
Fs	Fe2+/(Ca+Mg+Fe2+)	9.70
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	0.659
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	1.186
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.155
		100.000
FeT/FeT+Mg		0.17
Fe2/Fe2+Mg		0.16

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
49.33	0.03	2.94	0.21	0.18	5.62	0.15	15.99	18.61	0.19	93.24	0.001	0.066	0.069	41.13	49.17	9.70

Analysis No. 477

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	49.89	60.084	0.830	0.830	1.939	3.878	1.939	Si
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti
Al2O3	2.39	101.961	0.023	0.047	0.109	0.164	0.109	Al
Cr2O3	0.32	151.990	0.002	0.004	0.010	0.015	0.010	Cr
Fe2O3	0.00	159.688					0.014	Fe^{3+}
FeO	5.27	71.844	0.073	0.073	0.171	0.171	0.157	Fe^{2+}
MnO	0.17	70.937	0.002	0.002	0.006	0.006	0.006	Mn
MgO	17.42	40.304	0.432	0.432	1.009	1.009	1.009	Mg
CaO	17.85	56.077	0.318	0.318	0.743	0.743	0.743	Ca
Na2O	0.16	61.979	0.003	0.005	0.012	0.006	0.012	Na
Total	93.47		1.685	1.713	4.000	5.993	4.000	

No of Oxygens 6 No of Cation 4
F 1.0012

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.939	0.830	0.830	60.084	49.89
TiO2	0.000	0.000	0.000	79.866	0.00
Al2O3	0.109	0.047	0.023	101.961	2.39
Cr2O3	0.010	0.004	0.002	151.990	0.32
Fe2O3	0.014	0.006	0.003	159.688	0.50
FeO	0.157	0.067	0.067	71.844	4.82
MnO	0.006	0.002	0.002	70.937	0.17
MgO	1.009	0.432	0.432	40.304	17.42
CaO	0.743	0.318	0.318	56.077	17.85
Na2O	0.012	0.005	0.003	61.979	0.16
		1.713	1.682		93.52

Check! Fe2O3 as FeO 0.45
FeO* 5.27

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.939	2
4	Tet	Al	0.061	
6	Oct	Al	0.049	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.187	
6	Oct	Mg	0.765	
8	Cubic	Mg	0.245	1
8	Cubic	Ca	0.743	
8	Cubic	Na	0.012	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	38.93
En	Mg/(Ca+Mg+Fe2+)	52.86
Fs	Fe2+/(Ca+Mg+Fe2+)	8.21
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	1.918
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-0.331
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.413
		100.000
FeT/FeT+Mg		0.15
Fe2/Fe2+Mg		0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
49.89	0.00	2.39	0.32	0.50	4.82	0.17	17.42	17.85	0.16	93.52	0.000	0.061	0.049	38.93	52.86	8.21

Analysis No. 478

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.34	60.084	0.854	0.854	1.989	3.978	1.989	Si
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti
Al2O3	1.17	101.961	0.011	0.023	0.053	0.080	0.053	Al
Cr2O3	0.20	151.990	0.001	0.003	0.006	0.009	0.006	Cr

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.989	0.854	0.854	60.084	51.34
TiO2	0.000	0.000	0.000	79.866	0.00
Al2O3	0.053	0.023	0.011	101.961	1.17
Cr2O3	0.006	0.003	0.001	151.990	0.20

Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	4.55	71.844	0.063	0.063	0.147	0.147	0.147	Fe^{2+}	0.147	0.063	0.063	71.844	4.55
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	18.07	40.304	0.448	0.448	1.044	1.044	1.044	Mg	1.044	0.448	0.448	40.304	18.07
CaO	17.94	56.077	0.320	0.320	0.745	0.745	0.745	Ca	0.745	0.320	0.320	56.077	17.94
Na2O	0.15	61.979	0.002	0.005	0.011	0.006	0.011	Na	0.011	0.005	0.002	61.979	0.15
Total	93.57		1.703	1.719	4.000	6.013	4.000			1.719	1.703		93.57

No of Oxygens 6 No of Catior 4
F 0.9978

Check! Fe2O3 as FeO 0.00
FeO* 4.55

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.989	2
4	Tet	Al	0.011	
6	Oct	Al	0.042	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.158	
6	Oct	Mg	0.799	
8	Cubic	Mg	0.244	1
8	Cubic	Ca	0.745	
8	Cubic	Na	0.011	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	38.47
En	Mg/(Ca+Mg+Fe2+)	53.91
Fs	Fe2+/(Ca+Mg+Fe2+)	7.62
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	1.464
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.536
		100.000
FeT/FeT+Mg		0.12
Fe2/Fe2+Mg		0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.34	0.00	1.17	0.20	0.00	4.55	0.15	18.07	17.94	0.15	93.57	0.000	0.011	0.042	38.47	53.91	7.62

Analysis No. 479

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	49.42	60.084	0.823	0.823	1.923	3.847	1.923	Si	1.923	0.823	0.823	60.084	49.42
TiO2	0.02	79.866	0.000	0.000	0.001	0.001	0.001	Ti	0.001	0.000	0.000	79.866	0.02
Al2O3	3.13	101.961	0.031	0.061	0.144	0.215	0.144	Al	0.144	0.061	0.031	101.961	3.13
Cr2O3	0.22	151.990	0.001	0.003	0.007	0.010	0.007	Cr	0.007	0.003	0.001	151.990	0.22
Fe2O3	0.00	159.688					0.018	Fe^{3+}	0.018	0.008	0.004	159.688	0.62
FeO	5.86	71.844	0.082	0.082	0.191	0.191	0.173	Fe^{2+}	0.173	0.074	0.074	71.844	5.31
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	16.11	40.304	0.400	0.400	0.935	0.935	0.935	Mg	0.935	0.400	0.400	40.304	16.11
CaO	18.68	56.077	0.333	0.333	0.779	0.779	0.779	Ca	0.779	0.333	0.333	56.077	18.68
Na2O	0.22	61.979	0.003	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.003	61.979	0.22
Total	93.81		1.675	1.711	4.000	5.991	4.000			1.711	1.671		93.87

No of Oxygens 6 No of Cation 4
F 1.0015

Check! Fe2O3 as FeO 0.55
FeO* 5.86

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.924	2
4	Tet	Al	0.076	
6	Oct	Al	0.067	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.203	
6	Oct	Mg	0.730	
8	Cubic	Mg	0.205	1
8	Cubic	Ca	0.779	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.29
En	Mg/(Ca+Mg+Fe2+)	49.55
Fs	Fe2+/(Ca+Mg+Fe2+)	9.16
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	2.268
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-0.210
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	97.942
		100.000
FeT/FeT+Mg		0.17
Fe2/Fe2+Mg		0.16

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
49.42	0.02	3.13	0.22	0.62	5.31	0.15	16.11	18.68	0.22	93.87	0.001	0.076	0.067	41.29	49.55	9.16

Analysis No. 480

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.52	60.084	0.841	0.841	1.960	3.921	1.960	Si	1.960	0.841	0.841	60.084	50.52
TiO2	0.07	79.866	0.001	0.001	0.002	0.004	0.002	Ti	0.002	0.001	0.001	79.866	0.07
Al2O3	1.98	101.961	0.019	0.039	0.091	0.136	0.091	Al	0.091	0.039	0.019	101.961	1.98
Cr2O3	0.34	151.990	0.002	0.004	0.010	0.016	0.010	Cr	0.010	0.004	0.002	151.990	0.34
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	4.41	71.844	0.061	0.061	0.143	0.143	0.143	Fe^{2+}	0.143	0.061	0.061	71.844	4.41
MnO	0.10	70.937	0.001	0.001	0.003	0.003	0.003	Mn	0.003	0.001	0.001	70.937	0.10
MgO	17.13	40.304	0.425	0.425	0.991	0.991	0.991	Mg	0.991	0.425	0.425	40.304	17.13
CaO	18.89	56.077	0.337	0.337	0.785	0.785	0.785	Ca	0.785	0.337	0.337	56.077	18.89
Na2O	0.18	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.18
Total	93.62		1.691	1.716	4.000	6.006	4.000			1.716	1.691		93.62

No of Oxygens 6 No of Catior 4
F 0.9990

Check! Fe2O3 as FeO 0.00
FeO* 4.41

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.963	2
4	Tet	Al	0.037	
6	Oct	Al	0.053	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.157	
6	Oct	Mg	0.790	
8	Cubic	Mg	0.201	1
8	Cubic	Ca	0.785	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.92
En	Mg/(Ca+Mg+Fe2+)	51.63
Fs	Fe2+/(Ca+Mg+Fe2+)	7.46
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	1.727
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.273
		100.000
FeT/FeT+Mg		0.13

Fe2/Fe2+Mg	0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.52	0.07	1.98	0.34	0.00	4.41	0.10	17.13	18.89	0.18	93.62	0.002	0.037	0.053	40.92	51.63	7.46

Analysis No. 481

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	49.43	60.084	0.823	0.823	1.933	3.865	1.933	Si	1.933	0.823	0.823	60.084	49.43
TiO2	0.01	79.866	0.000	0.000	0.000	0.001	0.000	Ti	0.000	0.000	0.000	79.866	0.01
Al2O3	3.08	101.961	0.030	0.060	0.142	0.213	0.142	Al	0.142	0.060	0.030	101.961	3.08
Cr2O3	0.29	151.990	0.002	0.004	0.009	0.013	0.009	Cr	0.009	0.004	0.002	151.990	0.29
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	5.09	71.844	0.071	0.071	0.166	0.166	0.166	Fe^{2+}	0.166	0.071	0.071	71.844	5.09
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	16.11	40.304	0.400	0.400	0.939	0.939	0.939	Mg	0.939	0.400	0.400	40.304	16.11
CaO	18.90	56.077	0.337	0.337	0.792	0.792	0.792	Ca	0.792	0.337	0.337	56.077	18.90
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.19
Total	93.25		1.668	1.703	4.000	6.001	4.000			1.703	1.668		93.25

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Cation 4
F 0.9998

Check! Fe2O3 as FeO 0.00
FeO* 5.09

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.933	2
4	Tet	Al	0.067	
6	Oct	Al	0.075	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.180	
6	Oct	Mg	0.745	
8	Cubic	Mg	0.194	1
8	Cubic	Ca	0.792	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.73
En	Mg/(Ca+Mg+Fe2+)	49.49
Fs	Fe2+/(Ca+Mg+Fe2+)	8.77
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	1.762
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.238
		100.000

FeT/FeT+Mg	0.15
Fe2/Fe2+Mg	0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
49.43	0.01	3.08	0.29	0.00	5.09	0.15	16.11	18.90	0.19	93.25	0.000	0.067	0.075	41.73	49.49	8.77

Analysis No. 174

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.52	60.084	0.874	0.874	1.924	3.848	1.924	Si	1.924	0.874	0.874	60.084	52.52
TiO2	0.22	79.866	0.003	0.003	0.006	0.012	0.006	Ti	0.006	0.003	0.003	79.866	0.22
Al2O3	2.14	101.961	0.021	0.042	0.092	0.139	0.092	Al	0.092	0.042	0.021	101.961	2.14
Cr2O3	0.31	151.990	0.002	0.004	0.009	0.014	0.009	Cr	0.009	0.004	0.002	151.990	0.31
Fe2O3	0.00	159.688					0.051	Fe^{3+}	0.051	0.023	0.012	159.688	1.85
FeO	5.35	71.844	0.074	0.074	0.164	0.164	0.113	Fe^{2+}	0.113	0.051	0.051	71.844	3.69
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	16.84	40.304	0.418	0.418	0.920	0.920	0.920	Mg	0.920	0.418	0.418	40.304	16.84
CaO	22.08	56.077	0.394	0.394	0.867	0.867	0.867	Ca	0.867	0.394	0.394	56.077	22.08
Na2O	0.18	61.979	0.003	0.006	0.013	0.007	0.013	Na	0.013	0.006	0.003	61.979	0.18
Total	99.80		1.791	1.817	4.000	5.975	4.000			1.817	1.780		99.99

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Cation 4
F 1.0043

Check! Fe2O3 as FeO 1.66
FeO* 5.35

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.930	2
4	Tet	Al	0.070	
6	Oct	Al	0.023	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.178	
6	Oct	Mg	0.800	
8	Cubic	Mg	0.120	1
8	Cubic	Ca	0.867	
8	Cubic	Na	0.013	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.63
En	Mg/(Ca+Mg+Fe2+)	48.42
Fs	Fe2+/(Ca+Mg+Fe2+)	5.95
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	5.795
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-4.310
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.515
		100.000

FeT/FeT+Mg	0.15
Fe2/Fe2+Mg	0.11

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.52	0.22	2.14	0.31	1.85	3.69	0.15	16.84	22.08	0.18	99.99	0.006	0.070	0.023	45.63	48.42	5.95

Analysis No. 175

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.58	60.084	0.875	0.875	1.926	3.853	1.926	Si	1.926	0.875	0.875	60.084	52.58
TiO2	0.20	79.866	0.002	0.002	0.005	0.011	0.005	Ti	0.005	0.002	0.002	79.866	0.20
Al2O3	2.22	101.961	0.022	0.044	0.096	0.144	0.096	Al	0.096	0.044	0.022	101.961	2.22
Cr2O3	0.52	151.990	0.003	0.007	0.015	0.023	0.015	Cr	0.015	0.007	0.003	151.990	0.52
Fe2O3	0.00	159.688					0.034	Fe^{3+}	0.034	0.015	0.008	159.688	1.24
FeO	4.71	71.844	0.066	0.066	0.144	0.144	0.110	Fe^{2+}	0.110	0.050	0.050	71.844	3.60
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.16
MgO	16.92	40.304	0.420	0.420	0.924	0.924	0.924	Mg	0.924	0.420	0.420	40.304	16.92
CaO	22.29	56.077	0.397	0.397	0.875	0.875	0.875	Ca	0.875	0.397	0.397	56.077	22.29
Na2O	0.12	61.979	0.002	0.004	0.009	0.004	0.009	Na	0.009	0.004	0.002	61.979	0.12
Total	99.72		1.790	1.817	4.000	5.983	4.000			1.817	1.782		99.85

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Cation 4
F 1.0028

Check! Fe2O3 as FeO 1.11
FeO* 4.71

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.932	2
4	Tet	Al	0.068	
6	Oct	Al	0.028	1

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.83
En	Mg/(Ca+Mg+Fe2+)	48.40

C.N.	Site	Elements		Ideal Cations/Site		end member		%
4	Tet	Si+Ti	1.945	2		**Ortho and Calcic CPX**		
4	Tet	Al	0.055			Wo	Ca/(Ca+Mg+Fe2+)	38.41
6	Oct	Al	0.015	1		En	Mg/(Ca+Mg+Fe2+)	53.75
		Fe^{3+}+Cr						
6	Oct	+Fe^{2+}+Mn	0.164			Fs	Fe2+/(Ca+Mg+Fe2+)	5.77
6	Oct	Mg	0.808				total	100.00
8	Cubic	Mg	0.116	1				
8	Cubic	Ca	0.875			**Sodic and Calcic CPX**		
8	Cubic	Na	0.009			Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	3.853
			4.000			Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-2.858
						Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	99.005
								100.000
						FeT/FeT+Mg		0.14
						Fe2/Fe2+Mg		0.11

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.58	0.20	2.22	0.52	1.24	3.60	0.16	16.92	22.29	0.12	99.85	0.005	0.068	0.028	45.83	48.40	5.77

Analysis No. 176

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.34	60.084	0.888	0.888	1.941	3.883	1.941	Si	1.941	0.888	0.888	60.084	53.34
TiO2	0.11	79.866	0.001	0.001	0.003	0.006	0.003	Ti	0.003	0.001	0.001	79.866	0.11
Al2O3	1.65	101.961	0.016	0.032	0.071	0.106	0.071	Al	0.071	0.032	0.016	101.961	1.65
Cr2O3	0.45	151.990	0.003	0.006	0.013	0.020	0.013	Cr	0.013	0.006	0.003	151.990	0.45
Fe2O3	0.00	159.688					0.036	Fe^{3+}	0.036	0.016	0.008	159.688	1.30
FeO	6.12	71.844	0.085	0.085	0.186	0.186	0.151	Fe^{2+}	0.151	0.069	0.069	71.844	4.95
MnO	0.20	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.20
MgO	19.03	40.304	0.472	0.472	1.033	1.033	1.033	Mg	1.033	0.472	0.472	40.304	19.03
CaO	18.92	56.077	0.337	0.337	0.738	0.738	0.738	Ca	0.738	0.337	0.337	56.077	18.92
Na2O	0.12	61.979	0.002	0.004	0.009	0.004	0.009	Na	0.009	0.004	0.002	61.979	0.12
Total	99.96		1.808	1.829	4.000	5.982	4.000			1.829	1.800		100.09

No of Oxygens 6 No of Cation 4
F 1.0030

Check! Fe2O3 as FeO 1.17
FeO* 6.12

C.N.	Site	Elements		Ideal Cations/Site		end member		%
4	Tet	Si+Ti	1.952	2		**Ortho and Calcic CPX**		
4	Tet	Al	0.047			Wo	Ca/(Ca+Mg+Fe2+)	39.26
6	Oct	Al	0.011	1		En	Mg/(Ca+Mg+Fe2+)	54.39
		Fe^{3+}+Cr						
6	Oct	+Fe^{2+}+Mn	0.206			Fs	Fe2+/(Ca+Mg+Fe2+)	6.35
6	Oct	Mg	0.779				total	100.00
8	Cubic	Mg	0.254	1				
8	Cubic	Ca	0.738			**Sodic and Calcic CPX**		
8	Cubic	Na	0.009			Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	4.762
			4.000			Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-3.614
						Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.852
								100.000
						FeT/FeT+Mg		0.15
						Fe2/Fe2+Mg		0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.34	0.11	1.65	0.45	1.30	4.95	0.20	19.03	18.92	0.12	100.09	0.003	0.055	0.015	38.41	53.75	7.85

Analysis No. 177

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.76	60.084	0.895	0.895	1.952	3.904	1.952	Si	1.952	0.895	0.895	60.084	53.76
TiO2	0.11	79.866	0.001	0.001	0.003	0.006	0.003	Ti	0.003	0.001	0.001	79.866	0.11
Al2O3	1.11	101.961	0.011	0.022	0.047	0.071	0.047	Al	0.047	0.022	0.011	101.961	1.11
Cr2O3	0.49	151.990	0.003	0.006	0.014	0.021	0.014	Cr	0.014	0.006	0.003	151.990	0.49
Fe2O3	0.00	159.688					0.039	Fe^{3+}	0.039	0.018	0.009	159.688	1.44
FeO	5.33	71.844	0.074	0.074	0.162	0.162	0.122	Fe^{2+}	0.122	0.056	0.056	71.844	4.03
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.19
MgO	19.37	40.304	0.481	0.481	1.048	1.048	1.048	Mg	1.048	0.481	0.481	40.304	19.37
CaO	19.45	56.077	0.347	0.347	0.757	0.757	0.757	Ca	0.757	0.347	0.347	56.077	19.45
Na2O	0.15	61.979	0.002	0.005	0.011	0.005	0.011	Na	0.011	0.005	0.002	61.979	0.15
Total	99.96		1.817	1.834	4.000	5.980	4.000			1.834	1.808		100.11

No of Oxygens 6 No of Cation 4
F 1.0033

Check! Fe2O3 as FeO 1.30
FeO* 5.33

C.N.	Site	Elements		Ideal Cations/Site		end member		%
4	Tet	Si+Ti	1.955	2		**Ortho and Calcic CPX**		
4	Tet	Al	0.045			Wo	Ca/(Ca+Mg+Fe2+)	39.26
6	Oct	Al	0.002	1		En	Mg/(Ca+Mg+Fe2+)	54.39
		Fe^{3+}+Cr						
6	Oct	+Fe^{2+}+Mn	0.182			Fs	Fe2+/(Ca+Mg+Fe2+)	6.35
6	Oct	Mg	0.816				total	100.00
8	Cubic	Mg	0.233	1				
8	Cubic	Ca	0.757			**Sodic and Calcic CPX**		
8	Cubic	Na	0.011			Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	5.140
			4.000			Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-3.750
						Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.610
								100.000
						FeT/FeT+Mg		0.13
						Fe2/Fe2+Mg		0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.76	0.11	1.11	0.49	1.44	4.03	0.19	19.37	19.45	0.15	100.11	0.003	0.045	0.002	39.26	54.39	6.35

Analysis No. 178

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.68	60.084	0.860	0.860	1.889	3.778	1.889	Si	1.889	0.860	0.860	60.084	51.68
TiO2	0.28	79.866	0.003	0.003	0.008	0.015	0.008	Ti	0.008	0.003	0.003	79.866	0.28
Al2O3	3.54	101.961	0.035	0.069	0.153	0.229	0.153	Al	0.153	0.069	0.035	101.961	3.54
Cr2O3	0.44	151.990	0.003	0.006	0.013	0.019	0.013	Cr	0.013	0.006	0.003	151.990	0.44
Fe2O3	0.00	159.688					0.055	Fe^{3+}	0.055	0.025	0.013	159.688	2.00
FeO	6.75	71.844	0.094	0.094	0.206	0.206	0.151	Fe^{2+}	0.151	0.069	0.069	71.844	4.95
MnO	0.23	70.937	0.003	0.003	0.007	0.007	0.007	Mn	0.007	0.003	0.003	70.937	0.23
MgO	16.61	40.304	0.412	0.412	0.905	0.905	0.905	Mg	0.905	0.412	0.412	40.304	16.61
CaO	20.58	56.077	0.367	0.367	0.806	0.806	0.806	Ca	0.806	0.367	0.367	56.077	20.58
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.19

Total	100.30		1.781	1.821	4.000	5.972	4.000			1.821	1.768	100.50
No of Oxygens	6	No of Cation	4					Check!	Fe2O3 as FeO		1.80	
F	1.0046								FeO*		6.75	

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.897	2
4	Tet	Al	0.103	
6	Oct	Al	0.049	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.226	
6	Oct	Mg	0.725	
8	Cubic	Mg	0.180	1
8	Cubic	Ca	0.806	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.28
En	Mg/(Ca+Mg+Fe2+)	48.60
Fs	Fe2+/(Ca+Mg+Fe2+)	8.12
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	6.720
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-5.068
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.347
		100.000
FeT/FeT+Mg		0.19
Fe2/Fe2+Mg		0.14

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.68	0.28	3.54	0.44	2.00	4.95	0.23	16.61	20.58	0.19	100.50	0.008	0.103	0.049	43.28	48.60	8.12

Analysis No. 179

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.80	60.084	0.879	0.879	1.923	3.846	1.923	Si	1.923	0.879	0.879	60.084	52.80
TiO2	0.17	79.866	0.002	0.002	0.005	0.010	0.005	Ti	0.005	0.002	0.002	79.866	0.17
Al2O3	2.18	101.961	0.021	0.043	0.094	0.140	0.094	Al	0.094	0.043	0.021	101.961	2.18
Cr2O3	0.84	151.990	0.006	0.011	0.024	0.036	0.024	Cr	0.024	0.011	0.006	151.990	0.84
Fe2O3	0.00	159.688					0.040	Fe^{3+}	0.040	0.018	0.009	159.688	1.46
FeO	5.08	71.844	0.071	0.071	0.155	0.155	0.115	Fe^{2+}	0.115	0.052	0.052	71.844	3.76
MnO	0.18	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.18
MgO	17.75	40.304	0.440	0.440	0.964	0.964	0.964	Mg	0.964	0.440	0.440	40.304	17.75
CaO	20.92	56.077	0.373	0.373	0.816	0.816	0.816	Ca	0.816	0.373	0.373	56.077	20.92
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.19
Total	100.12		1.798	1.828	4.000	5.980	4.000			1.828	1.789		100.26
No of Oxygens	6	No of Cation	4					Check!	Fe2O3 as FeO		1.32		
F	1.0033								FeO*		5.08		

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.928	2
4	Tet	Al	0.072	
6	Oct	Al	0.022	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.184	
6	Oct	Mg	0.794	
8	Cubic	Mg	0.170	1
8	Cubic	Ca	0.816	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.09
En	Mg/(Ca+Mg+Fe2+)	50.86
Fs	Fe2+/(Ca+Mg+Fe2+)	6.05
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	4.825
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-3.167
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.342
		100.000
FeT/FeT+Mg		0.14
Fe2/Fe2+Mg		0.11

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.80	0.17	2.18	0.84	1.46	3.76	0.18	17.75	20.92	0.19	100.26	0.005	0.072	0.022	43.09	50.86	6.05

Analysis No. 180

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.96	60.084	0.865	0.865	1.898	3.797	1.898	Si	1.898	0.865	0.865	60.084	51.96
TiO2	0.20	79.866	0.002	0.002	0.005	0.011	0.005	Ti	0.005	0.002	0.002	79.866	0.20
Al2O3	3.02	101.961	0.030	0.059	0.130	0.195	0.130	Al	0.130	0.059	0.030	101.961	3.02
Cr2O3	0.68	151.990	0.004	0.009	0.020	0.030	0.020	Cr	0.020	0.009	0.004	151.990	0.68
Fe2O3	0.00	159.688					0.056	Fe^{3+}	0.056	0.025	0.013	159.688	2.02
FeO	5.98	71.844	0.083	0.083	0.183	0.183	0.127	Fe^{2+}	0.127	0.058	0.058	71.844	4.16
MnO	0.17	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.17
MgO	17.20	40.304	0.427	0.427	0.937	0.937	0.937	Mg	0.937	0.427	0.427	40.304	17.20
CaO	20.67	56.077	0.369	0.369	0.809	0.809	0.809	Ca	0.809	0.369	0.369	56.077	20.67
Na2O	0.18	61.979	0.003	0.006	0.013	0.006	0.013	Na	0.013	0.006	0.003	61.979	0.18
Total	100.06		1.785	1.822	4.000	5.972	4.000			1.822	1.773		100.26
No of Oxygens	6	No of Cation	4					Check!	Fe2O3 as FeO		1.82		
F	1.0047								FeO*		5.98		

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.904	2
4	Tet	Al	0.096	
6	Oct	Al	0.034	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.208	
6	Oct	Mg	0.759	
8	Cubic	Mg	0.178	1
8	Cubic	Ca	0.809	
8	Cubic	Na	0.013	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.20
En	Mg/(Ca+Mg+Fe2+)	50.02
Fs	Fe2+/(Ca+Mg+Fe2+)	6.78
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	6.769
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-5.212
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.444
		100.000
FeT/FeT+Mg		0.16
Fe2/Fe2+Mg		0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.96	0.20	3.02	0.68	2.02	4.16	0.17	17.20	20.67	0.18	100.26	0.005	0.096	0.034	43.20	50.02	6.78

Analysis No. 184

Calculate Fe2O3 Wt %

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.54	60.084	0.891	0.891	1.949	3.898	1.949	Si	1.949	0.891	0.891	60.084	53.54
TiO2	0.17	79.866	0.002	0.002	0.005	0.009	0.005	Ti	0.005	0.002	0.002	79.866	0.17
Al2O3	1.44	101.961	0.014	0.028	0.062	0.093	0.062	Al	0.062	0.028	0.014	101.961	1.44
Cr2O3	0.42	151.990	0.003	0.006	0.012	0.018	0.012	Cr	0.012	0.006	0.003	151.990	0.42
Fe2O3	0.00	159.688					0.028	Fe^{3+}	0.028	0.013	0.006	159.688	1.01
FeO	5.33	71.844	0.074	0.074	0.162	0.162	0.135	Fe^{2+}	0.135	0.062	0.062	71.844	4.42
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	18.02	40.304	0.447	0.447	0.978	0.978	0.978	Mg	0.978	0.447	0.447	40.304	18.02
CaO	21.01	56.077	0.375	0.375	0.819	0.819	0.819	Ca	0.819	0.375	0.375	56.077	21.01
Na2O	0.12	61.979	0.002	0.004	0.008	0.004	0.008	Na	0.008	0.004	0.002	61.979	0.12
Total	100.21		1.810	1.829	4.000	5.986	4.000			1.829	1.804		100.31

No of Oxygens 6 No of Cation 4
F 1.0023

Check! Fe2O3 as FeO 0.91
FeO* 5.33

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.953	2
4	Tet	Al	0.047	
6	Oct	Al	0.015	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.179	
6	Oct	Mg	0.806	
8	Cubic	Mg	0.172	1
8	Cubic	Ca	0.819	
8	Cubic	Na	0.008	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.42
En	Mg/(Ca+Mg+Fe2+)	50.62
Fs	Fe2+/(Ca+Mg+Fe2+)	6.97
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	3.336
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-2.310
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.974
		100.000

FeT/FeT+Mg 0.14
Fe2/Fe2+Mg 0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.54	0.17	1.44	0.42	1.01	4.42	0.15	18.02	21.01	0.12	100.31	0.005	0.047	0.015	42.42	50.62	6.97

Analysis No. 185

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.33	60.084	0.888	0.888	1.951	3.902	1.951	Si	1.951	0.888	0.888	60.084	53.33
TiO2	0.10	79.866	0.001	0.001	0.003	0.006	0.003	Ti	0.003	0.001	0.001	79.866	0.10
Al2O3	1.60	101.961	0.016	0.031	0.069	0.104	0.069	Al	0.069	0.031	0.016	101.961	1.60
Cr2O3	0.43	151.990	0.003	0.006	0.012	0.019	0.012	Cr	0.012	0.006	0.003	151.990	0.43
Fe2O3	0.00	159.688					0.018	Fe^{3+}	0.018	0.008	0.004	159.688	0.67
FeO	5.31	71.844	0.074	0.074	0.162	0.162	0.144	Fe^{2+}	0.144	0.066	0.066	71.844	4.71
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.19
MgO	18.49	40.304	0.459	0.459	1.009	1.009	1.009	Mg	1.009	0.459	0.459	40.304	18.49
CaO	19.89	56.077	0.355	0.355	0.780	0.780	0.780	Ca	0.780	0.355	0.355	56.077	19.89
Na2O	0.11	61.979	0.002	0.004	0.008	0.004	0.008	Na	0.008	0.004	0.002	61.979	0.11
Total	99.45		1.799	1.820	4.000	5.991	4.000			1.820	1.795		99.52

No of Oxygens 6 No of Catior 4
F 1.0015

Check! Fe2O3 as FeO 0.60
FeO* 5.31

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.954	2
4	Tet	Al	0.046	
6	Oct	Al	0.023	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.181	
6	Oct	Mg	0.796	
8	Cubic	Mg	0.212	1
8	Cubic	Ca	0.780	
8	Cubic	Na	0.008	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.35
En	Mg/(Ca+Mg+Fe2+)	52.19
Fs	Fe2+/(Ca+Mg+Fe2+)	7.46
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	2.334
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-1.329
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.995
		100.000

FeT/FeT+Mg 0.14
Fe2/Fe2+Mg 0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.33	0.10	1.60	0.43	0.67	4.71	0.19	18.49	19.89	0.11	99.52	0.003	0.046	0.023	40.35	52.19	7.46

Analysis No. 191

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.57	60.084	0.892	0.892	1.952	3.904	1.952	Si	1.952	0.892	0.892	60.084	53.57
TiO2	0.08	79.866	0.001	0.001	0.002	0.005	0.002	Ti	0.002	0.001	0.001	79.866	0.08
Al2O3	1.44	101.961	0.014	0.028	0.062	0.093	0.062	Al	0.062	0.028	0.014	101.961	1.44
Cr2O3	0.17	151.990	0.001	0.002	0.005	0.007	0.005	Cr	0.005	0.002	0.001	151.990	0.17
Fe2O3	0.00	159.688					0.032	Fe^{3+}	0.032	0.014	0.007	159.688	1.15
FeO	4.22	71.844	0.059	0.059	0.129	0.129	0.097	Fe^{2+}	0.097	0.044	0.044	71.844	3.19
MnO	0.13	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.13
MgO	17.59	40.304	0.436	0.436	0.955	0.955	0.955	Mg	0.955	0.436	0.436	40.304	17.59
CaO	22.65	56.077	0.404	0.404	0.884	0.884	0.884	Ca	0.884	0.404	0.404	56.077	22.65
Na2O	0.09	61.979	0.002	0.003	0.007	0.003	0.007	Na	0.007	0.003	0.002	61.979	0.09
Total	99.95		1.810	1.827	4.000	5.984	4.000			1.827	1.803		100.07

No of Oxygens 6 No of Catior 4
F 1.0026

Check! Fe2O3 as FeO 1.03
FeO* 4.22

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.954	2
4	Tet	Al	0.046	
6	Oct	Al	0.016	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.138	
6	Oct	Mg	0.846	
8	Cubic	Mg	0.109	1
8	Cubic	Ca	0.884	
8	Cubic	Na	0.007	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.66
En	Mg/(Ca+Mg+Fe2+)	49.33
Fs	Fe2+/(Ca+Mg+Fe2+)	5.01
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	3.536

	4.000	Jadeite	-2.789
		Diopside	99.253
			100.000
		FeT/FeT+Mg	0.12
		Fe2/Fe2+Mg	0.09

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.57	0.08	1.44	0.17	1.15	3.19	0.13	17.59	22.65	0.09	100.07	0.002	0.046	0.016	45.66	49.33	5.01

Analysis No. 192

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.68	60.084	0.893	0.893	1.952	3.904	1.952	Si	1.952	0.893	0.893	60.084	53.68
TiO2	0.11	79.866	0.001	0.001	0.003	0.006	0.003	Ti	0.003	0.001	0.001	79.866	0.11
Al2O3	1.54	101.961	0.015	0.030	0.066	0.099	0.066	Al	0.066	0.030	0.015	101.961	1.54
Cr2O3	0.21	151.990	0.001	0.003	0.006	0.009	0.006	Cr	0.006	0.003	0.001	151.990	0.21
Fe2O3	0.00	159.688					0.024	Fe^{3+}	0.024	0.011	0.006	159.688	0.89
FeO	4.57	71.844	0.064	0.064	0.139	0.139	0.115	Fe^{2+}	0.115	0.053	0.053	71.844	3.77
MnO	0.12	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.12
MgO	17.39	40.304	0.431	0.431	0.943	0.943	0.943	Mg	0.943	0.431	0.431	40.304	17.39
CaO	22.61	56.077	0.403	0.403	0.881	0.881	0.881	Ca	0.881	0.403	0.403	56.077	22.61
Na2O	0.09	61.979	0.001	0.003	0.006	0.003	0.006	Na	0.006	0.003	0.001	61.979	0.09
Total	100.32		1.813	1.831	4.000	5.988	4.000			1.831	1.807		100.41

No of Oxygens 6 No of Cation 4
F 1.0020

Check! Fe2O3 as FeO 0.80
FeO* 4.57

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.955	2
4	Tet	Al	0.045	
6	Oct	Al	0.021	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.149	
6	Oct	Mg	0.830	
8	Cubic	Mg	0.113	1
8	Cubic	Ca	0.881	
8	Cubic	Na	0.006	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.45
En	Mg/(Ca+Mg+Fe2+)	48.63
Fs	Fe2+/(Ca+Mg+Fe2+)	5.92
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	2.734
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-2.014
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	99.280
		100.000
FeT/FeT+Mg		0.13
Fe2/Fe2+Mg		0.11

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.68	0.11	1.54	0.21	0.89	3.77	0.12	17.39	22.61	0.09	100.41	0.003	0.045	0.021	45.45	48.63	5.92

Analysis No. 193

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.64	60.084	0.876	0.876	1.931	3.862	1.931	Si	1.931	0.876	0.876	60.084	52.64
TiO2	0.18	79.866	0.002	0.002	0.005	0.010	0.005	Ti	0.005	0.002	0.002	79.866	0.18
Al2O3	2.42	101.961	0.024	0.047	0.105	0.157	0.105	Al	0.105	0.047	0.024	101.961	2.42
Cr2O3	0.79	151.990	0.005	0.010	0.023	0.034	0.023	Cr	0.023	0.010	0.005	151.990	0.79
Fe2O3	0.00	159.688					0.013	Fe^{3+}	0.013	0.006	0.003	159.688	0.48
FeO	4.82	71.844	0.067	0.067	0.148	0.148	0.135	Fe^{2+}	0.135	0.061	0.061	71.844	4.39
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.18
MgO	17.02	40.304	0.422	0.422	0.931	0.931	0.931	Mg	0.931	0.422	0.422	40.304	17.02
CaO	21.37	56.077	0.381	0.381	0.840	0.840	0.840	Ca	0.840	0.381	0.381	56.077	21.37
Na2O	0.18	61.979	0.003	0.006	0.013	0.006	0.013	Na	0.013	0.006	0.003	61.979	0.18
Total	99.60		1.783	1.815	4.000	5.993	4.000			1.815	1.780		99.65

No of Oxygens 6 No of Cation 4
F 1.0011

Check! Fe2O3 as FeO 0.43
FeO* 4.82

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.936	2
4	Tet	Al	0.064	
6	Oct	Al	0.040	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.176	
6	Oct	Mg	0.783	
8	Cubic	Mg	0.148	1
8	Cubic	Ca	0.840	
8	Cubic	Na	0.013	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.09
En	Mg/(Ca+Mg+Fe2+)	48.85
Fs	Fe2+/(Ca+Mg+Fe2+)	7.06
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	1.563
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-0.094
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.531
		100.000
FeT/FeT+Mg		0.14
Fe2/Fe2+Mg		0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.64	0.18	2.42	0.79	0.48	4.39	0.18	17.02	21.37	0.18	99.65	0.005	0.064	0.040	44.09	48.85	7.06

Analysis No. 194

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.96	60.084	0.865	0.865	1.896	3.792	1.896	Si	1.896	0.865	0.865	60.084	51.96
TiO2	0.17	79.866	0.002	0.002	0.005	0.010	0.005	Ti	0.005	0.002	0.002	79.866	0.17
Al2O3	3.13	101.961	0.031	0.061	0.135	0.202	0.135	Al	0.135	0.061	0.031	101.961	3.13
Cr2O3	0.80	151.990	0.005	0.011	0.023	0.035	0.023	Cr	0.023	0.011	0.005	151.990	0.80
Fe2O3	0.00	159.688					0.051	Fe^{3+}	0.051	0.023	0.012	159.688	1.86
FeO	5.75	71.844	0.080	0.080	0.175	0.175	0.124	Fe^{2+}	0.124	0.057	0.057	71.844	4.07
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.16
MgO	16.89	40.304	0.419	0.419	0.919	0.919	0.919	Mg	0.919	0.419	0.419	40.304	16.89
CaO	21.25	56.077	0.379	0.379	0.831	0.831	0.831	Ca	0.831	0.379	0.379	56.077	21.25
Na2O	0.16	61.979	0.003	0.005	0.011	0.005	0.011	Na	0.011	0.005	0.003	61.979	0.16
Total	100.27		1.786	1.824	4.000	5.974	4.000			1.824	1.774		100.46

No of Oxygens 6 No of Catior 4
F 1.0043

Check! Fe2O3 as FeO 1.68
FeO* 5.75

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.901	2
4	Tet	Al	0.099	
6	Oct	Al	0.036	1
		Fe^{3+}+Cr		
6	Oct	$+Fe^{2+}$+Mn	0.204	
6	Oct	Mg	0.761	
8	Cubic	Mg	0.158	1
8	Cubic	Ca	0.831	
8	Cubic	Na	0.011	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.34
En	Mg/(Ca+Mg+Fe2+)	49.03
Fs	Fe2+/(Ca+Mg+Fe2+)	6.63
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	6.079
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-4.773
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.694
		100.000

FeT/FeT+Mg	0.16
Fe2/Fe2+Mg	0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.96	0.17	3.13	0.80	1.86	4.07	0.16	16.89	21.25	0.16	100.46	0.005	0.099	0.036	44.34	49.03	6.63

Analysis No. 195

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.22	60.084	0.869	0.869	1.901	3.802	1.901	Si
TiO2	0.19	79.866	0.002	0.002	0.005	0.011	0.005	Ti
Al2O3	2.73	101.961	0.027	0.054	0.117	0.176	0.117	Al
Cr2O3	0.21	151.990	0.001	0.003	0.006	0.009	0.006	Cr
Fe2O3	0.00	159.688					0.080	Fe^{3+}
FeO	6.94	71.844	0.097	0.097	0.211	0.211	0.132	Fe^{2+}
MnO	0.20	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	16.82	40.304	0.417	0.417	0.913	0.913	0.913	Mg
CaO	21.14	56.077	0.377	0.377	0.825	0.825	0.825	Ca
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na
Total	100.68		1.797	1.829	4.000	5.960	4.000	

No of Oxygens 6 No of Cation 4
F 1.0067

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.901	0.869	0.869	60.084	52.22
0.005	0.002	0.002	79.866	0.19
0.117	0.054	0.027	101.961	2.73
0.006	0.003	0.001	151.990	0.21
0.080	0.036	0.018	159.688	2.90
0.132	0.060	0.060	71.844	4.33
0.006	0.003	0.003	70.937	0.20
0.913	0.417	0.417	40.304	16.82
0.825	0.377	0.377	56.077	21.14
0.016	0.007	0.004	61.979	0.22
	1.829	1.779		100.97

Check! Fe2O3 as FeO 2.61
FeO* 6.94

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.906	2
4	Tet	Al	0.094	
6	Oct	Al	0.023	1
		Fe^{3+}+Cr		
6	Oct	$+Fe^{2+}$+Mn	0.224	
6	Oct	Mg	0.753	
8	Cubic	Mg	0.160	1
8	Cubic	Ca	0.825	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.12
En	Mg/(Ca+Mg+Fe2+)	48.84
Fs	Fe2+/(Ca+Mg+Fe2+)	7.05
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	9.469
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-7.622
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.153
		100.000

FeT/FeT+Mg	0.19
Fe2/Fe2+Mg	0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.22	0.19	2.73	0.21	2.90	4.33	0.20	16.82	21.14	0.22	100.97	0.005	0.094	0.023	44.12	48.84	7.05

Analysis No. 202

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	53.73	60.084	0.894	0.894	1.952	3.904	1.952	Si
TiO2	0.02	79.866	0.000	0.000	0.000	0.001	0.000	Ti
Al2O3	1.10	101.961	0.011	0.021	0.047	0.070	0.047	Al
Cr2O3	0.31	151.990	0.002	0.004	0.009	0.013	0.009	Cr
Fe2O3	0.00	159.688					0.047	Fe^{3+}
FeO	4.29	71.844	0.060	0.060	0.130	0.130	0.083	Fe^{2+}
MnO	0.12	70.937	0.002	0.002	0.004	0.004	0.004	Mn
MgO	18.09	40.304	0.449	0.449	0.980	0.980	0.980	Mg
CaO	22.34	56.077	0.398	0.398	0.870	0.870	0.870	Ca
Na2O	0.11	61.979	0.002	0.004	0.008	0.004	0.008	Na
Total	100.11		1.818	1.832	4.000	5.976	4.000	

No of Oxygens 6 No of Cation 4
F 1.0039

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.952	0.894	0.894	60.084	53.73
0.000	0.000	0.000	79.866	0.02
0.047	0.021	0.011	101.961	1.10
0.009	0.004	0.002	151.990	0.31
0.047	0.022	0.011	159.688	1.72
0.083	0.038	0.038	71.844	2.74
0.004	0.002	0.002	70.937	0.12
0.980	0.449	0.449	40.304	18.09
0.870	0.398	0.398	56.077	22.34
0.008	0.004	0.002	61.979	0.11
	1.832	1.807		100.28

Check! Fe2O3 as FeO 1.55
FeO* 4.29

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.953	2.000
4	Tet	Al	0.047	
6	Oct	Al	0.000	1.000
		Fe^{3+}+Cr		
6	Oct	$+Fe^{2+}$+Mn	0.143	
6	Oct	Mg	0.857	
8	Cubic	Mg	0.123	1.000
8	Cubic	Ca	0.870	
8	Cubic	Na	0.008	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.00
En	Mg/(Ca+Mg+Fe2+)	50.70
Fs	Fe2+/(Ca+Mg+Fe2+)	4.31
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	5.365
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-4.453
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	99.088
		100.000

FeT/FeT+Mg	0.12
Fe2/Fe2+Mg	0.08

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.73	0.02	1.10	0.31	1.72	2.74	0.12	18.09	22.34	0.11	100.28	0.000	0.047	0.000	45.00	50.70	4.31

Analysis No. 203

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	53.27	60.084	0.887	0.887	1.936	3.871	1.936	Si
TiO2	0.17	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	1.40	101.961	0.014	0.027	0.060	0.090	0.060	Al
Cr2O3	0.80	151.990	0.005	0.011	0.023	0.034	0.023	Cr
Fe2O3	0.00	159.688					0.051	Fe^{3+}

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.936	0.887	0.887	60.084	53.27
0.005	0.002	0.002	79.866	0.17
0.060	0.027	0.014	101.961	1.40
0.023	0.011	0.005	151.990	0.80
0.051	0.023	0.012	159.688	1.85

FeO	4.20	71.844	0.058	0.058	0.128	0.128	0.077	Fe^{2+}	0.077	0.035	0.035	71.844	2.53
MnO	0.10	70.937	0.001	0.001	0.003	0.003	0.003	Mn	0.003	0.001	0.001	70.937	0.10
MgO	17.88	40.304	0.444	0.444	0.969	0.969	0.969	Mg	0.969	0.444	0.444	40.304	17.88
CaO	22.17	56.077	0.395	0.395	0.863	0.863	0.863	Ca	0.863	0.395	0.395	56.077	22.17
Na2O	0.20	61.979	0.003	0.007	0.014	0.007	0.014	Na	0.014	0.007	0.003	61.979	0.20
Total	100.19		1.810	1.832	4.000	5.975	4.000			1.832	1.798		100.38

No of Oxygens 6 No of Cation 4
F 1.0042

Check! Fe2O3 as FeO 1.67
FeO* 4.20

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.940	2
4	Tet	Al	0.060	
6	Oct	Al	0.000	1
		Fe^{3+}+Cr		
6	Oct	$+Fe^{2+}$+Mn	0.154	
6	Oct	Mg	0.846	
8	Cubic	Mg	0.122	1
8	Cubic	Ca	0.863	
8	Cubic	Na	0.014	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.22
En	Mg/(Ca+Mg+Fe2+)	50.74
Fs	Fe2+/(Ca+Mg+Fe2+)	4.03
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	5.768
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-4.129
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.361
		100.000

FeT/FeT+Mg 0.12
Fe2/Fe2+Mg 0.07

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.27	0.17	1.40	0.80	1.85	2.53	0.10	17.88	22.17	0.20	100.38	0.005	0.060	0.000	45.22	50.74	4.03

Analysis No. 204

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.65	60.084	0.860	0.860	1.895	3.789	1.895	Si	1.895	0.860	0.860	60.084	51.65
TiO2	0.24	79.866	0.003	0.003	0.007	0.013	0.007	Ti	0.007	0.003	0.003	79.866	0.24
Al2O3	3.16	101.961	0.031	0.062	0.137	0.205	0.137	Al	0.137	0.062	0.031	101.961	3.16
Cr2O3	0.39	151.990	0.003	0.005	0.011	0.017	0.011	Cr	0.011	0.005	0.003	151.990	0.39
Fe2O3	0.00	159.688					0.065	Fe^{3+}	0.065	0.029	0.015	159.688	2.34
FeO	7.33	71.844	0.102	0.102	0.225	0.225	0.160	Fe^{2+}	0.160	0.073	0.073	71.844	5.22
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.19
MgO	16.16	40.304	0.401	0.401	0.884	0.884	0.884	Mg	0.884	0.401	0.401	40.304	16.16
CaO	20.89	56.077	0.373	0.373	0.821	0.821	0.821	Ca	0.821	0.373	0.373	56.077	20.89
Na2O	0.21	61.979	0.003	0.007	0.015	0.008	0.015	Na	0.015	0.007	0.003	61.979	0.21
Total	100.23		1.778	1.815	4.000	5.968	4.000			1.815	1.763		100.47

No of Oxygens 6 No of Cation 4
F 1.0054

Check! Fe2O3 as FeO 2.11
FeO* 7.33

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.901	2
4	Tet	Al	0.099	
6	Oct	Al	0.038	1
		Fe^{3+}+Cr		
6	Oct	$+Fe^{2+}$+Mn	0.242	
6	Oct	Mg	0.720	
8	Cubic	Mg	0.164	1
8	Cubic	Ca	0.821	
8	Cubic	Na	0.015	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.02
En	Mg/(Ca+Mg+Fe2+)	47.38
Fs	Fe2+/(Ca+Mg+Fe2+)	8.59
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	7.724
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-5.908
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.184
		100.000

FeT/FeT+Mg 0.20
Fe2/Fe2+Mg 0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.65	0.24	3.16	0.39	2.34	5.22	0.19	16.16	20.89	0.21	100.47	0.007	0.099	0.038	44.02	47.38	8.59

Analysis No. 205

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.73	60.084	0.878	0.878	1.916	3.831	1.916	Si	1.916	0.878	0.878	60.084	52.73
TiO2	0.17	79.866	0.002	0.002	0.005	0.010	0.005	Ti	0.005	0.002	0.002	79.866	0.17
Al2O3	2.38	101.961	0.023	0.047	0.102	0.153	0.102	Al	0.102	0.047	0.023	101.961	2.38
Cr2O3	0.81	151.990	0.005	0.011	0.023	0.035	0.023	Cr	0.023	0.011	0.005	151.990	0.81
Fe2O3	0.00	159.688					0.047	Fe^{3+}	0.047	0.022	0.011	159.688	1.72
FeO	4.89	71.844	0.068	0.068	0.149	0.149	0.101	Fe^{2+}	0.101	0.046	0.046	71.844	3.34
MnO	0.18	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.18
MgO	17.67	40.304	0.438	0.438	0.957	0.957	0.957	Mg	0.957	0.438	0.438	40.304	17.67
CaO	21.34	56.077	0.381	0.381	0.831	0.831	0.831	Ca	0.831	0.381	0.381	56.077	21.34
Na2O	0.18	61.979	0.003	0.006	0.013	0.006	0.013	Na	0.013	0.006	0.003	61.979	0.18
Total	100.36		1.801	1.833	4.000	5.976	4.000			1.833	1.790		100.53

No of Oxygens 6 No of Cation 4
F 1.0039

Check! Fe2O3 as FeO 1.55
FeO* 4.89

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.920	2
4	Tet	Al	0.080	
6	Oct	Al	0.022	1
		Fe^{3+}+Cr		
6	Oct	$+Fe^{2+}$+Mn	0.177	
6	Oct	Mg	0.800	
8	Cubic	Mg	0.156	1
8	Cubic	Ca	0.831	
8	Cubic	Na	0.013	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.97
En	Mg/(Ca+Mg+Fe2+)	50.66
Fs	Fe2+/(Ca+Mg+Fe2+)	5.37
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	5.584
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-4.050
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.465
		100.000

FeT/FeT+Mg 0.13
Fe2/Fe2+Mg 0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.73	0.17	2.38	0.81	1.72	3.34	0.18	17.67	21.34	0.18	100.53	0.005	0.080	0.022	43.97	50.66	5.37

Analysis No. 207

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.94	60.084	0.881	0.881	1.927	3.855	1.927	Si	1.927	0.881	0.881	60.084	52.94
TiO2	0.29	79.866	0.004	0.004	0.008	0.016	0.008	Ti	0.008	0.004	0.004	79.866	0.29
Al2O3	2.08	101.961	0.020	0.041	0.089	0.134	0.089	Al	0.089	0.041	0.020	101.961	2.08
Cr2O3	0.08	151.990	0.001	0.001	0.002	0.003	0.002	Cr	0.002	0.001	0.001	151.990	0.08
Fe2O3	0.00	159.688					0.050	Fe^{3+}	0.050	0.023	0.011	159.688	1.82
FeO	6.46	71.844	0.090	0.090	0.197	0.197	0.147	Fe^{2+}	0.147	0.067	0.067	71.844	4.82
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.18
MgO	16.70	40.304	0.414	0.414	0.906	0.906	0.906	Mg	0.906	0.414	0.414	40.304	16.70
CaO	21.84	56.077	0.389	0.389	0.852	0.852	0.852	Ca	0.852	0.389	0.389	56.077	21.84
Na2O	0.17	61.979	0.003	0.006	0.012	0.006	0.012	Na	0.012	0.006	0.003	61.979	0.17
Total	100.75		1.805	1.829	4.000	5.975	4.000			1.829	1.793		100.93

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Catior 4
F 1.0042

Check! Fe2O3 as FeO 1.64
FeO* 6.46

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	1.935	2	
4	Tet	Al	0.065		
6	Oct	Al	0.025	1	
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.205		
6	Oct	Mg	0.771		
8	Cubic	Mg	0.136	1	
8	Cubic	Ca	0.852		
8	Cubic	Na	0.012		
			4.000		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.72
En	Mg/(Ca+Mg+Fe2+)	47.57
Fs	Fe2+/(Ca+Mg+Fe2+)	7.71
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	5.764
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-4.336
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.572
		100.000
FeT/FeT+Mg		0.18
Fe2/Fe2+Mg		0.14

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.94	0.29	2.08	0.08	1.82	4.82	0.18	16.70	21.84	0.17	100.93	0.008	0.065	0.025	44.72	47.57	7.71

Analysis No. 208

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.75	60.084	0.861	0.861	1.890	3.781	1.890	Si	1.890	0.861	0.861	60.084	51.75
TiO2	0.28	79.866	0.003	0.003	0.008	0.015	0.008	Ti	0.008	0.003	0.003	79.866	0.28
Al2O3	3.00	101.961	0.029	0.059	0.129	0.194	0.129	Al	0.129	0.059	0.029	101.961	3.00
Cr2O3	0.11	151.990	0.001	0.001	0.003	0.005	0.003	Cr	0.003	0.001	0.001	151.990	0.11
Fe2O3	0.00	159.688					0.088	Fe^{3+}	0.088	0.040	0.020	159.688	3.19
FeO	7.93	71.844	0.110	0.110	0.242	0.242	0.154	Fe^{2+}	0.154	0.070	0.070	71.844	5.06
MnO	0.17	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.17
MgO	15.94	40.304	0.395	0.395	0.868	0.868	0.868	Mg	0.868	0.395	0.395	40.304	15.94
CaO	21.42	56.077	0.382	0.382	0.838	0.838	0.838	Ca	0.838	0.382	0.382	56.077	21.42
Na2O	0.23	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.23
Total	100.82		1.789	1.823	4.000	5.956	4.000			1.823	1.769		101.14

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Cation 4
F 1.0074

Check! Fe2O3 as FeO 2.87
FeO* 7.93

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	1.898	2	
4	Tet	Al	0.102		
6	Oct	Al	0.027	1	
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.251		
6	Oct	Mg	0.722		
8	Cubic	Mg	0.146	1	
8	Cubic	Ca	0.838		
8	Cubic	Na	0.016		
			4.000		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.05
En	Mg/(Ca+Mg+Fe2+)	46.65
Fs	Fe2+/(Ca+Mg+Fe2+)	8.30
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	10.272
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-8.400
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.128
		100.000
FeT/FeT+Mg		0.22
Fe2/Fe2+Mg		0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.75	0.28	3.00	0.11	3.19	5.06	0.17	15.94	21.42	0.23	101.14	0.008	0.102	0.027	45.05	46.65	8.30

Analysis No. 209

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.99	60.084	0.865	0.865	1.893	3.785	1.893	Si	1.893	0.865	0.865	60.084	51.99
TiO2	0.14	79.866	0.002	0.002	0.004	0.008	0.004	Ti	0.004	0.002	0.002	79.866	0.14
Al2O3	3.21	101.961	0.031	0.063	0.138	0.207	0.138	Al	0.138	0.063	0.031	101.961	3.21
Cr2O3	0.63	151.990	0.004	0.008	0.018	0.027	0.018	Cr	0.018	0.008	0.004	151.990	0.63
Fe2O3	0.00	159.688					0.064	Fe^{3+}	0.064	0.029	0.015	159.688	2.32
FeO	6.14	71.844	0.085	0.085	0.187	0.187	0.123	Fe^{2+}	0.123	0.056	0.056	71.844	4.05
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.18
MgO	17.27	40.304	0.428	0.428	0.937	0.937	0.937	Mg	0.937	0.428	0.428	40.304	17.27
CaO	20.66	56.077	0.368	0.368	0.806	0.806	0.806	Ca	0.806	0.368	0.368	56.077	20.66
Na2O	0.17	61.979	0.003	0.006	0.012	0.006	0.012	Na	0.012	0.006	0.003	61.979	0.17
Total	100.39		1.790	1.829	4.000	5.968	4.000			1.829	1.776		100.62

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Catior 4
F 1.0053

Check! Fe2O3 as FeO 2.09
FeO* 6.14

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	1.896	2	
4	Tet	Al	0.104		
6	Oct	Al	0.034	1	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.17
En	Mg/(Ca+Mg+Fe2+)	50.21

Site	Elements		Ideal Cations/Site
	Fe^{3+}+Cr		
6 Oct	+Fe^{2+}+Mn	0.211	
6 Oct	Mg	0.755	
8 Cubic	Mg	0.182	1
8 Cubic	Ca	0.806	
8 Cubic	Na	0.012	
		4.000	

end member		%
Fs	Fe2+/(Ca+Mg+Fe2+)	6.61
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.765
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-6.278
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.513
		100.000
FeT/FeT+Mg	0.17	
Fe2/Fe2+Mg	0.12	

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.99	0.14	3.21	0.63	2.32	4.05	0.18	17.27	20.66	0.17	100.62	0.004	0.104	0.034	43.17	50.21	6.61

Analysis No. 183

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.94	60.084	0.864	0.864	1.891	3.782	1.891	Si
TiO2	0.19	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	3.20	101.961	0.031	0.063	0.137	0.206	0.137	Al
Cr2O3	0.71	151.990	0.005	0.009	0.020	0.030	0.020	Cr
Fe2O3	0.00	159.688					0.062	Fe^{3+}
FeO	7.21	71.844	0.100	0.100	0.220	0.220	0.157	Fe^{2+}
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	18.83	40.304	0.467	0.467	1.022	1.022	1.022	Mg
CaO	17.60	56.077	0.314	0.314	0.687	0.687	0.687	Ca
Na2O	0.18	61.979	0.003	0.006	0.012	0.006	0.012	Na
Total	100.03		1.790	1.829	4.000	5.969	4.000	

No of Oxygens 6 — No of Cation 4
F 1.0052

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.891	0.864	0.864	60.084	51.94
0.005	0.002	0.002	79.866	0.19
0.137	0.063	0.031	101.961	3.20
0.020	0.009	0.005	151.990	0.71
0.062	0.029	0.014	159.688	2.28
0.157	0.072	0.072	71.844	5.16
0.006	0.003	0.003	70.937	0.18
1.022	0.467	0.467	40.304	18.83
0.687	0.314	0.314	56.077	17.60
0.012	0.006	0.003	61.979	0.18
	1.829	1.775		100.26

Check! Fe2O3 as FeO 2.05
FeO* 7.21

Cation Site Occupancy

C.N. Site	Elements		Ideal Cations/Site
4 Tet	Si+Ti	1.896	2
4 Tet	Al	0.104	
6 Oct	Al	0.034	1
	Fe^{3+}+Cr		
6 Oct	+Fe^{2+}+Mn	0.245	
6 Oct	Mg	0.721	
8 Cubic	Mg	0.301	1
8 Cubic	Ca	0.687	
8 Cubic	Na	0.012	
		4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	36.80
En	Mg/(Ca+Mg+Fe2+)	54.78
Fs	Fe2+/(Ca+Mg+Fe2+)	8.42
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.935
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-7.148
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.213
		100.000
FeT/FeT+Mg	0.18	
Fe2/Fe2+Mg	0.13	

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.94	0.19	3.20	0.71	2.28	5.16	0.18	18.83	17.60	0.18	100.26	0.005	0.104	0.034	36.80	54.78	8.42

Analysis No. 198

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.69	60.084	0.877	0.877	1.920	3.840	1.920	Si
TiO2	0.17	79.866	0.002	0.002	0.005	0.009	0.005	Ti
Al2O3	2.49	101.961	0.024	0.049	0.107	0.160	0.107	Al
Cr2O3	0.75	151.990	0.005	0.010	0.022	0.033	0.022	Cr
Fe2O3	0.00	159.688					0.033	Fe^{3+}
FeO	6.11	71.844	0.085	0.085	0.186	0.186	0.153	Fe^{2+}
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	17.89	40.304	0.444	0.444	0.972	0.972	0.972	Mg
CaO	19.79	56.077	0.353	0.353	0.773	0.773	0.773	Ca
Na2O	0.16	61.979	0.003	0.005	0.011	0.006	0.011	Na
Total	100.20		1.795	1.827	4.000	5.984	4.000	

No of Oxygens 6 — No of Cation 4
F 1.0028

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.920	0.877	0.877	60.084	52.69
0.005	0.002	0.002	79.866	0.17
0.107	0.049	0.024	101.961	2.49
0.022	0.010	0.005	151.990	0.75
0.033	0.015	0.008	159.688	1.20
0.153	0.070	0.070	71.844	5.03
0.005	0.002	0.002	70.937	0.15
0.972	0.444	0.444	40.304	17.89
0.773	0.353	0.353	56.077	19.79
0.011	0.005	0.003	61.979	0.16
	1.827	1.787		100.32

Check! Fe2O3 as FeO 1.08
FeO* 6.11

Cation Site Occupancy

C.N. Site	Elements		Ideal Cations/Site
4 Tet	Si+Ti	1.925	2
4 Tet	Al	0.075	
6 Oct	Al	0.032	1
	Fe^{3+}+Cr		
6 Oct	+Fe^{2+}+Mn	0.213	
6 Oct	Mg	0.756	
8 Cubic	Mg	0.216	1
8 Cubic	Ca	0.773	
8 Cubic	Na	0.011	
		4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.72
En	Mg/(Ca+Mg+Fe2+)	51.21
Fs	Fe2+/(Ca+Mg+Fe2+)	8.07
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.206
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-2.793
Diopside	Ca/(Fe3+ +(Na-Fe3+)+C	98.587
		100.000
FeT/FeT+Mg	0.16	
Fe2/Fe2+Mg	0.14	

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.69	0.17	2.49	0.75	1.20	5.03	0.15	17.89	19.79	0.16	100.32	0.005	0.075	0.032	40.72	51.21	8.07

Analysis No.	135								
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		
SiO2	52.62	60.084	0.876	0.876	1.936	3.872	1.936	Si	
TiO2	0.07	79.866	0.001	0.001	0.002	0.004	0.002	Ti	
Al2O3	1.85	101.961	0.018	0.036	0.080	0.121	0.080	Al	
Cr2O3	0.44	151.990	0.003	0.006	0.013	0.019	0.013	Cr	
Fe2O3	0.00	159.688					0.043	Fe^{3+}	
FeO	4.57	71.844	0.064	0.064	0.141	0.141	0.098	Fe^{2+}	
MnO	0.12	70.937	0.002	0.002	0.004	0.004	0.004	Mn	
MgO	17.11	40.304	0.425	0.425	0.939	0.939	0.939	Mg	
CaO	22.17	56.077	0.395	0.395	0.874	0.874	0.874	Ca	
Na2O	0.17	61.979	0.003	0.005	0.012	0.006	0.012	Na	
Total	99.12		1.786	1.809	4.000	5.979	4.000		
No of Oxygens	6	No of Catior	4						
F	1.0036								

Calculate Fe2O3 Wt %				
Atom Units	Cation Units	Moles	MW	Wt %
1.936	0.876	0.876	60.084	52.62
0.002	0.001	0.001	79.866	0.07
0.080	0.036	0.018	101.961	1.85
0.013	0.006	0.003	151.990	0.44
0.043	0.019	0.010	159.688	1.55
0.098	0.044	0.044	71.844	3.18
0.004	0.002	0.002	70.937	0.12
0.939	0.425	0.425	40.304	17.11
0.874	0.395	0.395	56.077	22.17
0.012	0.005	0.003	61.979	0.17
	1.809	1.776		99.27
Check!	Fe2O3 as FeO	1.39		
	FeO*	4.57		

Cation Site Occupancy						
C.N.	Site	Elements		Ideal Cations/Site		
4	Tet	Si+Ti	1.938	2		
4	Tet	Al	0.062			
6	Oct	Al	0.018	1		
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.157			
6	Oct	Mg	0.824			
8	Cubic	Mg	0.114	1		
8	Cubic	Ca	0.874			
8	Cubic	Na	0.012			
			4.000			

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.75
En	Mg/(Ca+Mg+Fe2+)	49.13
Fs	Fe2+/(Ca+Mg+Fe2+)	5.12
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.833
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.491
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.658
		100.000
FeT/FeT+Mg		0.13
Fe2/Fe2+Mg		0.09

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.62	0.07	1.85	0.44	1.55	3.18	0.12	17.11	22.17	0.17	99.27	0.002	0.062	0.018	45.75	49.13	5.12

Analysis No.	136								
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		
SiO2	51.95	60.084	0.865	0.865	1.926	3.852	1.926	Si	
TiO2	0.13	79.866	0.002	0.002	0.004	0.007	0.004	Ti	
Al2O3	2.14	101.961	0.021	0.042	0.094	0.140	0.094	Al	
Cr2O3	0.15	151.990	0.001	0.002	0.004	0.006	0.004	Cr	
Fe2O3	0.00	159.688					0.057	Fe^{3+}	
FeO	7.29	71.844	0.101	0.101	0.226	0.226	0.169	Fe^{2+}	
MnO	0.21	70.937	0.003	0.003	0.007	0.007	0.007	Mn	
MgO	16.81	40.304	0.417	0.417	0.929	0.929	0.929	Mg	
CaO	20.06	56.077	0.358	0.358	0.797	0.797	0.797	Ca	
Na2O	0.20	61.979	0.003	0.006	0.014	0.007	0.014	Na	
Total	98.93		1.771	1.796	4.000	5.971	4.000		
No of Oxygens	6	No of Catior	4						
F	1.0048								

Calculate Fe2O3 Wt %				
Atom Units	Cation Units	Moles	MW	Wt %
1.926	0.865	0.865	60.084	51.95
0.004	0.002	0.002	79.866	0.13
0.094	0.042	0.021	101.961	2.14
0.004	0.002	0.001	151.990	0.15
0.057	0.026	0.013	159.688	2.05
0.169	0.076	0.076	71.844	5.44
0.007	0.003	0.003	70.937	0.21
0.929	0.417	0.417	40.304	16.81
0.797	0.358	0.358	56.077	20.06
0.014	0.006	0.003	61.979	0.20
	1.796	1.758		99.14
Check!	Fe2O3 as FeO	1.85		
	FeO*	7.29		

Cation Site Occupancy						
C.N.	Site	Elements		Ideal Cations/Site		
4	Tet	Si+Ti	1.930	2		
4	Tet	Al	0.070			
6	Oct	Al	0.023	1		
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.237			
6	Oct	Mg	0.740			
8	Cubic	Mg	0.189	1		
8	Cubic	Ca	0.797			
8	Cubic	Na	0.014			
			4.000			

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.06
En	Mg/(Ca+Mg+Fe2+)	49.04
Fs	Fe2+/(Ca+Mg+Fe2+)	8.91
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.061
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.324
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.264
		100.000
FeT/FeT+Mg		0.20
Fe2/Fe2+Mg		0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.95	0.13	2.14	0.15	2.05	5.44	0.21	16.81	20.06	0.20	99.14	0.004	0.070	0.023	42.06	49.04	8.91

Analysis No.	137								
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		
SiO2	53.13	60.084	0.884	0.884	1.948	3.896	1.948	Si	
TiO2	0.07	79.866	0.001	0.001	0.002	0.004	0.002	Ti	
Al2O3	1.56	101.961	0.015	0.031	0.067	0.101	0.067	Al	
Cr2O3	0.29	151.990	0.002	0.004	0.008	0.013	0.008	Cr	
Fe2O3	0.00	159.688					0.035	Fe^{3+}	
FeO	5.82	71.844	0.081	0.081	0.178	0.178	0.143	Fe^{2+}	
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn	
MgO	18.16	40.304	0.451	0.451	0.993	0.993	0.993	Mg	
CaO	20.02	56.077	0.357	0.357	0.787	0.787	0.787	Ca	
Na2O	0.15	61.979	0.002	0.005	0.011	0.005	0.011	Na	
Total	99.39		1.796	1.816	4.000	5.982	4.000		
No of Oxygens	6	No of Catior	4						
F	1.0029								

Calculate Fe2O3 Wt %				
Atom Units	Cation Units	Moles	MW	Wt %
1.948	0.884	0.884	60.084	53.13
0.002	0.001	0.001	79.866	0.07
0.067	0.031	0.015	101.961	1.56
0.008	0.004	0.002	151.990	0.29
0.035	0.016	0.008	159.688	1.28
0.143	0.065	0.065	71.844	4.67
0.006	0.003	0.003	70.937	0.19
0.993	0.451	0.451	40.304	18.16
0.787	0.357	0.357	56.077	20.02
0.011	0.005	0.002	61.979	0.15
	1.816	1.788		99.51
Check!	Fe2O3 as FeO	1.15		
	FeO*	5.82		

Cation Site Occupancy						
C.N.	Site	Elements		Ideal Cations/Site		
4	Tet	Si+Ti	1.950	2		
4	Tet	Al	0.050			
6	Oct	Al	0.017	1		
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.193			
6	Oct	Mg	0.790			
8	Cubic	Mg	0.203	1		
8	Cubic	Ca	0.787			
8	Cubic	Na	0.011			
			4.000			

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.91
En	Mg/(Ca+Mg+Fe2+)	51.64
Fs	Fe2+/(Ca+Mg+Fe2+)	7.45
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.420
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.060
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.640

100.000

FeT/FeT+Mg 0.15
Fe2/Fe2+Mg 0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.13	0.07	1.56	0.29	1.28	4.67	0.19	18.16	20.02	0.15	99.51	0.002	0.050	0.017	40.91	51.64	7.45

Analysis No. 138

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.05	60.084	0.883	0.883	1.942	3.883	1.942	Si	1.942	0.883	0.883	60.084	53.05
TiO2	0.04	79.866	0.000	0.000	0.001	0.002	0.001	Ti	0.001	0.000	0.000	79.866	0.04
Al2O3	1.68	101.961	0.016	0.033	0.072	0.109	0.072	Al	0.072	0.033	0.016	101.961	1.68
Cr2O3	0.43	151.990	0.003	0.006	0.013	0.019	0.013	Cr	0.013	0.006	0.003	151.990	0.43
Fe2O3	0.00	159.688					0.042	Fe^{3+}	0.042	0.019	0.009	159.688	1.51
FeO	5.08	71.844	0.071	0.071	0.155	0.155	0.114	Fe^{2+}	0.114	0.052	0.052	71.844	3.72
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	18.15	40.304	0.450	0.450	0.990	0.990	0.990	Mg	0.990	0.450	0.450	40.304	18.15
CaO	20.66	56.077	0.368	0.368	0.810	0.810	0.810	Ca	0.810	0.368	0.368	56.077	20.66
Na2O	0.17	61.979	0.003	0.005	0.012	0.006	0.012	Na	0.012	0.005	0.003	61.979	0.17
Total	99.41		1.797	1.819	4.000	5.979	4.000			1.819	1.788		99.56

No of Oxygens 6 No of Catior 4
F 1.0035

Check! Fe2O3 as FeO 1.36
FeO* 5.08

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.943	2
4	Tet	Al	0.057	
6	Oct	Al	0.015	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.173	
6	Oct	Mg	0.812	
8	Cubic	Mg	0.178	1
8	Cubic	Ca	0.810	
8	Cubic	Na	0.012	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.32
En	Mg/(Ca+Mg+Fe2+)	51.73
Fs	Fe2+/(Ca+Mg+Fe2+)	5.95
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	5.068
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.626
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.558
		100.000

FeT/FeT+Mg 0.14
Fe2/Fe2+Mg 0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.05	0.04	1.68	0.43	1.51	3.72	0.15	18.15	20.66	0.17	99.56	0.001	0.057	0.015	42.32	51.73	5.95

Analysis No. 142

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.78	60.084	0.862	0.862	1.934	3.869	1.934	Si	1.934	0.862	0.862	60.084	51.78
TiO2	0.06	79.866	0.001	0.001	0.002	0.003	0.002	Ti	0.002	0.001	0.001	79.866	0.06
Al2O3	1.59	101.961	0.016	0.031	0.070	0.105	0.070	Al	0.070	0.031	0.016	101.961	1.59
Cr2O3	0.01	151.990	0.000	0.000	0.000	0.000	0.000	Cr	0.000	0.000	0.000	151.990	0.01
Fe2O3	0.00	159.688					0.075	Fe^{3+}	0.075	0.033	0.017	159.688	2.65
FeO	11.39	71.844	0.159	0.159	0.356	0.356	0.281	Fe^{2+}	0.281	0.125	0.125	71.844	9.00
MnO	0.31	70.937	0.004	0.004	0.010	0.010	0.010	Mn	0.010	0.004	0.004	70.937	0.31
MgO	15.22	40.304	0.378	0.378	0.848	0.848	0.848	Mg	0.848	0.378	0.378	40.304	15.22
CaO	19.07	56.077	0.340	0.340	0.763	0.763	0.763	Ca	0.763	0.340	0.340	56.077	19.07
Na2O	0.23	61.979	0.004	0.008	0.017	0.008	0.017	Na	0.017	0.008	0.004	61.979	0.23
Total	99.67		1.763	1.782	4.000	5.963	4.000			1.782	1.746		99.93

No of Oxygens 6 No of Catior 4
F 1.0062

Check! Fe2O3 as FeO 2.39
FeO* 11.39

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.936	2
4	Tet	Al	0.064	
6	Oct	Al	0.006	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.366	
6	Oct	Mg	0.628	
8	Cubic	Mg	0.220	1
8	Cubic	Ca	0.763	
8	Cubic	Na	0.017	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.34
En	Mg/(Ca+Mg+Fe2+)	44.79
Fs	Fe2+/(Ca+Mg+Fe2+)	14.87
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.552
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.385
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.832
		100.000

FeT/FeT+Mg 0.30
Fe2/Fe2+Mg 0.25

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.78	0.06	1.59	0.01	2.65	9.00	0.31	15.22	19.07	0.23	99.93	0.002	0.064	0.006	40.34	44.79	14.87

Analysis No. 143

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.50	60.084	0.857	0.857	1.933	3.866	1.933	Si	1.933	0.857	0.857	60.084	51.50
TiO2	0.09	79.866	0.001	0.001	0.002	0.005	0.002	Ti	0.002	0.001	0.001	79.866	0.09
Al2O3	1.74	101.961	0.017	0.034	0.077	0.116	0.077	Al	0.077	0.034	0.017	101.961	1.74
Cr2O3	0.09	151.990	0.001	0.001	0.003	0.004	0.003	Cr	0.003	0.001	0.001	151.990	0.09
Fe2O3	0.00	159.688					0.061	Fe^{3+}	0.061	0.027	0.014	159.688	2.18
FeO	9.23	71.844	0.128	0.128	0.290	0.290	0.228	Fe^{2+}	0.228	0.101	0.101	71.844	7.27
MnO	0.21	70.937	0.003	0.003	0.007	0.007	0.007	Mn	0.007	0.003	0.003	70.937	0.21
MgO	15.14	40.304	0.376	0.376	0.847	0.847	0.847	Mg	0.847	0.376	0.376	40.304	15.14
CaO	20.60	56.077	0.367	0.367	0.829	0.829	0.829	Ca	0.829	0.367	0.367	56.077	20.60
Na2O	0.17	61.979	0.003	0.006	0.012	0.006	0.012	Na	0.012	0.006	0.003	61.979	0.17
Total	98.77		1.753	1.774	4.000	5.969	4.000			1.774	1.739		98.99

No of Oxygens 6 No of Catior 4
F 1.0051

Check! Fe2O3 as FeO 1.96
FeO* 9.23

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.936	2
4	Tet	Al	0.064	
6	Oct	Al	0.013	1

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.51
En	Mg/(Ca+Mg+Fe2+)	44.50

		Fe^{3+}+Cr				
6	Oct	$+Fe^{2+}$+Mn	0.299		Fs	$Fe^{2+}/(Ca+Mg+Fe^{2+})$ 11.99
6	Oct	Mg	0.688			total 100.00
8	Cubic	Mg	0.159	1		
8	Cubic	Ca	0.829		**Sodic and Calcic CPX**	
8	Cubic	Na	0.012		Aegerine	$Fe^{3+}/(Fe^{3+}+(Na-Fe^{3+}$ 7.308
			4.000		Jadeite	$Na-Fe^{3+}/(Fe^{3+}+(Na-F$ -5.832
					Diopside	$Ca/(Fe^{3+}+(Na-Fe^{3+})+$ 98.524
						100.000
					FeT/FeT+Mg	0.25
					Fe2/Fe2+Mg	0.21

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.50	0.09	1.74	0.09	2.18	7.27	0.21	15.14	20.60	0.17	98.99	0.002	0.064	0.013	43.51	44.50	11.99

Analysis No. 144

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.08	60.084	0.867	0.867	1.923	3.845	1.923	Si	1.923	0.867	0.867	60.084	52.08
TiO2	0.07	79.866	0.001	0.001	0.002	0.004	0.002	Ti	0.002	0.001	0.001	79.866	0.07
Al2O3	2.20	101.961	0.022	0.043	0.096	0.144	0.096	Al	0.096	0.043	0.022	101.961	2.20
Cr2O3	0.75	151.990	0.005	0.010	0.022	0.033	0.022	Cr	0.022	0.010	0.005	151.990	0.75
Fe2O3	0.00	159.688					0.045	Fe^{3+}	0.045	0.020	0.010	159.688	1.63
FeO	5.23	71.844	0.073	0.073	0.161	0.161	0.116	Fe^{2+}	0.116	0.052	0.052	71.844	3.76
MnO	0.18	70.937	0.002	0.002	0.006	0.006	0.006	Mn	0.006	0.002	0.002	70.937	0.18
MgO	17.53	40.304	0.435	0.435	0.965	0.965	0.965	Mg	0.965	0.435	0.435	40.304	17.53
CaO	20.60	56.077	0.367	0.367	0.815	0.815	0.815	Ca	0.815	0.367	0.367	56.077	20.60
Na2O	0.16	61.979	0.003	0.005	0.012	0.006	0.012	Na	0.012	0.005	0.003	61.979	0.16
Total	98.79		1.774	1.803	4.000	5.977	4.000			1.803	1.764		98.95

No of Oxygens 6 No of Catior 4
F 1.0038

Check! Fe2O3 as FeO 1.47
FeO* 5.23

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site		end member	%
4	Tet	Si+Ti	1.924	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.076		Wo	$Ca/(Ca+Mg+Fe^{2+})$	42.98
6	Oct	Al	0.020	1	En	$Mg/(Ca+Mg+Fe^{2+})$	50.89
		Fe^{3+}+Cr					
6	Oct	$+Fe^{2+}$+Mn	0.189		Fs	$Fe^{2+}/(Ca+Mg+Fe^{2+})$	6.13
6	Oct	Mg	0.791			total	100.00
8	Cubic	Mg	0.174	1			
8	Cubic	Ca	0.815		**Sodic and Calcic CPX**		
8	Cubic	Na	0.012		Aegerine	$Fe^{3+}/(Fe^{3+}+(Na-Fe^{3+}$	5.474
			4.000		Jadeite	$Na-Fe^{3+}/(Fe^{3+}+(Na-F$	-4.073
					Diopside	$Ca/(Fe^{3+}+(Na-Fe^{3+})+$	98.599
							100.000
					FeT/FeT+Mg		0.14
					Fe2/Fe2+Mg		0.11

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.08	0.07	2.20	0.75	1.63	3.76	0.18	17.53	20.60	0.16	98.95	0.002	0.076	0.020	42.98	50.89	6.13

Analysis No. 145

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.14	60.084	0.868	0.868	1.925	3.851	1.925	Si	1.925	0.868	0.868	60.084	52.14
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti	0.000	0.000	0.000	79.866	0.00
Al2O3	2.15	101.961	0.021	0.042	0.094	0.140	0.094	Al	0.094	0.042	0.021	101.961	2.15
Cr2O3	0.71	151.990	0.005	0.009	0.021	0.031	0.021	Cr	0.021	0.009	0.005	151.990	0.71
Fe2O3	0.00	159.688					0.047	Fe^{3+}	0.047	0.021	0.011	159.688	1.71
FeO	5.01	71.844	0.070	0.070	0.155	0.155	0.107	Fe^{2+}	0.107	0.048	0.048	71.844	3.47
MnO	0.17	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.17
MgO	17.65	40.304	0.438	0.438	0.972	0.972	0.972	Mg	0.972	0.438	0.438	40.304	17.65
CaO	20.64	56.077	0.368	0.368	0.817	0.817	0.817	Ca	0.817	0.368	0.368	56.077	20.64
Na2O	0.17	61.979	0.003	0.006	0.012	0.006	0.012	Na	0.012	0.006	0.003	61.979	0.17
Total	98.64		1.774	1.803	4.000	5.976	4.000			1.803	1.764		98.81

No of Oxygens 6 No of Catior 4
F 1.0040

Check! Fe2O3 as FeO 1.54
FeO* 5.01

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site		end member	%
4	Tet	Si+Ti	1.925	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.075		Wo	$Ca/(Ca+Mg+Fe^{2+})$	43.08
6	Oct	Al	0.019	1	En	$Mg/(Ca+Mg+Fe^{2+})$	51.26
		Fe^{3+}+Cr					
6	Oct	$+Fe^{2+}$+Mn	0.181		Fs	$Fe^{2+}/(Ca+Mg+Fe^{2+})$	5.66
6	Oct	Mg	0.800			total	100.00
8	Cubic	Mg	0.171	1			
8	Cubic	Ca	0.817		**Sodic and Calcic CPX**		
8	Cubic	Na	0.012		Aegerine	$Fe^{3+}/(Fe^{3+}+(Na-Fe^{3+}$	5.729
			4.000		Jadeite	$Na-Fe^{3+}/(Fe^{3+}+(Na-F$	-4.244
					Diopside	$Ca/(Fe^{3+}+(Na-Fe^{3+})+$	98.515
							100.000
					FeT/FeT+Mg		0.14
					Fe2/Fe2+Mg		0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.14	0.00	2.15	0.71	1.71	3.47	0.17	17.65	20.64	0.17	98.81	0.000	0.075	0.019	43.08	51.26	5.66

Analysis No. 151

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.60	60.084	0.892	0.892	1.963	3.927	1.963	Si	1.963	0.892	0.892	60.084	53.60
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti	0.000	0.000	0.000	79.866	0.00
Al2O3	1.08	101.961	0.011	0.021	0.047	0.070	0.047	Al	0.047	0.021	0.011	101.961	1.08
Cr2O3	0.18	151.990	0.001	0.002	0.005	0.008	0.005	Cr	0.005	0.002	0.001	151.990	0.18
Fe2O3	0.00	159.688					0.029	Fe^{3+}	0.029	0.013	0.007	159.688	1.04
FeO	4.28	71.844	0.060	0.060	0.131	0.131	0.102	Fe^{2+}	0.102	0.047	0.047	71.844	3.34
MnO	0.12	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.12
MgO	17.40	40.304	0.432	0.432	0.950	0.950	0.950	Mg	0.950	0.432	0.432	40.304	17.40
CaO	22.73	56.077	0.405	0.405	0.892	0.892	0.892	Ca	0.892	0.405	0.405	56.077	22.73
Na2O	0.11	61.979	0.002	0.003	0.007	0.004	0.007	Na	0.007	0.003	0.002	61.979	0.11
Total	99.50		1.804	1.817	4.000	5.986	4.000			1.817	1.797		99.60

No of Oxygens 6 No of Catior 4

Check! Fe2O3 as FeO 0.94

F 1.0024 FeO* 4.28

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.963	2
4	Tet	Al	0.037	
6	Oct	Al	0.010	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.140	
6	Oct	Mg	0.850	
8	Cubic	Mg	0.100	1
8	Cubic	Ca	0.892	
8	Cubic	Na	0.007	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.87
En	Mg/(Ca+Mg+Fe2+)	48.86
Fs	Fe2+/(Ca+Mg+Fe2+)	5.27
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	3.186
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-2.354
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	99.168
		100.000
FeT/FeT+Mg		0.12
Fe2/Fe2+Mg		0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.60	0.00	1.08	0.18	1.04	3.34	0.12	17.40	22.73	0.11	99.60	0.000	0.037	0.010	45.87	48.86	5.27

Analysis No. 152

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	53.89	60.084	0.897	0.897	1.966	3.933	1.966	Si
TiO2	0.02	79.866	0.000	0.000	0.001	0.001	0.001	Ti
Al2O3	0.91	101.961	0.009	0.018	0.039	0.059	0.039	Al
Cr2O3	0.66	151.990	0.004	0.009	0.019	0.029	0.019	Cr
Fe2O3	0.00	159.688					0.017	Fe^{3+}
FeO	3.26	71.844	0.045	0.045	0.099	0.099	0.082	Fe^{2+}
MnO	0.12	70.937	0.002	0.002	0.004	0.004	0.004	Mn
MgO	18.43	40.304	0.457	0.457	1.002	1.002	1.002	Mg
CaO	21.99	56.077	0.392	0.392	0.860	0.860	0.860	Ca
Na2O	0.13	61.979	0.002	0.004	0.009	0.005	0.009	Na
Total	99.42		1.809	1.825	4.000	5.991	4.000	

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.966	0.897	0.897	60.084	53.89
0.001	0.000	0.000	79.866	0.02
0.039	0.018	0.009	101.961	0.91
0.019	0.009	0.004	151.990	0.66
0.017	0.008	0.004	159.688	0.63
0.082	0.038	0.038	71.844	2.70
0.004	0.002	0.002	70.937	0.12
1.002	0.457	0.457	40.304	18.43
0.860	0.392	0.392	56.077	21.99
0.009	0.004	0.002	61.979	0.13
	1.825	1.805		99.48

No of Oxygens 6 No of Catior 4 Check! Fe2O3 as FeO 0.56
F 1.0014 FeO* 3.26

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.967	2
4	Tet	Al	0.033	
6	Oct	Al	0.006	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.122	
6	Oct	Mg	0.872	
8	Cubic	Mg	0.131	1
8	Cubic	Ca	0.860	
8	Cubic	Na	0.009	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.21
En	Mg/(Ca+Mg+Fe2+)	51.56
Fs	Fe2+/(Ca+Mg+Fe2+)	4.23
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	1.980
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-0.893
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.913
		100.000
FeT/FeT+Mg		0.09
Fe2/Fe2+Mg		0.08

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.89	0.02	0.91	0.66	0.63	2.70	0.12	18.43	21.99	0.13	99.48	0.001	0.033	0.006	44.21	51.56	4.23

Analysis No. 153

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.71	60.084	0.861	0.861	1.910	3.821	1.910	Si
TiO2	0.12	79.866	0.001	0.001	0.003	0.007	0.003	Ti
Al2O3	2.49	101.961	0.024	0.049	0.108	0.163	0.108	Al
Cr2O3	0.25	151.990	0.002	0.003	0.007	0.011	0.007	Cr
Fe2O3	0.00	159.688					0.071	Fe^{3+}
FeO	7.51	71.844	0.105	0.105	0.232	0.232	0.161	Fe^{2+}
MnO	0.23	70.937	0.003	0.003	0.007	0.007	0.007	Mn
MgO	16.56	40.304	0.411	0.411	0.912	0.912	0.912	Mg
CaO	20.34	56.077	0.363	0.363	0.805	0.805	0.805	Ca
Na2O	0.20	61.979	0.003	0.006	0.014	0.007	0.014	Na
Total	99.40		1.773	1.802	4.000	5.964	4.000	

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.910	0.861	0.861	60.084	51.71
0.003	0.001	0.001	79.866	0.12
0.108	0.049	0.024	101.961	2.49
0.007	0.003	0.002	151.990	0.25
0.071	0.032	0.016	159.688	2.56
0.161	0.072	0.072	71.844	5.21
0.007	0.003	0.003	70.937	0.23
0.912	0.411	0.411	40.304	16.56
0.805	0.363	0.363	56.077	20.34
0.014	0.006	0.003	61.979	0.20
	1.802	1.757		99.66

No of Oxygens 6 No of Catior 4 Check! Fe2O3 as FeO 2.30
F 1.0060 FeO* 7.51

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.914	2
4	Tet	Al	0.086	
6	Oct	Al	0.022	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.246	
6	Oct	Mg	0.731	
8	Cubic	Mg	0.181	1
8	Cubic	Ca	0.805	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.87
En	Mg/(Ca+Mg+Fe2+)	48.56
Fs	Fe2+/(Ca+Mg+Fe2+)	8.57
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.684
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.947
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.262
		100.000
FeT/FeT+Mg		0.20
Fe2/Fe2+Mg		0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.71	0.12	2.49	0.25	2.56	5.21	0.23	16.56	20.34	0.20	99.66	0.003	0.086	0.022	42.87	48.56	8.57

Analysis No. 154

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.70	60.084	0.877	0.877	1.956	3.912	1.956	Si
TiO2	0.01	79.866	0.000	0.000	0.000	0.001	0.000	Ti
Al2O3	2.00	101.961	0.020	0.039	0.087	0.131	0.087	Al
Cr2O3	0.63	151.990	0.004	0.008	0.018	0.028	0.018	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.956	0.877	0.877	60.084	52.70
0.000	0.000	0.000	79.866	0.01
0.087	0.039	0.020	101.961	2.00
0.018	0.008	0.004	151.990	0.63
0.000	0.000	0.000	159.688	0.00

FeO	5.37	71.844	0.075	0.075	0.167	0.167	0.167	Fe^{2+}	0.167	0.075	0.075	71.844	5.37
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	17.26	40.304	0.428	0.428	0.955	0.955	0.955	Mg	0.955	0.428	0.428	40.304	17.26
CaO	20.13	56.077	0.359	0.359	0.801	0.801	0.801	Ca	0.801	0.359	0.359	56.077	20.13
Na2O	0.14	61.979	0.002	0.005	0.010	0.005	0.010	Na	0.010	0.005	0.002	61.979	0.14
Total	98.39		1.767	1.793	4.000	6.004	4.000			1.793	1.767		98.39

No of Oxygens 6 No of Catior 4
F 0.9993

Check! Fe2O3 as FeO 0.00
FeO* 5.37

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.957	2
4	Tet	Al	0.043	
6	Oct	Al	0.044	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.190	
6	Oct	Mg	0.766	
8	Cubic	Mg	0.189	1
8	Cubic	Ca	0.801	
8	Cubic	Na	0.010	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.65
En	Mg/(Ca+Mg+Fe2+)	49.68
Fs	Fe2+/(Ca+Mg+Fe2+)	8.67
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.285
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.715
		100.000
FeT/FeT+Mg		0.15
Fe2/Fe2+Mg		0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.70	0.01	2.00	0.63	0.00	5.37	0.15	17.26	20.13	0.14	98.39	0.000	0.043	0.044	41.65	49.68	8.67

Analysis No. 155

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.30	60.084	0.870	0.870	1.921	3.843	1.921	Si
TiO2	0.13	79.866	0.002	0.002	0.004	0.007	0.004	Ti
Al2O3	2.52	101.961	0.025	0.049	0.109	0.164	0.109	Al
Cr2O3	0.41	151.990	0.003	0.005	0.012	0.018	0.012	Cr
Fe2O3	0.00	159.688					0.038	Fe^{3+}
FeO	6.30	71.844	0.088	0.088	0.194	0.194	0.155	Fe^{2+}
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	17.19	40.304	0.427	0.427	0.941	0.941	0.941	Mg
CaO	20.46	56.077	0.365	0.365	0.805	0.805	0.805	Ca
Na2O	0.12	61.979	0.002	0.004	0.009	0.004	0.009	Na
Total	99.59		1.783	1.812	4.000	5.981	4.000	

No of Oxygens 6 No of Catior 4
F 1.0032

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.921	0.870	0.870	60.084	52.30
TiO2	0.004	0.002	0.002	79.866	0.13
Al2O3	0.109	0.049	0.025	101.961	2.52
Cr2O3	0.012	0.005	0.003	151.990	0.41
Fe2O3	0.038	0.017	0.009	159.688	1.38
FeO	0.155	0.070	0.070	71.844	5.06
MnO	0.005	0.002	0.002	70.937	0.16
MgO	0.941	0.427	0.427	40.304	17.19
CaO	0.805	0.365	0.365	56.077	20.46
Na2O	0.009	0.004	0.002	61.979	0.12
		1.812	1.774		99.73

Check! Fe2O3 as FeO 1.24
FeO* 6.30

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.925	2
4	Tet	Al	0.075	
6	Oct	Al	0.034	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.210	
6	Oct	Mg	0.756	
8	Cubic	Mg	0.186	1
8	Cubic	Ca	0.805	
8	Cubic	Na	0.009	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.34
En	Mg/(Ca+Mg+Fe2+)	49.49
Fs	Fe2+/(Ca+Mg+Fe2+)	8.17
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.681
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.592
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.911
		100.000
FeT/FeT+Mg		0.17
Fe2/Fe2+Mg		0.14

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.30	0.13	2.52	0.41	1.38	5.06	0.16	17.19	20.46	0.12	99.73	0.004	0.075	0.034	42.34	49.49	8.17

Analysis No. 165

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.43	60.084	0.856	0.856	1.907	3.815	1.907	Si
TiO2	0.08	79.866	0.001	0.001	0.002	0.004	0.002	Ti
Al2O3	2.85	101.961	0.028	0.056	0.125	0.187	0.125	Al
Cr2O3	0.79	151.990	0.005	0.010	0.023	0.035	0.023	Cr
Fe2O3	0.00	159.688					0.046	Fe^{3+}
FeO	5.74	71.844	0.080	0.080	0.178	0.178	0.132	Fe^{2+}
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	16.74	40.304	0.415	0.415	0.926	0.926	0.926	Mg
CaO	20.67	56.077	0.369	0.369	0.821	0.821	0.821	Ca
Na2O	0.18	61.979	0.003	0.006	0.013	0.007	0.013	Na
Total	98.63		1.759	1.795	4.000	5.977	4.000	

No of Oxygens 6 No of Catior 4
F 1.0039

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.907	0.856	0.856	60.084	51.43
TiO2	0.002	0.001	0.001	79.866	0.08
Al2O3	0.125	0.056	0.028	101.961	2.85
Cr2O3	0.023	0.010	0.005	151.990	0.79
Fe2O3	0.046	0.021	0.010	159.688	1.66
FeO	0.132	0.059	0.059	71.844	4.25
MnO	0.005	0.002	0.002	70.937	0.15
MgO	0.926	0.415	0.415	40.304	16.74
CaO	0.821	0.369	0.369	56.077	20.67
Na2O	0.013	0.006	0.003	61.979	0.18
		1.795	1.749		98.80

Check! Fe2O3 as FeO 1.49
FeO* 5.74

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.910	2
4	Tet	Al	0.090	
6	Oct	Al	0.034	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.206	
6	Oct	Mg	0.760	
8	Cubic	Mg	0.166	1
8	Cubic	Ca	0.821	
8	Cubic	Na	0.013	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.72
En	Mg/(Ca+Mg+Fe2+)	49.26
Fs	Fe2+/(Ca+Mg+Fe2+)	7.01
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	5.543
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.980
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.438
		100.000
FeT/FeT+Mg		0.16
Fe2/Fe2+Mg		0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.43	0.08	2.85	0.79	1.66	4.25	0.15	16.74	20.67	0.18	98.80	0.002	0.090	0.034	43.72	49.26	7.01

Analysis No.	166							
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.19	60.084	0.869	0.869	1.917	3.833	1.917	Si
TiO2	0.09	79.866	0.001	0.001	0.002	0.005	0.002	Ti
Al2O3	2.50	101.961	0.025	0.049	0.108	0.162	0.108	Al
Cr2O3	0.12	151.990	0.001	0.002	0.003	0.005	0.003	Cr
Fe2O3	0.00	159.688					0.061	Fe^{3+}
FeO	6.23	71.844	0.087	0.087	0.191	0.191	0.130	Fe^{2+}
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	16.62	40.304	0.412	0.412	0.910	0.910	0.910	Mg
CaO	21.65	56.077	0.386	0.386	0.852	0.852	0.852	Ca
Na2O	0.15	61.979	0.002	0.005	0.011	0.005	0.011	Na
Total	99.72		1.785	1.813	4.000	5.970	4.000	

No of Oxygens 6 No of Catior 4
F 1.0051

Calculate Fe2O3 Wt %				
Atom Units	Cation Units	Moles	MW	Wt %
1.917	0.869	0.869	60.084	52.19
0.002	0.001	0.001	79.866	0.09
0.108	0.049	0.025	101.961	2.50
0.003	0.002	0.001	151.990	0.12
0.061	0.028	0.014	159.688	2.20
0.130	0.059	0.059	71.844	4.25
0.005	0.002	0.002	70.937	0.16
0.910	0.412	0.412	40.304	16.62
0.852	0.386	0.386	56.077	21.65
0.011	0.005	0.002	61.979	0.15
	1.813	1.771		99.94

Check! Fe2O3 as FeO 1.98
FeO* 6.23

Cation Site Occupancy						
C.N.	Site	Elements		Ideal Cations/Site		end member	%
4	Tet	Si+Ti	1.919	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.081		Wo	Ca/(Ca+Mg+Fe2+)	45.02
6	Oct	Al	0.027	1	En	Mg/(Ca+Mg+Fe2+)	48.09
		Fe^{3+}+Cr					
6	Oct	$+Fe^{2+}$+Mn	0.200		Fs	Fe2+/(Ca+Mg+Fe2+)	6.89
6	Oct	Mg	0.773			total	100.00
8	Cubic	Mg	0.137	1			
8	Cubic	Ca	0.852		**Sodic and Calcic CPX**		
8	Cubic	Na	0.011		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.059
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.795
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.737
							100.000
					FeT/FeT+Mg		0.17
					Fe2/Fe2+Mg		0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.19	0.09	2.50	0.12	2.20	4.25	0.16	16.62	21.65	0.15	99.94	0.002	0.081	0.027	45.02	48.09	6.89

Analysis No.	167							
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	53.62	60.084	0.892	0.892	1.958	3.916	1.958	Si
TiO2	0.02	79.866	0.000	0.000	0.000	0.001	0.000	Ti
Al2O3	1.01	101.961	0.010	0.020	0.044	0.066	0.044	Al
Cr2O3	0.15	151.990	0.001	0.002	0.004	0.007	0.004	Cr
Fe2O3	0.00	159.688					0.045	Fe^{3+}
FeO	5.25	71.844	0.073	0.073	0.160	0.160	0.115	Fe^{2+}
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	17.79	40.304	0.441	0.441	0.968	0.968	0.968	Mg
CaO	21.74	56.077	0.388	0.388	0.851	0.851	0.851	Ca
Na2O	0.13	61.979	0.002	0.004	0.009	0.005	0.009	Na
Total	99.88		1.810	1.823	4.000	5.978	4.000	

No of Oxygens 6 No of Catior 4
F 1.0038

Calculate Fe2O3 Wt %				
Atom Units	Cation Units	Moles	MW	Wt %
1.958	0.892	0.892	60.084	53.62
0.000	0.000	0.000	79.866	0.02
0.044	0.020	0.010	101.961	1.01
0.004	0.002	0.001	151.990	0.15
0.045	0.020	0.010	159.688	1.64
0.115	0.053	0.053	71.844	3.78
0.005	0.002	0.002	70.937	0.16
0.968	0.441	0.441	40.304	17.79
0.851	0.388	0.388	56.077	21.74
0.009	0.004	0.002	61.979	0.13
	1.823	1.800		100.04

Check! Fe2O3 as FeO 1.47
FeO* 5.25

Cation Site Occupancy						
C.N.	Site	Elements		Ideal Cations/Site		end member	%
4	Tet	Si+Ti	1.958	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.042		Wo	Ca/(Ca+Mg+Fe2+)	43.97
6	Oct	Al	0.002	1	En	Mg/(Ca+Mg+Fe2+)	50.06
		Fe^{3+}+Cr					
6	Oct	$+Fe^{2+}$+Mn	0.170		Fs	Fe2+/(Ca+Mg+Fe2+)	5.96
6	Oct	Mg	0.828			total	100.00
8	Cubic	Mg	0.140	1			
8	Cubic	Ca	0.851		**Sodic and Calcic CPX**		
8	Cubic	Na	0.009		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	5.227
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-4.126
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.899
							100.000
					FeT/FeT+Mg		0.14
					Fe2/Fe2+Mg		0.11

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.62	0.02	1.01	0.15	1.64	3.78	0.16	17.79	21.74	0.13	100.04	0.000	0.042	0.002	43.97	50.06	5.96

Analysis No.	168							
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.17	60.084	0.868	0.868	1.931	3.861	1.931	Si
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti
Al2O3	2.29	101.961	0.022	0.045	0.100	0.150	0.100	Al
Cr2O3	0.29	151.990	0.002	0.004	0.008	0.013	0.008	Cr
Fe2O3	0.00	159.688					0.040	Fe^{3+}
FeO	6.43	71.844	0.089	0.089	0.199	0.199	0.159	Fe^{2+}
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	16.71	40.304	0.415	0.415	0.922	0.922	0.922	Mg
CaO	20.75	56.077	0.370	0.370	0.823	0.823	0.823	Ca
Na2O	0.15	61.979	0.002	0.005	0.011	0.005	0.011	Na
Total	99.01		1.772	1.799	4.000	5.980	4.000	

No of Oxygens 6 No of Catior 4
F 1.0033

Calculate Fe2O3 Wt %				
Atom Units	Cation Units	Moles	MW	Wt %
1.931	0.868	0.868	60.084	52.17
0.001	0.000	0.000	79.866	0.03
0.100	0.045	0.022	101.961	2.29
0.008	0.004	0.002	151.990	0.29
0.040	0.018	0.009	159.688	1.43
0.159	0.072	0.072	71.844	5.14
0.006	0.003	0.003	70.937	0.18
0.922	0.415	0.415	40.304	16.71
0.823	0.370	0.370	56.077	20.75
0.011	0.005	0.002	61.979	0.15
	1.799	1.763		99.15

Check! Fe2O3 as FeO 1.29
FeO* 6.43

Cation Site Occupancy						
C.N.	Site	Elements		Ideal Cations/Site		end member	%
4	Tet	Si+Ti	1.931	2	**Ortho and Calcic CPX**		
4	Tet	Al	0.069		Wo	Ca/(Ca+Mg+Fe2+)	43.22
6	Oct	Al	0.031	1	En	Mg/(Ca+Mg+Fe2+)	48.42
		Fe^{3+}+Cr					
6	Oct	$+Fe^{2+}$+Mn	0.213		Fs	Fe2+/(Ca+Mg+Fe2+)	8.36
6	Oct	Mg	0.756			total	100.00
8	Cubic	Mg	0.166	1			
8	Cubic	Ca	0.823		**Sodic and Calcic CPX**		
8	Cubic	Na	0.011		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.783
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.464
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.682

100.000

FeT/FeT+Mg 0.18
Fe2/Fe2+Mg 0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.17	0.03	2.29	0.29	1.43	5.14	0.18	16.71	20.75	0.15	99.15	0.001	0.069	0.031	43.22	48.42	8.36

Analysis No. 169

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.12	60.084	0.867	0.867	1.924	3.847	1.924	Si	1.924	0.867	0.867	60.084	52.12
TiO2	0.05	79.866	0.001	0.001	0.001	0.003	0.001	Ti	0.001	0.001	0.001	79.866	0.05
Al2O3	2.16	101.961	0.021	0.042	0.094	0.141	0.094	Al	0.094	0.042	0.021	101.961	2.16
Cr2O3	0.14	151.990	0.001	0.002	0.004	0.006	0.004	Cr	0.004	0.002	0.001	151.990	0.14
Fe2O3	0.00	159.688					0.067	Fe^{3+}	0.067	0.030	0.015	159.688	2.40
FeO	7.43	71.844	0.103	0.103	0.229	0.229	0.163	Fe^{2+}	0.163	0.073	0.073	71.844	5.27
MnO	0.17	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.17
MgO	16.58	40.304	0.411	0.411	0.912	0.912	0.912	Mg	0.912	0.411	0.411	40.304	16.58
CaO	20.61	56.077	0.368	0.368	0.815	0.815	0.815	Ca	0.815	0.368	0.368	56.077	20.61
Na2O	0.21	61.979	0.003	0.007	0.015	0.007	0.015	Na	0.015	0.007	0.003	61.979	0.21
Total	99.47		1.778	1.804	4.000	5.967	4.000			1.804	1.763		99.71

No of Oxygens 6 No of Cation 4
F 1.0056

Check! Fe2O3 as FeO 2.16
FeO* 7.43

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.925	2
4	Tet	Al	0.075	
6	Oct	Al	0.019	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.239	
6	Oct	Mg	0.742	
8	Cubic	Mg	0.170	1
8	Cubic	Ca	0.815	
8	Cubic	Na	0.015	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.13
En	Mg/(Ca+Mg+Fe2+)	48.27
Fs	Fe2+/(Ca+Mg+Fe2+)	8.60
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.046
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.258
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.212
		100.000

FeT/FeT+Mg 0.20
Fe2/Fe2+Mg 0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.12	0.05	2.16	0.14	2.40	5.27	0.17	16.58	20.61	0.21	99.71	0.001	0.075	0.019	43.13	48.27	8.60

Analysis No. 170

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.19	60.084	0.885	0.885	1.944	3.887	1.944	Si	1.944	0.885	0.885	60.084	53.19
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti	0.000	0.000	0.000	79.866	0.00
Al2O3	1.60	101.961	0.016	0.031	0.069	0.104	0.069	Al	0.069	0.031	0.016	101.961	1.60
Cr2O3	0.60	151.990	0.004	0.008	0.017	0.026	0.017	Cr	0.017	0.008	0.004	151.990	0.60
Fe2O3	0.00	159.688					0.036	Fe^{3+}	0.036	0.017	0.008	159.688	1.32
FeO	5.02	71.844	0.070	0.070	0.153	0.153	0.117	Fe^{2+}	0.117	0.053	0.053	71.844	3.83
MnO	0.13	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.13
MgO	18.07	40.304	0.448	0.448	0.984	0.984	0.984	Mg	0.984	0.448	0.448	40.304	18.07
CaO	20.89	56.077	0.373	0.373	0.818	0.818	0.818	Ca	0.818	0.373	0.373	56.077	20.89
Na2O	0.14	61.979	0.002	0.005	0.010	0.005	0.010	Na	0.010	0.005	0.002	61.979	0.14
Total	99.65		1.800	1.822	4.000	5.982	4.000			1.822	1.792		99.78

No of Oxygens 6 No of Cation 4
F 1.0030

Check! Fe2O3 as FeO 1.19
FeO* 5.02

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.944	2
4	Tet	Al	0.056	
6	Oct	Al	0.013	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.175	
6	Oct	Mg	0.812	
8	Cubic	Mg	0.172	1
8	Cubic	Ca	0.818	
8	Cubic	Na	0.010	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.62
En	Mg/(Ca+Mg+Fe2+)	51.29
Fs	Fe2+/(Ca+Mg+Fe2+)	6.10
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.398
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.177
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.779
		100.000

FeT/FeT+Mg 0.13
Fe2/Fe2+Mg 0.11

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.19	0.00	1.60	0.60	1.32	3.83	0.13	18.07	20.89	0.14	99.78	0.000	0.056	0.013	42.62	51.29	6.10

Analysis No. 171

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.18	60.084	0.885	0.885	1.944	3.888	1.944	Si	1.944	0.885	0.885	60.084	53.18
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti	0.000	0.000	0.000	79.866	0.00
Al2O3	1.54	101.961	0.015	0.030	0.066	0.100	0.066	Al	0.066	0.030	0.015	101.961	1.54
Cr2O3	0.44	151.990	0.003	0.006	0.013	0.019	0.013	Cr	0.013	0.006	0.003	151.990	0.44
Fe2O3	0.00	159.688					0.043	Fe^{3+}	0.043	0.020	0.010	159.688	1.57
FeO	5.54	71.844	0.077	0.077	0.169	0.169	0.126	Fe^{2+}	0.126	0.057	0.057	71.844	4.13
MnO	0.18	70.937	0.003	0.003	0.005	0.005	0.005	Mn	0.005	0.003	0.003	70.937	0.18
MgO	18.12	40.304	0.450	0.450	0.988	0.988	0.988	Mg	0.988	0.450	0.450	40.304	18.12
CaO	20.51	56.077	0.366	0.366	0.803	0.803	0.803	Ca	0.803	0.366	0.366	56.077	20.51
Na2O	0.15	61.979	0.002	0.005	0.011	0.005	0.011	Na	0.011	0.005	0.002	61.979	0.15
Total	99.67		1.801	1.821	4.000	5.978	4.000			1.821	1.791		99.82

No of Oxygens 6 No of Cation 4
F 1.0036

Check! Fe2O3 as FeO 1.41
FeO* 5.54

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.944	2
4	Tet	Al	0.056	
6	Oct	Al	0.011	1

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.91
En	Mg/(Ca+Mg+Fe2+)	51.51

		Fe^{3+}+Cr						
6	Oct	$+Fe^{2+}$+Mn	0.188		Fs	Fe2+/(Ca+Mg+Fe2+)	6.58	
6	Oct	Mg	0.802			total	100.00	
8	Cubic	Mg	0.186	1				
8	Cubic	Ca	0.803		**Sodic and Calcic CPX**			
8	Cubic	Na	0.011		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	5.313	
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.985	
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.672	
							100.000	
					FeT/FeT+Mg		0.15	
					Fe2/Fe2+Mg		0.11	

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.18	0.00	1.54	0.44	1.57	4.13	0.18	18.12	20.51	0.15	99.82	0.000	0.056	0.011	41.91	51.51	6.58

Analysis No. 296

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.97	60.084	0.848	0.848	1.912	3.823	1.912	Si
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti
Al2O3	2.74	101.961	0.027	0.054	0.121	0.182	0.121	Al
Cr2O3	0.04	151.990	0.000	0.000	0.001	0.002	0.001	Cr
Fe2O3	0.00	159.688					0.074	Fe^{3+}
FeO	9.87	71.844	0.137	0.137	0.310	0.310	0.236	Fe^{2+}
MnO	0.29	70.937	0.004	0.004	0.009	0.009	0.009	Mn
MgO	14.66	40.304	0.364	0.364	0.820	0.820	0.820	Mg
CaO	20.12	56.077	0.359	0.359	0.809	0.809	0.809	Ca
Na2O	0.26	61.979	0.004	0.009	0.019	0.010	0.019	Na
Total	98.95		1.744	1.775	4.000	5.963	4.000	

No of Oxygens 6 No of Cation 4
F 1.0062

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.912	0.848	0.848	60.084	50.97
0.000	0.000	0.000	79.866	0.00
0.121	0.054	0.027	101.961	2.74
0.001	0.000	0.000	151.990	0.04
0.074	0.033	0.016	159.688	2.61
0.236	0.105	0.105	71.844	7.52
0.009	0.004	0.004	70.937	0.29
0.820	0.364	0.364	40.304	14.66
0.809	0.359	0.359	56.077	20.12
0.019	0.009	0.004	61.979	0.26
		1.775	1.727	99.21

Check! Fe2O3 as FeO 2.35
FeO* 9.87

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.912	2
4	Tet	Al	0.088	
6	Oct	Al	0.033	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.320	
6	Oct	Mg	0.647	
8	Cubic	Mg	0.172	1
8	Cubic	Ca	0.809	
8	Cubic	Na	0.019	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.37
En	Mg/(Ca+Mg+Fe2+)	43.97
Fs	Fe2+/(Ca+Mg+Fe2+)	12.66
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.895
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.573
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.678
		100.000

FeT/FeT+Mg 0.27
Fe2/Fe2+Mg 0.22

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.97	0.00	2.74	0.04	2.61	7.52	0.29	14.66	20.12	0.26	99.21	0.000	0.088	0.033	43.37	43.97	12.66

Analysis No. 297

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.63	60.084	0.843	0.843	1.869	3.738	1.869	Si
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti
Al2O3	3.81	101.961	0.037	0.075	0.166	0.249	0.166	Al
Cr2O3	0.28	151.990	0.002	0.004	0.008	0.012	0.008	Cr
Fe2O3	0.00	159.688					0.098	Fe^{3+}
FeO	6.47	71.844	0.090	0.090	0.200	0.200	0.101	Fe^{2+}
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	15.78	40.304	0.392	0.392	0.868	0.868	0.868	Mg
CaO	22.06	56.077	0.393	0.393	0.872	0.872	0.872	Ca
Na2O	0.16	61.979	0.003	0.005	0.011	0.006	0.011	Na
Total	99.36		1.762	1.804	4.000	5.951	4.000	

No of Oxygens 6 No of Cation 4
F 1.0083

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.869	0.843	0.843	60.084	50.63
0.001	0.000	0.000	79.866	0.03
0.166	0.075	0.037	101.961	3.81
0.008	0.004	0.002	151.990	0.28
0.098	0.044	0.022	159.688	3.54
0.101	0.046	0.046	71.844	3.29
0.005	0.002	0.002	70.937	0.15
0.868	0.392	0.392	40.304	15.78
0.872	0.393	0.393	56.077	22.06
0.011	0.005	0.003	61.979	0.16
		1.804	1.740	99.72

Check! Fe2O3 as FeO 3.18
FeO* 6.47

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.870	2
4	Tet	Al	0.130	
6	Oct	Al	0.035	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.213	
6	Oct	Mg	0.752	
8	Cubic	Mg	0.116	1
8	Cubic	Ca	0.872	
8	Cubic	Na	0.011	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	47.36
En	Mg/(Ca+Mg+Fe2+)	47.13
Fs	Fe2+/(Ca+Mg+Fe2+)	5.51
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.119
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.840
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.721
		100.000

FeT/FeT+Mg 0.19
Fe2/Fe2+Mg 0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.63	0.03	3.81	0.28	3.54	3.29	0.15	15.78	22.06	0.16	99.72	0.001	0.130	0.035	47.36	47.13	5.51

Analysis No. 298

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.50	60.084	0.840	0.840	1.870	3.741	1.870	Si
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti
Al2O3	3.61	101.961	0.035	0.071	0.158	0.236	0.158	Al
Cr2O3	0.14	151.990	0.001	0.002	0.004	0.006	0.004	Cr
Fe2O3	0.00	159.688					0.112	Fe^{3+}
FeO	8.61	71.844	0.120	0.120	0.267	0.267	0.155	Fe^{2+}
MnO	0.20	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	15.40	40.304	0.382	0.382	0.850	0.850	0.850	Mg
CaO	20.92	56.077	0.373	0.373	0.830	0.830	0.830	Ca
Na2O	0.20	61.979	0.003	0.007	0.014	0.007	0.014	Na
Total	99.58		1.758	1.797	4.000	5.944	4.000	

No of Oxygens 6 No of Cation 4
F 1.0094

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.870	0.840	0.840	60.084	50.50
0.000	0.000	0.000	79.866	0.00
0.158	0.071	0.035	101.961	3.61
0.004	0.002	0.001	151.990	0.14
0.112	0.050	0.025	159.688	4.02
0.155	0.069	0.069	71.844	4.99
0.006	0.003	0.003	70.937	0.20
0.850	0.382	0.382	40.304	15.40
0.830	0.373	0.373	56.077	20.92
0.014	0.007	0.003	61.979	0.20
		1.797	1.733	99.98

Check! Fe2O3 as FeO 3.62
FeO* 8.61

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.870	2
4	Tet	Al	0.130	
6	Oct	Al	0.028	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.277	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.24
En	Mg/(Ca+Mg+Fe2+)	46.33
Fs	Fe2+/(Ca+Mg+Fe2+)	8.43

6	Oct	Mg	0.695		total		100.00
8	Cubic	Mg	0.155	1			
8	Cubic	Ca	0.830		**Sodic and Calcic CPX**		
8	Cubic	Na	0.014		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	13.264
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-11.548
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.284
							100.000
					FeT/FeT+Mg		0.24
					Fe2/Fe2+Mg		0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.50	0.00	3.61	0.14	4.02	4.99	0.20	15.40	20.92	0.20	99.98	0.000	0.130	0.028	45.24	46.33	8.43

Analysis No. 299

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.46	60.084	0.856	0.856	1.907	3.814	1.907	Si	1.907	0.856	0.856	60.084	51.46
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti	0.001	0.000	0.000	79.866	0.03
Al2O3	2.77	101.961	0.027	0.054	0.121	0.181	0.121	Al	0.121	0.054	0.027	101.961	2.77
Cr2O3	0.05	151.990	0.000	0.001	0.002	0.002	0.002	Cr	0.002	0.001	0.000	151.990	0.05
Fe2O3	0.00	159.688					0.075	Fe^{3+}	0.075	0.034	0.017	159.688	2.70
FeO	8.24	71.844	0.115	0.115	0.255	0.255	0.180	Fe^{2+}	0.180	0.081	0.081	71.844	5.81
MnO	0.22	70.937	0.003	0.003	0.007	0.007	0.007	Mn	0.007	0.003	0.003	70.937	0.22
MgO	16.00	40.304	0.397	0.397	0.884	0.884	0.884	Mg	0.884	0.397	0.397	40.304	16.00
CaO	20.39	56.077	0.364	0.364	0.810	0.810	0.810	Ca	0.810	0.364	0.364	56.077	20.39
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.19
Total	99.35		1.766	1.796	4.000	5.962	4.000			1.796	1.749		99.62

No of Oxygens 6 No of Cation 4
F 1.0063

Check! Fe2O3 as FeO 2.43
FeO* 8.24

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site		end member		%
4	Tet	Si+Ti	1.908	2	**Ortho and Calcic CPX**			
4	Tet	Al	0.092		Wo	Ca/(Ca+Mg+Fe2+)		43.21
6	Oct	Al	0.029	1	En	Mg/(Ca+Mg+Fe2+)		47.18
		Fe^{3+}+Cr						
6	Oct	+Fe^{2+}+Mn	0.264		Fs	Fe2+/(Ca+Mg+Fe2+)		9.62
6	Oct	Mg	0.707			total		100.00
8	Cubic	Mg	0.177	1				
8	Cubic	Ca	0.810		**Sodic and Calcic CPX**			
8	Cubic	Na	0.014		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+		9.136
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F		-7.479
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+		98.343
								100.000
					FeT/FeT+Mg			0.22
					Fe2/Fe2+Mg			0.17

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.46	0.03	2.77	0.05	2.70	5.81	0.22	16.00	20.39	0.19	99.62	0.001	0.092	0.029	43.21	47.18	9.62

Analysis No. 300

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.55	60.084	0.841	0.841	1.880	3.759	1.880	Si	1.880	0.841	0.841	60.084	50.55
TiO2	0.07	79.866	0.001	0.001	0.002	0.004	0.002	Ti	0.002	0.001	0.001	79.866	0.07
Al2O3	3.36	101.961	0.033	0.066	0.147	0.221	0.147	Al	0.147	0.066	0.033	101.961	3.36
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr	0.001	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.104	Fe^{3+}	0.104	0.047	0.023	159.688	3.71
FeO	10.06	71.844	0.140	0.140	0.313	0.313	0.209	Fe^{2+}	0.209	0.094	0.094	71.844	6.72
MnO	0.22	70.937	0.003	0.003	0.007	0.007	0.007	Mn	0.007	0.003	0.003	70.937	0.22
MgO	15.65	40.304	0.388	0.388	0.867	0.867	0.867	Mg	0.867	0.388	0.388	40.304	15.65
CaO	19.31	56.077	0.344	0.344	0.769	0.769	0.769	Ca	0.769	0.344	0.344	56.077	19.31
Na2O	0.20	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.20
Total	99.43		1.754	1.791	4.000	5.948	4.000			1.791	1.731		99.80

No of Oxygens 6 No of Cation 4
F 1.0087

Check! Fe2O3 as FeO 3.34
FeO* 10.06

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site		end member		%
4	Tet	Si+Ti	1.881	2	**Ortho and Calcic CPX**			
4	Tet	Al	0.119		Wo	Ca/(Ca+Mg+Fe2+)		41.68
6	Oct	Al	0.029	1	En	Mg/(Ca+Mg+Fe2+)		47.00
		Fe^{3+}+Cr						
6	Oct	+Fe^{2+}+Mn	0.320		Fs	Fe2+/(Ca+Mg+Fe2+)		11.32
6	Oct	Mg	0.651			total		100.00
8	Cubic	Mg	0.216	1				
8	Cubic	Ca	0.769		**Sodic and Calcic CPX**			
8	Cubic	Na	0.014		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+		13.262
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F		-11.415
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+		98.153
								100.000
					FeT/FeT+Mg			0.27
					Fe2/Fe2+Mg			0.19

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.55	0.07	3.36	0.02	3.71	6.72	0.22	15.65	19.31	0.20	99.80	0.002	0.119	0.029	41.68	47.00	11.32

Analysis No. 326

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.61	60.084	0.842	0.842	1.887	3.774	1.887	Si	1.887	0.842	0.842	60.084	50.61
TiO2	0.06	79.866	0.001	0.001	0.002	0.003	0.002	Ti	0.002	0.001	0.001	79.866	0.06
Al2O3	3.13	101.961	0.031	0.061	0.138	0.206	0.138	Al	0.138	0.061	0.031	101.961	3.13
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr	0.001	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.098	Fe^{3+}	0.098	0.044	0.022	159.688	3.48
FeO	12.30	71.844	0.171	0.171	0.383	0.383	0.286	Fe^{2+}	0.286	0.128	0.128	71.844	9.17
MnO	0.39	70.937	0.005	0.005	0.012	0.012	0.012	Mn	0.012	0.005	0.005	70.937	0.39
MgO	17.52	40.304	0.435	0.435	0.974	0.974	0.974	Mg	0.974	0.435	0.435	40.304	17.52
CaO	14.81	56.077	0.264	0.264	0.592	0.592	0.592	Ca	0.592	0.264	0.264	56.077	14.81
Na2O	0.17	61.979	0.003	0.006	0.013	0.006	0.013	Na	0.013	0.006	0.003	61.979	0.17

Total	99.01		1.752	1.786	4.000	5.951	4.000
No of Oxygens	6	No of Cation	4				
F	1.0082						

	1.786	1.730	99.35
Check!	Fe2O3 as FeO	3.13	
	FeO*	12.30	

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.888	2
4	Tet	Al	0.112	
6	Oct	Al	0.026	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.396	
6	Oct	Mg	0.578	
8	Cubic	Mg	0.396	1
8	Cubic	Ca	0.592	
8	Cubic	Na	0.013	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	31.96
En	Mg/(Ca+Mg+Fe2+)	52.60
Fs	Fe2+/(Ca+Mg+Fe2+)	15.44
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	16.167
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-14.089
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.922
		100.000
FeT/FeT+Mg		0.28
Fe2/Fe2+Mg		0.23

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.61	0.06	3.13	0.02	3.48	9.17	0.39	17.52	14.81	0.17	99.35	0.002	0.112	0.026	31.96	52.60	15.44

Analysis No. 327

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.61	60.084	0.876	0.876	1.948	3.896	1.948	Si
TiO2	0.07	79.866	0.001	0.001	0.002	0.004	0.002	Ti
Al2O3	1.25	101.961	0.012	0.024	0.054	0.082	0.054	Al
Cr2O3	0.01	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688				0.052	0.052	Fe^{3+}
FeO	11.89	71.844	0.165	0.165	0.368	0.368	0.316	Fe^{2+}
MnO	0.37	70.937	0.005	0.005	0.012	0.012	0.012	Mn
MgO	19.77	40.304	0.491	0.491	1.091	1.091	1.091	Mg
CaO	13.01	56.077	0.232	0.232	0.516	0.516	0.516	Ca
Na2O	0.11	61.979	0.002	0.003	0.008	0.004	0.008	Na
Total	99.09		1.784	1.798	4.000	5.974	4.000	

No of Oxygens	6	No of Cation	4
F	1.0044		

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.948	0.876	0.876	60.084	52.61
0.002	0.001	0.001	79.866	0.07
0.054	0.024	0.012	101.961	1.25
0.000	0.000	0.000	151.990	0.01
0.052	0.024	0.012	159.688	1.88
0.316	0.142	0.142	71.844	10.20
0.012	0.005	0.005	70.937	0.37
1.091	0.491	0.491	40.304	19.77
0.516	0.232	0.232	56.077	13.01
0.008	0.003	0.002	61.979	0.11
	1.798	1.772		99.28

Check!	Fe2O3 as FeO	1.69
	FeO*	11.89

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.950	2
4	Tet	Al	0.050	
6	Oct	Al	0.005	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.380	
6	Oct	Mg	0.615	
8	Cubic	Mg	0.476	1
8	Cubic	Ca	0.516	
8	Cubic	Na	0.008	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	26.84
En	Mg/(Ca+Mg+Fe2+)	56.74
Fs	Fe2+/(Ca+Mg+Fe2+)	16.42
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.009
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.548
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.539
		100.000
FeT/FeT+Mg		0.25
Fe2/Fe2+Mg		0.22

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.61	0.07	1.25	0.01	1.88	10.20	0.37	19.77	13.01	0.11	99.28	0.002	0.050	0.005	26.84	56.74	16.42

Analysis No. 345

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.57	60.084	0.842	0.842	1.883	3.765	1.883	Si
TiO2	0.05	79.866	0.001	0.001	0.001	0.003	0.001	Ti
Al2O3	3.24	101.961	0.032	0.064	0.142	0.213	0.142	Al
Cr2O3	0.03	151.990	0.000	0.000	0.001	0.001	0.001	Cr
Fe2O3	0.00	159.688				0.099	0.099	Fe^{3+}
FeO	12.21	71.844	0.170	0.170	0.380	0.380	0.281	Fe^{2+}
MnO	0.35	70.937	0.005	0.005	0.011	0.011	0.011	Mn
MgO	17.05	40.304	0.423	0.423	0.946	0.946	0.946	Mg
CaO	15.66	56.077	0.279	0.279	0.625	0.625	0.625	Ca
Na2O	0.15	61.979	0.002	0.005	0.011	0.005	0.011	Na
Total	99.31		1.754	1.788	4.000	5.950	4.000	

No of Oxygens	6	No of Cation	4
F	1.0084		

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.883	0.842	0.842	60.084	50.57
0.001	0.001	0.001	79.866	0.05
0.142	0.064	0.032	101.961	3.24
0.001	0.000	0.000	151.990	0.03
0.099	0.044	0.022	159.688	3.55
0.281	0.126	0.126	71.844	9.02
0.011	0.005	0.005	70.937	0.35
0.946	0.423	0.423	40.304	17.05
0.625	0.279	0.279	56.077	15.66
0.011	0.005	0.002	61.979	0.15
	1.788	1.732		99.66

Check!	Fe2O3 as FeO	3.19
	FeO*	12.21

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.884	2
4	Tet	Al	0.116	
6	Oct	Al	0.026	1
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.392	
6	Oct	Mg	0.582	
8	Cubic	Mg	0.365	1
8	Cubic	Ca	0.625	
8	Cubic	Na	0.011	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	33.73
En	Mg/(Ca+Mg+Fe2+)	51.10
Fs	Fe2+/(Ca+Mg+Fe2+)	15.16
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	15.640
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-13.955
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.315
		100.000
FeT/FeT+Mg		0.29
Fe2/Fe2+Mg		0.23

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.57	0.05	3.24	0.03	3.55	9.02	0.35	17.05	15.66	0.15	99.66	0.001	0.116	0.026	33.73	51.10	15.16

Analysis No. 346

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.93	60.084	0.864	0.864	1.930	3.861	1.930	Si
TiO2	0.04	79.866	0.000	0.000	0.001	0.002	0.001	Ti
Al2O3	1.69	101.961	0.017	0.033	0.074	0.111	0.074	Al
Cr2O3	0.03	151.990	0.000	0.000	0.001	0.001	0.001	Cr
Fe2O3	0.00	159.688					0.075	Fe^{3+}
FeO	9.95	71.844	0.138	0.138	0.309	0.309	0.234	Fe^{2+}
MnO	0.30	70.937	0.004	0.004	0.009	0.009	0.009	Mn
MgO	17.23	40.304	0.428	0.428	0.955	0.955	0.955	Mg
CaO	17.75	56.077	0.317	0.317	0.707	0.707	0.707	Ca
Na2O	0.18	61.979	0.003	0.006	0.013	0.007	0.013	Na
Total	99.10		1.771	1.791	4.000	5.962	4.000	

No of Oxygens 6 No of Cation 4
F 1.0063

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.930	0.864	0.864	60.084	51.93
0.001	0.000	0.000	79.866	0.04
0.074	0.033	0.017	101.961	1.69
0.001	0.000	0.000	151.990	0.03
0.075	0.034	0.017	159.688	2.70
0.234	0.105	0.105	71.844	7.52
0.009	0.004	0.004	70.937	0.30
0.955	0.428	0.428	40.304	17.23
0.707	0.317	0.317	56.077	17.75
0.013	0.006	0.003	61.979	0.18
	1.791	1.754		99.37

Check! Fe2O3 as FeO 2.43
FeO* 9.95

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.931	2
4	Tet	Al	0.069	
6	Oct	Al	0.006	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.320	
6	Oct	Mg	0.675	
8	Cubic	Mg	0.280	1
8	Cubic	Ca	0.707	
8	Cubic	Na	0.013	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	37.29
En	Mg/(Ca+Mg+Fe2+)	50.37
Fs	Fe2+/(Ca+Mg+Fe2+)	12.34
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.480
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.657
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.177
		100.000

FeT/FeT+Mg 0.24
Fe2/Fe2+Mg 0.20

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.93	0.04	1.69	0.03	2.70	7.52	0.30	17.23	17.75	0.18	99.37	0.001	0.069	0.006	37.29	50.37	12.34

Analysis No. 315

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.46	60.084	0.856	0.856	1.904	3.807	1.904	Si
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti
Al2O3	2.68	101.961	0.026	0.053	0.117	0.175	0.117	Al
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr
Fe2O3	0.00	159.688					0.085	Fe^{3+}
FeO	13.73	71.844	0.191	0.191	0.425	0.425	0.340	Fe^{2+}
MnO	0.38	70.937	0.005	0.005	0.012	0.012	0.012	Mn
MgO	19.16	40.304	0.475	0.475	1.057	1.057	1.057	Mg
CaO	11.95	56.077	0.213	0.213	0.474	0.474	0.474	Ca
Na2O	0.16	61.979	0.003	0.005	0.011	0.006	0.011	Na
Total	99.56		1.771	1.800	4.000	5.958	4.000	

No of Oxygens 6 No of Cation 4
F 1.0071

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.904	0.856	0.856	60.084	51.46
0.001	0.000	0.000	79.866	0.03
0.117	0.053	0.026	101.961	2.68
0.001	0.000	0.000	151.990	0.02
0.085	0.038	0.019	159.688	3.05
0.340	0.153	0.153	71.844	10.99
0.012	0.005	0.005	70.937	0.38
1.057	0.475	0.475	40.304	19.16
0.474	0.213	0.213	56.077	11.95
0.011	0.005	0.003	61.979	0.16
	1.800	1.752		99.87

Check! Fe2O3 as FeO 2.74
FeO* 13.73

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.904	2
4	Tet	Al	0.096	
6	Oct	Al	0.021	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.437	
6	Oct	Mg	0.542	
8	Cubic	Mg	0.515	1
8	Cubic	Ca	0.474	
8	Cubic	Na	0.011	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	25.33
En	Mg/(Ca+Mg+Fe2+)	56.50
Fs	Fe2+/(Ca+Mg+Fe2+)	18.17
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	17.512
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-15.191
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.679
		100.000

FeT/FeT+Mg 0.29
Fe2/Fe2+Mg 0.24

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.46	0.03	2.68	0.02	3.05	10.99	0.38	19.16	11.95	0.16	99.87	0.001	0.096	0.021	25.33	56.50	18.17

Analysis No. 493

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.78	60.084	0.862	0.862	2.025	4.050	2.025	Si
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti
Al2O3	2.08	101.961	0.020	0.041	0.096	0.144	0.096	Al
Cr2O3	0.11	151.990	0.001	0.001	0.003	0.005	0.003	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	1.48	71.844	0.021	0.021	0.048	0.048	0.048	Fe^{2+}
MnO	0.24	70.937	0.003	0.003	0.008	0.008	0.008	Mn
MgO	16.25	40.304	0.403	0.403	0.947	0.947	0.947	Mg
CaO	20.54	56.077	0.366	0.366	0.861	0.861	0.861	Ca
Na2O	0.15	61.979	0.002	0.005	0.011	0.006	0.011	Na
Total	92.62		1.679	1.702	4.000	6.069	4.000	

No of Oxygens 6 No of Catior 4
F 0.9886

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
2.025	0.862	0.862	60.084	51.78
0.000	0.000	0.000	79.866	0.00
0.096	0.041	0.020	101.961	2.08
0.003	0.001	0.001	151.990	0.11
0.000	0.000	0.000	159.688	0.00
0.048	0.021	0.021	71.844	1.48
0.008	0.003	0.003	70.937	0.24
0.947	0.403	0.403	40.304	16.25
0.861	0.366	0.366	56.077	20.54
0.011	0.005	0.002	61.979	0.15
	1.702	1.679		92.62

Check! Fe2O3 as FeO 0.00
FeO* 1.48

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	2.025	2	excess tet
4	Tet	Al			
6	Oct	Al	0.096	1	
		Fe^{3+}+Cr			
6	Oct	+Fe^{2+}+Mn	0.060		
6	Oct	Mg	0.845		
8	Cubic	Mg	0.103	1	
8	Cubic	Ca	0.861		
8	Cubic	Na	0.011		
			4.000		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	46.36
En	Mg/(Ca+Mg+Fe2+)	51.03
Fs	Fe2+/(Ca+Mg+Fe2+)	2.61
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.285
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.715
		100.000

FeT/FeT+Mg 0.05
Fe2/Fe2+Mg 0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.78	0.00	2.08	0.11	0.00	1.48	0.24	16.25	20.54	0.15	92.62	0.000	0.000	0.096	46.36	51.03	2.61

Analysis No. 494

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.36	60.084	0.838	0.838	1.986	3.972	1.986	Si
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti
Al2O3	3.59	101.961	0.035	0.070	0.167	0.250	0.167	Al
Cr2O3	0.14	151.990	0.001	0.002	0.004	0.007	0.004	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	1.48	71.844	0.021	0.021	0.049	0.049	0.049	Fe^{2+}
MnO	0.23	70.937	0.003	0.003	0.008	0.008	0.008	Mn
MgO	15.30	40.304	0.380	0.380	0.900	0.900	0.900	Mg
CaO	20.61	56.077	0.368	0.368	0.871	0.871	0.871	Ca
Na2O	0.19	61.979	0.003	0.006	0.015	0.007	0.015	Na
Total	91.93		1.649	1.688	4.000	6.065	4.000	

No of Oxygens 6 No of Catior 4
F 0.9892

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.986	0.838	0.838	60.084	50.36
0.001	0.000	0.000	79.866	0.03
0.167	0.070	0.035	101.961	3.59
0.004	0.002	0.001	151.990	0.14
0.000	0.000	0.000	159.688	0.00
0.049	0.021	0.021	71.844	1.48
0.008	0.003	0.003	70.937	0.23
0.900	0.380	0.380	40.304	15.30
0.871	0.368	0.368	56.077	20.61
0.015	0.006	0.003	61.979	0.19
	1.688	1.649		91.93

Check! Fe2O3 as FeO 0.00
FeO* 1.48

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	1.987	2	
4	Tet	Al	0.013		
6	Oct	Al	0.154	1	
		Fe^{3+}+Cr			
6	Oct	+Fe^{2+}+Mn	0.061		
6	Oct	Mg	0.785		
8	Cubic	Mg	0.114	1	
8	Cubic	Ca	0.871		
8	Cubic	Na	0.015		
			4.000		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	47.87
En	Mg/(Ca+Mg+Fe2+)	49.45
Fs	Fe2+/(Ca+Mg+Fe2+)	2.68
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.655
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.345
		100.000

FeT/FeT+Mg 0.05
Fe2/Fe2+Mg 0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.36	0.03	3.59	0.14	0.00	1.48	0.23	15.30	20.61	0.19	91.93	0.001	0.013	0.154	47.87	49.45	2.68

Analysis No. 495

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.52	60.084	0.841	0.841	1.996	3.991	1.996	Si
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti
Al2O3	3.38	101.961	0.033	0.066	0.157	0.236	0.157	Al
Cr2O3	0.12	151.990	0.001	0.002	0.004	0.005	0.004	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	1.48	71.844	0.021	0.021	0.049	0.049	0.049	Fe^{2+}
MnO	0.24	70.937	0.003	0.003	0.008	0.008	0.008	Mn
MgO	15.45	40.304	0.383	0.383	0.910	0.910	0.910	Mg
CaO	20.45	56.077	0.365	0.365	0.865	0.865	0.865	Ca
Na2O	0.14	61.979	0.002	0.005	0.011	0.006	0.011	Na
Total	91.79		1.649	1.685	4.000	6.071	4.000	

No of Oxygens 6 No of Catior 4
F 0.9884

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.996	0.841	0.841	60.084	50.52
0.000	0.000	0.000	79.866	0.00
0.157	0.066	0.033	101.961	3.38
0.004	0.002	0.001	151.990	0.12
0.000	0.000	0.000	159.688	0.00
0.049	0.021	0.021	71.844	1.48
0.008	0.003	0.003	70.937	0.24
0.910	0.383	0.383	40.304	15.45
0.865	0.365	0.365	56.077	20.45
0.011	0.005	0.002	61.979	0.14
	1.685	1.649		91.79

Check! Fe2O3 as FeO 0.00
FeO* 1.48

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	1.996	2	
4	Tet	Al	0.004		
6	Oct	Al	0.153	1	
		Fe^{3+}+Cr			
6	Oct	+Fe^{2+}+Mn	0.061		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	47.45
En	Mg/(Ca+Mg+Fe2+)	49.87
Fs	Fe2+/(Ca+Mg+Fe2+)	2.68

6	Oct	Mg	0.786		total		100.00
8	Cubic	Mg	0.123	1			
8	Cubic	Ca	0.865		**Sodic and Calcic CPX**		
8	Cubic	Na	0.011		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.263
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.737
							100.000
					FeT/FeT+Mg		0.05
					Fe2/Fe2+Mg		0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.52	0.00	3.38	0.12	0.00	1.48	0.24	15.45	20.45	0.14	91.79	0.000	0.004	0.153	47.45	49.87	2.68

Analysis No. 496

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.57	60.084	0.842	0.842	1.992	3.985	1.992	Si	1.992	0.842	0.842	60.084	50.57
TiO2	0.02	79.866	0.000	0.000	0.001	0.001	0.001	Ti	0.001	0.000	0.000	79.866	0.02
Al2O3	3.64	101.961	0.036	0.071	0.169	0.254	0.169	Al	0.169	0.071	0.036	101.961	3.64
Cr2O3	0.16	151.990	0.001	0.002	0.005	0.007	0.005	Cr	0.005	0.002	0.001	151.990	0.16
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	1.51	71.844	0.021	0.021	0.050	0.050	0.050	Fe^{2+}	0.050	0.021	0.021	71.844	1.51
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.19
MgO	15.24	40.304	0.378	0.378	0.895	0.895	0.895	Mg	0.895	0.378	0.378	40.304	15.24
CaO	20.56	56.077	0.367	0.367	0.868	0.868	0.868	Ca	0.868	0.367	0.367	56.077	20.56
Na2O	0.18	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.18
Total	92.08		1.650	1.690	4.000	6.073	4.000			1.690	1.650		92.08

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Catior 4
F 0.9880

Check! Fe2O3 as FeO 0.00
FeO* 1.51

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.993	2
4	Tet	Al	0.007	
6	Oct	Al	0.162	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.061	
6	Oct	Mg	0.777	
8	Cubic	Mg	0.118	1
8	Cubic	Ca	0.868	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	47.88
En	Mg/(Ca+Mg+Fe2+)	49.38
Fs	Fe2+/(Ca+Mg+Fe2+)	2.74
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.600
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.400
		100.000
FeT/FeT+Mg		0.05
Fe2/Fe2+Mg		0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.57	0.02	3.64	0.16	0.00	1.51	0.19	15.24	20.56	0.18	92.08	0.001	0.007	0.162	47.88	49.38	2.74

Analysis No. 498

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.06	60.084	0.850	0.850	1.996	3.993	1.996	Si	1.996	0.850	0.850	60.084	51.06
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti	0.000	0.000	0.000	79.866	0.00
Al2O3	2.96	101.961	0.029	0.058	0.136	0.205	0.136	Al	0.136	0.058	0.029	101.961	2.96
Cr2O3	0.16	151.990	0.001	0.002	0.005	0.008	0.005	Cr	0.005	0.002	0.001	151.990	0.16
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	1.44	71.844	0.020	0.020	0.047	0.047	0.047	Fe^{2+}	0.047	0.020	0.020	71.844	1.44
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.18
MgO	15.66	40.304	0.389	0.389	0.913	0.913	0.913	Mg	0.913	0.389	0.389	40.304	15.66
CaO	21.07	56.077	0.376	0.376	0.883	0.883	0.883	Ca	0.883	0.376	0.376	56.077	21.07
Na2O	0.18	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.18
Total	92.71		1.670	1.703	4.000	6.060	4.000			1.703	1.670		92.71

Calculate Fe2O3 Wt %

No of Oxygens 6 No of Catior 4
F 0.9901

Check! Fe2O3 as FeO 0.00
FeO* 1.44

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.996	2
4	Tet	Al	0.004	
6	Oct	Al	0.133	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.058	
6	Oct	Mg	0.809	
8	Cubic	Mg	0.104	1
8	Cubic	Ca	0.883	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	47.91
En	Mg/(Ca+Mg+Fe2+)	49.54
Fs	Fe2+/(Ca+Mg+Fe2+)	2.56
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.527
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.473
		100.000
FeT/FeT+Mg		0.05
Fe2/Fe2+Mg		0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.06	0.00	2.96	0.16	0.00	1.44	0.18	15.66	21.07	0.18	92.71	0.000	0.004	0.133	47.91	49.54	2.56

Analysis No. 499

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.21	60.084	0.836	0.836	1.988	3.975	1.988	Si	1.988	0.836	0.836	60.084	50.21
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti	0.001	0.000	0.000	79.866	0.03
Al2O3	3.67	101.961	0.036	0.072	0.171	0.257	0.171	Al	0.171	0.072	0.036	101.961	3.67
Cr2O3	0.13	151.990	0.001	0.002	0.004	0.006	0.004	Cr	0.004	0.002	0.001	151.990	0.13
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	1.54	71.844	0.021	0.021	0.051	0.051	0.051	Fe^{2+}	0.051	0.021	0.021	71.844	1.54
MnO	0.20	70.937	0.003	0.003	0.007	0.007	0.007	Mn	0.007	0.003	0.003	70.937	0.20
MgO	15.00	40.304	0.372	0.372	0.885	0.885	0.885	Mg	0.885	0.372	0.372	40.304	15.00
CaO	20.71	56.077	0.369	0.369	0.878	0.878	0.878	Ca	0.878	0.369	0.369	56.077	20.71
Na2O	0.19	61.979	0.003	0.006	0.015	0.007	0.015	Na	0.015	0.006	0.003	61.979	0.19

Calculate Fe2O3 Wt %

Total	91.69		1.642	1.682	4.000	6.069	4.000

No of Oxygens 6 No of Cation 4
F 0.9887

		1.682	1.642	91.69
Check!	Fe2O3 as FeO	0.00	
	FeO*	1.54	

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.988	2
4	Tet	Al	0.012	
6	Oct	Al	0.160	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.062	
6	Oct	Mg	0.779	
8	Cubic	Mg	0.107	1
8	Cubic	Ca	0.878	
8	Cubic	Na	0.015	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	48.41
En	Mg/(Ca+Mg+Fe2+)	48.78
Fs	Fe2+/(Ca+Mg+Fe2+)	2.81
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.672
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.328
		100.000
FeT/FeT+Mg		0.05
Fe2/Fe2+Mg		0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.21	0.03	3.67	0.13	0.00	1.54	0.20	15.00	20.71	0.19	91.69	0.001	0.012	0.160	48.41	48.78	2.81

Analysis No. 500

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.14	60.084	0.834	0.834	1.979	3.958	1.979	Si
TiO2	0.04	79.866	0.001	0.001	0.001	0.003	0.001	Ti
Al2O3	3.49	101.961	0.034	0.068	0.162	0.244	0.162	Al
Cr2O3	0.15	151.990	0.001	0.002	0.005	0.007	0.005	Cr
Fe2O3	0.00	159.688				0.000	0.000	Fe^{3+}
FeO	1.54	71.844	0.021	0.021	0.051	0.051	0.051	Fe^{2+}
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	14.98	40.304	0.372	0.372	0.881	0.881	0.881	Mg
CaO	21.30	56.077	0.380	0.380	0.901	0.901	0.901	Ca
Na2O	0.18	61.979	0.003	0.006	0.014	0.007	0.014	Na
Total	92.01		1.649	1.687	4.000	6.057	4.000	

No of Oxygens 6 No of Cation 4
F 0.9906

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.979	0.834	0.834	60.084	50.14
0.001	0.001	0.001	79.866	0.04
0.162	0.068	0.034	101.961	3.49
0.005	0.002	0.001	151.990	0.15
0.000	0.000	0.000	159.688	0.00
0.051	0.021	0.021	71.844	1.54
0.006	0.003	0.003	70.937	0.19
0.881	0.372	0.372	40.304	14.98
0.901	0.380	0.380	56.077	21.30
0.014	0.006	0.003	61.979	0.18
	1.687	1.649		92.01
Check!	Fe2O3 as FeO	0.00		
	FeO*	1.54		

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.980	2
4	Tet	Al	0.020	
6	Oct	Al	0.143	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.062	
6	Oct	Mg	0.796	
8	Cubic	Mg	0.086	1
8	Cubic	Ca	0.901	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	49.14
En	Mg/(Ca+Mg+Fe2+)	48.09
Fs	Fe2+/(Ca+Mg+Fe2+)	2.77
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.485
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.515
		100.000
FeT/FeT+Mg		0.05
Fe2/Fe2+Mg		0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.14	0.04	3.49	0.15	0.00	1.54	0.19	14.98	21.30	0.18	92.01	0.001	0.020	0.143	49.14	48.09	2.77

Analysis No. 508

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.18	60.084	0.852	0.852	1.986	3.972	1.986	Si
TiO2	0.05	79.866	0.001	0.001	0.002	0.003	0.002	Ti
Al2O3	2.94	101.961	0.029	0.058	0.134	0.202	0.134	Al
Cr2O3	0.24	151.990	0.002	0.003	0.007	0.011	0.007	Cr
Fe2O3	0.00	159.688				0.000	0.000	Fe^{3+}
FeO	1.16	71.844	0.016	0.016	0.038	0.038	0.038	Fe^{2+}
MnO	0.14	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	15.81	40.304	0.392	0.392	0.915	0.915	0.915	Mg
CaO	21.63	56.077	0.386	0.386	0.899	0.899	0.899	Ca
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na
Total	93.35		1.682	1.716	4.000	6.051	4.000	

No of Oxygens 6 No of Cation 4
F 0.9916

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.986	0.852	0.852	60.084	51.18
0.002	0.001	0.001	79.866	0.05
0.134	0.058	0.029	101.961	2.94
0.007	0.003	0.002	151.990	0.24
0.000	0.000	0.000	159.688	0.00
0.038	0.016	0.016	71.844	1.16
0.005	0.002	0.002	70.937	0.14
0.915	0.392	0.392	40.304	15.81
0.899	0.386	0.386	56.077	21.63
0.014	0.006	0.003	61.979	0.19
	1.716	1.682		93.35
Check!	Fe2O3 as FeO	0.00		
	FeO*	1.16		

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.987	2
4	Tet	Al	0.013	
6	Oct	Al	0.122	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.050	
6	Oct	Mg	0.828	
8	Cubic	Mg	0.086	1
8	Cubic	Ca	0.899	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	48.57
En	Mg/(Ca+Mg+Fe2+)	49.39
Fs	Fe2+/(Ca+Mg+Fe2+)	2.04
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.583
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.417
		100.000
FeT/FeT+Mg		0.04
Fe2/Fe2+Mg		0.04

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.18	0.05	2.94	0.24	0.00	1.16	0.14	15.81	21.63	0.19	93.35	0.002	0.013	0.122	48.57	49.39	2.04

Analysis No. 509

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	49.72	60.084	0.828	0.828	1.986	3.972	1.986	Si
TiO2	0.05	79.866	0.001	0.001	0.001	0.003	0.001	Ti
Al2O3	4.04	101.961	0.040	0.079	0.190	0.285	0.190	Al
Cr2O3	0.06	151.990	0.000	0.001	0.002	0.003	0.002	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	1.72	71.844	0.024	0.024	0.057	0.057	0.057	Fe^{2+}
MnO	0.19	70.937	0.003	0.003	0.007	0.007	0.007	Mn
MgO	14.33	40.304	0.356	0.356	0.853	0.853	0.853	Mg
CaO	20.75	56.077	0.370	0.370	0.888	0.888	0.888	Ca
Na2O	0.19	61.979	0.003	0.006	0.015	0.008	0.015	Na
Total	91.06		1.624	1.667	4.000	6.076	4.000	

No of Oxygens 6 No of Catior 4
F 0.9875

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.986	0.828	0.828	60.084	49.72
0.001	0.001	0.001	79.866	0.05
0.190	0.079	0.040	101.961	4.04
0.002	0.001	0.000	151.990	0.06
0.000	0.000	0.000	159.688	0.00
0.057	0.024	0.024	71.844	1.72
0.007	0.003	0.003	70.937	0.19
0.853	0.356	0.356	40.304	14.33
0.888	0.370	0.370	56.077	20.75
0.015	0.006	0.003	61.979	0.19
	1.667	1.624		91.06

Check! Fe2O3 as FeO 0.00
FeO* 1.72

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.987	2
4	Tet	Al	0.013	
6	Oct	Al	0.178	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.066	
6	Oct	Mg	0.756	
8	Cubic	Mg	0.097	1
8	Cubic	Ca	0.888	
8	Cubic	Na	0.015	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	49.37
En	Mg/(Ca+Mg+Fe2+)	47.44
Fs	Fe2+/(Ca+Mg+Fe2+)	3.19
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.671
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.329
		100.000
FeT/FeT+Mg		0.06
Fe2/Fe2+Mg		0.06

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
49.72	0.05	4.04	0.06	0.00	1.72	0.19	14.33	20.75	0.19	91.06	0.001	0.013	0.178	49.37	47.44	3.19

Analysis No. 510

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.02	60.084	0.833	0.833	1.975	3.950	1.975	Si
TiO2	0.04	79.866	0.001	0.001	0.001	0.003	0.001	Ti
Al2O3	3.28	101.961	0.032	0.064	0.153	0.229	0.153	Al
Cr2O3	0.13	151.990	0.001	0.002	0.004	0.006	0.004	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	1.49	71.844	0.021	0.021	0.049	0.049	0.049	Fe^{2+}
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	15.08	40.304	0.374	0.374	0.888	0.888	0.888	Mg
CaO	21.57	56.077	0.385	0.385	0.912	0.912	0.912	Ca
Na2O	0.17	61.979	0.003	0.005	0.013	0.006	0.013	Na
Total	91.93		1.650	1.686	4.000	6.048	4.000	

No of Oxygens 6 No of Catior 4
F 0.9920

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.975	0.833	0.833	60.084	50.02
0.001	0.001	0.001	79.866	0.04
0.153	0.064	0.032	101.961	3.28
0.004	0.002	0.001	151.990	0.13
0.000	0.000	0.000	159.688	0.00
0.049	0.021	0.021	71.844	1.49
0.005	0.002	0.002	70.937	0.16
0.888	0.374	0.374	40.304	15.08
0.912	0.385	0.385	56.077	21.57
0.013	0.005	0.003	61.979	0.17
	1.686	1.650		91.93

Check! Fe2O3 as FeO 0.00
FeO* 1.49

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.976	2
4	Tet	Al	0.024	
6	Oct	Al	0.129	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.058	
6	Oct	Mg	0.813	
8	Cubic	Mg	0.075	1
8	Cubic	Ca	0.912	
8	Cubic	Na	0.013	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	49.34
En	Mg/(Ca+Mg+Fe2+)	48.00
Fs	Fe2+/(Ca+Mg+Fe2+)	2.66
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.368
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.632
		100.000
FeT/FeT+Mg		0.05
Fe2/Fe2+Mg		0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.02	0.04	3.28	0.13	0.00	1.49	0.16	15.08	21.57	0.17	91.93	0.001	0.024	0.129	49.34	48.00	2.66

Analysis No. 511

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.19	60.084	0.835	0.835	2.000	4.000	2.000	Si
TiO2	0.06	79.866	0.001	0.001	0.002	0.004	0.002	Ti
Al2O3	3.17	101.961	0.031	0.062	0.149	0.223	0.149	Al
Cr2O3	0.08	151.990	0.001	0.001	0.002	0.004	0.002	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	1.71	71.844	0.024	0.024	0.057	0.057	0.057	Fe^{2+}
MnO	0.20	70.937	0.003	0.003	0.007	0.007	0.007	Mn
MgO	14.77	40.304	0.366	0.366	0.878	0.878	0.878	Mg
CaO	20.84	56.077	0.372	0.372	0.890	0.890	0.890	Ca
Na2O	0.20	61.979	0.003	0.006	0.016	0.008	0.016	Na
Total	91.22		1.636	1.670	4.000	6.070	4.000	

No of Oxygens 6 No of Catior 4
F 0.9885

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
2.000	0.835	0.835	60.084	50.19
0.002	0.001	0.001	79.866	0.06
0.149	0.062	0.031	101.961	3.17
0.002	0.001	0.001	151.990	0.08
0.000	0.000	0.000	159.688	0.00
0.057	0.024	0.024	71.844	1.71
0.007	0.003	0.003	70.937	0.20
0.878	0.366	0.366	40.304	14.77
0.890	0.372	0.372	56.077	20.84
0.016	0.006	0.003	61.979	0.20
	1.670	1.636		91.22

Check! Fe2O3 as FeO 0.00
FeO* 1.71

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	2.002	2	excess tet
4	Tet	Al			
6	Oct	Al	0.149	1	
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.066		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	48.78
En	Mg/(Ca+Mg+Fe2+)	48.10
Fs	Fe2+/(Ca+Mg+Fe2+)	3.12

6	Oct	Mg	0.785		total	100.00
8	Cubic	Mg	0.093	1		
8	Cubic	Ca	0.890		**Sodic and Calcic CPX**	
8	Cubic	Na	0.016		Aegerine Fe3+/(Fe3+ +(Na-Fe3+	0.000
			4.000		Jadeite Na-Fe3+/(Fe3+ +(Na-F	1.714
					Diopside Ca/(Fe3+ +(Na-Fe3+)+	98.286
						100.000
					FeT/FeT+Mg	0.06
					Fe2/Fe2+Mg	0.06

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.19	0.06	3.17	0.08	0.00	1.71	0.20	14.77	20.84	0.20	91.22	0.002	0.000	0.149	48.78	48.10	3.12

Analysis No. 131

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.34	60.084	0.871	0.871	1.914	3.829	1.914	Si	1.914	0.871	0.871	60.084	52.34
TiO2	0.18	79.866	0.002	0.002	0.005	0.010	0.005	Ti	0.005	0.002	0.002	79.866	0.18
Al2O3	2.50	101.961	0.025	0.049	0.108	0.162	0.108	Al	0.108	0.049	0.025	101.961	2.50
Cr2O3	0.12	151.990	0.001	0.002	0.004	0.005	0.004	Cr	0.004	0.002	0.001	151.990	0.12
Fe2O3	0.00	159.688					0.062	Fe^{3+}	0.062	0.028	0.014	159.688	2.24
FeO	6.12	71.844	0.085	0.085	0.187	0.187	0.126	Fe^{2+}	0.126	0.057	0.057	71.844	4.10
MnO	0.13	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.13
MgO	17.19	40.304	0.427	0.427	0.937	0.937	0.937	Mg	0.937	0.427	0.427	40.304	17.19
CaO	21.14	56.077	0.377	0.377	0.828	0.828	0.828	Ca	0.828	0.377	0.377	56.077	21.14
Na2O	0.17	61.979	0.003	0.005	0.012	0.006	0.012	Na	0.012	0.005	0.003	61.979	0.17
Total	99.90		1.792	1.820	4.000	5.969	4.000			1.820	1.778		100.12

No of Oxygens 6 No of Catior 4
F 1.0052

Check! Fe2O3 as FeO 2.02
FeO* 6.12

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.919	2
4	Tet	Al	0.081	
6	Oct	Al	0.027	1
		Fe^{3+}+Cr		
6	Oct	$+Fe^{2+}$+Mn	0.195	
6	Oct	Mg	0.778	
8	Cubic	Mg	0.160	1
8	Cubic	Ca	0.828	
8	Cubic	Na	0.012	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.80
En	Mg/(Ca+Mg+Fe2+)	49.56
Fs	Fe2+/(Ca+Mg+Fe2+)	6.64
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.337
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.911
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.573
		100.000
FeT/FeT+Mg		0.17
Fe2/Fe2+Mg		0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.34	0.18	2.50	0.12	2.24	4.10	0.13	17.19	21.14	0.17	100.12	0.005	0.081	0.027	43.80	49.56	6.64

Analysis No. 132

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	49.91	60.084	0.831	0.831	1.866	3.731	1.866	Si	1.866	0.831	0.831	60.084	49.91
TiO2	0.24	79.866	0.003	0.003	0.007	0.013	0.007	Ti	0.007	0.003	0.003	79.866	0.24
Al2O3	3.72	101.961	0.036	0.073	0.164	0.246	0.164	Al	0.164	0.073	0.036	101.961	3.72
Cr2O3	0.02	151.990	0.000	0.000	0.001	0.001	0.001	Cr	0.001	0.000	0.000	151.990	0.02
Fe2O3	0.00	159.688					0.112	Fe^{3+}	0.112	0.050	0.025	159.688	3.97
FeO	9.64	71.844	0.134	0.134	0.301	0.301	0.190	Fe^{2+}	0.190	0.084	0.084	71.844	6.07
MnO	0.22	70.937	0.003	0.003	0.007	0.007	0.007	Mn	0.007	0.003	0.003	70.937	0.22
MgO	15.08	40.304	0.374	0.374	0.840	0.840	0.840	Mg	0.840	0.374	0.374	40.304	15.08
CaO	19.83	56.077	0.354	0.354	0.794	0.794	0.794	Ca	0.794	0.354	0.354	56.077	19.83
Na2O	0.28	61.979	0.005	0.009	0.020	0.010	0.020	Na	0.020	0.009	0.005	61.979	0.28
Total	98.94		1.740	1.781	4.000	5.944	4.000			1.781	1.715		99.34

No of Oxygens 6 No of Catior 4
F 1.0094

Check! Fe2O3 as FeO 3.57
FeO* 9.64

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.872	2
4	Tet	Al	0.128	
6	Oct	Al	0.036	1
		Fe^{3+}+Cr		
6	Oct	$+Fe^{2+}$+Mn	0.309	
6	Oct	Mg	0.655	
8	Cubic	Mg	0.185	1
8	Cubic	Ca	0.794	
8	Cubic	Na	0.020	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.54
En	Mg/(Ca+Mg+Fe2+)	46.06
Fs	Fe2+/(Ca+Mg+Fe2+)	10.40
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	13.706
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-11.193
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.487
		100.000
FeT/FeT+Mg		0.26
Fe2/Fe2+Mg		0.18

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
49.91	0.24	3.72	0.02	3.97	6.07	0.22	15.08	19.83	0.28	99.34	0.007	0.128	0.036	43.54	46.06	10.40

Analysis No. 133

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.79	60.084	0.845	0.845	1.880	3.760	1.880	Si	1.880	0.845	0.845	60.084	50.79
TiO2	0.27	79.866	0.003	0.003	0.007	0.015	0.007	Ti	0.007	0.003	0.003	79.866	0.27
Al2O3	3.27	101.961	0.032	0.064	0.143	0.214	0.143	Al	0.143	0.064	0.032	101.961	3.27
Cr2O3	0.29	151.990	0.002	0.004	0.009	0.013	0.009	Cr	0.009	0.004	0.002	151.990	0.29
Fe2O3	0.00	159.688					0.090	Fe^{3+}	0.090	0.041	0.020	159.688	3.24
FeO	7.65	71.844	0.106	0.106	0.237	0.237	0.147	Fe^{2+}	0.147	0.066	0.066	71.844	4.73
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.16
MgO	15.57	40.304	0.386	0.386	0.859	0.859	0.859	Mg	0.859	0.386	0.386	40.304	15.57
CaO	21.28	56.077	0.379	0.379	0.844	0.844	0.844	Ca	0.844	0.379	0.379	56.077	21.28
Na2O	0.23	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.23

Total	99.51		1.761	1.799	4.000	5.955	4.000
No of Oxygens	6	No of Cation	4				
F	1.0076						

	1.799	1.741	99.84
Check!	Fe2O3 as FeO	2.92	
	FeO*	7.65	

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.887	2
4	Tet	Al	0.113	
6	Oct	Al	0.030	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.250	
6	Oct	Mg	0.719	
8	Cubic	Mg	0.140	1
8	Cubic	Ca	0.844	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.63
En	Mg/(Ca+Mg+Fe2+)	46.45
Fs	Fe2+/(Ca+Mg+Fe2+)	7.92
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.496
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.589
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.093
		100.000
FeT/FeT+Mg		0.22
Fe2/Fe2+Mg		0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.79	0.27	3.27	0.29	3.24	4.73	0.16	15.57	21.28	0.23	99.84	0.007	0.113	0.030	45.63	46.45	7.92

Analysis No. 134

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	49.78	60.084	0.829	0.829	1.841	3.682	1.841	Si
TiO2	0.35	79.866	0.004	0.004	0.010	0.020	0.010	Ti
Al2O3	4.36	101.961	0.043	0.086	0.190	0.285	0.190	Al
Cr2O3	0.30	151.990	0.002	0.004	0.009	0.013	0.009	Cr
Fe2O3	0.00	159.688	0.112	0.112	0.249	0.127	0.127	Fe^{3+}
FeO	8.05	71.844				0.249	0.122	Fe^{2+}
MnO	0.18	70.937	0.002	0.002	0.006	0.006	0.006	Mn
MgO	14.99	40.304	0.372	0.372	0.827	0.827	0.827	Mg
CaO	21.22	56.077	0.378	0.378	0.841	0.841	0.841	Ca
Na2O	0.39	61.979	0.006	0.013	0.028	0.014	0.028	Na
Total	99.62		1.749	1.800	4.000	5.936	4.000	

No of Oxygens	6	No of Cation	4
F	1.0107		

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.841	0.829	0.829	60.084	49.78
0.010	0.004	0.004	79.866	0.35
0.190	0.086	0.043	101.961	4.36
0.009	0.004	0.002	151.990	0.30
0.127	0.057	0.029	159.688	4.57
0.122	0.055	0.055	71.844	3.94
0.006	0.002	0.002	70.937	0.18
0.827	0.372	0.372	40.304	14.99
0.841	0.378	0.378	56.077	21.22
0.028	0.013	0.006	61.979	0.39
	1.800	1.720		100.08

Check!	Fe2O3 as FeO	4.11	
	FeO*	8.05	

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.851	2
4	Tet	Al	0.149	
6	Oct	Al	0.041	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.263	
6	Oct	Mg	0.696	
8	Cubic	Mg	0.131	1
8	Cubic	Ca	0.841	
8	Cubic	Na	0.028	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	47.00
En	Mg/(Ca+Mg+Fe2+)	46.19
Fs	Fe2+/(Ca+Mg+Fe2+)	6.81
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	14.638
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-11.407
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	96.769
		100.000
FeT/FeT+Mg		0.23
Fe2/Fe2+Mg		0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
49.78	0.35	4.36	0.30	4.57	3.94	0.18	14.99	21.22	0.39	100.08	0.010	0.149	0.041	47.00	46.19	6.81

Analysis No. 135

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.05	60.084	0.833	0.833	1.878	3.756	1.878	Si
TiO2	0.31	79.866	0.004	0.004	0.009	0.018	0.009	Ti
Al2O3	3.36	101.961	0.033	0.066	0.149	0.223	0.149	Al
Cr2O3	0.07	151.990	0.000	0.001	0.002	0.003	0.002	Cr
Fe2O3	0.00	159.688	0.091	0.091	0.205	0.091	0.091	Fe^{3+}
FeO	10.15	71.844	0.141	0.141	0.319	0.319	0.228	Fe^{2+}
MnO	0.26	70.937	0.004	0.004	0.008	0.008	0.008	Mn
MgO	15.59	40.304	0.387	0.387	0.872	0.872	0.872	Mg
CaO	18.61	56.077	0.332	0.332	0.748	0.748	0.748	Ca
Na2O	0.21	61.979	0.003	0.007	0.015	0.008	0.015	Na
Total	98.61		1.737	1.774	4.000	5.955	4.000	

No of Oxygens	6	No of Cation	4
F	1.0076		

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.878	0.833	0.833	60.084	50.05
0.009	0.004	0.004	79.866	0.31
0.149	0.066	0.033	101.961	3.36
0.002	0.001	0.000	151.990	0.07
0.091	0.040	0.020	159.688	3.21
0.228	0.101	0.101	71.844	7.26
0.008	0.004	0.004	70.937	0.26
0.872	0.387	0.387	40.304	15.59
0.748	0.332	0.332	56.077	18.61
0.015	0.007	0.003	61.979	0.21
	1.774	1.717		98.93

Check!	Fe2O3 as FeO	2.89	
	FeO*	10.15	

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.887	2
4	Tet	Al	0.113	
6	Oct	Al	0.036	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.329	
6	Oct	Mg	0.636	
8	Cubic	Mg	0.237	1
8	Cubic	Ca	0.748	
8	Cubic	Na	0.015	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.48
En	Mg/(Ca+Mg+Fe2+)	47.19
Fs	Fe2+/(Ca+Mg+Fe2+)	12.33
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.876
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.879
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.004
		100.000
FeT/FeT+Mg		0.27
Fe2/Fe2+Mg		0.21

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.05	0.31	3.36	0.07	3.21	7.26	0.26	15.59	18.61	0.21	98.93	0.009	0.113	0.036	40.48	47.19	12.33

Analysis No. 139

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.12	60.084	0.851	0.851	1.872	3.744	1.872	Si
TiO2	0.16	79.866	0.002	0.002	0.004	0.009	0.004	Ti
Al2O3	3.44	101.961	0.034	0.067	0.148	0.223	0.148	Al
Cr2O3	0.48	151.990	0.003	0.006	0.014	0.021	0.014	Cr
Fe2O3	0.00	159.688					0.098	Fe^{3+}
FeO	6.26	71.844	0.087	0.087	0.192	0.192	0.094	Fe^{2+}
MnO	0.14	70.937	0.002	0.002	0.004	0.004	0.004	Mn
MgO	16.14	40.304	0.400	0.400	0.881	0.881	0.881	Mg
CaO	22.19	56.077	0.396	0.396	0.871	0.871	0.871	Ca
Na2O	0.19	61.979	0.003	0.006	0.013	0.007	0.013	Na
Total	100.13		1.778	1.818	4.000	5.951	4.000	

No of Oxygens 6 No of Catior 4
F 1.0082

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.872	0.851	0.851	60.084	51.12
0.004	0.002	0.002	79.866	0.16
0.148	0.067	0.034	101.961	3.44
0.014	0.006	0.003	151.990	0.48
0.098	0.045	0.022	159.688	3.55
0.094	0.043	0.043	71.844	3.06
0.004	0.002	0.002	70.937	0.14
0.881	0.400	0.400	40.304	16.14
0.871	0.396	0.396	56.077	22.19
0.013	0.006	0.003	61.979	0.19
	1.818	1.756		100.48

Check! Fe2O3 as FeO 3.20
FeO* 6.26

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.876	2
4	Tet	Al	0.124	
6	Oct	Al	0.025	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.210	
6	Oct	Mg	0.765	
8	Cubic	Mg	0.116	1
8	Cubic	Ca	0.871	
8	Cubic	Na	0.013	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	47.18
En	Mg/(Ca+Mg+Fe2+)	47.74
Fs	Fe2+/(Ca+Mg+Fe2+)	5.08
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.083
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.585
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.502
		100.000
FeT/FeT+Mg		0.18
Fe2/Fe2+Mg		0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.12	0.16	3.44	0.48	3.55	3.06	0.14	16.14	22.19	0.19	100.48	0.004	0.124	0.025	47.18	47.74	5.08

Analysis No. 140

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.96	60.084	0.865	0.865	1.909	3.818	1.909	Si
TiO2	0.11	79.866	0.001	0.001	0.003	0.006	0.003	Ti
Al2O3	2.53	101.961	0.025	0.050	0.110	0.164	0.110	Al
Cr2O3	0.30	151.990	0.002	0.004	0.009	0.013	0.009	Cr
Fe2O3	0.00	159.688					0.069	Fe^{3+}
FeO	5.86	71.844	0.082	0.082	0.180	0.180	0.111	Fe^{2+}
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	16.65	40.304	0.413	0.413	0.912	0.912	0.912	Mg
CaO	21.88	56.077	0.390	0.390	0.861	0.861	0.861	Ca
Na2O	0.16	61.979	0.003	0.005	0.011	0.006	0.011	Na
Total	99.61		1.783	1.812	4.000	5.965	4.000	

No of Oxygens 6 No of Catior 4
F 1.0058

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.909	0.865	0.865	60.084	51.96
0.003	0.001	0.001	79.866	0.11
0.110	0.050	0.025	101.961	2.53
0.009	0.004	0.002	151.990	0.30
0.069	0.031	0.016	159.688	2.50
0.111	0.050	0.050	71.844	3.61
0.005	0.002	0.002	70.937	0.16
0.912	0.413	0.413	40.304	16.65
0.861	0.390	0.390	56.077	21.88
0.011	0.005	0.003	61.979	0.16
	1.812	1.767		99.86

Check! Fe2O3 as FeO 2.25
FeO* 5.86

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.912	2
4	Tet	Al	0.088	
6	Oct	Al	0.022	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.194	
6	Oct	Mg	0.785	
8	Cubic	Mg	0.127	1
8	Cubic	Ca	0.861	
8	Cubic	Na	0.011	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.71
En	Mg/(Ca+Mg+Fe2+)	48.40
Fs	Fe2+/(Ca+Mg+Fe2+)	5.89
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.907
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.605
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.698
		100.000
FeT/FeT+Mg		0.16
Fe2/Fe2+Mg		0.11

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.96	0.11	2.53	0.30	2.50	3.61	0.16	16.65	21.88	0.16	99.86	0.003	0.088	0.022	45.71	48.40	5.89

Analysis No. 141

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.21	60.084	0.852	0.852	1.894	3.787	1.894	Si
TiO2	0.17	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	2.26	101.961	0.022	0.044	0.098	0.148	0.098	Al
Cr2O3	0.19	151.990	0.001	0.002	0.006	0.008	0.006	Cr
Fe2O3	0.00	159.688					0.108	Fe^{3+}
FeO	7.22	71.844	0.100	0.100	0.223	0.223	0.115	Fe^{2+}
MnO	0.20	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	16.94	40.304	0.420	0.420	0.934	0.934	0.934	Mg
CaO	20.81	56.077	0.371	0.371	0.825	0.825	0.825	Ca
Na2O	0.13	61.979	0.002	0.004	0.009	0.005	0.009	Na
Total	99.14		1.775	1.800	4.000	5.946	4.000	

No of Oxygens 6 No of Catior 4
F 1.0091

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.894	0.852	0.852	60.084	51.21
0.005	0.002	0.002	79.866	0.17
0.098	0.044	0.022	101.961	2.26
0.006	0.002	0.001	151.990	0.19
0.108	0.049	0.024	159.688	3.89
0.115	0.052	0.052	71.844	3.72
0.006	0.003	0.003	70.937	0.20
0.934	0.420	0.420	40.304	16.94
0.825	0.371	0.371	56.077	20.81
0.009	0.004	0.002	61.979	0.13
	1.800	1.750		99.53

Check! Fe2O3 as FeO 3.50
FeO* 7.22

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.899	1.997
4	Tet	Al	0.098	
6	Oct	Al		1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.235	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.01
En	Mg/(Ca+Mg+Fe2+)	49.85
Fs	Fe2+/(Ca+Mg+Fe2+)	6.14

6	Oct	Mg	0.765		total		100.00
8	Cubic	Mg	0.169	1.003			
8	Cubic	Ca	0.825		**Sodic and Calcic CPX**		
8	Cubic	Na	0.009		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	12.979
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-11.867
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.889
							100.000
					FeT/FeT+Mg		0.19
					Fe2/Fe2+Mg		0.11

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.21	0.17	2.26	0.19	3.89	3.72	0.20	16.94	20.81	0.13	99.53	0.005	0.098	0.000	44.01	49.85	6.14

Analysis No. 142

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.18	60.084	0.835	0.835	1.847	3.694	1.847	Si	1.847	0.835	0.835	60.084	50.18
TiO2	0.30	79.866	0.004	0.004	0.008	0.016	0.008	Ti	0.008	0.004	0.004	79.866	0.30
Al2O3	3.91	101.961	0.038	0.077	0.170	0.254	0.170	Al	0.170	0.077	0.038	101.961	3.91
Cr2O3	0.28	151.990	0.002	0.004	0.008	0.012	0.008	Cr	0.008	0.004	0.002	151.990	0.28
Fe2O3	0.00	159.688					0.128	Fe^{3+}	0.128	0.058	0.029	159.688	4.62
FeO	8.48	71.844	0.118	0.118	0.261	0.261	0.133	Fe^{2+}	0.133	0.060	0.060	71.844	4.32
MnO	0.22	70.937	0.003	0.003	0.007	0.007	0.007	Mn	0.007	0.003	0.003	70.937	0.22
MgO	16.30	40.304	0.404	0.404	0.894	0.894	0.894	Mg	0.894	0.404	0.404	40.304	16.30
CaO	19.99	56.077	0.356	0.356	0.788	0.788	0.788	Ca	0.788	0.356	0.356	56.077	19.99
Na2O	0.23	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.23
Total	99.88		1.765	1.809	4.000	5.936	4.000			1.809	1.736		100.34

No of Oxygens 6 No of Cation 4
F 1.0108

Check! Fe2O3 as FeO 4.16
FeO* 8.48

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.855	2
4	Tet	Al	0.145	
6	Oct	Al	0.025	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.276	
6	Oct	Mg	0.699	
8	Cubic	Mg	0.195	1
8	Cubic	Ca	0.788	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.42
En	Mg/(Ca+Mg+Fe2+)	49.26
Fs	Fe2+/(Ca+Mg+Fe2+)	7.33
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	15.902
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-13.881
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.980
		100.000
FeT/FeT+Mg		0.23
Fe2/Fe2+Mg		0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.18	0.30	3.91	0.28	4.62	4.32	0.22	16.30	19.99	0.23	100.34	0.008	0.145	0.025	43.42	49.26	7.33

Analysis No. 143

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.77	60.084	0.845	0.845	1.867	3.734	1.867	Si	1.867	0.845	0.845	60.084	50.77
TiO2	0.28	79.866	0.003	0.003	0.008	0.015	0.008	Ti	0.008	0.003	0.003	79.866	0.28
Al2O3	3.82	101.961	0.037	0.075	0.166	0.248	0.166	Al	0.166	0.075	0.037	101.961	3.82
Cr2O3	0.33	151.990	0.002	0.004	0.010	0.015	0.010	Cr	0.010	0.004	0.002	151.990	0.33
Fe2O3	0.00	159.688					0.088	Fe^{3+}	0.088	0.040	0.020	159.688	3.17
FeO	7.79	71.844	0.108	0.108	0.240	0.240	0.152	Fe^{2+}	0.152	0.069	0.069	71.844	4.94
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.19
MgO	16.19	40.304	0.402	0.402	0.888	0.888	0.888	Mg	0.888	0.402	0.402	40.304	16.19
CaO	20.43	56.077	0.364	0.364	0.805	0.805	0.805	Ca	0.805	0.364	0.364	56.077	20.43
Na2O	0.17	61.979	0.003	0.006	0.012	0.006	0.012	Na	0.012	0.006	0.003	61.979	0.17
Total	99.97		1.768	1.810	4.000	5.956	4.000			1.810	1.748		100.29

No of Oxygens 6 No of Cation 4
F 1.0074

Check! Fe2O3 as FeO 2.85
FeO* 7.79

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.875	2
4	Tet	Al	0.125	
6	Oct	Al	0.040	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.255	
6	Oct	Mg	0.705	
8	Cubic	Mg	0.183	1
8	Cubic	Ca	0.805	
8	Cubic	Na	0.012	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.64
En	Mg/(Ca+Mg+Fe2+)	48.12
Fs	Fe2+/(Ca+Mg+Fe2+)	8.23
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.736
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.243
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.507
		100.000
FeT/FeT+Mg		0.21
Fe2/Fe2+Mg		0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.77	0.28	3.82	0.33	3.17	4.94	0.19	16.19	20.43	0.17	100.29	0.008	0.125	0.040	43.64	48.12	8.23

Analysis No. 144

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.59	60.084	0.842	0.842	1.870	3.741	1.870	Si	1.870	0.842	0.842	60.084	50.59
TiO2	0.33	79.866	0.004	0.004	0.009	0.019	0.009	Ti	0.009	0.004	0.004	79.866	0.33
Al2O3	3.52	101.961	0.035	0.069	0.153	0.230	0.153	Al	0.153	0.069	0.035	101.961	3.52
Cr2O3	0.14	151.990	0.001	0.002	0.004	0.006	0.004	Cr	0.004	0.002	0.001	151.990	0.14
Fe2O3	0.00	159.688					0.097	Fe^{3+}	0.097	0.044	0.022	159.688	3.49
FeO	9.51	71.844	0.132	0.132	0.294	0.294	0.197	Fe^{2+}	0.197	0.089	0.089	71.844	6.37
MnO	0.28	70.937	0.004	0.004	0.009	0.009	0.009	Mn	0.009	0.004	0.004	70.937	0.28
MgO	16.49	40.304	0.409	0.409	0.909	0.909	0.909	Mg	0.909	0.409	0.409	40.304	16.49
CaO	18.62	56.077	0.332	0.332	0.738	0.738	0.738	Ca	0.738	0.332	0.332	56.077	18.62
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.19

Total	99.68		1.762	1.801	4.000	5.951	4.000
No of Oxygens	6	No of Cation	4				
F	1.0082						

		1.801	1.740	100.03
Check!	Fe2O3 as FeO	3.14		
	FeO*	9.51		

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.880	2
4	Tet	Al	0.120	
6	Oct	Al	0.033	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.307	
6	Oct	Mg	0.660	
8	Cubic	Mg	0.249	1
8	Cubic	Ca	0.738	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	40.01
En	Mg/(Ca+Mg+Fe2+)	49.30
Fs	Fe2+/(Ca+Mg+Fe2+)	10.69
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	12.920
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-11.094
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.174
		100.000
FeT/FeT+Mg		0.24
Fe2/Fe2+Mg		0.18

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.59	0.33	3.52	0.14	3.49	6.37	0.28	16.49	18.62	0.19	100.03	0.009	0.120	0.033	40.01	49.30	10.69

Analysis No. 155

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.03	60.084	0.866	0.866	1.907	3.814	1.907	Si
TiO2	0.12	79.866	0.002	0.002	0.003	0.007	0.003	Ti
Al2O3	2.17	101.961	0.021	0.043	0.094	0.141	0.094	Al
Cr2O3	0.22	151.990	0.001	0.003	0.007	0.010	0.007	Cr
Fe2O3	0.00	159.688					0.089	Fe^{3+}
FeO	7.46	71.844	0.104	0.104	0.229	0.229	0.139	Fe^{2+}
MnO	0.23	70.937	0.003	0.003	0.007	0.007	0.007	Mn
MgO	16.82	40.304	0.417	0.417	0.919	0.919	0.919	Mg
CaO	21.00	56.077	0.374	0.374	0.825	0.825	0.825	Ca
Na2O	0.14	61.979	0.002	0.005	0.010	0.005	0.010	Na
Total	100.20		1.791	1.816	4.000	5.955	4.000	

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.907	0.866	0.866	60.084	52.03
0.003	0.002	0.002	79.866	0.12
0.094	0.043	0.021	101.961	2.17
0.007	0.003	0.001	151.990	0.22
0.089	0.041	0.020	159.688	3.24
0.139	0.063	0.063	71.844	4.54
0.007	0.003	0.003	70.937	0.23
0.919	0.417	0.417	40.304	16.82
0.825	0.374	0.374	56.077	21.00
0.010	0.005	0.002	61.979	0.14
	1.816	1.771		100.52

No of Oxygens	6	No of Cation	4	
F	1.0075			
Check!	Fe2O3 as FeO	2.92		
	FeO*	7.46		

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.910	2
4	Tet	Al	0.090	
6	Oct	Al	0.004	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.242	
6	Oct	Mg	0.754	
8	Cubic	Mg	0.165	1
8	Cubic	Ca	0.825	
8	Cubic	Na	0.010	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.80
En	Mg/(Ca+Mg+Fe2+)	48.81
Fs	Fe2+/(Ca+Mg+Fe2+)	7.40
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.704
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.491
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.787
		100.000
FeT/FeT+Mg		0.20
Fe2/Fe2+Mg		0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.03	0.12	2.17	0.22	3.24	4.54	0.23	16.82	21.00	0.14	100.52	0.003	0.090	0.004	43.80	48.81	7.40

Analysis No. 156

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.87	60.084	0.863	0.863	1.915	3.829	1.915	Si
TiO2	0.11	79.866	0.001	0.001	0.003	0.006	0.003	Ti
Al2O3	2.35	101.961	0.023	0.046	0.102	0.153	0.102	Al
Cr2O3	0.22	151.990	0.001	0.003	0.006	0.010	0.006	Cr
Fe2O3	0.00	159.688					0.065	Fe^{3+}
FeO	7.01	71.844	0.098	0.098	0.216	0.216	0.152	Fe^{2+}
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	16.45	40.304	0.408	0.408	0.905	0.905	0.905	Mg
CaO	21.17	56.077	0.378	0.378	0.837	0.837	0.837	Ca
Na2O	0.12	61.979	0.002	0.004	0.009	0.004	0.009	Na
Total	99.50		1.777	1.804	4.000	5.968	4.000	

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.915	0.863	0.863	60.084	51.87
0.003	0.001	0.001	79.866	0.11
0.102	0.046	0.023	101.961	2.35
0.006	0.003	0.001	151.990	0.22
0.065	0.029	0.015	159.688	2.32
0.152	0.068	0.068	71.844	4.92
0.006	0.003	0.003	70.937	0.19
0.905	0.408	0.408	40.304	16.45
0.837	0.378	0.378	56.077	21.17
0.009	0.004	0.002	61.979	0.12
	1.804	1.763		99.73

No of Oxygens	6	No of Cation	4	
F	1.0054			
Check!	Fe2O3 as FeO	2.09		
	FeO*	7.01		

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.918	2
4	Tet	Al	0.082	
6	Oct	Al	0.020	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.229	
6	Oct	Mg	0.751	
8	Cubic	Mg	0.154	1
8	Cubic	Ca	0.837	
8	Cubic	Na	0.009	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.20
En	Mg/(Ca+Mg+Fe2+)	47.78
Fs	Fe2+/(Ca+Mg+Fe2+)	8.02
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	7.628
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.584
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.955
		100.000
FeT/FeT+Mg		0.19
Fe2/Fe2+Mg		0.14

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.87	0.11	2.35	0.22	2.32	4.92	0.19	16.45	21.17	0.12	99.73	0.003	0.082	0.020	44.20	47.78	8.02

Analysis No. 157

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.70	60.084	0.860	0.860	1.911	3.823	1.911	Si
TiO2	0.21	79.866	0.003	0.003	0.006	0.012	0.006	Ti
Al2O3	2.09	101.961	0.020	0.041	0.091	0.137	0.091	Al
Cr2O3	0.04	151.990	0.000	0.001	0.001	0.002	0.001	Cr
Fe2O3	0.00	159.688					0.085	Fe^{3+}
FeO	9.36	71.844	0.130	0.130	0.289	0.289	0.204	Fe^{2+}
MnO	0.29	70.937	0.004	0.004	0.009	0.009	0.009	Mn
MgO	16.32	40.304	0.405	0.405	0.899	0.899	0.899	Mg
CaO	19.72	56.077	0.352	0.352	0.781	0.781	0.781	Ca
Na2O	0.16	61.979	0.003	0.005	0.012	0.006	0.012	Na
Total	99.89		1.777	1.801	4.000	5.957	4.000	

No of Oxygens 6 No of Catior 4
F 1.0072

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.911	0.860	0.860	60.084	51.70
0.006	0.003	0.003	79.866	0.21
0.091	0.041	0.020	101.961	2.09
0.001	0.001	0.000	151.990	0.04
0.085	0.038	0.019	159.688	3.07
0.204	0.092	0.092	71.844	6.60
0.009	0.004	0.004	70.937	0.29
0.899	0.405	0.405	40.304	16.32
0.781	0.352	0.352	56.077	19.72
0.012	0.005	0.003	61.979	0.16
	1.801	1.758		100.20

Check! Fe2O3 as FeO 2.76
FeO* 9.36

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.917	2
4	Tet	Al	0.083	
6	Oct	Al	0.008	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.300	
6	Oct	Mg	0.692	
8	Cubic	Mg	0.207	1
8	Cubic	Ca	0.781	
8	Cubic	Na	0.012	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	41.45
En	Mg/(Ca+Mg+Fe2+)	47.72
Fs	Fe2+/(Ca+Mg+Fe2+)	10.83
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.757
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.282
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.525
		100.000
FeT/FeT+Mg		0.24
Fe2/Fe2+Mg		0.18

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.70	0.21	2.09	0.04	3.07	6.60	0.29	16.32	19.72	0.16	100.20	0.006	0.083	0.008	41.45	47.72	10.83

Analysis No. 160

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.93	60.084	0.848	0.848	1.871	3.742	1.871	Si
TiO2	0.19	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	3.65	101.961	0.036	0.072	0.158	0.237	0.158	Al
Cr2O3	0.40	151.990	0.003	0.005	0.012	0.017	0.012	Cr
Fe2O3	0.00	159.688					0.088	Fe^{3+}
FeO	7.18	71.844	0.100	0.100	0.221	0.221	0.133	Fe^{2+}
MnO	0.17	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	15.71	40.304	0.390	0.390	0.860	0.860	0.860	Mg
CaO	21.78	56.077	0.388	0.388	0.857	0.857	0.857	Ca
Na2O	0.14	61.979	0.002	0.005	0.010	0.005	0.010	Na
Total	100.15		1.771	1.812	4.000	5.956	4.000	

No of Oxygens 6 No of Catior 4
F 1.0074

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.871	0.848	0.848	60.084	50.93
0.005	0.002	0.002	79.866	0.19
0.158	0.072	0.036	101.961	3.65
0.012	0.005	0.003	151.990	0.40
0.088	0.040	0.020	159.688	3.17
0.133	0.060	0.060	71.844	4.33
0.005	0.002	0.002	70.937	0.17
0.860	0.390	0.390	40.304	15.71
0.857	0.388	0.388	56.077	21.78
0.010	0.005	0.002	61.979	0.14
	1.812	1.751		100.47

Check! Fe2O3 as FeO 2.85
FeO* 7.18

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.876	2
4	Tet	Al	0.124	
6	Oct	Al	0.034	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.238	
6	Oct	Mg	0.728	
8	Cubic	Mg	0.132	1
8	Cubic	Ca	0.857	
8	Cubic	Na	0.010	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	46.33
En	Mg/(Ca+Mg+Fe2+)	46.49
Fs	Fe2+/(Ca+Mg+Fe2+)	7.18
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.107
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-8.933
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.827
		100.000
FeT/FeT+Mg		0.20
Fe2/Fe2+Mg		0.13

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.93	0.19	3.65	0.40	3.17	4.33	0.17	15.71	21.78	0.14	100.47	0.005	0.124	0.034	46.33	46.49	7.18

Analysis No. 161

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.97	60.084	0.848	0.848	1.879	3.758	1.879	Si
TiO2	0.29	79.866	0.004	0.004	0.008	0.016	0.008	Ti
Al2O3	3.05	101.961	0.030	0.060	0.133	0.199	0.133	Al
Cr2O3	0.28	151.990	0.002	0.004	0.008	0.012	0.008	Cr
Fe2O3	0.00	159.688					0.097	Fe^{3+}
FeO	7.88	71.844	0.110	0.110	0.243	0.243	0.146	Fe^{2+}
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	15.85	40.304	0.393	0.393	0.871	0.871	0.871	Mg
CaO	21.32	56.077	0.380	0.380	0.842	0.842	0.842	Ca
Na2O	0.16	61.979	0.003	0.005	0.011	0.006	0.011	Na
Total	99.96		1.772	1.806	4.000	5.952	4.000	

No of Oxygens 6 No of Catior 4
F 1.0081

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.879	0.848	0.848	60.084	50.97
0.008	0.004	0.004	79.866	0.29
0.133	0.060	0.030	101.961	3.05
0.008	0.004	0.002	151.990	0.28
0.097	0.044	0.022	159.688	3.49
0.146	0.066	0.066	71.844	4.74
0.005	0.002	0.002	70.937	0.16
0.871	0.393	0.393	40.304	15.85
0.842	0.380	0.380	56.077	21.32
0.011	0.005	0.003	61.979	0.16
	1.806	1.750		100.31

Check! Fe2O3 as FeO 3.14
FeO* 7.88

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.887	2
4	Tet	Al	0.113	
6	Oct	Al	0.019	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.256	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.29
En	Mg/(Ca+Mg+Fe2+)	46.85
Fs	Fe2+/(Ca+Mg+Fe2+)	7.86

6	Oct	Mg	0.724			total	100.00
8	Cubic	Mg	0.147	1			
8	Cubic	Ca	0.842		**Sodic and Calcic CPX**		
8	Cubic	Na	0.011		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	11.338
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-10.017
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.679
							100.000
					FeT/FeT+Mg		0.22
					Fe2/Fe2+Mg		0.14

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.97	0.29	3.05	0.28	3.49	4.74	0.16	15.85	21.32	0.16	100.31	0.008	0.113	0.019	45.29	46.85	7.86

Analysis No. 162

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.78	60.084	0.845	0.845	1.874	3.748	1.874	Si	1.874	0.845	0.845	60.084	50.78
TiO2	0.27	79.866	0.003	0.003	0.008	0.015	0.008	Ti	0.008	0.003	0.003	79.866	0.27
Al2O3	3.46	101.961	0.034	0.068	0.150	0.226	0.150	Al	0.150	0.068	0.034	101.961	3.46
Cr2O3	0.30	151.990	0.002	0.004	0.009	0.013	0.009	Cr	0.009	0.004	0.002	151.990	0.30
Fe2O3	0.00	159.688					0.090	Fe^{3+}	0.090	0.041	0.020	159.688	3.24
FeO	7.50	71.844	0.104	0.104	0.231	0.231	0.142	Fe^{2+}	0.142	0.064	0.064	71.844	4.59
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.19
MgO	15.82	40.304	0.393	0.393	0.870	0.870	0.870	Mg	0.870	0.393	0.393	40.304	15.82
CaO	21.22	56.077	0.378	0.378	0.839	0.839	0.839	Ca	0.839	0.378	0.378	56.077	21.22
Na2O	0.17	61.979	0.003	0.006	0.012	0.006	0.012	Na	0.012	0.006	0.003	61.979	0.17
Total	99.72		1.765	1.804	4.000	5.955	4.000			1.804	1.745		100.04

No of Oxygens 6 No of Catior 4
F 1.0075

Calculate Fe2O3 Wt %

Check! Fe2O3 as FeO 2.91
FeO* 7.50

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.882	2
4	Tet	Al	0.118	
6	Oct	Al	0.032	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.246	
6	Oct	Mg	0.722	
8	Cubic	Mg	0.149	1
8	Cubic	Ca	0.839	
8	Cubic	Na	0.012	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.33
En	Mg/(Ca+Mg+Fe2+)	47.02
Fs	Fe2+/(Ca+Mg+Fe2+)	7.65
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	10.553
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-9.105
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.552
		100.000
FeT/FeT+Mg		0.21
Fe2/Fe2+Mg		0.14

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.78	0.27	3.46	0.30	3.24	4.59	0.19	15.82	21.22	0.17	100.04	0.008	0.118	0.032	45.33	47.02	7.65

Analysis No. 163

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.97	60.084	0.848	0.848	1.870	3.740	1.870	Si	1.870	0.848	0.848	60.084	50.97
TiO2	0.26	79.866	0.003	0.003	0.007	0.015	0.007	Ti	0.007	0.003	0.003	79.866	0.26
Al2O3	3.26	101.961	0.032	0.064	0.141	0.211	0.141	Al	0.141	0.064	0.032	101.961	3.26
Cr2O3	0.21	151.990	0.001	0.003	0.006	0.009	0.006	Cr	0.006	0.003	0.001	151.990	0.21
Fe2O3	0.00	159.688					0.110	Fe^{3+}	0.110	0.050	0.025	159.688	3.99
FeO	8.57	71.844	0.119	0.119	0.263	0.263	0.153	Fe^{2+}	0.153	0.069	0.069	71.844	4.98
MnO	0.25	70.937	0.003	0.003	0.008	0.008	0.008	Mn	0.008	0.003	0.003	70.937	0.25
MgO	15.94	40.304	0.395	0.395	0.872	0.872	0.872	Mg	0.872	0.395	0.395	40.304	15.94
CaO	20.90	56.077	0.373	0.373	0.822	0.822	0.822	Ca	0.822	0.373	0.373	56.077	20.90
Na2O	0.17	61.979	0.003	0.005	0.012	0.006	0.012	Na	0.012	0.005	0.003	61.979	0.17
Total	100.52		1.779	1.815	4.000	5.945	4.000			1.815	1.754		100.92

No of Oxygens 6 No of Catior 4
F 1.0093

Calculate Fe2O3 Wt %

Check! Fe2O3 as FeO 3.59
FeO* 8.57

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.877	2
4	Tet	Al	0.123	
6	Oct	Al	0.018	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.277	
6	Oct	Mg	0.705	
8	Cubic	Mg	0.167	1
8	Cubic	Ca	0.822	
8	Cubic	Na	0.012	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.50
En	Mg/(Ca+Mg+Fe2+)	47.22
Fs	Fe2+/(Ca+Mg+Fe2+)	8.27
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	13.227
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-11.814
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.587
		100.000
FeT/FeT+Mg		0.23
Fe2/Fe2+Mg		0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.97	0.26	3.26	0.21	3.99	4.98	0.25	15.94	20.90	0.17	100.92	0.007	0.123	0.018	44.50	47.22	8.27

Analysis No. 164

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.38	60.084	0.838	0.838	1.869	3.738	1.869	Si	1.869	0.838	0.838	60.084	50.38
TiO2	0.23	79.866	0.003	0.003	0.006	0.013	0.006	Ti	0.006	0.003	0.003	79.866	0.23
Al2O3	3.11	101.961	0.031	0.061	0.136	0.204	0.136	Al	0.136	0.061	0.031	101.961	3.11
Cr2O3	0.03	151.990	0.000	0.000	0.001	0.001	0.001	Cr	0.001	0.000	0.000	151.990	0.03
Fe2O3	0.00	159.688					0.126	Fe^{3+}	0.126	0.057	0.028	159.688	4.53
FeO	10.02	71.844	0.139	0.139	0.311	0.311	0.185	Fe^{2+}	0.185	0.083	0.083	71.844	5.95
MnO	0.28	70.937	0.004	0.004	0.009	0.009	0.009	Mn	0.009	0.004	0.004	70.937	0.28
MgO	15.90	40.304	0.395	0.395	0.879	0.879	0.879	Mg	0.879	0.395	0.395	40.304	15.90
CaO	19.49	56.077	0.348	0.348	0.775	0.775	0.775	Ca	0.775	0.348	0.348	56.077	19.49
Na2O	0.20	61.979	0.003	0.006	0.014	0.007	0.014	Na	0.014	0.006	0.003	61.979	0.20

Calculate Fe2O3 Wt %

Total	99.64		1.761	1.795	4.000	5.937	4.000
No of Oxygens	6	No of Cation	4				
F	1.0106						

	1.795	1.732	100.09
Check!	Fe2O3 as FeO	4.07	
	FeO*	10.02	

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.875	2
4	Tet	Al	0.125	
6	Oct	Al	0.011	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.320	
6	Oct	Mg	0.668	
8	Cubic	Mg	0.211	1
8	Cubic	Ca	0.775	
8	Cubic	Na	0.014	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.14
En	Mg/(Ca+Mg+Fe2+)	47.83
Fs	Fe2+/(Ca+Mg+Fe2+)	10.04
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	16.020
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-14.230
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.210
		100.000
FeT/FeT+Mg		0.26
Fe2/Fe2+Mg		0.17

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.38	0.23	3.11	0.03	4.53	5.95	0.28	15.90	19.49	0.20	100.09	0.006	0.125	0.011	42.14	47.83	10.04

Analysis No. 130

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.98	60.084	0.865	0.865	1.940	3.881	1.940	Si
TiO2	0.31	79.866	0.004	0.004	0.009	0.017	0.009	Ti
Al2O3	3.31	101.961	0.032	0.065	0.146	0.218	0.146	Al
Cr2O3	0.01	151.990	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	14.72	71.844	0.205	0.205	0.460	0.460	0.460	Fe^{2+}
MnO	0.38	70.937	0.005	0.005	0.012	0.012	0.012	Mn
MgO	17.95	40.304	0.445	0.445	0.999	0.999	0.999	Mg
CaO	10.65	56.077	0.190	0.190	0.426	0.426	0.426	Ca
Na2O	0.12	61.979	0.002	0.004	0.009	0.004	0.009	Na
Total	99.43		1.749	1.783	4.000	6.018	4.000	

No of Oxygens	6	No of Cation	4
F	0.9971		

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.940	0.865	0.865	60.084	51.98
0.009	0.004	0.004	79.866	0.31
0.146	0.065	0.032	101.961	3.31
0.000	0.000	0.000	151.990	0.01
0.000	0.000	0.000	159.688	0.00
0.460	0.205	0.205	71.844	14.72
0.012	0.005	0.005	70.937	0.38
0.999	0.445	0.445	40.304	17.95
0.426	0.190	0.190	56.077	10.65
0.009	0.004	0.002	61.979	0.12
	1.783	1.749		99.43
Check!	Fe2O3 as FeO	0.00		
	FeO*	14.72		

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.949	2
4	Tet	Al	0.051	
6	Oct	Al	0.095	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.472	
6	Oct	Mg	0.434	
8	Cubic	Mg	0.565	1
8	Cubic	Ca	0.426	
8	Cubic	Na	0.009	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	22.60
En	Mg/(Ca+Mg+Fe2+)	53.01
Fs	Fe2+/(Ca+Mg+Fe2+)	24.39
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	2.008
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.992
		100.000
FeT/FeT+Mg		0.32
Fe2/Fe2+Mg		0.32

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.98	0.31	3.31	0.01	0.00	14.72	0.38	17.95	10.65	0.12	99.43	0.009	0.051	0.095	22.60	53.01	24.39

Analysis No. 173

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.79	60.084	0.845	0.845	1.880	3.759	1.880	Si
TiO2	0.21	79.866	0.003	0.003	0.006	0.012	0.006	Ti
Al2O3	2.94	101.961	0.029	0.058	0.128	0.192	0.128	Al
Cr2O3	0.03	151.990	0.000	0.000	0.001	0.001	0.001	Cr
Fe2O3	0.00	159.688					0.110	Fe^{3+}
FeO	13.47	71.844	0.187	0.187	0.417	0.417	0.307	Fe^{2+}
MnO	0.41	70.937	0.006	0.006	0.013	0.013	0.013	Mn
MgO	18.31	40.304	0.454	0.454	1.010	1.010	1.010	Mg
CaO	13.51	56.077	0.241	0.241	0.536	0.536	0.536	Ca
Na2O	0.14	61.979	0.002	0.004	0.010	0.005	0.010	Na
Total	99.80		1.768	1.799	4.000	5.945	4.000	

No of Oxygens	6	No of Cation	4
F	1.0092		

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.880	0.845	0.845	60.084	50.79
0.006	0.003	0.003	79.866	0.21
0.128	0.058	0.029	101.961	2.94
0.001	0.000	0.000	151.990	0.03
0.110	0.049	0.025	159.688	3.94
0.307	0.138	0.138	71.844	9.92
0.013	0.006	0.006	70.937	0.41
1.010	0.454	0.454	40.304	18.31
0.536	0.241	0.241	56.077	13.51
0.010	0.004	0.002	61.979	0.14
	1.799	1.743		100.20
Check!	Fe2O3 as FeO	3.55		
	FeO*	13.47		

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.886	2
4	Tet	Al	0.114	
6	Oct	Al	0.014	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.430	
6	Oct	Mg	0.556	
8	Cubic	Mg	0.454	1
8	Cubic	Ca	0.536	
8	Cubic	Na	0.010	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	28.91
En	Mg/(Ca+Mg+Fe2+)	54.51
Fs	Fe2+/(Ca+Mg+Fe2+)	16.58
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	20.115
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-18.306
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.190
		100.000
FeT/FeT+Mg		0.29
Fe2/Fe2+Mg		0.23

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.79	0.21	2.94	0.03	3.94	9.92	0.41	18.31	13.51	0.14	100.20	0.006	0.114	0.014	28.91	54.51	16.58

Analysis No.	358							
	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	53.99	60.084	0.899	0.899	1.939	3.878	1.939	Si
TiO2	0.08	79.866	0.001	0.001	0.002	0.004	0.002	Ti
Al2O3	0.93	101.961	0.009	0.018	0.039	0.059	0.039	Al
Cr2O3	0.04	151.990	0.000	0.000	0.001	0.002	0.001	Cr
Fe2O3	0.00	159.688					0.081	Fe^{3+}
FeO	15.72	71.844	0.219	0.219	0.472	0.472	0.391	Fe^{2+}
MnO	0.46	70.937	0.007	0.007	0.014	0.014	0.014	Mn
MgO	26.24	40.304	0.651	0.651	1.405	1.405	1.405	Mg
CaO	3.20	56.077	0.057	0.057	0.123	0.123	0.123	Ca
Na2O	0.06	61.979	0.001	0.002	0.004	0.002	0.004	Na
Total	100.71		1.843	1.854	4.000	5.959	4.000	

No of Oxygens	6	No of Cation	4
F	1.0068		

Calculate Fe2O3 Wt %				
Atom Units	Cation Units	Moles	MW	Wt %
1.939	0.899	0.899	60.084	53.99
0.002	0.001	0.001	79.866	0.08
0.039	0.018	0.009	101.961	0.93
0.001	0.000	0.000	151.990	0.04
0.081	0.038	0.019	159.688	3.01
0.391	0.181	0.181	71.844	13.01
0.014	0.007	0.007	70.937	0.46
1.405	0.651	0.651	40.304	26.24
0.123	0.057	0.057	56.077	3.20
0.004	0.002	0.001	61.979	0.06
	1.854	1.824		101.01

Check!	Fe2O3 as	2.71
	FeO*	15.72

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.941	2
4	Tet	Al		
6	Oct	Al	0.039	1
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.487	
6	Oct	Mg	0.474	
8	Cubic	Mg	0.931	1
8	Cubic	Ca	0.123	
8	Cubic	Na	0.004	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	:a+Mg+Fe2+)	6.42
En	:a+Mg+Fe2+)	73.21
Fs	:a+Mg+Fe2+)	20.37
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +	63.875
Jadeite	Na-Fe3+/(Fe3	-60.657
Diopside	Ca/(Fe3+ +(N	96.782
		100.000

FeT/FeT+Mg	0.25
Fe2/Fe2+Mg	0.22

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.99	0.08	0.93	0.04	3.01	13.01	0.46	26.24	3.20	0.06	101.01	0.002	0.000	0.039	6.42	73.21	20.37

Analysis No. 221

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.96	60.084	0.881	0.881	2.008	4.016	2.008	Si
TiO2	0.02	79.866	0.000	0.000	0.001	0.001	0.001	Ti
Al2O3	1.35	101.961	0.013	0.026	0.060	0.090	0.060	Al
Cr2O3	0.17	151.990	0.001	0.002	0.005	0.008	0.005	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	1.75	71.844	0.024	0.024	0.055	0.055	0.055	Fe^{2+}
MnO	0.17	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	16.88	40.304	0.419	0.419	0.954	0.954	0.954	Mg
CaO	22.18	56.077	0.396	0.396	0.901	0.901	0.901	Ca
Na2O	0.13	61.979	0.002	0.004	0.010	0.005	0.010	Na
Total	95.61		1.739	1.756	4.000	6.037	4.000	

No of Oxygens 6 No of Cation 4
F 0.9939

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
2.008	0.881	0.881	60.084	52.96
0.001	0.000	0.000	79.866	0.02
0.060	0.026	0.013	101.961	1.35
0.005	0.002	0.001	151.990	0.17
0.000	0.000	0.000	159.688	0.00
0.055	0.024	0.024	71.844	1.75
0.005	0.002	0.002	70.937	0.17
0.954	0.419	0.419	40.304	16.88
0.901	0.396	0.396	56.077	22.18
0.010	0.004	0.002	61.979	0.13
	1.756	1.739		95.61

Check! Fe2O3 as FeO 0.00
FeO* 1.75

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	2.009	2	excess tet
4	Tet	Al			
6	Oct	Al	0.060	1	
		Fe^{3+}+Cr			
6	Oct	+Fe^{2+}+Mn	0.066		
6	Oct	Mg	0.874		
8	Cubic	Mg	0.080	1	
8	Cubic	Ca	0.901		
8	Cubic	Na	0.010		
			4.000		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	47.16
En	Mg/(Ca+Mg+Fe2+)	49.94
Fs	Fe2+/(Ca+Mg+Fe2+)	2.90
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.081
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.919
		100.000
FeT/FeT+Mg		0.05
Fe2/Fe2+Mg		0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.96	0.02	1.35	0.17	0.00	1.75	0.17	16.88	22.18	0.13	95.61	0.001	0.000	0.060	47.16	49.94	2.90

Analysis No. 222

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.08	60.084	0.850	0.850	2.005	4.009	2.005	Si
TiO2	0.04	79.866	0.001	0.001	0.001	0.002	0.001	Ti
Al2O3	2.68	101.961	0.026	0.053	0.124	0.186	0.124	Al
Cr2O3	0.07	151.990	0.000	0.001	0.002	0.003	0.002	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	2.66	71.844	0.037	0.037	0.087	0.087	0.087	Fe^{2+}
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	15.18	40.304	0.377	0.377	0.888	0.888	0.888	Mg
CaO	20.65	56.077	0.368	0.368	0.868	0.868	0.868	Ca
Na2O	0.24	61.979	0.004	0.008	0.018	0.009	0.018	Na
Total	92.78		1.666	1.696	4.000	6.060	4.000	

No of Oxygens 6 No of Cation 4
F 0.9901

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
2.005	0.850	0.850	60.084	51.08
0.001	0.001	0.001	79.866	0.04
0.124	0.053	0.026	101.961	2.68
0.002	0.001	0.000	151.990	0.07
0.000	0.000	0.000	159.688	0.00
0.087	0.037	0.037	71.844	2.66
0.006	0.003	0.003	70.937	0.19
0.888	0.377	0.377	40.304	15.18
0.868	0.368	0.368	56.077	20.65
0.018	0.008	0.004	61.979	0.24
	1.696	1.666		92.78

Check! Fe2O3 as FeO 0.00
FeO* 2.66

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	2.006	2.006	excess tet
4	Tet	Al			
6	Oct	Al	0.124	1.000	
		Fe^{3+}+Cr			
6	Oct	+Fe^{2+}+Mn	0.096		
6	Oct	Mg	0.780		
8	Cubic	Mg	0.108	0.994	
8	Cubic	Ca	0.868		
8	Cubic	Na	0.018		
			4.000		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	47.10
En	Mg/(Ca+Mg+Fe2+)	48.17
Fs	Fe2+/(Ca+Mg+Fe2+)	4.74
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	2.049
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.951
		100.000
FeT/FeT+Mg		0.09
Fe2/Fe2+Mg		0.09

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.08	0.04	2.68	0.07	0.00	2.66	0.19	15.18	20.65	0.24	92.78	0.001	0.000	0.124	47.10	48.17	4.74

Analysis No. 223

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.59	60.084	0.859	0.859	1.996	3.993	1.996	Si
TiO2	0.02	79.866	0.000	0.000	0.001	0.001	0.001	Ti
Al2O3	2.28	101.961	0.022	0.045	0.104	0.156	0.104	Al
Cr2O3	0.08	151.990	0.001	0.001	0.002	0.004	0.002	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	2.43	71.844	0.034	0.034	0.079	0.079	0.079	Fe^{2+}
MnO	0.21	70.937	0.003	0.003	0.007	0.007	0.007	Mn
MgO	16.15	40.304	0.401	0.401	0.932	0.932	0.932	Mg
CaO	20.78	56.077	0.371	0.371	0.862	0.862	0.862	Ca
Na2O	0.24	61.979	0.004	0.008	0.018	0.009	0.018	Na
Total	93.78		1.694	1.720	4.000	6.041	4.000	

No of Oxygens 6 No of Cation 4
F 0.9932

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.996	0.859	0.859	60.084	51.59
0.001	0.000	0.000	79.866	0.02
0.104	0.045	0.022	101.961	2.28
0.002	0.001	0.001	151.990	0.08
0.000	0.000	0.000	159.688	0.00
0.079	0.034	0.034	71.844	2.43
0.007	0.003	0.003	70.937	0.21
0.932	0.401	0.401	40.304	16.15
0.862	0.371	0.371	56.077	20.78
0.018	0.008	0.004	61.979	0.24
	1.720	1.694		93.78

Check! Fe2O3 as FeO 0.00
FeO* 2.43

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	1.997	2.000	
4	Tet	Al	0.003		
6	Oct	Al	0.101	1.000	
		Fe^{3+}+Cr			
6	Oct	+Fe^{2+}+Mn	0.088		
6	Oct	Mg	0.811		
8	Cubic	Mg	0.120	1.000	
8	Cubic	Ca	0.862		
8	Cubic	Na	0.018		

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	46.03
En	Mg/(Ca+Mg+Fe2+)	49.77
Fs	Fe2+/(Ca+Mg+Fe2+)	4.20
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000

	4.000	Jadeite	Na-Fe3+/(Fe3+ +(Na-F	2.040	
		Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.960	
				100.000	
		FeT/FeT+Mg		0.08	
		Fe2/Fe2+Mg		0.08	

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.59	0.02	2.28	0.08	0.00	2.43	0.21	16.15	20.78	0.24	93.78	0.001	0.003	0.101	46.03	49.77	4.20

Analysis No. 224

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.89	60.084	0.864	0.864	2.003	4.005	2.003	Si
TiO2	0.06	79.866	0.001	0.001	0.002	0.004	0.002	Ti
Al2O3	2.30	101.961	0.023	0.045	0.105	0.157	0.105	Al
Cr2O3	0.14	151.990	0.001	0.002	0.004	0.007	0.004	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	2.41	71.844	0.034	0.034	0.078	0.078	0.078	Fe^{2+}
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	16.32	40.304	0.405	0.405	0.939	0.939	0.939	Mg
CaO	20.54	56.077	0.366	0.366	0.849	0.849	0.849	Ca
Na2O	0.20	61.979	0.003	0.006	0.015	0.007	0.015	Na
Total	94.04		1.698	1.725	4.000	6.052	4.000	

No of Oxygens 6 No of Cation 4
F 0.9915

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
2.003	0.864	0.864	60.084	51.89
0.002	0.001	0.001	79.866	0.06
0.105	0.045	0.023	101.961	2.30
0.004	0.002	0.001	151.990	0.14
0.000	0.000	0.000	159.688	0.00
0.078	0.034	0.034	71.844	2.41
0.006	0.003	0.003	70.937	0.18
0.939	0.405	0.405	40.304	16.32
0.849	0.366	0.366	56.077	20.54
0.015	0.006	0.003	61.979	0.20
	1.725	1.698		94.04

Check! Fe2O3 as FeO 0.00
FeO* 2.41

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	2.004	2.004	excess tet
4	Tet	Al			
6	Oct	Al	0.105	1.000	
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.088		
6	Oct	Mg	0.807		
8	Cubic	Mg	0.132	0.996	
8	Cubic	Ca	0.849		
8	Cubic	Na	0.015		
			4.000		

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.52
En	Mg/(Ca+Mg+Fe2+)	50.32
Fs	Fe2+/(Ca+Mg+Fe2+)	4.17
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.691
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.309
		100.000
FeT/FeT+Mg		0.08
Fe2/Fe2+Mg		0.08

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.89	0.06	2.30	0.14	0.00	2.41	0.18	16.32	20.54	0.20	94.04	0.002	0.000	0.105	45.52	50.32	4.17

Analysis No. 225

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	53.27	60.084	0.887	0.887	2.009	4.018	2.009	Si
TiO2	0.02	79.866	0.000	0.000	0.001	0.001	0.001	Ti
Al2O3	1.74	101.961	0.017	0.034	0.077	0.116	0.077	Al
Cr2O3	0.41	151.990	0.003	0.005	0.012	0.018	0.012	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	1.71	71.844	0.024	0.024	0.054	0.054	0.054	Fe^{2+}
MnO	0.17	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	17.53	40.304	0.435	0.435	0.985	0.985	0.985	Mg
CaO	20.86	56.077	0.372	0.372	0.843	0.843	0.843	Ca
Na2O	0.19	61.979	0.003	0.006	0.014	0.007	0.014	Na
Total	95.89		1.743	1.765	4.000	6.047	4.000	

No of Oxygens 6 No of Cation 4
F 0.9922

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
2.009	0.887	0.887	60.084	53.27
0.001	0.000	0.000	79.866	0.02
0.077	0.034	0.017	101.961	1.74
0.012	0.005	0.003	151.990	0.41
0.000	0.000	0.000	159.688	0.00
0.054	0.024	0.024	71.844	1.71
0.005	0.002	0.002	70.937	0.17
0.985	0.435	0.435	40.304	17.53
0.843	0.372	0.372	56.077	20.86
0.014	0.006	0.003	61.979	0.19
	1.765	1.743		95.89

Check! Fe2O3 as FeO 0.00
FeO* 1.71

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	2.009	2.009	excess tet
4	Tet	Al			
6	Oct	Al	0.077	1.000	
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.071		
6	Oct	Mg	0.852		
8	Cubic	Mg	0.134	0.991	
8	Cubic	Ca	0.843		
8	Cubic	Na	0.014		
			4.000		

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.78
En	Mg/(Ca+Mg+Fe2+)	52.36
Fs	Fe2+/(Ca+Mg+Fe2+)	2.87
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.607
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.393
		100.000
FeT/FeT+Mg		0.05
Fe2/Fe2+Mg		0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.27	0.02	1.74	0.41	0.00	1.71	0.17	17.53	20.86	0.19	95.89	0.001	0.000	0.077	44.78	52.36	2.87

Analysis No. 226

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.68	60.084	0.877	0.877	1.987	3.974	1.987	Si
TiO2	0.05	79.866	0.001	0.001	0.001	0.003	0.001	Ti
Al2O3	1.60	101.961	0.016	0.031	0.071	0.107	0.071	Al
Cr2O3	0.46	151.990	0.003	0.006	0.014	0.021	0.014	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	1.27	71.844	0.018	0.018	0.040	0.040	0.040	Fe^{2+}
MnO	0.08	70.937	0.001	0.001	0.003	0.003	0.003	Mn
MgO	17.09	40.304	0.424	0.424	0.961	0.961	0.961	Mg
CaO	22.57	56.077	0.402	0.402	0.912	0.912	0.912	Ca
Na2O	0.15	61.979	0.002	0.005	0.011	0.005	0.011	Na
Total	95.96		1.744	1.765	4.000	6.025	4.000	

No of Oxygens 6 No of Cation 4
F 0.9958

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.987	0.877	0.877	60.084	52.68
0.001	0.001	0.001	79.866	0.05
0.071	0.031	0.016	101.961	1.60
0.014	0.006	0.003	151.990	0.46
0.000	0.000	0.000	159.688	0.00
0.040	0.018	0.018	71.844	1.27
0.003	0.001	0.001	70.937	0.08
0.961	0.424	0.424	40.304	17.09
0.912	0.402	0.402	56.077	22.57
0.011	0.005	0.002	61.979	0.15
	1.765	1.744		95.96

Check! Fe2O3 as FeO 0.00
FeO* 1.27

Cation Site Occupancy end

C.N.	Site	Elements		Ideal Cations/Site		member		%
4	Tet	Si+Ti	1.988	2.000	**Ortho and Calcic CPX**			
4	Tet	Al	0.012		Wo	Ca/(Ca+Mg+Fe2+)		47.67
6	Oct	Al	0.060	1.000	En	Mg/(Ca+Mg+Fe2+)		50.23
		Fe^{3+}+Cr						
6	Oct	+Fe^{2+}+Mn	0.057		Fs	Fe2+/(Ca+Mg+Fe2+)		2.10
6	Oct	Mg	0.884			total		100.00
8	Cubic	Mg	0.077	1.000				
8	Cubic	Ca	0.912		**Sodic and Calcic CPX**			
8	Cubic	Na	0.011		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+		0.000
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F		1.177
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+		98.823
								100.000
					FeT/FeT+Mg		0.04	
					Fe2/Fe2+Mg		0.04	

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.68	0.05	1.60	0.46	0.00	1.27	0.08	17.09	22.57	0.15	95.96	0.001	0.012	0.060	47.67	50.23	2.10

Analysis No. 227

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.82	60.084	0.846	0.846	1.972	3.943	1.972	Si	1.972	0.846	0.846	60.084	50.82
TiO2	0.06	79.866	0.001	0.001	0.002	0.003	0.002	Ti	0.002	0.001	0.001	79.866	0.06
Al2O3	3.14	101.961	0.031	0.062	0.144	0.215	0.144	Al	0.144	0.062	0.031	101.961	3.14
Cr2O3	0.21	151.990	0.001	0.003	0.006	0.010	0.006	Cr	0.006	0.003	0.001	151.990	0.21
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	2.58	71.844	0.036	0.036	0.084	0.084	0.084	Fe^{2+}	0.084	0.036	0.036	71.844	2.58
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.18
MgO	15.26	40.304	0.379	0.379	0.883	0.883	0.883	Mg	0.883	0.379	0.379	40.304	15.26
CaO	21.39	56.077	0.381	0.381	0.889	0.889	0.889	Ca	0.889	0.381	0.381	56.077	21.39
Na2O	0.20	61.979	0.003	0.007	0.015	0.008	0.015	Na	0.015	0.007	0.003	61.979	0.20
Total	93.84		1.680	1.716	4.000	6.041	4.000			1.716	1.680		93.84

No of Oxygens 6 No of Cation 4
F 0.9933

Calculate Fe2O3 Wt %

Check! Fe2O3 as FeO 0.00
FeO* 2.58

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site		end member		%
4	Tet	Si+Ti	1.973	2.000	**Ortho and Calcic CPX**			
4	Tet	Al	0.027		Wo	Ca/(Ca+Mg+Fe2+)		47.92
6	Oct	Al	0.117	1.000	En	Mg/(Ca+Mg+Fe2+)		47.57
		Fe^{3+}+Cr						
6	Oct	+Fe^{2+}+Mn	0.096		Fs	Fe2+/(Ca+Mg+Fe2+)		4.51
6	Oct	Mg	0.787			total		100.00
8	Cubic	Mg	0.096	1.000				
8	Cubic	Ca	0.889		**Sodic and Calcic CPX**			
8	Cubic	Na	0.015		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+		0.000
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F		1.687
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+		98.313
								100.000
					FeT/FeT+Mg		0.09	
					Fe2/Fe2+Mg		0.09	

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.82	0.06	3.14	0.21	0.00	2.58	0.18	15.26	21.39	0.20	93.84	0.002	0.027	0.117	47.92	47.57	4.51

Analysis No. 228

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	50.75	60.084	0.845	0.845	1.982	3.963	1.982	Si	1.982	0.845	0.845	60.084	50.75
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti	0.000	0.000	0.000	79.866	0.00
Al2O3	3.18	101.961	0.031	0.062	0.146	0.220	0.146	Al	0.146	0.062	0.031	101.961	3.18
Cr2O3	0.18	151.990	0.001	0.002	0.005	0.008	0.005	Cr	0.005	0.002	0.001	151.990	0.18
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	2.31	71.844	0.032	0.032	0.075	0.075	0.075	Fe^{2+}	0.075	0.032	0.032	71.844	2.31
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.19
MgO	15.26	40.304	0.379	0.379	0.888	0.888	0.888	Mg	0.888	0.379	0.379	40.304	15.26
CaO	21.04	56.077	0.375	0.375	0.880	0.880	0.880	Ca	0.880	0.375	0.375	56.077	21.04
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na	0.016	0.007	0.004	61.979	0.22
Total	93.13		1.669	1.705	4.000	6.049	4.000			1.705	1.669		93.13

No of Oxygens 6 No of Cation 4
F 0.9918

Calculate Fe2O3 Wt %

Check! Fe2O3 as FeO 0.00
FeO* 2.31

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site		end member		%
4	Tet	Si+Ti	1.982	2.000	**Ortho and Calcic CPX**			
4	Tet	Al	0.018		Wo	Ca/(Ca+Mg+Fe2+)		47.74
6	Oct	Al	0.128	1.000	En	Mg/(Ca+Mg+Fe2+)		48.17
		Fe^{3+}+Cr						
6	Oct	+Fe^{2+}+Mn	0.087		Fs	Fe2+/(Ca+Mg+Fe2+)		4.09
6	Oct	Mg	0.785			total		100.00
8	Cubic	Mg	0.103	1.000				
8	Cubic	Ca	0.880		**Sodic and Calcic CPX**			
8	Cubic	Na	0.016		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+		0.000
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F		1.832
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+		98.168
								100.000
					FeT/FeT+Mg		0.08	
					Fe2/Fe2+Mg		0.08	

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.75	0.00	3.18	0.18	0.00	2.31	0.19	15.26	21.04	0.22	93.13	0.000	0.018	0.128	47.74	48.17	4.09

Analysis No. 229

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.52	60.084	0.874	0.874	1.996	3.993	1.996	Si	1.996	0.874	0.874	60.084	52.52
TiO2	0.02	79.866	0.000	0.000	0.001	0.001	0.001	Ti	0.001	0.000	0.000	79.866	0.02
Al2O3	2.14	101.961	0.021	0.042	0.096	0.144	0.096	Al	0.096	0.042	0.021	101.961	2.14
Cr2O3	0.49	151.990	0.003	0.006	0.015	0.022	0.015	Cr	0.015	0.006	0.003	151.990	0.49
Fe2O3	0.00	159.688					0.000	Fe^{3+}	0.000	0.000	0.000	159.688	0.00
FeO	1.40	71.844	0.019	0.019	0.045	0.045	0.045	Fe^{2+}	0.045	0.019	0.019	71.844	1.40
MnO	0.13	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.13

MgO	16.97	40.304	0.421	0.421	0.962	0.962	0.962	Mg	0.962	0.421	0.421	40.304	16.97
CaO	21.40	56.077	0.382	0.382	0.872	0.872	0.872	Ca	0.872	0.382	0.382	56.077	21.40
Na2O	0.14	61.979	0.002	0.005	0.011	0.005	0.011	Na	0.011	0.005	0.002	61.979	0.14
Total	95.22		1.725	1.751	4.000	6.047	4.000			1.751	1.725		95.22

No of Oxygens 6 No of Cation 4
F 0.9922

Check! Fe2O3 as FeO 0.00
FeO* 1.40

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.997	2.000
4	Tet	Al	0.003	
6	Oct	Al	0.093	1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.063	
6	Oct	Mg	0.844	
8	Cubic	Mg	0.118	1.000
8	Cubic	Ca	0.872	
8	Cubic	Na	0.011	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	46.42
En	Mg/(Ca+Mg+Fe2+)	51.21
Fs	Fe2+/(Ca+Mg+Fe2+)	2.37
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.193
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.807
		100.000
FeT/FeT+Mg		0.04
Fe2/Fe2+Mg		0.04

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.52	0.02	2.14	0.49	0.00	1.40	0.13	16.97	21.40	0.14	95.22	0.001	0.003	0.093	46.42	51.21	2.37

Analysis No. 236

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.73	60.084	0.844	0.844	1.876	3.751	1.876	Si
TiO2	0.02	79.866	0.000	0.000	0.001	0.001	0.001	Ti
Al2O3	3.27	101.961	0.032	0.064	0.142	0.214	0.142	Al
Cr2O3	0.04	151.990	0.000	0.001	0.001	0.002	0.001	Cr
Fe2O3	0.00	159.688					0.119	Fe^{3+}
FeO	8.54	71.844	0.119	0.119	0.264	0.264	0.145	Fe^{2+}
MnO	0.18	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	15.73	40.304	0.390	0.390	0.867	0.867	0.867	Mg
CaO	20.89	56.077	0.373	0.373	0.828	0.828	0.828	Ca
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na
Total	99.63		1.765	1.801	4.000	5.940	4.000	

No of Oxygens 6 No of Cation 4
F 1.0100

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.876	0.844	0.844	60.084	50.73
0.001	0.000	0.000	79.866	0.02
0.142	0.064	0.032	101.961	3.27
0.001	0.001	0.000	151.990	0.04
0.119	0.054	0.027	159.688	4.29
0.145	0.065	0.065	71.844	4.68
0.006	0.003	0.003	70.937	0.18
0.867	0.390	0.390	40.304	15.73
0.828	0.373	0.373	56.077	20.89
0.016	0.007	0.004	61.979	0.22
	1.801	1.738		100.05

Check! Fe2O3 as FeO 3.86
FeO* 8.54

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.876	2.000
4	Tet	Al	0.124	
6	Oct	Al	0.019	1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.271	
6	Oct	Mg	0.710	
8	Cubic	Mg	0.157	1.000
8	Cubic	Ca	0.828	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.99
En	Mg/(Ca+Mg+Fe2+)	47.14
Fs	Fe2+/(Ca+Mg+Fe2+)	7.87
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	14.143
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-12.297
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.153
		100.000
FeT/FeT+Mg		0.23
Fe2/Fe2+Mg		0.14

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.73	0.02	3.27	0.04	4.29	4.68	0.18	15.73	20.89	0.22	100.05	0.001	0.124	0.019	44.99	47.14	7.87

Analysis No. 237

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	50.73	60.084	0.844	0.844	1.880	3.760	1.880	Si
TiO2	0.05	79.866	0.001	0.001	0.001	0.003	0.001	Ti
Al2O3	3.00	101.961	0.029	0.059	0.131	0.197	0.131	Al
Cr2O3	0.10	151.990	0.001	0.001	0.003	0.004	0.003	Cr
Fe2O3	0.00	159.688					0.120	Fe^{3+}
FeO	7.77	71.844	0.108	0.108	0.241	0.241	0.121	Fe^{2+}
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	15.94	40.304	0.395	0.395	0.881	0.881	0.881	Mg
CaO	21.22	56.077	0.378	0.378	0.843	0.843	0.843	Ca
Na2O	0.22	61.979	0.004	0.007	0.016	0.008	0.016	Na
Total	99.19		1.763	1.797	4.000	5.940	4.000	

No of Oxygens 6 No of Cation 4
F 1.0101

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.880	0.844	0.844	60.084	50.73
0.001	0.001	0.001	79.866	0.05
0.131	0.059	0.029	101.961	3.00
0.003	0.001	0.001	151.990	0.10
0.120	0.054	0.027	159.688	4.29
0.121	0.054	0.054	71.844	3.91
0.005	0.002	0.002	70.937	0.16
0.881	0.395	0.395	40.304	15.94
0.843	0.378	0.378	56.077	21.22
0.016	0.007	0.004	61.979	0.22
	1.797	1.736		99.62

Check! Fe2O3 as FeO 3.86
FeO* 7.77

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.881	2.000
4	Tet	Al	0.119	
6	Oct	Al	0.012	1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.249	
6	Oct	Mg	0.739	
8	Cubic	Mg	0.141	1.000
8	Cubic	Ca	0.843	
8	Cubic	Na	0.016	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.68
En	Mg/(Ca+Mg+Fe2+)	47.74
Fs	Fe2+/(Ca+Mg+Fe2+)	6.57
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	13.925
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-12.056
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.131
		100.000
FeT/FeT+Mg		0.21
Fe2/Fe2+Mg		0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
50.73	0.05	3.00	0.10	4.29	3.91	0.16	15.94	21.22	0.22	99.62	0.001	0.119	0.012	45.68	47.74	6.57

Analysis No. 238

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.93	60.084	0.864	0.864	2.006	4.011	2.006	Si
TiO2	0.04	79.866	0.001	0.001	0.001	0.002	0.001	Ti
Al2O3	1.99	101.961	0.020	0.039	0.091	0.136	0.091	Al
Cr2O3	0.10	151.990	0.001	0.001	0.003	0.005	0.003	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	2.52	71.844	0.035	0.035	0.081	0.081	0.081	Fe^{2+}
MnO	0.25	70.937	0.004	0.004	0.008	0.008	0.008	Mn
MgO	16.56	40.304	0.411	0.411	0.953	0.953	0.953	Mg
CaO	20.37	56.077	0.363	0.363	0.843	0.843	0.843	Ca
Na2O	0.18	61.979	0.003	0.006	0.013	0.007	0.013	Na
Total	93.94		1.701	1.724	4.000	6.047	4.000	

No of Oxygens 6 No of Cation 4
F 0.9922

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
2.006	0.864	0.864	60.084	51.93
0.001	0.001	0.001	79.866	0.04
0.091	0.039	0.020	101.961	1.99
0.003	0.001	0.001	151.990	0.10
0.000	0.000	0.000	159.688	0.00
0.081	0.035	0.035	71.844	2.52
0.008	0.004	0.004	70.937	0.25
0.953	0.411	0.411	40.304	16.56
0.843	0.363	0.363	56.077	20.37
0.013	0.006	0.003	61.979	0.18
	1.724	1.701		93.94

Check! Fe2O3 as FeO 0.00
FeO* 2.52

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	2.007	2.007	excess tet
4	Tet	Al			
6	Oct	Al	0.091	1.000	
		Fe^{3+}+Cr			
6	Oct	+Fe^{2+}+Mn	0.093		
6	Oct	Mg	0.817		
8	Cubic	Mg	0.137	0.993	
8	Cubic	Ca	0.843		
8	Cubic	Na	0.013		
			4.000		

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.89
En	Mg/(Ca+Mg+Fe2+)	50.78
Fs	Fe2+/(Ca+Mg+Fe2+)	4.33
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.569
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.431
		100.000
FeT/FeT+Mg		0.08
Fe2/Fe2+Mg		0.08

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.93	0.04	1.99	0.10	0.00	2.52	0.25	16.56	20.37	0.18	93.94	0.001	0.000	0.091	44.89	50.78	4.33

Analysis No. 239

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.95	60.084	0.865	0.865	1.999	3.998	1.999	Si
TiO2	0.06	79.866	0.001	0.001	0.002	0.003	0.002	Ti
Al2O3	2.28	101.961	0.022	0.045	0.103	0.155	0.103	Al
Cr2O3	0.13	151.990	0.001	0.002	0.004	0.006	0.004	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	2.36	71.844	0.033	0.033	0.076	0.076	0.076	Fe^{2+}
MnO	0.20	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	16.62	40.304	0.412	0.412	0.953	0.953	0.953	Mg
CaO	20.46	56.077	0.365	0.365	0.844	0.844	0.844	Ca
Na2O	0.17	61.979	0.003	0.005	0.013	0.006	0.013	Na
Total	94.23		1.704	1.730	4.000	6.048	4.000	

No of Oxygens 6 No of Cation 4
F 0.9920

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.999	0.865	0.865	60.084	51.95
0.002	0.001	0.001	79.866	0.06
0.103	0.045	0.022	101.961	2.28
0.004	0.002	0.001	151.990	0.13
0.000	0.000	0.000	159.688	0.00
0.076	0.033	0.033	71.844	2.36
0.006	0.003	0.003	70.937	0.20
0.953	0.412	0.412	40.304	16.62
0.844	0.365	0.365	56.077	20.46
0.013	0.005	0.003	61.979	0.17
	1.730	1.704		94.23

Check! Fe2O3 as FeO 0.00
FeO* 2.36

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	2.001	2.001	excess tet
4	Tet	Al			
6	Oct	Al	0.103	1.000	
		Fe^{3+}+Cr			
6	Oct	+Fe^{2+}+Mn	0.086		
6	Oct	Mg	0.810		
8	Cubic	Mg	0.143	0.999	
8	Cubic	Ca	0.844		
8	Cubic	Na	0.013		
			4.000		

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.04
En	Mg/(Ca+Mg+Fe2+)	50.90
Fs	Fe2+/(Ca+Mg+Fe2+)	4.06
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.477
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.523
		100.000
FeT/FeT+Mg		0.07
Fe2/Fe2+Mg		0.07

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.95	0.06	2.28	0.13	0.00	2.36	0.20	16.62	20.46	0.17	94.23	0.002	0.000	0.103	45.04	50.90	4.06

Analysis No. 240

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.93	60.084	0.881	0.881	2.008	4.016	2.008	Si
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti
Al2O3	1.55	101.961	0.015	0.030	0.069	0.104	0.069	Al
Cr2O3	0.24	151.990	0.002	0.003	0.007	0.011	0.007	Cr
Fe2O3	0.00	159.688					0.000	Fe^{3+}
FeO	2.03	71.844	0.028	0.028	0.064	0.064	0.064	Fe^{2+}
MnO	0.21	70.937	0.003	0.003	0.007	0.007	0.007	Mn
MgO	18.09	40.304	0.449	0.449	1.023	1.023	1.023	Mg
CaO	19.95	56.077	0.356	0.356	0.811	0.811	0.811	Ca
Na2O	0.13	61.979	0.002	0.004	0.009	0.005	0.009	Na
Total	95.15		1.736	1.755	4.000	6.042	4.000	

No of Oxygens 6 No of Cation 4
F 0.9930

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
2.008	0.881	0.881	60.084	52.93
0.001	0.000	0.000	79.866	0.03
0.069	0.030	0.015	101.961	1.55
0.007	0.003	0.002	151.990	0.24
0.000	0.000	0.000	159.688	0.00
0.064	0.028	0.028	71.844	2.03
0.007	0.003	0.003	70.937	0.21
1.023	0.449	0.449	40.304	18.09
0.811	0.356	0.356	56.077	19.95
0.009	0.004	0.002	61.979	0.13
	1.755	1.736		95.15

Check! Fe2O3 as FeO 0.00
FeO* 2.03

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	
4	Tet	Si+Ti	2.009	2.009	excess tet
4	Tet	Al			
6	Oct	Al	0.069	1.000	
		Fe^{3+}+Cr			
6	Oct	+Fe^{2+}+Mn	0.078		
6	Oct	Mg	0.853		
8	Cubic	Mg	0.170	0.991	
8	Cubic	Ca	0.811		
8	Cubic	Na	0.009		

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.72
En	Mg/(Ca+Mg+Fe2+)	53.89
Fs	Fe2+/(Ca+Mg+Fe2+)	3.39
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	0.000

	4.000	Jadeite	Na-Fe3+/(Fe3+ +(Na-F	1.150	
		Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.850	
				100.000	
		FeT/FeT+Mg		0.06	
		Fe2/Fe2+Mg		0.06	

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.93	0.03	1.55	0.24	0.00	2.03	0.21	18.09	19.95	0.13	95.15	0.001	0.000	0.069	42.72	53.89	3.39

Analysis No. 247

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.10	60.084	0.850	0.850	1.891	3.781	1.891	Si
TiO2	0.18	79.866	0.002	0.002	0.005	0.010	0.005	Ti
Al2O3	3.50	101.961	0.034	0.069	0.153	0.229	0.153	Al
Cr2O3	0.15	151.990	0.001	0.002	0.004	0.007	0.004	Cr
Fe2O3	0.00	159.688					0.071	Fe^{3+}
FeO	7.26	71.844	0.101	0.101	0.225	0.225	0.154	Fe^{2+}
MnO	0.20	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	15.91	40.304	0.395	0.395	0.878	0.878	0.878	Mg
CaO	20.68	56.077	0.369	0.369	0.820	0.820	0.820	Ca
Na2O	0.27	61.979	0.004	0.009	0.019	0.010	0.019	Na
Total	99.24		1.760	1.799	4.000	5.964	4.000	

No of Oxygens 6 No of Cation 4
F 1.0060

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.891	0.850	0.850	60.084	51.10
TiO2	0.005	0.002	0.002	79.866	0.18
Al2O3	0.153	0.069	0.034	101.961	3.50
Cr2O3	0.004	0.002	0.001	151.990	0.15
Fe2O3	0.071	0.032	0.016	159.688	2.55
FeO	0.154	0.069	0.069	71.844	4.96
MnO	0.006	0.003	0.003	70.937	0.20
MgO	0.878	0.395	0.395	40.304	15.91
CaO	0.820	0.369	0.369	56.077	20.68
Na2O	0.019	0.009	0.004	61.979	0.27
		1.799	1.744		99.50

Check! Fe2O3 as FeO 2.30
FeO* 7.26

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.896	2.000
4	Tet	Al	0.104	
6	Oct	Al	0.048	1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.235	
6	Oct	Mg	0.716	
8	Cubic	Mg	0.161	1.000
8	Cubic	Ca	0.820	
8	Cubic	Na	0.019	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.29
En	Mg/(Ca+Mg+Fe2+)	47.41
Fs	Fe2+/(Ca+Mg+Fe2+)	8.30
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	8.468
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-6.195
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.727
		100.000
FeT/FeT+Mg		0.20
Fe2/Fe2+Mg		0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.10	0.18	3.50	0.15	2.55	4.96	0.20	15.91	20.68	0.27	99.50	0.005	0.104	0.048	44.29	47.41	8.30

Analysis No. 248

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	51.57	60.084	0.858	0.858	1.902	3.804	1.902	Si
TiO2	0.08	79.866	0.001	0.001	0.002	0.004	0.002	Ti
Al2O3	2.91	101.961	0.029	0.057	0.126	0.190	0.126	Al
Cr2O3	0.10	151.990	0.001	0.001	0.003	0.004	0.003	Cr
Fe2O3	0.00	159.688					0.079	Fe^{3+}
FeO	7.78	71.844	0.108	0.108	0.240	0.240	0.161	Fe^{2+}
MnO	0.20	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	16.19	40.304	0.402	0.402	0.890	0.890	0.890	Mg
CaO	20.57	56.077	0.367	0.367	0.813	0.813	0.813	Ca
Na2O	0.24	61.979	0.004	0.008	0.017	0.009	0.017	Na
Total	99.64		1.772	1.805	4.000	5.960	4.000	

No of Oxygens 6 No of Cation 4
F 1.0067

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.902	0.858	0.858	60.084	51.57
TiO2	0.002	0.001	0.001	79.866	0.08
Al2O3	0.126	0.057	0.029	101.961	2.91
Cr2O3	0.003	0.001	0.001	151.990	0.10
Fe2O3	0.079	0.036	0.018	159.688	2.86
FeO	0.161	0.072	0.072	71.844	5.21
MnO	0.006	0.003	0.003	70.937	0.20
MgO	0.890	0.402	0.402	40.304	16.19
CaO	0.813	0.367	0.367	56.077	20.57
Na2O	0.017	0.008	0.004	61.979	0.24
		1.805	1.754		99.92

Check! Fe2O3 as FeO 2.57
FeO* 7.78

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.904	2.000
4	Tet	Al	0.096	
6	Oct	Al	0.031	1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.249	
6	Oct	Mg	0.720	
8	Cubic	Mg	0.170	1.000
8	Cubic	Ca	0.813	
8	Cubic	Na	0.017	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.62
En	Mg/(Ca+Mg+Fe2+)	47.76
Fs	Fe2+/(Ca+Mg+Fe2+)	8.62
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	9.557
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-7.503
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	97.946
		100.000
FeT/FeT+Mg		0.21
Fe2/Fe2+Mg		0.15

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.57	0.08	2.91	0.10	2.86	5.21	0.20	16.19	20.57	0.24	99.92	0.002	0.096	0.031	43.62	47.76	8.62

Analysis No. 249

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.84	60.084	0.879	0.879	1.932	3.865	1.932	Si
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti
Al2O3	2.10	101.961	0.021	0.041	0.091	0.136	0.091	Al
Cr2O3	0.48	151.990	0.003	0.006	0.014	0.021	0.014	Cr
Fe2O3	0.00	159.688					0.041	Fe^{3+}
FeO	5.04	71.844	0.070	0.070	0.154	0.154	0.113	Fe^{2+}
MnO	0.10	70.937	0.001	0.001	0.003	0.003	0.003	Mn
MgO	17.77	40.304	0.441	0.441	0.969	0.969	0.969	Mg
CaO	21.03	56.077	0.375	0.375	0.824	0.824	0.824	Ca
Na2O	0.17	61.979	0.003	0.006	0.012	0.006	0.012	Na
Total	99.56		1.794	1.820	4.000	5.979	4.000	

No of Oxygens 6 No of Cation 4
F 1.0035

Calculate Fe2O3 Wt %

	Atom Units	Cation Units	Moles	MW	Wt %
SiO2	1.932	0.879	0.879	60.084	52.84
TiO2	0.001	0.000	0.000	79.866	0.03
Al2O3	0.091	0.041	0.021	101.961	2.10
Cr2O3	0.014	0.006	0.003	151.990	0.48
Fe2O3	0.041	0.019	0.009	159.688	1.51
FeO	0.113	0.051	0.051	71.844	3.68
MnO	0.003	0.001	0.001	70.937	0.10
MgO	0.969	0.441	0.441	40.304	17.77
CaO	0.824	0.375	0.375	56.077	21.03
Na2O	0.012	0.006	0.003	61.979	0.17
		1.820	1.784		99.71

Check! Fe2O3 as FeO 1.36
FeO* 5.04

Cation Site Occupancy end

C.N.	Site	Elements		Ideal Cations/Site	member		%
4	Tet	Si+Ti	1.933	2.000	**Ortho and Calcic CPX**		
4	Tet	Al	0.067		Wo	Ca/(Ca+Mg+Fe2+)	43.24
6	Oct	Al	0.024	1.000	En	Mg/(Ca+Mg+Fe2+)	50.84
		Fe^{3+}+Cr					
6	Oct	+Fe^{2+}+Mn	0.171		Fs	Fe2+/(Ca+Mg+Fe2+)	5.91
6	Oct	Mg	0.805			total	100.00
8	Cubic	Mg	0.164	1.000			
8	Cubic	Ca	0.824		**Sodic and Calcic CPX**		
8	Cubic	Na	0.012		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.956
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.496
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.540
							100.000
					FeT/FeT+Mg		0.14
					Fe2/Fe2+Mg		0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.84	0.03	2.10	0.48	1.51	3.68	0.10	17.77	21.03	0.17	99.71	0.001	0.067	0.024	43.24	50.84	5.91

Analysis No. 250

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.21	60.084	0.886	0.886	1.940	3.880	1.940	Si	1.940	0.886	0.886	60.084	53.21
TiO2	0.04	79.866	0.001	0.001	0.001	0.002	0.001	Ti	0.001	0.001	0.001	79.866	0.04
Al2O3	1.53	101.961	0.015	0.030	0.066	0.099	0.066	Al	0.066	0.030	0.015	101.961	1.53
Cr2O3	0.31	151.990	0.002	0.004	0.009	0.013	0.009	Cr	0.009	0.004	0.002	151.990	0.31
Fe2O3	0.00	159.688					0.052	Fe^{3+}	0.052	0.024	0.012	159.688	1.91
FeO	5.57	71.844	0.078	0.078	0.170	0.170	0.118	Fe^{2+}	0.118	0.054	0.054	71.844	3.86
MnO	0.20	70.937	0.003	0.003	0.006	0.006	0.006	Mn	0.006	0.003	0.003	70.937	0.20
MgO	18.58	40.304	0.461	0.461	1.010	1.010	1.010	Mg	1.010	0.461	0.461	40.304	18.58
CaO	20.17	56.077	0.360	0.360	0.788	0.788	0.788	Ca	0.788	0.360	0.360	56.077	20.17
Na2O	0.14	61.979	0.002	0.005	0.010	0.005	0.010	Na	0.010	0.005	0.002	61.979	0.14
Total	99.75		1.806	1.826	4.000	5.974	4.000			1.826	1.795		99.94

No of Oxygens 6 No of Cation 4
F 1.0044

Calculate Fe2O3 Wt %

Check! Fe2O3 as FeO 1.71
FeO* 5.57

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	end member		%
4	Tet	Si+Ti	1.941	2.000	**Ortho and Calcic CPX**		
4	Tet	Al	0.059		Wo	Ca/(Ca+Mg+Fe2+)	41.14
6	Oct	Al	0.007	1.000	En	Mg/(Ca+Mg+Fe2+)	52.72
		Fe^{3+}+Cr					
6	Oct	+Fe^{2+}+Mn	0.185		Fs	Fe2+/(Ca+Mg+Fe2+)	6.14
6	Oct	Mg	0.808			total	100.00
8	Cubic	Mg	0.202	1.000			
8	Cubic	Ca	0.788		**Sodic and Calcic CPX**		
8	Cubic	Na	0.010		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	6.552
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.311
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.759
							100.000
					FeT/FeT+Mg		0.14
					Fe2/Fe2+Mg		0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.21	0.04	1.53	0.31	1.91	3.86	0.20	18.58	20.17	0.14	99.94	0.001	0.059	0.007	41.14	52.72	6.14

Analysis No. 271

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	52.77	60.084	0.878	0.878	1.927	3.853	1.927	Si	1.927	0.878	0.878	60.084	52.77
TiO2	0.04	79.866	0.000	0.000	0.001	0.002	0.001	Ti	0.001	0.000	0.000	79.866	0.04
Al2O3	1.85	101.961	0.018	0.036	0.080	0.120	0.080	Al	0.080	0.036	0.018	101.961	1.85
Cr2O3	0.73	151.990	0.005	0.010	0.021	0.032	0.021	Cr	0.021	0.010	0.005	151.990	0.73
Fe2O3	0.00	159.688					0.054	Fe^{3+}	0.054	0.025	0.012	159.688	1.97
FeO	4.81	71.844	0.067	0.067	0.147	0.147	0.093	Fe^{2+}	0.093	0.042	0.042	71.844	3.03
MnO	0.16	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.16
MgO	17.73	40.304	0.440	0.440	0.965	0.965	0.965	Mg	0.965	0.440	0.440	40.304	17.73
CaO	21.58	56.077	0.385	0.385	0.844	0.844	0.844	Ca	0.844	0.385	0.385	56.077	21.58
Na2O	0.15	61.979	0.002	0.005	0.010	0.005	0.010	Na	0.010	0.005	0.002	61.979	0.15
Total	99.82		1.798	1.823	4.000	5.973	4.000			1.823	1.786		100.01

No of Oxygens 6 No of Cation 4
F 1.0045

Calculate Fe2O3 Wt %

Check! Fe2O3 as FeO 1.78
FeO* 4.81

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site	end member		%
4	Tet	Si+Ti	1.928	2.000	**Ortho and Calcic CPX**		
4	Tet	Al	0.072		Wo	Ca/(Ca+Mg+Fe2+)	44.39
6	Oct	Al	0.007	1.000	En	Mg/(Ca+Mg+Fe2+)	50.74
		Fe^{3+}+Cr					
6	Oct	+Fe^{2+}+Mn	0.173		Fs	Fe2+/(Ca+Mg+Fe2+)	4.87
6	Oct	Mg	0.820			total	100.00
8	Cubic	Mg	0.145	1.000			
8	Cubic	Ca	0.844		**Sodic and Calcic CPX**		
8	Cubic	Na	0.010		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	6.347
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-5.125
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.777
							100.000
					FeT/FeT+Mg		0.13
					Fe2/Fe2+Mg		0.09

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.77	0.04	1.85	0.73	1.97	3.03	0.16	17.73	21.58	0.15	100.01	0.001	0.072	0.007	44.39	50.74	4.87

Analysis No. 272

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.10	60.084	0.884	0.884	1.942	3.884	1.942	Si	1.942	0.884	0.884	60.084	53.10
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti	0.000	0.000	0.000	79.866	0.00
Al2O3	1.59	101.961	0.016	0.031	0.069	0.103	0.069	Al	0.069	0.031	0.016	101.961	1.59
Cr2O3	0.57	151.990	0.004	0.007	0.016	0.025	0.016	Cr	0.016	0.007	0.004	151.990	0.57
Fe2O3	0.00	159.688					0.041	Fe^{3+}	0.041	0.019	0.009	159.688	1.51
FeO	4.90	71.844	0.068	0.068	0.150	0.150	0.108	Fe^{2+}	0.108	0.049	0.049	71.844	3.55
MnO	0.17	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.17

MgO	17.87	40.304	0.443	0.443	0.974	0.974	0.974	Mg		0.974	0.443	0.443	40.304	17.87
CaO	21.24	56.077	0.379	0.379	0.832	0.832	0.832	Ca		0.832	0.379	0.379	56.077	21.24
Na2O	0.15	61.979	0.002	0.005	0.011	0.005	0.011	Na		0.011	0.005	0.002	61.979	0.15
Total	99.59		1.798	1.820	4.000	5.979	4.000				1.820	1.789		99.74

No of Oxygens 6 No of Cation 4
F 1.0035

Check! Fe2O3 as FeO 1.35
FeO* 4.90

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.942	2.000
4	Tet	Al	0.058	
6	Oct	Al	0.011	1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.172	
6	Oct	Mg	0.818	
8	Cubic	Mg	0.157	1.000
8	Cubic	Ca	0.832	
8	Cubic	Na	0.011	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.46
En	Mg/(Ca+Mg+Fe2+)	50.88
Fs	Fe2+/(Ca+Mg+Fe2+)	5.66
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.914
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.624
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.710
		100.000
FeT/FeT+Mg		0.13
Fe2/Fe2+Mg		0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.10	0.00	1.59	0.57	1.51	3.55	0.17	17.87	21.24	0.15	99.74	0.000	0.058	0.011	43.46	50.88	5.66

Analysis No. 273

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.34	60.084	0.888	0.888	1.941	3.882	1.941	Si	1.941	0.888	0.888	60.084	53.34
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti	0.001	0.000	0.000	79.866	0.03
Al2O3	1.59	101.961	0.016	0.031	0.068	0.102	0.068	Al	0.068	0.031	0.016	101.961	1.59
Cr2O3	0.61	151.990	0.004	0.008	0.018	0.026	0.018	Cr	0.018	0.008	0.004	151.990	0.61
Fe2O3	0.00	159.688					0.041	Fe^{3+}	0.041	0.019	0.009	159.688	1.50
FeO	4.85	71.844	0.068	0.068	0.148	0.148	0.106	Fe^{2+}	0.106	0.049	0.049	71.844	3.50
MnO	0.13	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.13
MgO	17.91	40.304	0.444	0.444	0.971	0.971	0.971	Mg	0.971	0.444	0.444	40.304	17.91
CaO	21.54	56.077	0.384	0.384	0.840	0.840	0.840	Ca	0.840	0.384	0.384	56.077	21.54
Na2O	0.14	61.979	0.002	0.005	0.010	0.005	0.010	Na	0.010	0.005	0.002	61.979	0.14
Total	100.14		1.808	1.830	4.000	5.979	4.000			1.830	1.798		100.29

No of Oxygens 6 No of Cation 4
F 1.0034

Check! Fe2O3 as FeO 1.35
FeO* 4.85

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.942	2.000
4	Tet	Al	0.058	
6	Oct	Al	0.010	1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.169	
6	Oct	Mg	0.821	
8	Cubic	Mg	0.150	1.000
8	Cubic	Ca	0.840	
8	Cubic	Na	0.010	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.79
En	Mg/(Ca+Mg+Fe2+)	50.66
Fs	Fe2+/(Ca+Mg+Fe2+)	5.55
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.846
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.668
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.822
		100.000
FeT/FeT+Mg		0.13
Fe2/Fe2+Mg		0.10

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.34	0.03	1.59	0.61	1.50	3.50	0.13	17.91	21.54	0.14	100.29	0.001	0.058	0.010	43.79	50.66	5.55

Analysis No. 278

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.95	60.084	0.898	0.898	1.955	3.909	1.955	Si	1.955	0.898	0.898	60.084	53.95
TiO2	0.03	79.866	0.000	0.000	0.001	0.002	0.001	Ti	0.001	0.000	0.000	79.866	0.03
Al2O3	1.32	101.961	0.013	0.026	0.056	0.085	0.056	Al	0.056	0.026	0.013	101.961	1.32
Cr2O3	0.32	151.990	0.002	0.004	0.009	0.014	0.009	Cr	0.009	0.004	0.002	151.990	0.32
Fe2O3	0.00	159.688					0.032	Fe^{3+}	0.032	0.015	0.007	159.688	1.19
FeO	5.76	71.844	0.080	0.080	0.175	0.175	0.142	Fe^{2+}	0.142	0.065	0.065	71.844	4.69
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn	0.005	0.002	0.002	70.937	0.15
MgO	19.21	40.304	0.477	0.477	1.038	1.038	1.038	Mg	1.038	0.477	0.477	40.304	19.21
CaO	19.41	56.077	0.346	0.346	0.753	0.753	0.753	Ca	0.753	0.346	0.346	56.077	19.41
Na2O	0.13	61.979	0.002	0.004	0.009	0.004	0.009	Na	0.009	0.004	0.002	61.979	0.13
Total	100.28		1.820	1.838	4.000	5.984	4.000			1.838	1.813		100.40

No of Oxygens 6 No of Cation 4
F 1.0027

Check! Fe2O3 as FeO 1.07
FeO* 5.76

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.955	2.000
4	Tet	Al	0.045	
6	Oct	Al	0.012	1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.188	
6	Oct	Mg	0.800	
8	Cubic	Mg	0.238	1.000
8	Cubic	Ca	0.753	
8	Cubic	Na	0.009	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	38.98
En	Mg/(Ca+Mg+Fe2+)	53.67
Fs	Fe2+/(Ca+Mg+Fe2+)	7.35
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	4.252
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.093
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.841
		100.000
FeT/FeT+Mg		0.14
Fe2/Fe2+Mg		0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.95	0.03	1.32	0.32	1.19	4.69	0.15	19.21	19.41	0.13	100.40	0.001	0.045	0.012	38.98	53.67	7.35

Analysis No. 279

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	53.65	60.084	0.893	0.893	1.948	3.895	1.948	Si
TiO2	0.04	79.866	0.001	0.001	0.001	0.002	0.001	Ti
Al2O3	1.49	101.961	0.015	0.029	0.064	0.096	0.064	Al
Cr2O3	0.39	151.990	0.003	0.005	0.011	0.017	0.011	Cr
Fe2O3	0.00	159.688					0.037	Fe^{3+}
FeO	6.00	71.844	0.084	0.084	0.182	0.182	0.145	Fe^{2+}
MnO	0.19	70.937	0.003	0.003	0.006	0.006	0.006	Mn
MgO	19.65	40.304	0.488	0.488	1.063	1.063	1.063	Mg
CaO	18.39	56.077	0.328	0.328	0.715	0.715	0.715	Ca
Na2O	0.13	61.979	0.002	0.004	0.009	0.005	0.009	Na
Total	99.94		1.815	1.834	4.000	5.982	4.000	

No of Oxygens 6 No of Cation 4
F 1.0031

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.948	0.893	0.893	60.084	53.65
0.001	0.001	0.001	79.866	0.04
0.064	0.029	0.015	101.961	1.49
0.011	0.005	0.003	151.990	0.39
0.037	0.017	0.008	159.688	1.35
0.145	0.067	0.067	71.844	4.79
0.006	0.003	0.003	70.937	0.19
1.063	0.488	0.488	40.304	19.65
0.715	0.328	0.328	56.077	18.39
0.009	0.004	0.002	61.979	0.13
	1.834	1.806		100.07

Check! Fe2O3 as FeO 1.21
FeO* 6.00

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.949	2.000
4	Tet	Al	0.051	
6	Oct	Al	0.013	1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.199	
6	Oct	Mg	0.788	
8	Cubic	Mg	0.275	1.000
8	Cubic	Ca	0.715	
8	Cubic	Na	0.009	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	37.18
En	Mg/(Ca+Mg+Fe2+)	55.27
Fs	Fe2+/(Ca+Mg+Fe2+)	7.55
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	5.083
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-3.774
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.691
		100.000
FeT/FeT+Mg		0.15
Fe2/Fe2+Mg		0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.65	0.04	1.49	0.39	1.35	4.79	0.19	19.65	18.39	0.13	100.07	0.001	0.051	0.013	37.18	55.27	7.55

Analysis No. 280

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	53.35	60.084	0.888	0.888	1.937	3.874	1.937	Si
TiO2	0.00	79.866	0.000	0.000	0.000	0.000	0.000	Ti
Al2O3	1.80	101.961	0.018	0.035	0.077	0.115	0.077	Al
Cr2O3	0.56	151.990	0.004	0.007	0.016	0.024	0.016	Cr
Fe2O3	0.00	159.688					0.043	Fe^{3+}
FeO	5.15	71.844	0.072	0.072	0.156	0.156	0.113	Fe^{2+}
MnO	0.17	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	18.35	40.304	0.455	0.455	0.993	0.993	0.993	Mg
CaO	20.71	56.077	0.369	0.369	0.806	0.806	0.806	Ca
Na2O	0.14	61.979	0.002	0.005	0.010	0.005	0.010	Na
Total	100.23		1.810	1.834	4.000	5.978	4.000	

No of Oxygens 6 No of Cation 4
F 1.0036

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.937	0.888	0.888	60.084	53.35
0.000	0.000	0.000	79.866	0.00
0.077	0.035	0.018	101.961	1.80
0.016	0.007	0.004	151.990	0.56
0.043	0.020	0.010	159.688	1.58
0.113	0.052	0.052	71.844	3.73
0.005	0.002	0.002	70.937	0.17
0.993	0.455	0.455	40.304	18.35
0.806	0.369	0.369	56.077	20.71
0.010	0.005	0.002	61.979	0.14
	1.834	1.800		100.38

Check! Fe2O3 as FeO 1.42
FeO* 5.15

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.937	2.000
4	Tet	Al	0.063	
6	Oct	Al	0.014	1.000
6	Oct	Fe^{3+}+Cr +Fe^{2+}+Mn	0.178	
6	Oct	Mg	0.809	
8	Cubic	Mg	0.184	1.000
8	Cubic	Ca	0.806	
8	Cubic	Na	0.010	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.14
En	Mg/(Ca+Mg+Fe2+)	51.95
Fs	Fe2+/(Ca+Mg+Fe2+)	5.92
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+	5.305
Jadeite	Na-Fe3+/(Fe3+ +(Na-F	-4.086
Diopside	Ca/(Fe3+ +(Na-Fe3+)+	98.781
		100.000
FeT/FeT+Mg		0.14
Fe2/Fe2+Mg		0.10

Analysis No. 305

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	53.69	60.084	0.894	0.894	1.957	3.914	1.957	Si
TiO2	0.10	79.866	0.001	0.001	0.003	0.005	0.003	Ti
Al2O3	0.63	101.961	0.006	0.012	0.027	0.040	0.027	Al
Cr2O3	0.71	151.990	0.005	0.009	0.020	0.031	0.020	Cr
Fe2O3	0.00	159.688					0.042	Fe^{3+}
FeO	2.42	71.844	0.034	0.034	0.074	0.074	0.032	Fe^{2+}
MnO	0.07	70.937	0.001	0.001	0.002	0.002	0.002	Mn
MgO	18.79	40.304	0.466	0.466	1.021	1.021	1.021	Mg
CaO	22.72	56.077	0.405	0.405	0.887	0.887	0.887	Ca
Na2O	0.12	61.979	0.002	0.004	0.009	0.004	0.009	Na
Total	99.25		1.814	1.826	4.000	5.979	4.000	

No of Oxygens 6 No of Cation 4
F 1.0035

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.957	0.894	0.894	60.084	53.69
0.003	0.001	0.001	79.866	0.10
0.027	0.012	0.006	101.961	0.63
0.020	0.009	0.005	151.990	0.71
0.042	0.019	0.010	159.688	1.53
0.032	0.014	0.014	71.844	1.04
0.002	0.001	0.001	70.937	0.07
1.021	0.466	0.466	40.304	18.79
0.887	0.405	0.405	56.077	22.72
0.009	0.004	0.002	61.979	0.12
	1.826	1.804		99.40

Check! Fe2O3 as FeO 1.38
FeO* 2.42

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.960	1.987
4	Tet	Al	0.027	
6	Oct	Al	0.000	1.000
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.096	
6	Oct	Mg	0.904	
8	Cubic	Mg	0.117	1.013
8	Cubic	Ca	0.887	
8	Cubic	Na	0.009	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	45.74
En	Mg/(Ca+Mg+Fe2+)	52.63
Fs	Fe2+/(Ca+Mg+Fe2+)	1.63
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	4.697
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-3.717
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	99.020
		100.000
FeT/FeT+Mg		0.07
Fe2/Fe2+Mg		0.03

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.69	0.10	0.63	0.71	1.53	1.04	0.07	18.79	22.72	0.12	99.40	0.003	0.027	0.000	45.74	52.63	1.63

Analysis No. 306

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	54.01	60.084	0.899	0.899	1.960	3.919	1.960	Si
TiO2	0.07	79.866	0.001	0.001	0.002	0.004	0.002	Ti
Al2O3	0.57	101.961	0.006	0.011	0.024	0.036	0.024	Al
Cr2O3	0.61	151.990	0.004	0.008	0.018	0.026	0.018	Cr
Fe2O3	0.00	159.688					0.043	Fe^{3+}
FeO	2.64	71.844	0.037	0.037	0.080	0.080	0.037	Fe^{2+}
MnO	0.08	70.937	0.001	0.001	0.002	0.002	0.002	Mn
MgO	18.69	40.304	0.464	0.464	1.011	1.011	1.011	Mg
CaO	23.03	56.077	0.411	0.411	0.895	0.895	0.895	Ca
Na2O	0.11	61.979	0.002	0.004	0.008	0.004	0.008	Na
Total	99.80		1.823	1.835	4.000	5.979	4.000	

No of Oxygens 6 No of Cation 4
F 1.0036

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.960	0.899	0.899	60.084	54.01
0.002	0.001	0.001	79.866	0.07
0.024	0.011	0.006	101.961	0.57
0.018	0.008	0.004	151.990	0.61
0.043	0.020	0.010	159.688	1.57
0.037	0.017	0.017	71.844	1.23
0.002	0.001	0.001	70.937	0.08
1.011	0.464	0.464	40.304	18.69
0.895	0.411	0.411	56.077	23.03
0.008	0.004	0.002	61.979	0.11
	1.835	1.814		99.96

Check! Fe2O3 as FeO 1.41
FeO* 2.64

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.962	1.986
4	Tet	Al	0.024	
6	Oct	Al	0.000	1.000
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.100	
6	Oct	Mg	0.900	
8	Cubic	Mg	0.111	1.014
8	Cubic	Ca	0.895	
8	Cubic	Na	0.008	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	46.07
En	Mg/(Ca+Mg+Fe2+)	52.01
Fs	Fe2+/(Ca+Mg+Fe2+)	1.92
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	4.739
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-3.875
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	99.135
		100.000
FeT/FeT+Mg		0.07
Fe2/Fe2+Mg		0.04

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
54.01	0.07	0.57	0.61	1.57	1.23	0.08	18.69	23.03	0.11	99.96	0.002	0.024	0.000	46.07	52.01	1.92

Analysis No. 307

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.84	60.084	0.879	0.879	1.936	3.872	1.936	Si
TiO2	0.10	79.866	0.001	0.001	0.003	0.006	0.003	Ti
Al2O3	1.45	101.961	0.014	0.028	0.062	0.094	0.062	Al
Cr2O3	0.10	151.990	0.001	0.001	0.003	0.004	0.003	Cr
Fe2O3	0.00	159.688					0.065	Fe^{3+}
FeO	5.18	71.844	0.072	0.072	0.159	0.159	0.094	Fe^{2+}
MnO	0.15	70.937	0.002	0.002	0.005	0.005	0.005	Mn
MgO	17.98	40.304	0.446	0.446	0.982	0.982	0.982	Mg
CaO	21.47	56.077	0.383	0.383	0.843	0.843	0.843	Ca
Na2O	0.11	61.979	0.002	0.004	0.008	0.004	0.008	Na
Total	99.38		1.800	1.817	4.000	5.968	4.000	

No of Oxygens 6 No of Cation 4
F 1.0054

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.936	0.879	0.879	60.084	52.84
0.003	0.001	0.001	79.866	0.10
0.062	0.028	0.014	101.961	1.45
0.003	0.001	0.001	151.990	0.10
0.065	0.029	0.015	159.688	2.35
0.094	0.043	0.043	71.844	3.06
0.005	0.002	0.002	70.937	0.15
0.982	0.446	0.446	40.304	17.98
0.843	0.383	0.383	56.077	21.47
0.008	0.004	0.002	61.979	0.11
	1.817	1.786		99.61

Check! Fe2O3 as FeO 2.12
FeO* 5.18

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.939	2.000
4	Tet	Al	0.061	
6	Oct	Al	0.001	1.000
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.166	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	43.93
En	Mg/(Ca+Mg+Fe2+)	51.18
Fs	Fe2+/(Ca+Mg+Fe2+)	4.89

6	Oct	Mg	0.833		total		100.00
8	Cubic	Mg	0.149	1.000			
8	Cubic	Ca	0.843		**Sodic and Calcic CPX**		
8	Cubic	Na	0.008		Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	7.625
			4.000		Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-6.716
					Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	99.091
							100.000
					FeT/FeT+Mg		0.14
					Fe2/Fe2+Mg		0.09

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.84	0.10	1.45	0.10	2.35	3.06	0.15	17.98	21.47	0.11	99.61	0.003	0.061	0.001	43.93	51.18	4.89

Analysis No. 317

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	53.68	60.084	0.893	0.893	1.962	3.924	1.962	Si	1.962	0.893	0.893	60.084	53.68
TiO2	0.07	79.866	0.001	0.001	0.002	0.004	0.002	Ti	0.002	0.001	0.001	79.866	0.07
Al2O3	0.87	101.961	0.008	0.017	0.037	0.056	0.037	Al	0.037	0.017	0.008	101.961	0.87
Cr2O3	0.57	151.990	0.004	0.007	0.016	0.025	0.016	Cr	0.016	0.007	0.004	151.990	0.57
Fe2O3	0.00	159.688					0.026	Fe^{3+}	0.026	0.012	0.006	159.688	0.93
FeO	2.62	71.844	0.036	0.036	0.080	0.080	0.054	Fe^{2+}	0.054	0.025	0.025	71.844	1.78
MnO	0.06	70.937	0.001	0.001	0.002	0.002	0.002	Mn	0.002	0.001	0.001	70.937	0.06
MgO	18.72	40.304	0.464	0.464	1.020	1.020	1.020	Mg	1.020	0.464	0.464	40.304	18.72
CaO	22.32	56.077	0.398	0.398	0.874	0.874	0.874	Ca	0.874	0.398	0.398	56.077	22.32
Na2O	0.10	61.979	0.002	0.003	0.007	0.003	0.007	Na	0.007	0.003	0.002	61.979	0.10
Total	98.99		1.808	1.822	4.000	5.987	4.000			1.822	1.802		99.09

No of Oxygens 6 No of Cation 4
F 1.0021

Check! Fe2O3 as FeO 0.84
FeO* 2.62

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.964	2.000
4	Tet	Al	0.036	
6	Oct	Al	0.001	1.000
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.098	
6	Oct	Mg	0.901	
8	Cubic	Mg	0.119	1.000
8	Cubic	Ca	0.874	
8	Cubic	Na	0.007	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	44.86
En	Mg/(Ca+Mg+Fe2+)	52.35
Fs	Fe2+/(Ca+Mg+Fe2+)	2.79
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	2.910
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-2.140
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	99.230
		100.000
FeT/FeT+Mg		0.07
Fe2/Fe2+Mg		0.05

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
53.68	0.07	0.87	0.57	0.93	1.78	0.06	18.72	22.32	0.10	99.09	0.002	0.036	0.001	44.86	52.35	2.79

Analysis No. 318

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	54.69	60.084	0.910	0.910	1.946	3.892	1.946	Si	1.946	0.910	0.910	60.084	54.69
TiO2	0.04	79.866	0.000	0.000	0.001	0.002	0.001	Ti	0.001	0.000	0.000	79.866	0.04
Al2O3	0.71	101.961	0.007	0.014	0.030	0.045	0.030	Al	0.030	0.014	0.007	101.961	0.71
Cr2O3	0.78	151.990	0.005	0.010	0.022	0.033	0.022	Cr	0.022	0.010	0.005	151.990	0.78
Fe2O3	0.00	159.688					0.064	Fe^{3+}	0.064	0.030	0.015	159.688	2.40
FeO	2.31	71.844	0.032	0.032	0.069	0.069	0.004	Fe^{2+}	0.004	0.002	0.002	71.844	0.15
MnO	0.08	70.937	0.001	0.001	0.002	0.002	0.002	Mn	0.002	0.001	0.001	70.937	0.08
MgO	19.17	40.304	0.476	0.476	1.017	1.017	1.017	Mg	1.017	0.476	0.476	40.304	19.17
CaO	23.71	56.077	0.423	0.423	0.904	0.904	0.904	Ca	0.904	0.423	0.423	56.077	23.71
Na2O	0.14	61.979	0.002	0.005	0.010	0.005	0.010	Na	0.010	0.005	0.002	61.979	0.14
Total	101.62		1.857	1.871	4.000	5.968	4.000			1.871	1.842		101.86

No of Oxygens 6 No of Cation 4
F 1.0054

Check! Fe2O3 as FeO 2.16
FeO* 2.31

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.947	1.977
4	Tet	Al	0.030	
6	Oct	Al	0.000	1.000
		Fe^{3+}+Cr		
6	Oct	+Fe^{2+}+Mn	0.093	
6	Oct	Mg	0.907	
8	Cubic	Mg	0.110	1.023
8	Cubic	Ca	0.904	
8	Cubic	Na	0.010	
			4.000	

end member		%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	46.96
En	Mg/(Ca+Mg+Fe2+)	52.81
Fs	Fe2+/(Ca+Mg+Fe2+)	0.22
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	7.045
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-5.977
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.933
		100.000
FeT/FeT+Mg		0.06
Fe2/Fe2+Mg		0.00

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
54.69	0.04	0.71	0.78	2.40	0.15	0.08	19.17	23.71	0.14	101.86	0.001	0.030	0.000	46.96	52.81	0.22

Analysis No. 301

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units		Atom Units	Cation Units	Moles	MW	Wt %
SiO2	51.71	60.084	0.861	0.861	1.907	3.813	1.907	Si	1.907	0.861	0.861	60.084	51.71
TiO2	0.19	79.866	0.002	0.002	0.005	0.011	0.005	Ti	0.005	0.002	0.002	79.866	0.19
Al2O3	3.04	101.961	0.030	0.060	0.132	0.198	0.132	Al	0.132	0.060	0.030	101.961	3.04
Cr2O3	0.31	151.990	0.002	0.004	0.009	0.014	0.009	Cr	0.009	0.004	0.002	151.990	0.31
Fe2O3	0.00	159.688					0.046	Fe^{3+}	0.046	0.021	0.010	159.688	1.66
FeO	5.58	71.844	0.078	0.078	0.172	0.172	0.126	Fe^{2+}	0.126	0.057	0.057	71.844	4.09
MnO	0.14	70.937	0.002	0.002	0.004	0.004	0.004	Mn	0.004	0.002	0.002	70.937	0.14
MgO	17.56	40.304	0.436	0.436	0.965	0.965	0.965	Mg	0.965	0.436	0.436	40.304	17.56
CaO	20.10	56.077	0.358	0.358	0.794	0.794	0.794	Ca	0.794	0.358	0.358	56.077	20.10
Na2O	0.16	61.979	0.003	0.005	0.011	0.006	0.011	Na	0.011	0.005	0.003	61.979	0.16
Total	98.79		1.771	1.806	4.000	5.977	4.000			1.806	1.761		98.96

No of Oxygens	6	No of Cation	4	Check!	Fe2O3 as FeO	1.49	
F	1.0038				FeO*	5.58	

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.912	2.000
4	Tet	Al	0.088	
6	Oct	Al	0.044	1.000
		Fe^{3+}+Cr		
6	Oct	$+Fe^{2+}$+Mn	0.186	
6	Oct	Mg	0.770	
8	Cubic	Mg	0.195	1.000
8	Cubic	Ca	0.794	
8	Cubic	Na	0.011	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	42.12
En	Mg/(Ca+Mg+Fe2+)	51.19
Fs	Fe2+/(Ca+Mg+Fe2+)	6.69
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	5.705
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-4.321
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.617
		100.000
FeT/FeT+Mg		0.15
Fe2/Fe2+Mg		0.12

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
51.71	0.19	3.04	0.31	1.66	4.09	0.14	17.56	20.10	0.16	98.96	0.005	0.088	0.044	42.12	51.19	6.69

Analysis No. 310

	Wt %	MW	Moles	Cations Unit	Normaliz Cation Units	Oxygen Units	atom units	
SiO2	52.48	60.084	0.873	0.873	1.923	3.847	1.923	Si
TiO2	0.13	79.866	0.002	0.002	0.004	0.007	0.004	Ti
Al2O3	1.91	101.961	0.019	0.037	0.082	0.124	0.082	Al
Cr2O3	0.85	151.990	0.006	0.011	0.024	0.037	0.024	Cr
Fe2O3	0.00	159.688					0.048	Fe^{3+}
FeO	4.08	71.844	0.057	0.057	0.125	0.125	0.077	Fe^{2+}
MnO	0.14	70.937	0.002	0.002	0.004	0.004	0.004	Mn
MgO	17.39	40.304	0.431	0.431	0.950	0.950	0.950	Mg
CaO	22.33	56.077	0.398	0.398	0.877	0.877	0.877	Ca
Na2O	0.13	61.979	0.002	0.004	0.009	0.005	0.009	Na
Total	99.45		1.790	1.817	4.000	5.976	4.000	

Calculate Fe2O3 Wt %

Atom Units	Cation Units	Moles	MW	Wt %
1.923	0.873	0.873	60.084	52.48
0.004	0.002	0.002	79.866	0.13
0.082	0.037	0.019	101.961	1.91
0.024	0.011	0.006	151.990	0.85
0.048	0.022	0.011	159.688	1.76
0.077	0.035	0.035	71.844	2.50
0.004	0.002	0.002	70.937	0.14
0.950	0.431	0.431	40.304	17.39
0.877	0.398	0.398	56.077	22.33
0.009	0.004	0.002	61.979	0.13
	1.817	1.779		99.62

No of Oxygens	6	No of Cation	4	Check!	Fe2O3 as FeO	1.58	
F	1.0040				FeO*	4.08	

Cation Site Occupancy

C.N.	Site	Elements		Ideal Cations/Site
4	Tet	Si+Ti	1.927	2.000
4	Tet	Al	0.073	
6	Oct	Al	0.010	1.000
		Fe^{3+}+Cr		
6	Oct	$+Fe^{2+}$+Mn	0.154	
6	Oct	Mg	0.836	
8	Cubic	Mg	0.114	1.000
8	Cubic	Ca	0.877	
8	Cubic	Na	0.009	
			4.000	

	end member	%
Ortho and Calcic CPX		
Wo	Ca/(Ca+Mg+Fe2+)	46.06
En	Mg/(Ca+Mg+Fe2+)	49.91
Fs	Fe2+/(Ca+Mg+Fe2+)	4.03
	total	100.00
Sodic and Calcic CPX		
Aegerine	Fe3+/(Fe3+ +(Na-Fe3+)	5.461
Jadeite	Na-Fe3+/(Fe3+ +(Na-Fe	-4.392
Diopside	Ca/(Fe3+ +(Na-Fe3+)+(	98.931
		100.000
FeT/FeT+Mg		0.12
Fe2/Fe2+Mg		0.07

SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Ti	Al IV	Al VI	Wo	En	Fs
52.48	0.13	1.91	0.85	1.76	2.50	0.14	17.39	22.33	0.13	99.62	0.004	0.073	0.010	46.06	49.91	4.03

Sample	SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO*	MnO	MgO	CaO	Na2O	Total	Analysis No.
CD41-1_1 cpx_core_a	51.54	0.18	2.17	0.02	0.00	10.40	0.32	14.61	20.10	0.27	99.62	27
CD41-1_1 cpx_b	51.62	0.18	2.13	0.00	0.00	10.38	0.29	14.68	20.29	0.19	99.76	28
CD41-1_1 cpx_c	51.04	0.33	2.42	0.00	0.00	11.06	0.35	14.55	19.72	0.22	99.68	29
CD41-1_1 cpx_rim_d	51.69	0.19	2.16	0.09	0.00	9.70	0.27	16.14	19.53	0.21	99.97	30
41-1_1_cpx_core_b	51.64	0.23	2.02	0.00	0.00	10.93	0.36	14.52	20.07	0.30	100.07	35
41-1_1_cpx_core_c	51.39	0.20	2.13	0.02	0.00	11.52	0.34	14.55	19.51	0.26	99.92	36
41-1_1_cpx_rim_d	52.93	0.34	3.30	0.00	0.00	12.80	0.38	13.25	16.31	0.34	99.65	37
41-1_2cpx_core a	50.83	0.20	2.41	0.00	0.00	10.88	0.35	14.54	20.00	0.25	99.45	55
41-1_2cpx_core b	50.05	0.14	3.85	0.03	0.00	9.00	0.22	15.35	20.31	0.17	99.13	56
41-1_2cpx_core c	52.01	0.04	2.23	0.11	0.00	6.53	0.18	16.51	21.23	0.17	99.01	57
41-1_2cpx_core d	50.67	0.23	3.61	0.04	0.00	8.74	0.20	15.41	20.40	0.19	99.49	58
41-1_2cpx_rim e	51.34	0.16	2.02	0.00	0.00	10.81	0.33	14.66	20.21	0.27	99.80	59
41-1_2opx rim_e	51.50	0.21	2.93	0.11	0.00	8.79	0.26	15.94	19.75	0.19	99.68	65
41-1_4 cpx core	51.53	0.02	1.55	0.01	0.00	10.15	0.37	14.75	19.79	0.24	98.40	90
41-1_4 cpx core_b	50.57	0.08	2.57	0.00	0.00	10.86	0.37	14.43	19.61	0.22	98.71	91
41-1_4 cpx core_c	51.17	0.07	2.26	0.04	0.00	10.13	0.29	14.71	19.84	0.23	98.74	92
41-1_4 cpx core_d	51.04	0.08	2.16	0.00	0.00	10.52	0.33	14.79	19.44	0.22	98.58	93
41-1_4 cpx rim_e	50.69	0.12	2.41	0.02	0.00	12.21	0.34	14.38	18.40	0.19	98.77	94
41-1_6 cpx_core	51.56	0.02	2.48	0.20	0.00	6.44	0.21	16.28	20.02	0.17	97.37	109
41-1_6 cpx core_b	50.49	0.03	2.91	0.04	0.00	10.45	0.29	14.40	19.72	0.25	98.58	110
41-1_6 cpx core_c	50.58	0.11	3.53	0.22	0.00	8.09	0.18	15.45	20.27	0.22	98.65	111
41-1_6 cpx rim_d	50.24	0.11	3.12	0.17	0.00	9.06	0.18	15.25	20.09	0.23	98.45	112
41-1_7 cpx core_a	50.66	0.12	2.89	0.09	0.00	9.21	0.27	14.58	20.28	0.29	98.39	123
41-1_7 cpx core_b	51.13	0.12	2.06	0.00	0.00	10.12	0.32	14.85	19.87	0.22	98.68	124
41-1_7 cpx rim_c	51.07	0.08	2.13	0.01	0.00	10.92	0.34	14.35	19.83	0.27	99.00	125
43-4_1 cpx core_a	52.62	0.07	1.85	0.44	0.00	4.57	0.12	17.11	22.17	0.17	99.12	135
43-4_1 cpx core_b	51.95	0.13	2.14	0.15	0.00	7.29	0.21	16.81	20.06	0.20	98.93	136
43-4_1 cpx core_c	53.13	0.07	1.56	0.29	0.00	5.82	0.19	18.16	20.02	0.15	99.39	137
43-4_1 cpx rim_d	53.05	0.04	1.68	0.43	0.00	5.08	0.15	18.15	20.66	0.17	99.41	138
43-4_2 cpx core_a	51.78	0.06	1.59	0.01	0.00	11.39	0.31	15.22	19.07	0.23	99.67	142
43-4_2 cpx core_b	51.50	0.09	1.74	0.09	0.00	9.23	0.21	15.14	20.60	0.17	98.77	143
43-4_2 cpx core_c	52.08	0.07	2.20	0.75	0.00	5.23	0.18	17.53	20.60	0.16	98.79	144
43-4_2 cpx rim_d	52.14	0.00	2.15	0.71	0.00	5.01	0.17	17.65	20.64	0.17	98.64	145
43-4_4 cpx core_a	53.60	0.00	1.08	0.18	0.00	4.28	0.12	17.40	22.73	0.11	99.50	151
43-4_4 cpx core_b	53.89	0.02	0.91	0.66	0.00	3.26	0.12	18.43	21.99	0.13	99.42	152
43-4_4 cpx core_c	51.71	0.12	2.49	0.25	0.00	7.51	0.23	16.56	20.34	0.20	99.40	153
43-4_4 cpx core_d	52.70	0.01	2.00	0.63	0.00	5.37	0.15	17.26	20.13	0.14	98.39	154
43-4_4 cpx rim_e	52.30	0.13	2.52	0.41	0.00	6.30	0.16	17.19	20.46	0.12	99.59	155
43-4_6 cpx	51.43	0.08	2.85	0.79	0.00	5.74	0.15	16.74	20.67	0.18	98.63	165
43-4_7 cpx core_a	52.19	0.09	2.50	0.12	0.00	6.23	0.16	16.62	21.65	0.15	99.72	166
43-4_7 cpx core_b	53.62	0.02	1.01	0.15	0.00	5.25	0.16	17.79	21.74	0.13	99.88	167
43-4_7 cpx core_c	52.17	0.03	2.29	0.29	0.00	6.43	0.18	16.71	20.75	0.15	99.01	168
43-4_7 cpx core_d	52.12	0.05	2.16	0.14	0.00	7.43	0.17	16.58	20.61	0.21	99.47	169
43-4_7 cpx core_e	53.19	0.00	1.60	0.60	0.00	5.02	0.13	18.07	20.89	0.14	99.65	170
43-4_7 cpx rim_f	53.18	0.00	1.54	0.44	0.00	5.54	0.18	18.12	20.51	0.15	99.67	171
8-2_4 cpx core_a	50.21	0.18	2.75	0.00	0.00	9.49	0.27	14.83	19.73	0.30	97.76	188
8-2_4 cpx core_b	49.98	0.09	2.83	0.00	0.00	9.45	0.25	14.49	20.45	0.24	97.77	189
8-2_4 cpx core_c	50.78	0.10	2.80	0.20	0.00	7.05	0.19	15.38	21.27	0.22	97.98	190
8-2_4 cpx rim_d	48.97	0.16	4.18	0.14	0.00	8.76	0.17	14.17	20.33	0.26	97.14	191
48-1_6 cpx core_a	52.96	0.02	1.35	0.17	0.00	1.75	0.17	16.88	22.18	0.13	95.61	221
48-1_6 cpx core_b	51.08	0.04	2.68	0.07	0.00	2.66	0.19	15.18	20.65	0.24	92.78	222
48-1_6 cpx core_c	51.59	0.02	2.28	0.08	0.00	2.43	0.21	16.15	20.78	0.24	93.78	223
48-1_6 cpx core_d	51.89	0.06	2.30	0.14	0.00	2.41	0.18	16.32	20.54	0.20	94.04	224
48-1_6 cpx rim_e	53.27	0.02	1.74	0.41	0.00	1.71	0.17	17.53	20.86	0.19	95.89	225
48-1_6 cpx2 core_a	52.68	0.05	1.60	0.46	0.00	1.27	0.08	17.09	22.57	0.15	95.96	226
48-1_6 cpx2 core_b	50.82	0.06	3.14	0.21	0.00	2.58	0.18	15.26	21.39	0.20	93.84	227
48-1_6 cpx2 core_c	50.75	0.00	3.18	0.18	0.00	2.31	0.19	15.26	21.04	0.22	93.13	228
48-1_6 cpx2 rim_e	52.52	0.02	2.14	0.49	0.00	1.40	0.13	16.97	21.40	0.14	95.22	229
48-1_5 cpx core_a	50.73	0.02	3.27	0.04	0.00	8.54	0.18	15.73	20.89	0.22	99.63	236
48-1_5 cpx core_b	50.73	0.05	3.00	0.10	0.00	7.77	0.16	15.94	21.22	0.22	99.19	237
48-1_5 cpx core_c	51.93	0.04	1.99	0.10	0.00	2.52	0.25	16.56	20.37	0.18	93.94	238
48-1_5 cpx core_d	51.95	0.06	2.28	0.13	0.00	2.36	0.20	16.62	20.46	0.17	94.23	239
48-1_5 cpx rim_e	52.93	0.03	1.55	0.24	0.00	2.03	0.21	18.09	19.95	0.13	95.15	240
48-1_4 cpx core_a	51.10	0.18	3.50	0.15	0.00	7.26	0.20	15.91	20.68	0.27	99.24	247
48-1_4 cpx core_b	51.57	0.08	2.91	0.10	0.00	7.78	0.20	16.19	20.57	0.24	99.64	248
48-1_4 cpx core_c	52.84	0.03	2.10	0.48	0.00	5.04	0.10	17.77	21.03	0.17	99.56	249
48-1_4 cpx rim_d	53.21	0.04	1.53	0.31	0.00	5.57	0.20	18.58	20.17	0.14	99.75	250
48-1_1 cpx core_a	52.77	0.04	1.85	0.73	0.00	4.81	0.16	17.73	21.58	0.15	99.82	271
48-1_1 cpx core_b	53.10	0.00	1.59	0.57	0.00	4.90	0.17	17.87	21.24	0.15	99.59	272
48-1_1 cpx rim_c	53.34	0.03	1.59	0.61	0.00	4.85	0.13	17.91	21.54	0.14	100.14	273
48-1_1 cpx2 core	53.95	0.03	1.32	0.32	0.00	5.76	0.15	19.21	19.41	0.13	100.28	278
48-1_1 cpx2 core_b	53.65	0.04	1.49	0.39	0.00	6.00	0.19	19.65	18.39	0.13	99.94	279
48-1_1 cpx2 rim_c	53.35	0.00	1.80	0.56	0.00	5.15	0.17	18.35	20.71	0.14	100.23	280
45-1_2 cpx core_a	50.97	0.00	2.74	0.04	0.00	9.87	0.29	14.66	20.12	0.26	98.95	296
45-1_2 cpx core_b	50.63	0.03	3.81	0.28	0.00	6.47	0.15	15.78	22.06	0.16	99.36	297
45-1_2 cpx core_c	50.50	0.00	3.61	0.14	0.00	8.61	0.20	15.40	20.92	0.20	99.58	298
45-1_2 cpx core_d	51.46	0.03	2.77	0.05	0.00	8.24	0.22	16.00	20.39	0.19	99.35	299
45-1_2 cpx rim_e	50.55	0.07	3.36	0.02	0.00	10.06	0.22	15.65	19.31	0.20	99.43	300
45-1_4 cpx mp core_a	50.61	0.06	3.13	0.02	0.00	12.30	0.39	17.52	14.81	0.17	99.01	326
45-1_4 cpx mp rim_b	52.61	0.07	1.25	0.01	0.00	11.89	0.37	19.77	13.01	0.11	99.09	327
45-1_6 cpx mp	50.57	0.05	3.24	0.03	0.00	12.21	0.35	17.05	15.66	0.15	99.31	345
45-1_6 cpx2 mp	51.93	0.04	1.69	0.03	0.00	9.95	0.30	17.23	17.75	0.18	99.10	346
43-1_3 cpx core_a	51.23	0.00	1.07	0.07	0.00	3.72	0.09	17.08	20.44	0.13	93.82	470
43-1_3 cpx core_b	51.54	0.00	0.73	0.12	0.00	3.09	0.10	17.50	20.45	0.12	93.66	471
43-1_3 cpx core_c	48.72	0.00	2.47	0.30	0.00	4.47	0.11	16.63	18.29	0.19	91.18	472
43-1_3 cpx rim_d	50.07	0.03	2.20	0.30	0.00	4.38	0.11	17.17	18.75	0.19	93.21	473
43-1_1 cpx core_a	47.47	0.03	1.91	0.12	0.00	3.67	0.11	15.60	18.18	0.17	87.25	474
43-1_1 cpx core_b	51.01	0.03	1.67	0.25	0.00	4.80	0.14	19.20	16.32	0.17	93.59	475
43-1_1 cpx core_c	49.33	0.03	2.94	0.21	0.00	5.78	0.15	15.99	18.61	0.19	93.22	476
43-1_1 cpx rim_d	49.89	0.00	2.39	0.32	0.00	5.27	0.17	17.42	17.85	0.16	93.47	477
43-1_1 cpx2 core_a	51.34	0.00	1.17	0.20	0.00	4.55	0.15	18.07	17.94	0.15	93.57	478

43-1_1 cpx2 core_b	49.42	0.02	3.13	0.22	0.00	5.86	0.15	16.11	18.68	0.22	93.81	479
43-1_1 cpx2 core_c	50.52	0.07	1.98	0.34	0.00	4.41	0.10	17.13	18.89	0.18	93.62	480
43-1_1 cpx2 rim_d	49.43	0.01	3.08	0.29	0.00	5.09	0.15	16.11	18.90	0.19	93.25	481
46-1_5 cpx core_a	51.78	0.00	2.08	0.11	0.00	1.48	0.24	16.25	20.54	0.15	92.62	493
46-1_5 cpx core_b	50.36	0.03	3.59	0.14	0.00	1.48	0.23	15.30	20.61	0.19	91.93	494
46-1_5 cpx core_c	50.52	0.00	3.38	0.12	0.00	1.48	0.24	15.45	20.45	0.14	91.79	495
46-1_5 cpx core_d	50.57	0.02	3.64	0.16	0.00	1.51	0.19	15.24	20.56	0.18	92.08	496
46-1_5 cpx2 core_a	51.06	0.00	2.96	0.16	0.00	1.44	0.18	15.66	21.07	0.18	92.71	498
46-1_5 cpx2 core_b	50.21	0.03	3.67	0.13	0.00	1.54	0.20	15.00	20.71	0.19	91.69	499
46-1_5 cpx2 core_c	50.14	0.04	3.49	0.15	0.00	1.54	0.19	14.98	21.30	0.18	92.01	500
46-1_6 cpx core_b	51.18	0.05	2.94	0.24	0.00	1.16	0.14	15.81	21.63	0.19	93.35	508
46-1_6 cpx core_c	49.72	0.05	4.04	0.06	0.00	1.72	0.19	14.33	20.75	0.19	91.06	509
46-1_6 cpx core_d	50.02	0.04	3.28	0.13	0.00	1.49	0.16	15.08	21.57	0.17	91.93	510
46-1_6 cpx core_e	50.19	0.06	3.17	0.08	0.00	1.71	0.20	14.77	20.84	0.20	91.22	511
46-1_6 cpx dark core	52.34	0.18	2.50	0.12	0.00	6.12	0.13	17.19	21.14	0.17	99.90	131
46-1_6 cpx light core	49.91	0.24	3.72	0.02	0.00	9.64	0.22	15.08	19.83	0.28	98.94	132
46-1_6 cpx dark2	50.79	0.27	3.27	0.29	0.00	7.65	0.16	15.57	21.28	0.23	99.51	133
46-1_6 cpx dark3	49.78	0.35	4.36	0.30	0.00	8.05	0.18	14.99	21.22	0.39	99.62	134
46-1_6 cpx rim	50.05	0.31	3.36	0.07	0.00	10.15	0.26	15.59	18.61	0.21	98.61	135
46-1_6 opx rim	51.12	0.16	3.44	0.48	0.00	6.26	0.14	16.14	22.19	0.19	100.13	139
46-1_6 opx core	51.96	0.11	2.53	0.30	0.00	5.86	0.16	16.65	21.88	0.16	99.61	140
46-1_5 cpx dark core	51.21	0.17	2.26	0.19	0.00	7.22	0.20	16.94	20.81	0.13	99.14	141
46-1_5 cpx light2	50.18	0.30	3.91	0.28	0.00	8.48	0.22	16.30	19.99	0.23	99.88	142
46-1_5 cpx light3	50.77	0.28	3.82	0.33	0.00	7.79	0.19	16.19	20.43	0.17	99.97	143
46-1_5 cpx rim	50.59	0.33	3.52	0.14	0.00	9.51	0.28	16.49	18.62	0.19	99.68	144
46-1_3 cpx core	52.03	0.12	2.17	0.22	0.00	7.46	0.23	16.82	21.00	0.14	100.20	155
46-1_3 cpx light2	51.87	0.11	2.35	0.22	0.00	7.01	0.19	16.45	21.17	0.12	99.50	156
46-1_3 cpx rim	51.70	0.21	2.09	0.04	0.00	9.36	0.29	16.32	19.72	0.16	99.89	157
46-1_2 cpx core	50.93	0.19	3.65	0.40	0.00	7.18	0.17	15.71	21.78	0.14	100.15	160
46-1_2 cpx dark2	50.97	0.29	3.05	0.28	0.00	7.88	0.16	15.85	21.32	0.16	99.96	161
46-1_2 cpx light2	50.78	0.27	3.46	0.30	0.00	7.50	0.19	15.82	21.22	0.17	99.72	162
46-1_2 cpx light3	50.97	0.26	3.26	0.21	0.00	8.57	0.25	15.94	20.90	0.17	100.52	163
46-1_2 cpx rim	50.38	0.23	3.11	0.03	0.00	10.02	0.28	15.90	19.49	0.20	99.64	164
43-1_1 cpx core	52.52	0.22	2.14	0.31	0.00	5.35	0.15	16.84	22.08	0.18	99.80	174
43-1_1 cpx light2	52.58	0.20	2.22	0.52	0.00	4.71	0.16	16.92	22.29	0.12	99.72	175
43-1_1 cpx dark rim	53.34	0.11	1.65	0.45	0.00	6.12	0.20	19.03	18.92	0.12	99.96	176
43-1_1 opx dark core	53.76	0.11	1.11	0.49	0.00	5.33	0.19	19.37	19.45	0.15	99.96	177
43-1_1 opx light2	51.68	0.28	3.54	0.44	0.00	6.75	0.23	16.61	20.58	0.19	100.30	178
43-1_1 opx dark2	52.80	0.17	2.18	0.84	0.00	5.08	0.18	17.75	20.92	0.19	100.12	179
43-1_1 opx rim	51.96	0.20	3.02	0.68	0.00	5.98	0.17	17.20	20.67	0.18	100.06	180
43-1_1 opx2 core	53.54	0.17	1.44	0.42	0.00	5.33	0.15	18.02	21.01	0.12	100.21	184
43-1_1 opx2 rim	53.33	0.10	1.60	0.43	0.00	5.31	0.19	18.49	19.89	0.11	99.45	185
43-1_3 opx core	53.57	0.08	1.44	0.17	0.00	4.22	0.13	17.59	22.65	0.09	99.95	191
43-1_3 opx 2	53.68	0.11	1.54	0.21	0.00	4.57	0.12	17.39	22.61	0.09	100.32	192
43-1_3 opx light2	52.64	0.18	2.42	0.79	0.00	4.82	0.18	17.02	21.37	0.18	99.60	193
43-1_3 opx rim	51.96	0.17	3.13	0.80	0.00	5.75	0.16	16.89	21.25	0.16	100.27	194
43-1_3 opx light1	52.22	0.19	2.73	0.21	0.00	6.94	0.20	16.82	21.14	0.22	100.68	195
43-1_5 cpx core	53.73	0.02	1.10	0.31	0.00	4.29	0.12	18.09	22.34	0.11	100.11	202
43-1_5 cpx dark2	53.27	0.17	1.40	0.80	0.00	4.20	0.10	17.88	22.17	0.20	100.19	203
43-1_5 cpx light2	51.65	0.24	3.16	0.39	0.00	7.33	0.19	16.16	20.89	0.21	100.23	204
43-1_5 cpx rim	52.73	0.17	2.38	0.81	0.00	4.89	0.18	17.67	21.34	0.18	100.36	205
43-1_6 cpx core	52.94	0.29	2.08	0.08	0.00	6.46	0.18	16.70	21.84	0.17	100.75	207
43-1_6 cpx light2	51.75	0.28	3.00	0.11	0.00	7.93	0.17	15.94	21.42	0.23	100.82	208
43-1_6 cpx rim	51.99	0.14	3.21	0.63	0.00	6.14	0.18	17.27	20.66	0.17	100.39	209
48-2_2 cpx core	53.69	0.10	0.63	0.71	0.00	2.42	0.07	18.79	22.72	0.12	99.25	305
48-2_2 cpx 2	54.01	0.07	0.57	0.61	0.00	2.64	0.08	18.69	23.03	0.11	99.80	306
48-2_2 cpx rim	52.84	0.10	1.45	0.10	0.00	5.18	0.15	17.98	21.47	0.11	99.38	307
48-2_6 cpx core	53.68	0.07	0.87	0.57	0.00	2.62	0.06	18.72	22.32	0.10	98.99	317
48-2_6 cpx rim	54.69	0.04	0.71	0.78	0.00	2.31	0.08	19.17	23.71	0.14	101.62	318
5-1_1 cpx core	51.53	0.31	1.97	0.00	0.00	11.85	0.50	14.61	19.63	0.32	100.72	214
5-1_1 cpx dark2	51.65	0.27	2.69	0.04	0.00	9.72	0.29	15.54	19.85	0.23	100.27	215
5-1_1 cpx dark3	50.64	0.32	3.38	0.06	0.00	8.79	0.25	15.69	20.28	0.22	99.62	216
5-1_1 cpx light	51.82	0.25	2.26	0.03	0.00	10.19	0.31	15.44	19.97	0.30	100.57	217
5-1_1 cpx rim	51.08	0.32	2.65	0.06	0.00	8.78	0.31	15.89	19.81	0.22	99.12	218
5-1_3 cpx light core	51.13	0.35	1.80	0.04	0.00	10.61	0.44	14.53	20.33	0.28	99.51	233
5-1_3 cpx dark2	50.42	0.35	4.04	0.06	0.00	7.65	0.16	15.30	21.47	0.22	99.66	234
5-1_3 cpx rim	51.29	0.36	1.71	0.00	0.00	11.26	0.48	14.36	19.61	0.33	99.40	235
5-1_3a opx light2	51.25	0.27	2.08	0.04	0.00	10.97	0.40	15.18	19.62	0.28	100.08	244
5-1_3a opx dark rim	51.46	0.28	2.31	0.02	0.00	10.18	0.31	16.41	18.42	0.22	99.62	245
5-1_4 cpx core	51.31	0.31	1.64	0.02	0.00	10.45	0.45	14.85	19.85	0.26	99.14	247
5-1_4 cpx rim	50.96	0.35	1.88	0.02	0.00	11.56	0.47	14.33	19.76	0.30	99.63	248
5-1_4a cpx core	51.45	0.32	1.58	0.00	0.00	10.84	0.43	14.97	19.80	0.29	99.68	264
5-1_4a cpx rim	51.29	0.33	1.64	0.00	0.00	11.48	0.55	14.35	19.71	0.26	99.61	265
5-1_7 cpx core	50.89	0.30	1.65	0.00	0.00	11.63	0.51	14.19	19.37	0.33	98.88	280
5-1_7 cpx dark rim	51.33	0.28	1.82	0.01	0.00	10.13	0.34	15.02	19.91	0.28	99.12	281
5-1_10 cpx core	51.64	0.11	2.24	0.37	0.00	4.93	0.15	16.87	21.65	0.12	98.09	287
5-1_10 cpx rim	51.46	0.13	2.73	0.63	0.00	4.30	0.12	16.53	22.68	0.18	98.76	288
5-1_10 cpx light2	51.83	0.14	2.18	0.25	0.00	5.16	0.15	16.88	21.96	0.13	98.68	289
5-1_12 cpx dark2	50.59	0.34	2.27	0.02	0.00	9.56	0.32	15.69	19.52	0.25	98.57	295
5-1_12 cpx rim	50.85	0.27	1.86	0.02	0.00	10.04	0.36	15.11	19.70	0.28	98.49	296
2-1_1 cpx core	51.43	0.28	1.62	0.01	0.00	10.77	0.51	14.22	20.07	0.28	99.19	321
2-1_1 cpx rim	51.41	0.29	1.45	0.00	0.00	12.07	0.55	13.81	19.72	0.29	99.59	322
2-1_3 cpx core	51.32	0.18	1.26	0.00	0.00	12.22	0.62	13.56	19.44	0.25	98.86	340
2-1_3 cpx rim	51.40	0.23	1.24	0.00	0.00	12.12	0.61	13.76	19.89	0.27	99.53	341
2-1_11 opx1 core	50.02	0.29	4.36	0.00	0.00	6.14	0.16	14.91	22.78	0.14	98.81	99
2-1_11 opx1 lightrim	49.69	0.51	3.64	0.00	0.00	10.61	0.28	14.15	19.83	0.25	98.98	100
2-1_11 opx2 core	50.25	0.18	3.93	0.00	0.00	6.52	0.15	15.05	22.88	0.16	99.13	101
2-1_11 opx2 rim	49.86	0.23	4.16	0.00	0.00	6.23	0.05	14.96	23.04	0.12	98.66	103
2-1_13 olivine core (cpx)	51.28	0.16	1.45	0.00	0.00	11.84	0.54	13.93	19.21	0.26	98.69	68
2-1_13 olivine rim (cpx)	51.09	0.18	1.49	0.00	0.00	12.02	0.55	13.84	18.89	0.22	98.27	69
2-1_13 olivine core (cpx)	51.44	0.20	1.09	0.00	0.00	11.66	0.56	13.68	19.73	0.24	98.60	77
2-1_13 olivine rim (cpx)	51.04	0.13	1.22	0.00	0.00	12.39	0.61	13.20	19.69	0.27	98.55	78

Comment	SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Analysis No.
41-1_4 gm opx_b	51.34	0.12	2.60	0.07	0.00	10.47	0.27	16.14	18.87	0.22	100.10	89
8-2_1 gm cpx	50.28	0.15	3.78	0.08	0.00	10.38	0.24	15.56	18.61	0.21	99.29	176
8-2_1 gm cpx	48.54	0.25	4.32	0.02	0.00	12.65	0.34	14.48	17.47	0.28	98.34	178
8-2_2 gm cpx2	50.44	0.12	2.31	0.00	0.00	11.86	0.41	16.58	15.76	0.21	97.69	181
8-2_3 gm cpx	48.86	0.14	3.87	0.04	0.00	10.39	0.27	14.70	18.10	0.25	96.63	185
8-2_3 gm cpx2	49.60	0.16	3.54	0.14	0.00	9.10	0.20	14.33	20.52	0.23	97.82	187
8-2_5 gm cpx core	51.41	0.07	2.15	0.20	0.00	6.79	0.21	16.11	20.99	0.19	98.11	195
8-2_5 gm cpx2	48.57	0.24	5.24	0.01	0.00	12.29	0.37	13.90	16.79	0.43	97.85	196
8-2_5 gm cpx3	51.24	0.16	2.25	0.07	0.00	9.58	0.29	16.08	18.02	0.19	97.87	198
8-2_7 gm cpx	51.89	0.12	1.81	0.02	0.00	12.13	0.36	17.36	15.65	0.17	99.51	203
8-2_8 gm cpx	50.15	0.20	3.78	0.10	0.00	10.15	0.26	14.59	20.06	0.29	99.59	211
8-2_8 gm cpx2	49.84	0.12	4.08	0.13	0.00	9.82	0.27	14.75	19.89	0.28	99.17	212
45-1_3 gm cpx	51.46	0.03	2.68	0.02	0.00	13.73	0.38	19.16	11.95	0.16	99.56	315
46-1_7 gm cpx	51.98	0.31	3.31	0.01	0.00	14.72	0.38	17.95	10.65	0.12	99.43	130
46-1_1 gm cpx	50.79	0.21	2.94	0.03	0.00	13.47	0.41	18.31	13.51	0.14	99.80	173
43-1_1 gm cpx	51.94	0.19	3.20	0.71	0.00	7.21	0.18	18.83	17.60	0.18	100.03	183
43-1_3 gm cpx	52.69	0.17	2.49	0.75	0.00	6.11	0.15	17.89	19.79	0.16	100.20	198
48-2_1 gm cpx	51.71	0.19	3.04	0.31	0.00	5.58	0.14	17.56	20.10	0.16	98.79	301
48-2_3 gm cpx	52.48	0.13	1.91	0.85	0.00	4.08	0.14	17.39	22.33	0.13	99.45	310
5-1_5 gm cpx	50.39	0.42	4.14	0.08	0.00	9.36	0.27	17.24	17.54	0.20	99.64	269
5-1_6 gm cpx	51.27	0.19	2.89	0.54	0.00	5.06	0.14	16.82	21.78	0.21	98.90	275
5-1_7 gm cpx	53.00	0.14	1.31	0.28	0.00	4.81	0.15	18.19	21.17	0.11	99.16	282
5-1_9 gm cpx	52.93	0.11	1.34	0.40	0.00	5.01	0.14	18.32	20.71	0.14	99.10	286
2-1_10 opx gm core	50.01	0.03	0.32	0.00	0.00	30.86	1.57	12.89	3.29	0.10	99.08	121
41-1_1_gmopx	53.21	0.16	2.95	0.02	0.00	19.37	0.47	21.70	2.69	0.17	100.73	43
47-1_1 gm opx	53.99	0.08	0.93	0.04	0.00	15.72	0.46	26.24	3.20	0.06	100.71	358

Sample	SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Analysis No.	Si	Ti	Al IV	Al VI	Wo	En	Fs
2-1 1 cpx core	51.43	0.28	1.62	0.01	2.11	8.87	0.51	14.22	20.07	0.28	99.40	321	1.936	0.008	0.056	0.016	43	42	15
2-1 1 cpx rim	51.41	0.29	1.45	0.00	2.37	9.94	0.55	13.81	19.72	0.29	99.82	322	1.937	0.008	0.055	0.009	42	41	17
2-1 3 cpx core	51.32	0.18	1.26	0.00	1.76	10.64	0.62	13.56	19.44	0.25	99.04	340	1.951	0.005	0.044	0.012	42	40	18
2-1 3 cpx rim	51.40	0.23	1.24	0.00	2.60	9.78	0.61	13.76	19.89	0.27	99.79	341	1.939	0.006	0.055	0.001	43	41	16
2-1 11 opx1 core	50.02	0.29	4.36	0.00	2.97	3.47	0.16	14.91	22.78	0.14	99.10	99	1.860	0.008	0.132	0.059	49	45	6
2-1 11 opx1 lightrim	49.69	0.51	3.64	0.00	3.13	7.79	0.28	14.15	19.83	0.25	99.28	100	1.870	0.015	0.116	0.046	43	43	13
2-1 11 opx2 core	50.25	0.18	3.93	0.00	3.66	3.23	0.15	15.05	22.88	0.16	99.48	101	1.864	0.005	0.131	0.040	49	45	5
2-1 11 opx2 rim	49.86	0.23	4.16	0.00	3.54	3.04	0.05	14.96	23.04	0.12	99.01	103	1.857	0.006	0.137	0.046	50	45	5
2-1 13 olivine core (cpx)	51.28	0.16	1.45	0.00	1.73	10.28	0.54	13.93	19.21	0.26	98.84	68	1.948	0.005	0.048	0.017	41	42	17
2-1 13 olivine rim (cpx)	51.09	0.18	1.49	0.00	1.34	10.81	0.55	13.84	18.89	0.22	98.41	69	1.950	0.005	0.045	0.022	41	41	18
2-1 13 olivine core (cpx)	51.44	0.20	1.09	0.00	1.47	10.34	0.56	13.68	19.73	0.24	98.75	77	1.958	0.006	0.037	0.012	42	41	17
2-1 13 olivine rim (cpx)	51.04	0.13	1.22	0.00	2.05	10.55	0.61	13.20	19.69	0.27	98.75	78	1.949	0.004	0.047	0.008	43	40	18
5-1 1 cpx core	51.53	0.31	1.97	0.00	3.47	8.73	0.50	14.61	19.63	0.32	101.06	214	1.911	0.009	0.080	0.006	42	43	15
5-1 1 cpx dark2	51.65	0.27	2.69	0.04	2.45	7.52	0.29	15.54	19.85	0.23	100.51	215	1.908	0.007	0.085	0.032	42	46	12
5-1 1 cpx dark3	50.64	0.32	3.38	0.06	3.51	5.63	0.25	15.69	20.28	0.22	99.97	216	1.875	0.009	0.116	0.032	44	47	9
5-1 1 cpx light	51.82	0.25	2.26	0.03	3.12	7.38	0.31	15.44	19.97	0.30	100.88	217	1.911	0.007	0.082	0.016	42	45	12
5-1 1 cpx rim	51.08	0.32	2.65	0.06	2.71	6.34	0.31	15.89	19.81	0.22	99.39	218	1.902	0.009	0.089	0.027	42	47	11
5-1 3 cpx light core	51.13	0.35	1.80	0.04	3.16	7.77	0.44	14.53	20.33	0.28	99.83	233	1.915	0.010	0.075	0.005	44	43	13
5-1 3 cpx dark2	50.42	0.35	4.04	0.06	3.34	4.65	0.16	15.30	21.47	0.22	100.00	234	1.863	0.010	0.127	0.049	46	46	8
5-1 3 cpx rim	51.29	0.36	1.71	0.00	2.60	8.92	0.48	14.36	19.61	0.33	99.66	235	1.927	0.010	0.063	0.013	42	43	15
5-1 3a opx light2	51.25	0.27	2.08	0.04	3.72	7.62	0.40	15.18	19.62	0.28	100.46	244	1.904	0.008	0.088	0.003	42	45	13
5-1 3a opx dark rim	51.46	0.28	2.31	0.02	2.86	7.60	0.31	16.41	18.42	0.22	99.90	245	1.909	0.008	0.083	0.018	39	48	13
5-1 4 cpx core	51.31	0.31	1.64	0.02	2.66	8.06	0.45	14.85	19.85	0.26	99.41	247	1.927	0.009	0.065	0.008	42	44	13
5-1 4 cpx rim	50.96	0.35	1.88	0.02	3.39	8.51	0.47	14.33	19.76	0.30	99.97	248	1.911	0.010	0.079	0.004	43	43	14
5-1 4a cpx core	51.45	0.32	1.58	0.00	3.18	7.98	0.43	14.97	19.80	0.29	100.00	264	1.922	0.009	0.069	0.001	42	44	13
5-1 4a cpx rim	51.29	0.33	1.64	0.00	2.74	9.02	0.55	14.35	19.71	0.26	99.89	265	1.925	0.009	0.065	0.007	42	43	15
5-1 7 cpx core	50.89	0.30	1.65	0.00	2.96	8.97	0.51	14.19	19.37	0.33	99.17	280	1.925	0.009	0.067	0.007	42	43	15
5-1 7 cpx dark rim	51.33	0.28	1.82	0.01	2.71	7.70	0.34	15.02	19.91	0.28	99.39	281	1.924	0.008	0.068	0.012	43	45	13
5-1 10 cpx core	51.64	0.11	2.24	0.37	1.80	3.31	0.15	16.87	21.65	0.12	98.26	287	1.922	0.003	0.075	0.023	45	49	5
5-1 10 cpx rim	51.46	0.13	2.73	0.63	2.34	2.19	0.12	16.53	22.68	0.18	98.99	288	1.901	0.004	0.095	0.024	48	49	4
5-1 10 cpx light2	51.83	0.14	2.18	0.25	2.26	3.13	0.15	16.88	21.96	0.13	98.91	289	1.918	0.004	0.078	0.017	46	49	5
5-1 12 cpx dark2	50.59	0.34	2.27	0.02	3.57	6.35	0.32	15.69	19.52	0.25	98.92	295	1.898	0.010	0.092	0.008	42	47	11
5-1 12 cpx rim	50.85	0.27	1.86	0.02	3.16	7.19	0.36	15.11	19.70	0.28	98.81	296	1.916	0.008	0.076	0.007	43	45	12
8-2 4 cpx core a	50.21	0.18	2.75	0.00	2.99	6.80	0.27	14.83	19.73	0.30	98.06	188	1.902	0.005	0.093	0.030	43	45	12
8-2 4 cpx core b	49.98	0.09	2.83	0.00	3.31	6.47	0.25	14.49	20.45	0.24	98.11	189	1.896	0.003	0.102	0.025	45	44	11
8-2 4 cpx core c	50.78	0.10	2.80	0.20	2.35	4.94	0.19	15.38	21.27	0.22	98.22	190	1.907	0.003	0.090	0.034	46	46	8
8-2 4 cpx rim d	48.97	0.16	4.18	0.14	3.07	6.00	0.17	14.17	20.33	0.26	97.45	191	1.865	0.005	0.130	0.058	45	44	10
CD41-1 1 cpx core a	51.54	0.18	2.17	0.02	2.20	8.42	0.32	14.61	20.10	0.27	99.84	27	1.926	0.005	0.069	0.026	43	43	14
CD41-1 1 cpx b	51.62	0.18	2.13	0.00	2.01	8.57	0.29	14.68	20.29	0.19	99.97	28	1.926	0.005	0.068	0.025	43	43	14
CD41-1 1 cpx c	51.04	0.33	2.42	0.00	2.55	8.76	0.35	14.55	19.72	0.22	99.94	29	1.909	0.009	0.081	0.025	42	43	15
CD41-1 1 cpx rim d	51.69	0.19	2.16	0.09	3.06	6.95	0.27	16.14	19.53	0.21	100.28	30	1.911	0.005	0.083	0.011	41	47	11
41-1 1 cpx core b	51.64	0.23	2.02	0.00	2.60	8.59	0.36	14.52	20.07	0.30	100.33	35	1.924	0.006	0.070	0.019	43	43	14
41-1 1 cpx core c	51.39	0.20	2.13	0.02	2.64	9.14	0.34	14.55	19.51	0.26	100.18	36	1.920	0.006	0.075	0.019	42	43	15
41-1 1 cpx rim d	52.93	0.34	3.30	0.00	0.00	12.80	0.38	13.25	16.31	0.34	99.65	37	1.998	0.010	0.000	0.154	36	41	22
41-1 2cpx core a	50.83	0.20	2.41	0.00	3.29	7.92	0.35	14.54	20.00	0.25	99.78	55	1.904	0.006	0.091	0.016	43	44	13
41-1 2cpx core b	50.05	0.14	3.85	0.03	3.81	5.57	0.22	15.35	20.31	0.17	99.51	56	1.864	0.004	0.132	0.037	44	46	9
41-1 2cpx core c	52.01	0.04	2.23	0.11	2.12	4.62	0.18	16.51	21.23	0.17	99.22	57	1.925	0.001	0.074	0.024	44	48	8
41-1 2cpx core d	50.67	0.23	3.61	0.04	2.95	6.08	0.20	15.41	20.40	0.19	99.79	58	1.880	0.006	0.114	0.044	44	46	10
41-1 2cpx rim e	51.34	0.16	2.02	0.00	3.21	7.92	0.33	14.66	20.21	0.27	100.12	59	1.916	0.005	0.080	0.009	43	44	13
41-1 2opx rim e	51.50	0.21	2.93	0.11	2.11	6.89	0.26	15.94	19.75	0.19	99.90	65	1.906	0.006	0.088	0.040	42	47	11
41-1 4 cpx core	51.53	0.02	1.55	0.01	1.81	8.52	0.37	14.75	19.79	0.24	98.59	90	1.948	0.001	0.052	0.017	42	44	14
41-1 4 cpx core b	50.57	0.08	2.57	0.00	2.84	8.30	0.37	14.43	19.61	0.22	98.99	91	1.908	0.002	0.089	0.025	42	43	14
41-1 4 cpx core c	51.17	0.07	2.26	0.04	2.09	8.25	0.29	14.71	19.84	0.23	98.95	92	1.926	0.002	0.072	0.028	42	44	14
41-1 4 cpx core d	51.04	0.08	2.16	0.00	2.29	8.46	0.33	14.79	19.44	0.22	98.81	93	1.925	0.002	0.072	0.024	42	44	14
41-1 4 cpx rim e	50.69	0.12	2.41	0.02	2.14	10.29	0.34	14.38	18.40	0.19	98.98	94	1.919	0.004	0.078	0.030	40	43	17
41-1 6 cpx core	51.56	0.02	2.48	0.20	0.46	6.03	0.21	16.28	20.02	0.17	97.42	109	1.941	0.001	0.058	0.052	42	48	10
41-1 6 cpx core b	50.49	0.03	2.91	0.04	2.73	7.99	0.29	14.40	19.72	0.25	98.85	110	1.905	0.001	0.095	0.035	43	44	14
41-1 6 cpx core c	50.58	0.11	3.53	0.22	2.48	5.86	0.18	15.45	20.27	0.22	98.90	111	1.889	0.003	0.108	0.048	44	46	10
41-1 6 cpx rim d	50.24	0.11	3.12	0.17	3.43	5.97	0.18	15.25	20.09	0.23	98.80	112	1.886	0.003	0.111	0.027	44	46	10
41-1 7 cpx core a	50.66	0.12	2.89	0.09	2.34	7.11	0.27	14.58	20.28	0.29	98.62	123	1.908	0.003	0.088	0.040	44	44	12
41-1 7 cpx core b	51.13	0.12	2.06	0.00	2.37	7.99	0.32	14.85	19.87	0.22	98.92	124	1.925	0.003	0.071	0.020	42	44	13
41-1 7 cpx rim c	51.07	0.08	2.13	0.01	2.64	8.54	0.34	14.35	19.83	0.27	99.27	125	1.923	0.002	0.075	0.020	43	43	14
43-1 1 cpx core	52.52	0.22	2.14	0.31	1.85	3.69	0.15	16.84	22.08	0.18	99.99	174	1.924	0.006	0.070	0.023	46	48	6
43-1 1 cpx light2	52.58	0.20	2.22	0.52	1.24	3.60	0.16	16.92	22.29	0.12	99.85	175	1.926	0.005	0.068	0.028	46	48	6
43-1 1 cpx dark rim	53.34	0.11	1.65	0.45	1.30	4.95	0.20	19.03	18.92	0.12	100.09	176	1.941	0.003	0.055	0.015	38	54	8
43-1 1 opx dark core	53.76	0.11	1.11	0.49	1.44	4.03	0.19	19.37	19.45	0.15	100.11	177	1.952	0.003	0.045	0.002	39	54	6
43-1 1 opx light2	51.68	0.28	3.54	0.44	2.00	4.95	0.23	16.61	20.58	0.19	100.50	178	1.889	0.008	0.103	0.049	43	49	8
43-1 1 opx dark2	52.80	0.17	2.18	0.84	1.46	3.76	0.18	17.75	20.92	0.19	100.26	179	1.923	0.005	0.072	0.022	43	51	6
43-1 1 opx rim	51.96	0.20	3.02	0.68	2.02	4.16	0.17	17.20	20.67	0.18	100.26	180	1.898	0.005	0.096	0.034	43	50	7
43-1 1 opx2 core	53.54	0.17	1.44	0.42	1.01	4.42	0.15	18.02	21.01	0.12	100.31	184	1.949	0.005	0.047	0.015	42	51	7
43-1 1 opx2 rim	53.33	0.10	1.60	0.43	0.67	4.71	0.19	18.49	19.89	0.11	99.52	185	1.951	0.003	0.046	0.023	40	52	7
43-1 3 opx core	53.57	0.08	1.44	0.17	1.15	3.19	0.13	17.59	22.65	0.09	100.07	191	1.952	0.002	0.046	0.016	46	49	5
43-1 3 opx 2	53.68	0.11	1.54	0.21	0.89	3.77	0.12	17.39	22.61	0.09	100.41	192	1.952	0.003	0.045	0.021	45	49	6
43-1 3 opx light2	52.64	0.18	2.42	0.79	0.48	4.39	0.18	17.02	21.37	0.18	99.65	193	1.931	0.005	0.064	0.040	44	49	7
43-1 3 opx rim	51.96	0.17	3.13	0.80	1.86	4.07	0.16	16.89	21.25	0.16	100.46	194	1.896	0.005	0.099	0.036	44	49	7
43-1 3 opx light1	52.22	0.19	2.73	0.21	2.90	4.33	0.20	16.82	21.14	0.22	100.97	195	1.901	0.005	0.094	0.023	44	49	7
43-1 5 cpx core	53.73	0.02	1.10	0.31	1.72	2.74	0.12	18.09	22.34	0.11	100.28	202	1.952	0.000	0.047	0.000	45	51	4
43-1 5 cpx dark2	53.27	0.17	1.40	0.80	1.85	2.53	0.10	17.88	22.17	0.20	100.38	203	1.936	0.005	0.060	0.000	45	51	4
43-1 5 cpx light2	51.65	0.24	3.16	0.39	2.34	5.22	0.19	16.16	20.89	0.21	100.47	204	1.895	0.007	0.099	0.038	44	47	9
43-1 5 cpx rim	52.73	0.17	2.38	0.81	1.72	3.34	0.18	17.67	21.34	0.18	100.53	205	1.916	0.005	0.080	0.022	44	51	5
43-1 6 cpx core	52.94	0.29	2.08	0.08	1.82	4.82	0.18	16.70	21.84	0.17	100.93	207	1.927	0.008	0.065	0.025	45	48	8
43-1 6 cpx light2	51.75	0.28	3.00	0.11	3.19	5.06	0.17	15.94	21.42	0.23	101.14	208	1.890	0.008	0.102	0.027	45	47	8
43-1 6 cpx rim	51.99	0.14	3.21	0.63	2.32	4.05	0.18	17.27	20.66	0.17	100.62	209	1.893	0.004	0.104	0.034	43	50	7
43-1 3 cpx core a	51.23	0.00	1.07	0.07	0.00	3.72	0.09	17.08	20.44	0.13	93.82	470	1.983	0.000	0.017	0.032	43	50	6
43-1 3 cpx core b	51.54	0.00	0.73	0.12	0.00	3.09	0.10	17.50	20.45	0.12	93.66	471	1.994	0.000	0.006	0.027	43	52	5
43-1 3 cpx core c	48.72	0.00	2.47	0.30	0.32	4.18	0.11	16.63	18.29	0.19	91.22	472	1.940	0.000	0.060	0.056	41	52	7
43-1 3 cpx rim d	50.07	0.03	2.20	0.30	0.14	4.25	0.11	17.17	18.75	0.19	93.22	473	1.949	0.001	0.050	0.051	41	52	7
43-1 1 cpx core a	47.47	0.03	1.91	0.12	0.00	3.67	0.11	15.60	18.18	0.17	87.25	474	1.977	0.001	0.022	0.071	43	51	7
43-1 1 cpx core b	51.01	0.03	1.67	0.25	0.00	4.80	0.14	19.20	16.32	0.17	93.59	475	1.966	0.001	0.033	0.043	35	57	8
43-1 1 cpx core c	49.33	0.03	2.94	0.21	0.18	5.62	0.15	15.99	18.61	0.19	93.24	476	1.933	0.001	0.066	0.069	41	49	10
43-1 1 cpx rim d	49.89	0.00	2.39	0.32	0.50	4.82	0.17	17.42	17.85	0.16	93.52	477	1.939	0.000	0.061	0.049	39	53	8
43-1 1 cpx2 core a	51.34	0.00	1.17	0.20	0.00	4.55	0.15	18.07	17.94	0.15	93.57	478	1.989	0.000	0.011	0.042	38	54	8
43-1 1 cpx2 core b	49.42	0.02	3.13	0.22	0.62	5.31	0.15	16.11	18.68	0.22	93.87	479	1.923	0.001	0.076	0.067	41	50	9
43-1 1 cpx2 core c	50.52	0.07	1.98	0.34	0.00	4.41	0.10	17.13	18.89	0.18	93.62	480	1.960	0.002	0.037	0.053	41	52	7
43-1 1 cpx2 rim d	49.43	0.01	3.08	0.29	0.00	5.09	0.15	16.11	18.90	0.19	93.25	481	1.933	0.000	0.067	0.075	42	49	9
43-4 1 cpx core a	52.62	0.07	1.85	0.44	1.55	3.18	0.12	17.11	22.17	0.17	99.27	135	1.936	0.002	0.062	0.018	46	49	5
43-4 1 cpx core b	51.95	0.13	2.14	0.15	2.05	5.44	0.21	16.81	20.06	0.20	99.14	136	1.926	0.004	0.070	0.023	42	49	9
43-4 1 cpx core c	53.13	0.07	1.56	0.29	1.28	4.67	0.19	18.16	20.02	0.15	99.51	137	1.948	0.002	0.050	0.017	41	52	7
43-4 1 cpx rim d	53.05	0.04	1.68	0.43	1.51	3.72	0.15	18.15	20.66	0.17	99.56	138	1.942	0.001	0.057	0.015	42	52	6
43-4 2 cpx core a	51.78	0.06	1.59	0.01	2.65	9.00	0.31	15.22	19.07	0.23	99.93	142	1.934	0.002	0.064	0.006	40	45	15
43-4 2 cpx core b	51.50	0.09	1.74	0.09	2.18	7.27	0.21	15.14	20.60	0.17	98.99	143	1.933	0.002	0.064	0.013	44	44	12
43-4 2 cpx core c	52.08	0.07	2.20	0.75	1.63	3.76	0.18	17.53	20.60	0.16	98.95	144	1.923	0.002	0.076	0.020	43	51	6
43-4 2 cpx rim d	52.14	0.00	2.15	0.71	1.71	3.47	0.17	17.65	20.64	0.17	98.81	145	1.925	0.000	0.075	0.019	43	51	6
43-4 4 cpx core a	53.60	0.00	1.08	0.18	1.04	3.34	0.12	17.40	22.73	0.11	99.60	151	1.963	0.000	0.037	0.010	46	49	5
43-4 4 cpx core b	53.89	0.02	0.91	0.66	0.63	2.70	0.12	18.43	21.99	0.13	99.48	152	1.966	0.001	0.033	0.006	44	52	4
43-4 4 cpx core c	51.71	0.12	2.49	0.25	2.56	5.21	0.23	16.56	20.34	0.20	99.66	153	1.910	0.003	0.086	0.022	43	49	9
43-4 4 cpx core d	52.70	0.01	2.00	0.63	0.00	5.37	0.15	17.26	20.13	0.14	98.39	154	1.956	0.000	0.043	0.044	42	50	9
43-4 4 cpx rim e	52.30	0.13	2.52	0.41	1.38	5.06	0.16	17.19	20.46	0.12	99.73	155	1.921	0.004	0.075	0.034	42	49	8
43-4 6 cpx	51.43	0.08	2.85	0.79	1.66	4.25	0.15	16.74	20.67	0.18	98.80	165	1.907	0.002	0.090	0.034	44	49	7
43-4 7 cpx core a	52.19	0.09	2.50	0.12	2.20	4.25	0.16	16.62	21.65	0.15	99.94	166	1.917	0.002	0.081	0.027	45	48	7
43-4 7 cpx core b	53.62	0.02	1.01	0.15	1.64	3.78	0.16	17.79	21.74	0.13	100.04	167	1.958	0.000	0.042	0.002	44	50	6
43-4 7 cpx core c	52.17	0.03	2.29	0.29	1.43	5.14	0.18	16.71	20.75	0.15	99.15	168	1.931	0.001	0.069	0.031	43	48	8
43-4 7 cpx core d	52.12	0.05	2.16	0.14	2.40	5.27	0.17	16.58	20.61	0.21	99.71	169	1.924	0.001	0.075	0.019	43	48	9
43-4 7 cpx core e	53.19	0.00	1.60	0.60	1.32	3.83	0.13	18.07	20.89	0.14	99.78	170	1.944	0.000	0.056	0.013	43	51	6
43-4 7 cpx rim f	53.18	0.00	1.54	0.44	1.57	4.13	0.18	18.12	20.51	0.15	99.82	171	1.944	0.000	0.056	0.011	42	52	7
45-1 2 cpx core a	50.97	0.00	2.74	0.04	2.61	7.52	0.29	14.66	20.12	0.26	99.21	296	1.912	0.000	0.088	0.033	43	44	13
45-1 2 cpx core b	50.63	0.03	3.81	0.28	3.54	3.29	0.15	15.78	22.06	0.16	99.72	297	1.869	0.001	0.130	0.035	47	47	6
45-1 2 cpx core c	50.50	0.00	3.61	0.14	4.02	4.99	0.20	15.40	20.92	0.20	99.98	298	1.870	0.000	0.130	0.028	45	46	8
45-1 2 cpx core d	51.46	0.03	2.77	0.05	2.70	5.81	0.22	16.00	20.39	0.19	99.62	299	1.907	0.001	0.092	0.029	43	47	10
45-1 2 cpx rim e	50.55	0.07	3.36	0.02	3.71	6.72	0.22	15.65	19.31	0.20	99.80	300	1.880	0.002	0.119	0.029	42	47	11
45-1 4 cpx mp core a	50.61	0.06	3.13	0.02	3.48	9.17	0.39	17.52	14.81	0.17	99.35	326	1.887	0.002	0.112	0.026	32	53	15
45-1 4 cpx mp rim b	52.61	0.07	1.25	0.01	1.88	10.20	0.37	19.77	13.01	0.11	99.28	327	1.948	0.002	0.050	0.005	27	57	16
45-1 6 cpx mp	50.57	0.05	3.24	0.03	3.55	9.02	0.35	17.05	15.66	0.15	99.66	345	1.883	0.001	0.116	0.026	34	51	15
45-1 6 cpx2 mp	51.93	0.04	1.69	0.03	2.70	7.52	0.30	17.23	17.75	0.18	99.37	346	1.930	0.001	0.069	0.006	37	50	12
46-1 5 cpx core a	51.78	0.00	2.08	0.11	0.00	1.48	0.24	16.25	20.54	0.15	92.62	493	2.025	0.000	0.000	0.096	46	51	3
46-1 5 cpx core b	50.36	0.03	3.59	0.14	0.00	1.48	0.23	15.30	20.61	0.19	91.93	494	1.986	0.001	0.013	0.154	48	49	3
46-1 5 cpx core c	50.52	0.00	3.38	0.12	0.00	1.48	0.24	15.45	20.45	0.14	91.79	495	1.996	0.000	0.004	0.153	47	50	3
46-1 5 cpx core d	50.57	0.02	3.64	0.16	0.00	1.51	0.19	15.24	20.56	0.18	92.08	496	1.992	0.001	0.007	0.162	48	49	3
46-1 5 cpx2 core a	51.06	0.00	2.96	0.16	0.00	1.44	0.18	15.66	21.07	0.18	92.71	498	1.996	0.000	0.004	0.133	48	50	3
46-1 5 cpx2 core b	50.21	0.03	3.67	0.13	0.00	1.54	0.20	15.00	20.71	0.19	91.69	499	1.988	0.001	0.012	0.160	48	49	3
46-1 5 cpx2 core c	50.14	0.04	3.49	0.15	0.00	1.54	0.19	14.98	21.30	0.18	92.01	500	1.979	0.001	0.020	0.143	49	48	3
46-1 6 cpx core b	51.18	0.05	2.94	0.24	0.00	1.16	0.14	15.81	21.63	0.19	93.35	508	1.986	0.002	0.013	0.122	49	49	2
46-1 6 cpx core c	49.72	0.05	4.04	0.06	0.00	1.72	0.19	14.33	20.75	0.19	91.06	509	1.986	0.001	0.013	0.178	49	47	3
46-1 6 cpx core d	50.02	0.04	3.28	0.13	0.00	1.49	0.16	15.08	21.57	0.17	91.93	510	1.975	0.001	0.024	0.129	49	48	3

46-1	6 cpx core e	50.19	0.06	3.17	0.08	0.00	1.71	0.20	14.77	20.84	0.20	91.22	511	2.000	0.002	0.000	0.149	49	48	3
46-1	6 cpx dark core	52.34	0.18	2.50	0.12	2.24	4.10	0.13	17.19	21.14	0.17	100.12	131	1.914	0.005	0.081	0.027	44	50	7
46-1	6 cpx light core	49.91	0.24	3.72	0.02	3.97	6.07	0.22	15.08	19.83	0.28	99.34	132	1.866	0.007	0.128	0.036	44	46	10
46-1	6 cpx dark2	50.79	0.27	3.27	0.29	3.24	4.73	0.16	15.57	21.28	0.23	99.84	133	1.880	0.007	0.113	0.030	46	46	8
46-1	6 cpx dark3	49.78	0.35	4.36	0.30	4.57	3.94	0.18	14.99	21.22	0.39	100.08	134	1.841	0.010	0.149	0.041	47	46	7
46-1	6 cpx rim	50.05	0.31	3.36	0.07	3.21	7.26	0.26	15.59	18.61	0.21	98.93	135	1.878	0.009	0.113	0.036	40	47	12
46-1	6 opx rim	51.12	0.16	3.44	0.48	3.55	3.06	0.14	16.14	22.19	0.19	100.48	139	1.872	0.004	0.124	0.025	47	48	5
46-1	6 opx core	51.96	0.11	2.53	0.30	2.50	3.61	0.16	16.65	21.88	0.16	99.86	140	1.909	0.003	0.088	0.022	46	48	6
46-1	5 cpx dark core	51.21	0.17	2.26	0.19	3.89	3.72	0.20	16.94	20.81	0.13	99.53	141	1.894	0.005	0.098	0.000	44	50	6
46-1	5 cpx light2	50.18	0.30	3.91	0.28	4.62	4.32	0.22	16.30	19.99	0.23	100.34	142	1.847	0.008	0.145	0.025	43	49	7
46-1	5 cpx light3	50.77	0.28	3.82	0.33	3.17	4.94	0.19	16.19	20.43	0.17	100.29	143	1.867	0.008	0.125	0.040	44	48	8
46-1	5 cpx rim	50.59	0.33	3.52	0.14	3.49	6.37	0.28	16.49	18.62	0.19	100.03	144	1.870	0.009	0.120	0.033	40	49	11
46-1	3 cpx core	52.03	0.12	2.17	0.22	3.24	4.54	0.23	16.82	21.00	0.14	100.52	155	1.907	0.003	0.090	0.004	44	49	7
46-1	3 cpx light2	51.87	0.11	2.35	0.22	2.32	4.92	0.19	16.45	21.17	0.12	99.73	156	1.915	0.003	0.082	0.020	44	48	8
46-1	3 cpx rim	51.70	0.21	2.09	0.04	3.07	6.60	0.29	16.32	19.72	0.16	100.20	157	1.911	0.006	0.083	0.008	41	48	11
46-1	2 cpx core	50.93	0.19	3.65	0.40	3.17	4.33	0.17	15.71	21.78	0.14	100.47	160	1.871	0.005	0.124	0.034	46	46	7
46-1	2 cpx dark2	50.97	0.29	3.05	0.28	3.49	4.74	0.16	15.85	21.32	0.16	100.31	161	1.879	0.008	0.113	0.019	45	47	8
46-1	2 cpx light2	50.78	0.27	3.46	0.30	3.24	4.59	0.19	15.82	21.22	0.17	100.04	162	1.874	0.008	0.118	0.032	45	47	8
46-1	2 cpx light3	50.97	0.26	3.26	0.21	3.99	4.98	0.25	15.94	20.90	0.17	100.92	163	1.870	0.007	0.123	0.018	45	47	8
46-1	2 cpx rim	50.38	0.23	3.11	0.03	4.53	5.95	0.28	15.90	19.49	0.20	100.09	164	1.869	0.006	0.125	0.011	42	48	10
48-1	6 cpx core a	52.96	0.02	1.35	0.17	0.00	1.75	0.17	16.88	22.18	0.13	95.61	221	2.008	0.001	0.000	0.060	47	50	3
48-1	6 cpx core b	51.08	0.04	2.68	0.07	0.00	2.66	0.19	15.18	20.65	0.24	92.78	222	2.005	0.001	0.000	0.124	47	48	5
48-1	6 cpx core c	51.59	0.02	2.28	0.08	0.00	2.43	0.21	16.15	20.78	0.24	93.78	223	1.996	0.001	0.003	0.101	46	50	4
48-1	6 cpx core d	51.89	0.06	2.30	0.14	0.00	2.41	0.18	16.32	20.54	0.20	94.04	224	2.003	0.002	0.000	0.105	46	50	4
48-1	6 cpx rim e	53.27	0.02	1.74	0.41	0.00	1.71	0.17	17.53	20.86	0.19	95.89	225	2.009	0.001	0.000	0.077	45	52	3
48-1	6 cpx2 core a	52.68	0.05	1.60	0.46	0.00	1.27	0.08	17.09	22.57	0.15	95.96	226	1.987	0.001	0.012	0.060	48	50	2
48-1	6 cpx2 core b	50.82	0.06	3.14	0.21	0.00	2.58	0.18	15.26	21.39	0.20	93.84	227	1.972	0.002	0.027	0.117	48	48	5
48-1	6 cpx2 core c	50.75	0.00	3.18	0.18	0.00	2.31	0.19	15.26	21.04	0.22	93.13	228	1.982	0.000	0.018	0.128	48	48	4
48-1	6 cpx2 rim e	52.52	0.02	2.14	0.49	0.00	1.40	0.13	16.97	21.40	0.14	95.22	229	1.996	0.001	0.003	0.093	46	51	2
48-1	5 cpx core a	50.73	0.02	3.27	0.04	4.29	4.68	0.18	15.73	20.89	0.22	100.05	236	1.876	0.001	0.124	0.019	45	47	8
48-1	5 cpx core b	50.73	0.05	3.00	0.10	4.29	3.91	0.16	15.94	21.22	0.22	99.62	237	1.880	0.001	0.119	0.012	46	48	7
48-1	5 cpx core c	51.93	0.04	1.99	0.10	0.00	2.52	0.25	16.56	20.37	0.18	93.94	238	2.006	0.001	0.000	0.091	45	51	4
48-1	5 cpx core d	51.95	0.06	2.28	0.13	0.00	2.36	0.20	16.62	20.46	0.17	94.23	239	1.999	0.002	0.000	0.103	45	51	4
48-1	5 cpx rim e	52.93	0.03	1.55	0.24	0.00	2.03	0.21	18.09	19.95	0.13	95.15	240	2.008	0.001	0.000	0.069	43	54	3
48-1	4 cpx core a	51.10	0.18	3.50	0.15	2.55	4.96	0.20	15.91	20.68	0.27	99.50	247	1.891	0.005	0.104	0.048	44	47	8
48-1	4 cpx core b	51.57	0.08	2.91	0.10	2.86	5.21	0.20	16.19	20.57	0.24	99.92	248	1.902	0.002	0.096	0.031	44	48	9
48-1	4 cpx core c	52.84	0.03	2.10	0.48	1.51	3.68	0.10	17.77	21.03	0.17	99.71	249	1.932	0.001	0.067	0.024	43	51	6
48-1	4 cpx rim d	53.21	0.04	1.53	0.31	1.91	3.86	0.20	18.58	20.17	0.14	99.94	250	1.940	0.001	0.059	0.007	41	53	6
48-1	1 cpx core a	52.77	0.04	1.85	0.73	1.97	3.03	0.16	17.73	21.58	0.15	100.01	271	1.927	0.001	0.072	0.007	44	51	5
48-1	1 cpx core b	53.10	0.00	1.59	0.57	1.51	3.55	0.17	17.87	21.24	0.15	99.74	272	1.942	0.000	0.058	0.011	43	51	6
48-1	1 cpx rim c	53.34	0.03	1.59	0.61	1.50	3.50	0.13	17.91	21.54	0.14	100.29	273	1.941	0.001	0.058	0.010	44	51	6
48-1	1 cpx2 core	53.95	0.03	1.32	0.32	1.19	4.69	0.15	19.21	19.41	0.13	100.40	278	1.955	0.001	0.045	0.012	39	54	7
48-1	1 cpx2 core b	53.65	0.04	1.49	0.39	1.35	4.79	0.19	19.65	18.39	0.13	100.07	279	1.948	0.001	0.051	0.013	37	55	8
48-1	1 cpx2 rim c	53.35	0.00	1.80	0.56	1.58	3.73	0.17	18.35	20.71	0.14	100.38	280	1.937	0.000	0.063	0.014	42	52	6
48-2	2 cpx core	53.69	0.10	0.63	0.71	1.53	1.04	0.07	18.79	22.72	0.12	99.40	305	1.957	0.003	0.027	0.000	46	53	2
48-2	2 cpx 2	54.01	0.07	0.57	0.61	1.57	1.23	0.08	18.69	23.03	0.11	99.96	306	1.960	0.002	0.024	0.000	46	52	2
48-2	2 cpx rim	52.84	0.10	1.45	0.10	2.35	3.06	0.15	17.98	21.47	0.11	99.61	307	1.936	0.003	0.061	0.001	44	51	5
48-2	6 cpx core	53.68	0.07	0.87	0.57	0.93	1.78	0.06	18.72	22.32	0.10	99.09	317	1.962	0.002	0.036	0.001	45	52	3
48-2	6 cpx rim	54.69	0.04	0.71	0.78	2.40	0.15	0.08	19.17	23.71	0.14	101.86	318	1.946	0.001	0.030	0.000	47	53	0

Sample	SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	CaO	Na2O	Total	Analysis No.	Wo	En	Fs
5-1_5 gm cpx	50.39	0.42	4.14	0.08	3.50	6.21	0.27	17.24	17.54	0.20	99.99	269	38	52	10
5-1_6 gm cpx	51.27	0.19	2.89	0.54	2.88	2.47	0.14	16.82	21.78	0.21	99.19	275	46	50	4
5-1_7 gm cpx	53.00	0.14	1.31	0.28	1.67	3.30	0.15	18.19	21.17	0.11	99.33	282	43	52	5
5-1_9 gm cpx	52.93	0.11	1.34	0.40	1.76	3.43	0.14	18.32	20.71	0.14	99.27	286	42	52	5
8-2_1 gm cpx	50.28	0.15	3.78	0.08	3.24	7.46	0.24	15.56	18.61	0.21	99.61	176	40	47	13
8-2_1 gm cpx	48.54	0.25	4.32	0.02	4.68	8.44	0.34	14.48	17.47	0.28	98.81	178	40	46	15
8-2_2 gm cpx2	50.44	0.12	2.31	0.00	2.85	9.30	0.41	16.58	15.76	0.21	97.98	181	34	50	16
8-2_3 gm cpx	48.86	0.14	3.87	0.04	2.98	7.70	0.27	14.70	18.10	0.25	96.93	185	41	46	13
8-2_3 gm cpx2	49.60	0.16	3.54	0.14	3.06	6.35	0.20	14.33	20.52	0.23	98.13	187	45	44	11
8-2_5 gm cpx core	51.41	0.07	2.15	0.20	2.14	4.86	0.21	16.11	20.99	0.19	98.32	195	44	47	8
8-2_5 gm cpx2	48.57	0.24	5.24	0.01	2.95	9.64	0.37	13.90	16.79	0.43	98.14	196	38	44	17
8-2_5 gm cpx3	51.24	0.16	2.25	0.07	1.20	8.50	0.29	16.08	18.02	0.19	97.99	198	38	48	14
8-2_7 gm cpx	51.89	0.12	1.81	0.02	2.35	10.02	0.36	17.36	15.65	0.17	99.75	203	33	51	16
8-2_8 gm cpx	50.15	0.20	3.78	0.10	3.71	6.81	0.26	14.59	20.06	0.29	99.96	211	44	44	12
8-2_8 gm cpx2	49.84	0.12	4.08	0.13	3.84	6.37	0.27	14.75	19.89	0.28	99.55	212	44	45	11
41-1_4 gm opx_b	51.34	0.12	2.60	0.07	3.58	7.25	0.27	16.14	18.87	0.22	100.46	89	40	48	12
43-1_1 gm cpx	51.94	0.19	3.20	0.71	2.28	5.16	0.18	18.83	17.60	0.18	100.26	183	37	55	8
43-1_3 gm cpx	52.69	0.17	2.49	0.75	1.20	5.03	0.15	17.89	19.79	0.16	100.32	198	41	51	8
45-1_3 gm cpx	51.46	0.03	2.68	0.02	3.05	10.99	0.38	19.16	11.95	0.16	99.87	315	25	57	18
46-1_7 gm cpx	51.98	0.31	3.31	0.01	0.00	14.72	0.38	17.95	10.65	0.12	99.43	130	23	53	24
46-1_1 gm cpx	50.79	0.21	2.94	0.03	3.94	9.92	0.41	18.31	13.51	0.14	100.20	173	29	55	17
48-2_1 gm cpx	51.71	0.19	3.04	0.31	1.66	4.09	0.14	17.56	20.10	0.16	98.96	301	42	51	7
48-2_3 gm cpx	52.48	0.13	1.91	0.85	1.76	2.50	0.14	17.39	22.33	0.13	99.62	310	46	50	4
2-1_10 opx gm core	50.01	0.03	0.32	0.00	16.54	15.35	1.57	12.89	3.29	0.10	100.11	121	10	54	36
41-1_1_gmopx	53.21	0.16	2.95	0.02	0.00	19.37	0.47	21.70	2.69	0.17	100.73	43	6	63	31
47-1_1 gm opx	53.99	0.08	0.93	0.04	3.01	13.01	0.46	26.24	3.20	0.06	101.01	358	6	73	20

Pigeonite

Sample	Analysis No.	SiO2	TiO2	Al2O3	FeO*	MnO	MgO	CaO	Na2O	K2O	Total
2-1_13 glass1	79	74.37	0.37	11.17	2.87	0.08	0.13	0.56	0.45	1.49	91.49
2-1_12 plag glassincl core	91	74.88	0.57	11.32	2.38	0.08	0.11	0.46	0.61	1.77	92.18
2-1_12 plag glass rim	92	48.29	0.04	31.81	0.68	0.00	0.04	15.27	2.80	0.08	99.01
2-1_11 glass gm	106	76.69	0.29	11.57	2.68	0.05	0.10	0.52	0.41	1.07	93.38
5-1_1 opx glass incl	213	51.59	0.00	30.18	1.21	0.03	0.11	13.40	4.06	0.06	100.63
5-1_1 gm glass	220	65.91	0.82	11.55	9.86	0.21	1.63	4.37	1.53	0.63	96.51
5-1_1 gm glass1	222	66.12	0.90	12.77	9.00	0.17	1.45	4.31	1.60	0.59	96.91
5-1_1 gm glass2	223	66.47	0.79	13.38	8.03	0.19	1.35	4.56	1.89	0.57	97.23
5-1_1 gm glass3	225	66.38	0.72	13.35	7.25	0.12	1.11	4.55	1.91	0.55	95.95
5-1_1 gm glass4	226	66.17	0.57	13.74	7.27	0.13	1.26	4.40	1.45	0.58	95.57
5-1_3 cpx glass incl	236	53.50	0.04	28.49	0.82	0.02	0.08	11.87	4.03	0.10	98.96
5-1_3 plag glass incl	238	67.44	0.70	11.01	7.22	0.20	1.40	3.07	1.32	1.37	93.72
5-1_3 gm glass	241	54.31	0.13	28.99	0.85	0.00	0.07	12.12	2.96	0.10	99.53
5-1_3 gm glass2	242	66.77	0.64	12.61	7.46	0.17	1.52	3.70	0.73	1.29	94.89
5-1_4 plag glass incl	249	51.30	0.34	1.96	12.01	0.50	14.24	19.80	0.28	0.00	100.43
5-1_4 plag2 glass incl	254	61.65	1.19	10.98	11.34	0.30	2.13	4.34	2.26	1.49	95.69
5-1_4 glass	258	65.87	0.62	12.42	7.59	0.16	1.58	4.55	0.96	1.06	94.82
5-1_4 glass2	259	66.12	0.68	12.54	7.95	0.15	1.56	4.78	1.01	0.92	95.71
5-1_8 glass	283	65.56	0.70	12.66	8.03	0.19	1.52	4.76	1.58	0.49	95.50
5-1_12 cpx glass incl	297	66.33	0.60	15.04	3.40	0.14	0.81	3.78	0.32	0.59	91.02
2-1_1 glass	328	96.85	0.09	1.67	0.05	0.00	0.01	0.03	0.13	0.24	99.08
2-1_3 glass	342	75.37	0.36	11.18	2.79	0.07	0.12	0.56	0.28	0.85	91.59
2-1_4 gm glass	349	96.45	0.19	1.60	0.18	0.00	0.00	0.01	0.09	0.04	98.57
2-1_4 gm glass2	350	96.32	0.15	1.73	0.11	0.01	0.00	0.04	0.08	0.01	98.46
2-1_4 gm glass3	351	75.70	0.39	11.56	2.26	0.03	0.08	0.30	0.22	0.91	91.45
2-1_6 gm glass	362	97.11	0.04	1.95	0.10	0.02	0.00	0.05	0.11	0.02	99.41

Normalised

2-1_13 glass1	81.28	0.40	12.21	3.14	0.09	0.15	0.62	0.49	1.63	100.00
2-1_12 plag glassincl core	81.23	0.62	12.28	2.58	0.09	0.12	0.50	0.66	1.92	100.00
2-1_12 plag glass rim	48.77	0.04	32.13	0.69	0.00	0.04	15.42	2.83	0.08	100.00
2-1_11 glass gm	82.12	0.31	12.39	2.87	0.05	0.11	0.56	0.44	1.15	100.00
5-1_1 opx glass incl	51.26	0.00	29.99	1.20	0.02	0.11	13.32	4.03	0.06	100.00
5-1_1 gm glass	68.29	0.85	11.97	10.22	0.21	1.69	4.53	1.59	0.66	100.00
5-1_1 gm glass1	68.23	0.93	13.18	9.29	0.17	1.50	4.45	1.65	0.61	100.00
5-1_1 gm glass2	68.36	0.81	13.76	8.26	0.20	1.39	4.69	1.94	0.58	100.00
5-1_1 gm glass3	69.18	0.76	13.91	7.56	0.13	1.16	4.74	1.99	0.57	100.00
5-1_1 gm glass4	69.23	0.59	14.38	7.61	0.14	1.32	4.60	1.52	0.61	100.00
5-1_3 cpx glass incl	54.06	0.04	28.79	0.83	0.02	0.08	12.00	4.07	0.10	100.00
5-1_3 plag glass incl	71.96	0.75	11.75	7.70	0.21	1.49	3.28	1.40	1.46	100.00
5-1_3 gm glass	54.57	0.14	29.13	0.85	0.00	0.07	12.18	2.97	0.10	100.00
5-1_3 gm glass2	70.37	0.67	13.29	7.86	0.18	1.60	3.90	0.77	1.36	100.00
5-1_4 plag glass incl	51.08	0.34	1.95	11.96	0.50	14.18	19.71	0.28	0.00	100.00
5-1_4 plag2 glass incl	64.43	1.25	11.47	11.85	0.32	2.23	4.54	2.36	1.56	100.00
5-1_4 glass	69.47	0.65	13.10	8.00	0.17	1.67	4.80	1.01	1.12	100.00
5-1_4 glass2	69.09	0.71	13.10	8.31	0.15	1.63	4.99	1.05	0.97	100.00
5-1_8 glass	68.65	0.74	13.26	8.41	0.20	1.59	4.98	1.65	0.51	100.00
5-1_12 cpx glass incl	72.87	0.66	16.52	3.74	0.16	0.89	4.15	0.36	0.65	100.00
2-1_1 glass	97.76	0.09	1.68	0.05	0.00	0.01	0.03	0.13	0.24	100.00
2-1_3 glass	82.29	0.39	12.21	3.05	0.08	0.13	0.62	0.31	0.92	100.00
2-1_4 gm glass	97.85	0.20	1.62	0.18	0.00	0.00	0.01	0.09	0.04	100.00
2-1_4 gm glass2	97.83	0.15	1.75	0.11	0.01	0.00	0.04	0.08	0.01	100.00
2-1_4 gm glass3	82.78	0.43	12.64	2.47	0.04	0.09	0.32	0.24	0.99	100.00
2-1_6 gm glass	97.69	0.04	1.96	0.10	0.02	0.00	0.06	0.11	0.02	100.00

Comment	Analysis No.	SiO2	TiO2	Al2O3	FeO*	MnO	MgO	CaO	Na2O	K2O	Total
41-1_1_glass	42	69.91	0.53	11.16	7.39	0.12	0.99	4.03	1.52	1.59	97.24
41-1_1_glass2	47	69.50	0.55	11.36	7.02	0.14	1.00	4.24	1.55	1.74	97.10
41-1_1_glass3	48	69.47	0.47	11.32	7.25	0.13	1.03	4.10	1.66	1.67	97.10
41-1_1glass4	54	69.61	0.43	11.39	6.84	0.11	1.07	4.16	1.69	1.81	97.11
41-1_2glass	68	69.29	0.44	11.12	6.79	0.14	1.01	4.02	1.56	1.79	96.16
41-1_2glass2	69	69.62	0.33	14.85	4.15	0.08	0.45	5.38	2.43	1.27	98.56
41-1_2glass3	70	69.36	0.45	11.79	6.78	0.11	0.94	4.06	1.73	1.79	97.02
41-1_3 glass	77	69.42	0.35	11.33	7.27	0.15	0.98	3.95	1.64	1.87	96.96
41-1_3 glass	79	70.12	0.36	11.70	6.54	0.13	0.77	3.81	1.62	1.84	96.90
41-1_4 glass	83	69.61	0.37	11.18	7.14	0.12	0.92	3.89	1.55	1.82	96.60
41-1_4 glass2	87	69.96	0.18	11.47	6.79	0.12	0.82	3.81	1.51	1.89	96.55
41-1_4 glass1	98	68.72	0.21	11.39	7.08	0.14	1.21	4.51	1.42	1.58	96.26
41-1_5 glass	99	69.25	0.21	11.68	6.63	0.12	1.12	4.27	1.36	1.62	96.26
41-1_5 glass3	104	68.35	0.20	11.33	3.20	0.14	1.05	4.24	1.31	1.65	91.47
41-1_6 glass	115	69.72	0.25	11.50	6.81	0.15	0.82	3.70	1.18	1.76	95.89
41-1_7 plag glass incl	129	66.74	0.23	12.26	6.51	0.14	1.66	4.29	1.11	1.38	94.32
48-1_6 olivine glass	234	56.15	0.14	17.32	6.70	0.15	2.15	11.68	0.75	0.58	95.63
48-1_6 olivine glass2	235	55.95	0.13	17.40	7.06	0.16	2.28	11.54	0.90	0.55	95.97
48-1_4 glass	243	58.52	0.16	13.90	10.85	0.14	2.69	7.42	0.70	1.03	95.41
48-1_4 glass2	244	57.85	0.20	14.10	10.17	0.20	3.18	8.08	0.73	0.96	95.46
48-1_4 glass3	245	57.82	0.21	14.19	10.12	0.18	3.20	8.00	0.77	0.92	95.41
48-1_4 cpx glass incl	246	55.00	0.11	16.45	8.87	0.15	4.96	9.41	1.10	0.56	96.60
48-1_2 olivine2 glass incl	257	57.22	0.15	17.42	5.95	0.12	1.30	10.63	0.46	0.48	93.72
48-1_2 glass	260	59.37	0.14	14.06	10.16	0.18	2.71	7.51	0.80	0.99	95.92
48-1_2 glass2	261	59.03	0.21	14.13	10.49	0.17	2.64	7.28	0.74	0.98	95.67
48-1_1 olivine glass incl	269	53.99	0.17	16.17	9.00	0.18	4.76	10.70	1.09	0.52	96.58
48-1_1 trapped glass	270	55.43	0.09	16.18	8.13	0.14	4.64	10.37	1.15	0.59	96.72
48-1_1 trapped glass2	277	54.91	0.15	16.10	8.44	0.15	5.47	10.23	1.21	0.55	97.21
48-1_1 trapped glass3	281	54.89	0.11	16.39	8.35	0.17	5.08	10.05	1.12	0.53	96.70
45-1_1 plag glass	286	54.10	0.22	13.93	12.67	0.23	4.80	9.08	1.15	0.43	96.61
45-1_1 plag glass2	287	53.33	0.13	14.18	12.72	0.25	4.78	9.14	1.16	0.38	96.07
45-1_1 olivine glass incl	290	52.39	0.13	14.89	12.53	0.21	3.85	9.97	1.06	0.31	95.34
45-1_1 olivine glass2 incl	291	52.30	0.13	15.58	12.16	0.17	3.26	10.02	0.87	0.29	94.78
45-1_1 olivine glass3 incl	292	52.85	0.16	14.90	12.55	0.21	4.06	10.03	1.18	0.34	96.27
45-1_2 glass	303	53.83	0.12	14.66	12.04	0.21	4.24	9.23	1.34	0.36	96.03
45-1_2 glass2	304	53.40	0.16	14.58	12.30	0.20	4.47	9.39	1.29	0.36	96.15
45-1_2 plag glass	310	54.03	0.18	14.43	12.12	0.23	4.48	9.11	1.35	0.40	96.33
45-1_3 olivine glass incl	313	53.68	0.14	16.98	9.92	0.17	2.05	10.38	0.80	0.39	94.51
45-1_3 olivine glass2 incl	314	53.02	0.14	16.08	10.74	0.19	2.15	11.00	0.77	0.29	94.38
47-1_1 olivine glass incl	357	53.66	0.20	15.95	11.36	0.21	1.80	11.60	1.13	0.80	96.72
47-1_1 olivine2 glass incl	362	45.16	0.04	33.64	1.44	0.01	0.13	18.24	1.15	0.03	99.85
47-1_olivine glass incl	421	54.08	0.05	1.45	14.41	0.34	27.75	1.95	0.02	0.00	100.04
47-1_olivine2 glassincl	424	56.59	0.10	18.21	6.55	0.12	0.95	11.34	1.41	0.82	96.08
glass check	536	56.71	0.12	13.64	2.02	0.18	3.51	8.27	0.51	0.84	85.80
Normalised											
41-1_1_glass		71.89	0.55	11.48	7.60	0.12	1.02	4.14	1.56	1.64	100.00
41-1_1_glass2		71.57	0.57	11.70	7.23	0.15	1.03	4.37	1.60	1.79	100.00
41-1_1_glass3		71.54	0.49	11.66	7.47	0.13	1.07	4.22	1.71	1.72	100.00
41-1_1glass4		71.68	0.44	11.73	7.04	0.12	1.10	4.28	1.74	1.86	100.00
41-1_2glass		72.06	0.45	11.56	7.06	0.15	1.06	4.18	1.62	1.86	100.00
41-1_2glass2		70.64	0.33	15.07	4.21	0.08	0.45	5.46	2.47	1.29	100.00
41-1_2glass3		71.49	0.47	12.15	6.99	0.11	0.97	4.18	1.78	1.85	100.00
41-1_3 glass		71.59	0.37	11.68	7.50	0.15	1.01	4.07	1.69	1.93	100.00
41-1_3 glass		72.36	0.37	12.07	6.75	0.14	0.80	3.93	1.67	1.90	100.00
41-1_4 glass		72.06	0.38	11.57	7.39	0.13	0.95	4.03	1.60	1.88	100.00
41-1_4 glass2		72.46	0.19	11.88	7.03	0.12	0.85	3.95	1.56	1.96	100.00
41-1_4 glass1		71.39	0.22	11.83	7.36	0.15	1.25	4.69	1.48	1.64	100.00
41-1_5 glass		71.94	0.22	12.13	6.89	0.12	1.16	4.44	1.41	1.68	100.00
41-1_5 glass3		74.73	0.22	12.39	3.50	0.15	1.14	4.64	1.43	1.80	100.00
41-1_6 glass		72.70	0.26	11.99	7.10	0.16	0.85	3.86	1.23	1.84	100.00
41-1_7 plag glass incl		70.76	0.24	13.00	6.90	0.15	1.76	4.55	1.18	1.46	100.00
48-1_6 olivine glass		58.72	0.15	18.11	7.01	0.15	2.25	12.21	0.79	0.61	100.00
48-1_6 olivine glass2		58.30	0.13	18.13	7.36	0.17	2.38	12.03	0.94	0.57	100.00
48-1_4 glass		61.33	0.17	14.57	11.37	0.15	2.82	7.78	0.73	1.08	100.00
48-1_4 glass2		60.60	0.21	14.77	10.65	0.21	3.33	8.46	0.76	1.01	100.00
48-1_4 glass3		60.60	0.22	14.87	10.61	0.19	3.35	8.38	0.81	0.96	100.00
48-1_4 cpx glass incl		56.94	0.11	17.03	9.18	0.15	5.13	9.74	1.14	0.58	100.00
48-1_2 olivine2 glass incl		61.05	0.16	18.59	6.35	0.12	1.39	11.34	0.49	0.51	100.00
48-1_2 glass		61.90	0.14	14.66	10.59	0.19	2.83	7.83	0.83	1.03	100.00
48-1_2 glass2		61.70	0.22	14.77	10.97	0.17	2.76	7.61	0.77	1.03	100.00
48-1_1 olivine glass incl		55.90	0.18	16.74	9.32	0.19	4.93	11.08	1.12	0.53	100.00
48-1_1 trapped glass		57.31	0.09	16.73	8.41	0.14	4.80	10.72	1.19	0.61	100.00
48-1_1 trapped glass2		56.48	0.15	16.56	8.68	0.16	5.63	10.52	1.24	0.57	100.00
48-1_1 trapped glass3		56.76	0.12	16.95	8.63	0.17	5.25	10.39	1.16	0.55	100.00
45-1_1 plag glass		56.00	0.23	14.42	13.12	0.24	4.97	9.40	1.19	0.44	100.00
45-1_1 plag glass2		55.51	0.14	14.76	13.24	0.26	4.98	9.51	1.20	0.40	100.00
45-1_1 olivine glass incl		54.95	0.13	15.62	13.14	0.22	4.04	10.46	1.11	0.33	100.00
45-1_1 olivine glass2 incl		55.18	0.14	16.44	12.83	0.18	3.44	10.57	0.92	0.30	100.00
45-1_1 olivine glass3 incl		54.90	0.16	15.48	13.04	0.21	4.22	10.42	1.22	0.36	100.00
45-1_2 glass		56.05	0.12	15.27	12.54	0.22	4.42	9.61	1.40	0.38	100.00
45-1_2 glass2		55.54	0.17	15.16	12.79	0.21	4.65	9.77	1.34	0.37	100.00
45-1_2 plag glass		56.09	0.19	14.98	12.58	0.23	4.65	9.46	1.40	0.42	100.00
45-1_3 olivine glass incl		56.80	0.14	17.97	10.50	0.18	2.17	10.98	0.85	0.42	100.00
45-1_3 olivine glass2 incl		56.18	0.15	17.04	11.38	0.20	2.28	11.65	0.82	0.31	100.00
47-1_1 olivine glass incl		55.48	0.20	16.49	11.75	0.22	1.86	11.99	1.17	0.83	100.00
47-1_1 olivine2 glass incl		45.23	0.04	33.69	1.44	0.01	0.13	18.27	1.16	0.03	100.00
47-1_olivine glass incl		54.06	0.05	1.45	14.40	0.34	27.74	1.95	0.02	0.00	100.00
47-1_olivine2 glassincl		58.90	0.11	18.95	6.82	0.12	0.98	11.80	1.47	0.85	100.00
glass check		66.09	0.14	15.90	2.35	0.21	4.09	9.64	0.59	0.98	100.00

Sample	SiO2	TiO2	Al2O3	FeO*	MnO	MgO	CaO	Na2O	K2O	Total	Analysis No.
2-1_13 glass1	81.28	0.40	12.21	3.14	0.09	0.15	0.62	0.49	1.63	100.00	79
2-1_12 plag glassincl core	81.23	0.62	12.28	2.58	0.09	0.12	0.50	0.66	1.92	100.00	91
2-1_12 plag glass rim	48.77	0.04	32.13	0.69	0.00	0.04	15.42	2.83	0.08	100.00	92
2-1_11 glass gm	82.12	0.31	12.39	2.87	0.05	0.11	0.56	0.44	1.15	100.00	106
5-1_1 opx glass incl	51.26	0.00	29.99	1.20	0.02	0.11	13.32	4.03	0.06	100.00	213
5-1_1 gm glass	68.29	0.85	11.97	10.22	0.21	1.69	4.53	1.59	0.66	100.00	220
5-1_1 gm glass1	68.23	0.93	13.18	9.29	0.17	1.50	4.45	1.65	0.61	100.00	222
5-1_1 gm glass2	68.36	0.81	13.76	8.26	0.20	1.39	4.69	1.94	0.58	100.00	223
5-1_1 gm glass3	69.18	0.76	13.91	7.56	0.13	1.16	4.74	1.99	0.57	100.00	225
5-1_1 gm glass4	69.23	0.59	14.38	7.61	0.14	1.32	4.60	1.52	0.61	100.00	226
5-1_3 cpx glass incl	54.06	0.04	28.79	0.83	0.02	0.08	12.00	4.07	0.10	100.00	236
5-1_3 plag glass incl	71.96	0.75	11.75	7.70	0.21	1.49	3.28	1.40	1.46	100.00	238
5-1_3 gm glass	54.57	0.14	29.13	0.85	0.00	0.07	12.18	2.97	0.10	100.00	241
5-1_3 gm glass2	70.37	0.67	13.29	7.86	0.18	1.60	3.90	0.77	1.36	100.00	242
5-1_4 plag glass incl	51.08	0.34	1.95	11.96	0.50	14.18	19.71	0.28	0.00	100.00	249
5-1_4 plag2 glass incl	64.43	1.25	11.47	11.85	0.32	2.23	4.54	2.36	1.56	100.00	254
5-1_4 glass	69.47	0.65	13.10	8.00	0.17	1.67	4.80	1.01	1.12	100.00	258
5-1_4 glass2	69.09	0.71	13.10	8.31	0.15	1.63	4.99	1.05	0.97	100.00	259
5-1_8 glass	68.65	0.74	13.26	8.41	0.20	1.59	4.98	1.65	0.51	100.00	283
5-1_12 cpx glass incl	72.87	0.66	16.52	3.74	0.16	0.89	4.15	0.36	0.65	100.00	297
2-1_1 glass	97.76	0.09	1.68	0.05	0.00	0.01	0.03	0.13	0.24	100.00	328
2-1_3 glass	82.29	0.39	12.21	3.05	0.08	0.13	0.62	0.31	0.92	100.00	342
2-1_4 gm glass	97.85	0.20	1.62	0.18	0.00	0.00	0.01	0.09	0.04	100.00	349
2-1_4 gm glass2	97.83	0.15	1.75	0.11	0.01	0.00	0.04	0.08	0.01	100.00	350
2-1_4 gm glass3	82.78	0.43	12.64	2.47	0.04	0.09	0.32	0.24	0.99	100.00	351
2-1_6 gm glass	97.69	0.04	1.96	0.10	0.02	0.00	0.06	0.11	0.02	100.00	362
41-1_1_glass	71.89	0.55	11.48	7.60	0.12	1.02	4.14	1.56	1.64	100.00	42
41-1_1_glass2	71.57	0.57	11.70	7.23	0.15	1.03	4.37	1.60	1.79	100.00	47
41-1_1_glass3	71.54	0.49	11.66	7.47	0.13	1.07	4.22	1.71	1.72	100.00	48
41-1_1glass4	71.68	0.44	11.73	7.04	0.12	1.10	4.28	1.74	1.86	100.00	54
41-1_2glass	72.06	0.45	11.56	7.06	0.15	1.06	4.18	1.62	1.86	100.00	68
41-1_2glass2	70.64	0.33	15.07	4.21	0.08	0.45	5.46	2.47	1.29	100.00	69
41-1_2glass3	71.49	0.47	12.15	6.99	0.11	0.97	4.18	1.78	1.85	100.00	70
41-1_3 glass	71.59	0.37	11.68	7.50	0.15	1.01	4.07	1.69	1.93	100.00	77
41-1_3 glass	72.36	0.37	12.07	6.75	0.14	0.80	3.93	1.67	1.90	100.00	79
41-1_4 glass	72.06	0.38	11.57	7.39	0.13	0.95	4.03	1.60	1.88	100.00	83
41-1_4 glass2	72.46	0.19	11.88	7.03	0.12	0.85	3.95	1.56	1.96	100.00	87
41-1_4 glass1	71.39	0.22	11.83	7.36	0.15	1.25	4.69	1.48	1.64	100.00	98
41-1_5 glass	71.94	0.22	12.13	6.89	0.12	1.16	4.44	1.41	1.68	100.00	99
41-1_5 glass3	74.73	0.22	12.39	3.50	0.15	1.14	4.64	1.43	1.80	100.00	104
41-1_6 glass	72.70	0.26	11.99	7.10	0.16	0.85	3.86	1.23	1.84	100.00	115
41-1_7 plag glass incl	70.76	0.24	13.00	6.90	0.15	1.76	4.55	1.18	1.46	100.00	129
48-1_6 olivine glass	58.72	0.15	18.11	7.01	0.15	2.25	12.21	0.79	0.61	100.00	234
48-1_6 olivine glass2	58.30	0.13	18.13	7.36	0.17	2.38	12.03	0.94	0.57	100.00	235
48-1_4 glass	61.33	0.17	14.57	11.37	0.15	2.82	7.78	0.73	1.08	100.00	243
48-1_4 glass2	60.60	0.21	14.77	10.65	0.21	3.33	8.46	0.76	1.01	100.00	244
48-1_4 glass3	60.60	0.22	14.87	10.61	0.19	3.35	8.38	0.81	0.96	100.00	245
48-1_4 cpx glass incl	56.94	0.11	17.03	9.18	0.15	5.13	9.74	1.14	0.58	100.00	246
48-1_2 olivine2 glass incl	61.05	0.16	18.59	6.35	0.12	1.39	11.34	0.49	0.51	100.00	257
48-1_2 glass	61.90	0.14	14.66	10.59	0.19	2.83	7.83	0.83	1.03	100.00	260
48-1_2 glass2	61.70	0.22	14.77	10.97	0.17	2.76	7.61	0.77	1.03	100.00	261
48-1_1 olivine glass incl	55.90	0.18	16.74	9.32	0.19	4.93	11.08	1.12	0.53	100.00	269
48-1_1 trapped glass	57.31	0.09	16.73	8.41	0.14	4.80	10.72	1.19	0.61	100.00	270
48-1_1 trapped glass2	56.48	0.15	16.56	8.68	0.16	5.63	10.52	1.24	0.57	100.00	277
48-1_1 trapped glass3	56.76	0.12	16.95	8.63	0.17	5.25	10.39	1.16	0.55	100.00	281
45-1_1 plag glass	56.00	0.23	14.42	13.12	0.24	4.97	9.40	1.19	0.44	100.00	286
45-1_1 plag glass2	55.51	0.14	14.76	13.24	0.26	4.98	9.51	1.20	0.40	100.00	287
45-1_1 olivine glass incl	54.95	0.13	15.62	13.14	0.22	4.04	10.46	1.11	0.33	100.00	290
45-1_1 olivine glass2 incl	55.18	0.14	16.44	12.83	0.18	3.44	10.57	0.92	0.30	100.00	291
45-1_1 olivine glass3 incl	54.90	0.16	15.48	13.04	0.21	4.22	10.42	1.22	0.36	100.00	292
45-1_2 glass	56.05	0.12	15.27	12.54	0.22	4.42	9.61	1.40	0.38	100.00	303
45-1_2 glass2	55.54	0.17	15.16	12.79	0.21	4.65	9.77	1.34	0.37	100.00	304
45-1_2 plag glass	56.09	0.19	14.98	12.58	0.23	4.65	9.46	1.40	0.42	100.00	310
45-1_3 olivine glass incl	56.80	0.14	17.97	10.50	0.18	2.17	10.98	0.85	0.42	100.00	313
45-1_3 olivine glass2 incl	56.18	0.15	17.04	11.38	0.20	2.28	11.65	0.82	0.31	100.00	314

Analysis No.	229				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.65	60.10	0.6764	1.3527	0.9872
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0004	0.0006	0.0005
Cr2O3	0.04	76.00	0.0005	0.0008	0.0008
FeO	9.35	71.80	0.1302	0.1302	0.1901
MnO	0.15	70.94	0.0021	0.0021	0.0031
MgO	50.34	40.30	1.2491	1.2491	1.8233
CaO	0.26	56.10	0.0046	0.0046	0.0067
Na2O	0.02	31.00	0.0005	0.0002	0.0007
Total	100.82			2.7404	3.0125
No. of Oxygens	4				
F	1.460				

End Member Calculation		
X_{fo}	1.8233	90.6
X_{fa}	0.1901	9.4
	2.0133	100.0

Analysis No.	230				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.90	60.10	0.6639	1.3278	0.9873
TiO2	0.03	79.87	0.0004	0.0009	0.0006
Al2O3	0.02	51.00	0.0003	0.0005	0.0005
Cr2O3	0.07	76.00	0.0009	0.0013	0.0013
FeO	13.97	71.80	0.1946	0.1946	0.2893
MnO	0.23	70.94	0.0032	0.0032	0.0047
MgO	46.62	40.30	1.1568	1.1568	1.7203
CaO	0.26	56.10	0.0047	0.0047	0.0070
Na2O	0.01	31.00	0.0002	0.0001	0.0004
Total	101.10			2.6898	3.0114
No. of Oxygens	4				
F	1.487				

End Member Calculation		
X_{fo}	1.7203	85.6
X_{fa}	0.2893	14.4
	2.0097	100.0

Analysis No.	231				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.66	60.10	0.6765	1.3531	0.9867
TiO2	0.03	79.87	0.0004	0.0008	0.0006
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.04	76.00	0.0005	0.0007	0.0007
FeO	10.39	71.80	0.1447	0.1447	0.2111
MnO	0.19	70.94	0.0027	0.0027	0.0040
MgO	49.80	40.30	1.2357	1.2357	1.8023
CaO	0.27	56.10	0.0049	0.0049	0.0071
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.38			2.7426	3.0124
No. of Oxygens	4				
F	1.458				

End Member Calculation		
X_{fo}	1.8023	89.5
X_{fa}	0.2111	10.5
	2.0133	100.0

Analysis No.	267				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.37	60.10	0.6717	1.3434	0.9889
TiO2	0.04	79.87	0.0005	0.0010	0.0007
Al2O3	0.03	51.00	0.0006	0.0009	0.0009
Cr2O3	0.08	76.00	0.0011	0.0016	0.0016
FeO	8.98	71.80	0.1251	0.1251	0.1841
MnO	0.13	70.94	0.0018	0.0018	0.0027
MgO	49.89	40.30	1.2380	1.2380	1.8225
CaO	0.28	56.10	0.0050	0.0050	0.0074
Na2O	0.02	31.00	0.0005	0.0003	0.0007
Total	99.82			2.7170	3.0095

No. of Oxygens	4
F	1.472

End Member Calculation		
X_{fo}	1.8225	90.8
X_{fa}	0.1841	9.2
	2.0067	100.0

Analysis No.	268				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.38	60.10	0.6719	1.3438	0.9891
TiO2	0.03	79.87	0.0004	0.0009	0.0006
Al2O3	0.02	51.00	0.0003	0.0004	0.0004
Cr2O3	0.04	76.00	0.0005	0.0007	0.0007
FeO	9.92	71.80	0.1382	0.1382	0.2034
MnO	0.16	70.94	0.0022	0.0022	0.0033
MgO	49.44	40.30	1.2268	1.2268	1.8060
CaO	0.23	56.10	0.0042	0.0042	0.0061
Na2O	0.01	31.00	0.0002	0.0001	0.0003
Total	100.22			2.7172	3.0099
No. of Oxygens	4				
F	1.472				

End Member Calculation		
X_{fo}	1.8060	89.9
X_{fa}	0.2034	10.1
	2.0093	100.0

Analysis No.	290				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.37	60.10	0.6551	1.3101	0.9915
TiO2	0.04	79.87	0.0005	0.0010	0.0007
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.02	76.00	0.0003	0.0004	0.0004
FeO	14.30	71.80	0.1992	0.1992	0.3014
MnO	0.21	70.94	0.0029	0.0029	0.0045
MgO	45.34	40.30	1.1251	1.1251	1.7028
CaO	0.23	56.10	0.0042	0.0042	0.0063
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	99.51			2.6429	3.0076
No. of Oxygens	4				
F	1.514				

End Member Calculation		
X_{fo}	1.7028	85.0
X_{fa}	0.3014	15.0
	2.0042	100.0

Analysis No.	291				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.46	60.10	0.6732	1.3464	0.9981
TiO2	0.02	79.87	0.0002	0.0005	0.0004
Al2O3	0.04	51.00	0.0007	0.0011	0.0011
Cr2O3	0.06	76.00	0.0008	0.0012	0.0012
FeO	8.50	71.80	0.1184	0.1184	0.1755
MnO	0.13	70.94	0.0018	0.0018	0.0027
MgO	49.32	40.30	1.2238	1.2238	1.8145
CaO	0.26	56.10	0.0046	0.0046	0.0068
Na2O	0.00	31.00	0.0001	0.0001	0.0001
Total	98.79			2.6979	3.0004
No. of Oxygens	4				
F	1.483				

End Member Calculation		
X_{fo}	1.8145	91.2
X_{fa}	0.1755	8.8
	1.9900	100.0

Analysis No.	14				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.32	60.10	0.6376	1.2752	0.9904
TiO2	0.01	79.87	0.0001	0.0003	0.0002
Al2O3	0.03	51.00	0.0006	0.0008	0.0009
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.58	71.80	0.3145	0.3145	0.4885
MnO	0.41	70.94	0.0057	0.0057	0.0089
MgO	39.25	40.30	0.9739	0.9739	1.5129
CaO	0.25	56.10	0.0044	0.0044	0.0069
Na2O	0.01	31.00	0.0003	0.0001	0.0000
Total	100.85			2.5750	3.0087
No. of Oxygens	4				
F	1.553				

End Member Calculation		
X_{fo}	1.5129	75.6
X_{fa}	0.4885	24.4
	2.0014	100.0

Analysis No.	15				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.42	60.10	0.6393	1.2785	0.9900
TiO2	0.01	79.87	0.0002	0.0004	0.0003
Al2O3	0.01	51.00	0.0003	0.0004	0.0004
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.86	71.80	0.3184	0.3184	0.4931
MnO	0.40	70.94	0.0057	0.0057	0.0088
MgO	39.27	40.30	0.9744	0.9744	1.5090
CaO	0.27	56.10	0.0048	0.0048	0.0074
Na2O	0.02	31.00	0.0007	0.0004	0.0012
Total	101.27			2.5830	3.0101
No. of Oxygens	4				
F	1.549				

End Member Calculation		
X_{fo}	1.5090	75.4
X_{fa}	0.4931	24.6
	2.0021	100.0

Analysis No.	19				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.43	60.10	0.6394	1.2789	0.9892
TiO2	0.12	79.87	0.0015	0.0030	0.0023
Al2O3	0.02	51.00	0.0004	0.0006	0.0006
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.28	71.80	0.3242	0.3242	0.5016
MnO	0.43	70.94	0.0061	0.0061	0.0094
MgO	38.98	40.30	0.9672	0.9672	1.4963
CaO	0.31	56.10	0.0055	0.0055	0.0085
Na2O	0.01	31.00	0.0004	0.0002	0.0006
Total	101.58			2.5857	3.0085
No. of Oxygens	4				
F	1.547				

End Member Calculation		
X_{fo}	1.4963	74.9
X_{fa}	0.5016	25.1
	1.9979	100.0

Analysis No.	20				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.50	60.10	0.6406	1.2812	0.9902
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0002	0.0004	0.0004
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.63	71.80	0.3291	0.3291	0.5087
MnO	0.32	70.94	0.0046	0.0046	0.0071
MgO	39.01	40.30	0.9680	0.9680	1.4963
CaO	0.25	56.10	0.0044	0.0044	0.0069
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.73			2.5877	3.0096
No. of Oxygens	4				
F	1.546				

End Member Calculation		
X_{fo}	1.4963	74.6
X_{fa}	0.5087	25.4
	2.0050	100.0

Analysis No.	21				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.90	60.10	0.6473	1.2945	0.9917
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0003	0.0004	0.0004

Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.62	71.80	0.3150	0.3150	0.4827
MnO	0.35	70.94	0.0050	0.0050	0.0076
MgO	39.91	40.30	0.9903	0.9903	1.5173
CaO	0.28	56.10	0.0049	0.0049	0.0076
Na2O	0.03	31.00	0.0011	0.0006	0.0017
Total	102.11			2.6107	3.0090
No. of Oxygens	4				
F	1.532				

End Member Calculation		
X_{fo}	1.5173	75.9
X_{fa}	0.4827	24.1
	2.0000	100.0

Analysis No.	22				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.61	60.10	0.6424	1.2849	0.9889
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0005	0.0007	0.0007
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.71	71.80	0.3302	0.3302	0.5083
MnO	0.40	70.94	0.0056	0.0056	0.0086
MgO	39.18	40.30	0.9722	0.9722	1.4965
CaO	0.28	56.10	0.0050	0.0050	0.0076
Na2O	0.00	31.00	0.0001	0.0001	0.0002
Total	102.20			2.5986	3.0108
No. of Oxygens	4				
F	1.539				

End Member Calculation		
X_{fo}	1.4965	74.6
X_{fa}	0.5083	25.4
	2.0048	100.0

Analysis No.	46				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.39	60.10	0.6388	1.2775	0.9880
TiO2	0.03	79.87	0.0004	0.0007	0.0006
Al2O3	0.04	51.00	0.0008	0.0012	0.0012
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.50	71.80	0.3273	0.3273	0.5062
MnO	0.45	70.94	0.0063	0.0063	0.0098
MgO	38.98	40.30	0.9672	0.9672	1.4961
CaO	0.30	56.10	0.0054	0.0054	0.0084
Na2O	0.02	31.00	0.0006	0.0003	0.0010
Total	101.72			2.5861	3.0113
No. of Oxygens	4				
F	1.547				

End Member Calculation		
X_{fo}	1.4961	74.7
X_{fa}	0.5062	25.3
	2.0023	100.0

Analysis No.	47				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.18	60.10	0.6353	1.2705	0.9929
TiO2	0.07	79.87	0.0008	0.0017	0.0013
Al2O3	0.02	51.00	0.0004	0.0006	0.0006
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	24.18	71.80	0.3368	0.3368	0.5263
MnO	0.37	70.94	0.0052	0.0052	0.0081
MgO	37.80	40.30	0.9380	0.9380	1.4660
CaO	0.35	56.10	0.0062	0.0062	0.0097
Na2O	0.02	31.00	0.0007	0.0004	0.0011
Total	100.98			2.5593	3.0061
No. of Oxygens	4				
F	1.563				

End Member Calculation		
X_{fo}	1.4660	73.6
X_{fa}	0.5263	26.4
	1.9923	100.0

Analysis No.	48				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.40	60.10	0.6389	1.2779	0.9900
TiO2	0.05	79.87	0.0006	0.0012	0.0009
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.88	71.80	0.3326	0.3326	0.5153
MnO	0.39	70.94	0.0055	0.0055	0.0085
MgO	38.66	40.30	0.9593	0.9593	1.4863
CaO	0.27	56.10	0.0049	0.0049	0.0075
Na2O	0.02	31.00	0.0007	0.0004	0.0011

Total	101.67			2.5817	3.0097
No. of Oxygens	4				
F	1.549				

End Member Calculation		
X_{fo}	1.4863	74.3
X_{fa}	0.5153	25.7
	2.0017	100.0

Analysis No.	49				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.32	60.10	0.6376	1.2752	0.9933
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0003	0.0004	0.0004
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.22	71.80	0.3234	0.3234	0.5038
MnO	0.34	70.94	0.0047	0.0047	0.0074
MgO	38.63	40.30	0.9586	0.9586	1.4933
CaO	0.29	56.10	0.0052	0.0052	0.0080
Na2O	0.01	31.00	0.0002	0.0001	0.0003
Total	100.82			2.5676	3.0066
No. of Oxygens	4				
F	1.558				

End Member Calculation		
X_{fo}	1.4933	74.8
X_{fa}	0.5038	25.2
	1.9972	100.0

Analysis No.	52				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.18	60.10	0.6353	1.2705	0.9925
TiO2	0.03	79.87	0.0004	0.0008	0.0007
Al2O3	0.04	51.00	0.0008	0.0012	0.0013
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.08	71.80	0.3214	0.3214	0.5022
MnO	0.37	70.94	0.0053	0.0053	0.0082
MgO	38.50	40.30	0.9553	0.9553	1.4925
CaO	0.32	56.10	0.0057	0.0057	0.0089
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	100.53			2.5604	3.0062
No. of Oxygens	4				
F	1.562				

End Member Calculation		
X_{fo}	1.4925	74.8
X_{fa}	0.5022	25.2
	1.9947	100.0

Analysis No.	53				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	37.91	60.10	0.6308	1.2616	0.9873
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0003	0.0005	0.0005
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.97	71.80	0.3199	0.3199	0.5007
MnO	0.41	70.94	0.0058	0.0058	0.0091
MgO	38.79	40.30	0.9625	0.9625	1.5065
CaO	0.27	56.10	0.0049	0.0049	0.0077
Na2O	0.03	31.00	0.0009	0.0005	0.0015
Total	100.40			2.5557	3.0132
No. of Oxygens	4				
F	1.565				

End Member Calculation		
X_{fo}	1.5065	75.1
X_{fa}	0.5007	24.9
	2.0072	100.0

Analysis No.	33				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.40	60.10	0.6389	1.2779	0.9872
TiO2	0.08	79.87	0.0010	0.0019	0.0015
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.71	71.80	0.3302	0.3302	0.5102
MnO	0.35	70.94	0.0049	0.0049	0.0076
MgO	39.03	40.30	0.9685	0.9685	1.4964
CaO	0.27	56.10	0.0049	0.0049	0.0076
Na2O	0.01	31.00	0.0003	0.0002	0.0005
Total	101.86			2.5888	3.0113
No. of Oxygens	4				
F	1.545				

End Member Calculation		
X_{fo}	1.4964	74.6
X_{fa}	0.5102	25.4
	2.0067	100.0

Analysis No.	34				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.75	60.10	0.6448	1.2895	0.9942
TiO2	0.02	79.87	0.0002	0.0005	0.0004
Al2O3	0.01	51.00	0.0002	0.0004	0.0004
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.44	71.80	0.3265	0.3265	0.5034
MnO	0.39	70.94	0.0055	0.0055	0.0085
MgO	38.94	40.30	0.9663	0.9663	1.4899
CaO	0.30	56.10	0.0053	0.0053	0.0082
Na2O	0.01	31.00	0.0005	0.0002	0.0007
Total	101.86			2.5941	3.0056
No. of Oxygens	4				
F	1.542				

End Member Calculation		
X_{fo}	1.4899	74.7
X_{fa}	0.5034	25.3
	1.9933	100.0

Analysis No.	35				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.47	60.10	0.6401	1.2802	0.9896
TiO2	0.01	79.87	0.0001	0.0003	0.0002
Al2O3	0.02	51.00	0.0005	0.0007	0.0007
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.83	71.80	0.3319	0.3319	0.5131
MnO	0.41	70.94	0.0058	0.0058	0.0089
MgO	38.80	40.30	0.9628	0.9628	1.4885
CaO	0.31	56.10	0.0055	0.0055	0.0086
Na2O	0.01	31.00	0.0003	0.0002	0.0005
Total	101.86			2.5873	3.0101
No. of Oxygens	4				
F	1.546				

End Member Calculation		
X_{fo}	1.4885	74.4
X_{fa}	0.5131	25.6
	2.0016	100.0

Analysis No.	54				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.01	60.10	0.6324	1.2649	0.9847
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0000	0.0001	0.0001
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.71	71.80	0.3302	0.3302	0.5142
MnO	0.38	70.94	0.0054	0.0054	0.0084
MgO	38.84	40.30	0.9638	0.9638	1.5006
CaO	0.26	56.10	0.0047	0.0047	0.0073
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.21			2.5691	3.0153
No. of Oxygens	4				
F	1.557				

End Member Calculation		
X_{fo}	1.5006	74.5
X_{fa}	0.5142	25.5
	2.0147	100.0

Analysis No.	55				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.19	60.10	0.6354	1.2709	0.9855
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0003	0.0005	0.0005
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.70	71.80	0.3301	0.3301	0.5119
MnO	0.39	70.94	0.0055	0.0055	0.0086
MgO	38.98	40.30	0.9672	0.9672	1.5001
CaO	0.28	56.10	0.0050	0.0050	0.0078
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.56			2.5792	3.0143
No. of Oxygens	4				
F	1.551				

End Member Calculation		
X_{fo}	1.5001	74.6
X_{fa}	0.5119	25.4

	2.0120	100.0

Analysis No.	50				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.44	60.10	0.6396	1.2792	0.9932
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0004	0.0006	0.0006
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.96	71.80	0.3198	0.3198	0.4966
MnO	0.41	70.94	0.0057	0.0057	0.0089
MgO	38.88	40.30	0.9648	0.9648	1.4982
CaO	0.30	56.10	0.0054	0.0054	0.0083
Na2O	0.02	31.00	0.0008	0.0004	0.0012
Total	101.03			2.5758	3.0071
No. of Oxygens	4				
F	1.553				

End Member Calculation		
X_{fo}	1.4982	75.1
X_{fa}	0.4966	24.9
	1.9948	100.0

Analysis No.	51				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.17	60.10	0.6351	1.2702	0.9862
TiO2	0.07	79.87	0.0008	0.0017	0.0013
Al2O3	0.04	51.00	0.0008	0.0013	0.0013
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	24.58	71.80	0.3423	0.3423	0.5316
MnO	0.41	70.94	0.0058	0.0058	0.0089
MgO	38.26	40.30	0.9494	0.9494	1.4742
CaO	0.30	56.10	0.0053	0.0053	0.0083
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.83			2.5760	3.0118
No. of Oxygens	4				
F	1.553				

End Member Calculation		
X_{fo}	1.4742	73.5
X_{fa}	0.5316	26.5
	2.0058	100.0

Analysis No.	26				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.47	60.10	0.6401	1.2802	0.9892
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0002	0.0004	0.0004
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.66	71.80	0.3156	0.3156	0.4877
MnO	0.42	70.94	0.0059	0.0059	0.0091
MgO	39.54	40.30	0.9811	0.9811	1.5163
CaO	0.28	56.10	0.0050	0.0050	0.0077
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.38			2.5882	3.0106
No. of Oxygens	4				
F	1.545				

End Member Calculation		
X_{fo}	1.5163	75.7
X_{fa}	0.4877	24.3
	2.0041	100.0

Analysis No.	535				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.02	60.10	0.6326	1.2652	0.9777
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.03	51.00	0.0006	0.0008	0.0009
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	24.29	71.80	0.3383	0.3383	0.5228
MnO	0.39	70.94	0.0055	0.0055	0.0085
MgO	37.92	40.30	0.9409	0.9409	1.4542
CaO	0.34	56.10	0.0061	0.0061	0.0095
Na2O	0.03	31.00	0.0008	0.0004	0.0013
Total	101.02			2.5574	2.9748
No. of Oxygens	4				
F	1.564				

End Member Calculation		
X_{fo}	1.4542	73.6
X_{fa}	0.5228	26.4
	1.9770	100.0

Analysis No.	219				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.02	60.10	0.6326	1.2652	0.9825
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.72	71.80	0.3164	0.3164	0.4915
MnO	0.38	70.94	0.0053	0.0053	0.0083
MgO	39.67	40.30	0.9844	0.9844	1.5288
CaO	0.22	56.10	0.0039	0.0039	0.0061
Na2O	0.01	31.00	0.0003	0.0002	0.0005
Total	101.02			2.5755	3.0177
No. of Oxygens	4				
F	1.553				

End Member Calculation		
X_{fo}	1.5288	75.7
X_{fa}	0.4915	24.3
	2.0203	100.0

Analysis No.	220				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.15	60.10	0.6348	1.2696	0.9947
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0001	0.0002	0.0002
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	21.65	71.80	0.3015	0.3015	0.4725
MnO	0.36	70.94	0.0051	0.0051	0.0080
MgO	39.15	40.30	0.9715	0.9715	1.5222
CaO	0.24	56.10	0.0043	0.0043	0.0068
Na2O	0.03	31.00	0.0011	0.0005	0.0017
Total	99.60			2.5527	3.0061
No. of Oxygens	4				
F	1.567				

End Member Calculation		
X_{fo}	1.5222	76.3
X_{fa}	0.4725	23.7
	1.9947	100.0

Analysis No.	181				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.05	60.10	0.6664	1.3328	0.9940
TiO2	0.05	79.87	0.0006	0.0012	0.0009
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.04	76.00	0.0005	0.0007	0.0007
FeO	15.18	71.80	0.2114	0.2114	0.3154
MnO	0.23	70.94	0.0032	0.0032	0.0048
MgO	45.50	40.30	1.1290	1.1290	1.6841
CaO	0.18	56.10	0.0032	0.0032	0.0048
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.23			2.6817	3.0047
No. of Oxygens	4				
F	1.492				

End Member Calculation		
X_{fo}	1.6841	84.2
X_{fa}	0.3154	15.8
	1.9994	100.0

Analysis No.	182				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.73	60.10	0.6611	1.3221	0.9923
TiO2	0.03	79.87	0.0004	0.0009	0.0006
Al2O3	0.05	51.00	0.0010	0.0015	0.0015
Cr2O3	0.02	76.00	0.0003	0.0004	0.0004
FeO	16.53	71.80	0.2302	0.2302	0.3456
MnO	0.28	70.94	0.0039	0.0039	0.0058
MgO	44.40	40.30	1.1017	1.1017	1.6538
CaO	0.20	56.10	0.0036	0.0036	0.0054
Na2O	0.02	31.00	0.0008	0.0004	0.0012
Total	101.27			2.6648	3.0067
No. of Oxygens	4				
F	1.501				

End Member Calculation		
X_{fo}	1.6538	82.7
X_{fa}	0.3456	17.3
	1.9994	100.0

Analysis No.	187				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.10	60.10	0.6672	1.3344	0.9877
TiO2	0.02	79.87	0.0002	0.0004	0.0003
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.04	76.00	0.0005	0.0007	0.0007
FeO	13.21	71.80	0.1840	0.1840	0.2723
MnO	0.22	70.94	0.0031	0.0031	0.0045
MgO	47.37	40.30	1.1754	1.1754	1.7399
CaO	0.21	56.10	0.0037	0.0037	0.0055
Na2O	0.03	31.00	0.0010	0.0005	0.0014
Total	101.19			2.7022	3.0124
No. of Oxygens	4				
F	1.480				

End Member Calculation		
X_{fo}	1.7399	86.5
X_{fa}	0.2723	13.5
	2.0123	100.0

Analysis No.	189				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.69	60.10	0.6604	1.3208	0.9918
TiO2	0.07	79.87	0.0009	0.0017	0.0013
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.03	76.00	0.0004	0.0006	0.0006
FeO	16.35	71.80	0.2277	0.2277	0.3420
MnO	0.27	70.94	0.0037	0.0037	0.0056
MgO	44.50	40.30	1.1042	1.1042	1.6584
CaO	0.21	56.10	0.0038	0.0038	0.0056
Na2O	0.03	31.00	0.0010	0.0005	0.0016
Total	101.16			2.6634	3.0072

No. of Oxygens	4
F	1.502

End Member Calculation		
X_{fo}	1.6584	82.9
X_{fa}	0.3420	17.1
	2.0004	100.0

Analysis No.	196				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.82	60.10	0.6626	1.3251	0.9891
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.04	51.00	0.0007	0.0011	0.0011
Cr2O3	0.07	76.00	0.0009	0.0013	0.0013
FeO	15.28	71.80	0.2128	0.2128	0.3177
MnO	0.25	70.94	0.0035	0.0035	0.0052
MgO	45.63	40.30	1.1323	1.1323	1.6903
CaO	0.19	56.10	0.0033	0.0033	0.0049
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.27			2.6794	3.0097
No. of Oxygens	4				
F	1.493				

End Member Calculation		
X_{fo}	1.6903	84.2
X_{fa}	0.3177	15.8
	2.0080	100.0

Analysis No.	199				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.89	60.10	0.6804	1.3607	0.9936
TiO2	0.04	79.87	0.0005	0.0011	0.0008
Al2O3	0.01	51.00	0.0003	0.0004	0.0004
Cr2O3	0.05	76.00	0.0007	0.0010	0.0010
FeO	10.19	71.80	0.1419	0.1419	0.2073
MnO	0.16	70.94	0.0022	0.0022	0.0033
MgO	49.50	40.30	1.2283	1.2283	1.7937
CaO	0.19	56.10	0.0033	0.0033	0.0049
Na2O	0.00	31.00	0.0001	0.0001	0.0002
Total	101.04			2.7391	3.0051
No. of Oxygens	4				
F	1.460				

End Member Calculation		
X_{fo}	1.7937	89.6
X_{fa}	0.2073	10.4
	2.0010	100.0

Analysis No.	200				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.31	60.10	0.6707	1.3414	0.9884
TiO2	0.05	79.87	0.0007	0.0013	0.0010
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.07	76.00	0.0009	0.0014	0.0014
FeO	12.40	71.80	0.1727	0.1727	0.2545
MnO	0.19	70.94	0.0027	0.0027	0.0040
MgO	47.97	40.30	1.1903	1.1903	1.7542
CaO	0.23	56.10	0.0041	0.0041	0.0060
Na2O	0.02	31.00	0.0006	0.0003	0.0009
Total	101.24			2.7143	3.0103
No. of Oxygens	4				
F	1.474				

End Member Calculation		
X_{fo}	1.7542	87.3
X_{fa}	0.2545	12.7
	2.0087	100.0

Analysis No.	139				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.39	60.10	0.6554	1.3108	0.9902
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.02	76.00	0.0003	0.0004	0.0004
FeO	15.58	71.80	0.2170	0.2170	0.3278
MnO	0.23	70.94	0.0033	0.0033	0.0050
MgO	44.85	40.30	1.1129	1.1129	1.6814
CaO	0.17	56.10	0.0030	0.0030	0.0046
Na2O	0.01	31.00	0.0004	0.0002	0.0006
Total	100.26			2.6476	3.0099
No. of Oxygens	4				
F	1.511				

End Member Calculation		
X_{fo}	1.6814	83.7
X_{fa}	0.3278	16.3
	2.0092	100.0

Analysis No.	140				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.56	60.10	0.6582	1.3165	0.9930
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0003	0.0005	0.0005
Cr2O3	0.01	76.00	0.0002	0.0003	0.0003
FeO	15.76	71.80	0.2195	0.2195	0.3311
MnO	0.21	70.94	0.0030	0.0030	0.0045
MgO	44.63	40.30	1.1074	1.1074	1.6706
CaO	0.23	56.10	0.0041	0.0041	0.0062
Na2O	0.02	31.00	0.0005	0.0003	0.0008
Total	100.44			2.6515	3.0070
No. of Oxygens	4				
F	1.509				

End Member Calculation		
X_{fo}	1.6706	83.5
X_{fa}	0.3311	16.5
	2.0018	100.0

Analysis No.	147				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.99	60.10	0.6654	1.3308	0.9931
TiO2	0.05	79.87	0.0006	0.0012	0.0009
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.04	76.00	0.0006	0.0008	0.0008
FeO	12.08	71.80	0.1682	0.1682	0.2511
MnO	0.20	70.94	0.0029	0.0029	0.0043
MgO	47.24	40.30	1.1722	1.1722	1.7495
CaO	0.22	56.10	0.0039	0.0039	0.0058
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	99.83			2.6801	3.0056
No. of Oxygens	4				
F	1.492				

End Member Calculation		
X_{fo}	1.7495	87.4
X_{fa}	0.2511	12.6
	2.0006	100.0

Analysis No.	148				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.99	60.10	0.6654	1.3308	0.9909
TiO2	0.03	79.87	0.0003	0.0007	0.0005
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.04	76.00	0.0005	0.0008	0.0008
FeO	13.18	71.80	0.1836	0.1836	0.2734
MnO	0.23	70.94	0.0033	0.0033	0.0049
MgO	46.87	40.30	1.1630	1.1630	1.7319
CaO	0.20	56.10	0.0035	0.0035	0.0052
Na2O	0.01	31.00	0.0004	0.0002	0.0006
Total	100.56			2.6861	3.0084
No. of Oxygens	4				
F	1.489				

End Member Calculation		
X_{fo}	1.7319	86.4
X_{fa}	0.2734	13.6
	2.0053	100.0

Analysis No.	149				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.62	60.10	0.6592	1.3185	0.9888
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0005	0.0007	0.0007
Cr2O3	0.02	76.00	0.0002	0.0003	0.0003
FeO	15.34	71.80	0.2136	0.2136	0.3205
MnO	0.23	70.94	0.0032	0.0032	0.0049
MgO	45.42	40.30	1.1270	1.1270	1.6905

CaO	0.18	56.10	0.0032	0.0032	0.0048
Na2O	0.01	31.00	0.0003	0.0001	0.0004
Total	100.84			2.6668	3.0109
No. of Oxygens	4				
F	1.500				

End Member Calculation		
X_{fo}	1.6905	84.1
X_{fa}	0.3205	15.9
	2.0110	100.0

Analysis No.	156				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.60	60.10	0.6589	1.3178	0.9907
TiO2	0.01	79.87	0.0001	0.0003	0.0002
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.01	76.00	0.0002	0.0003	0.0003
FeO	15.52	71.80	0.2162	0.2162	0.3250
MnO	0.23	70.94	0.0033	0.0033	0.0049
MgO	45.13	40.30	1.1199	1.1199	1.6838
CaO	0.15	56.10	0.0026	0.0026	0.0039
Na2O	0.00	31.00	0.0001	0.0001	0.0002
Total	100.66			2.6603	3.0090
No. of Oxygens	4				
F	1.504				

End Member Calculation		
X_{fo}	1.6838	83.8
X_{fa}	0.3250	16.2
	2.0088	100.0

Analysis No.	157				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.04	60.10	0.6662	1.3324	0.9945
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0005	0.0007	0.0007
Cr2O3	0.01	76.00	0.0002	0.0002	0.0002
FeO	13.97	71.80	0.1946	0.1946	0.2904
MnO	0.22	70.94	0.0030	0.0030	0.0045
MgO	46.16	40.30	1.1454	1.1454	1.7098
CaO	0.19	56.10	0.0033	0.0033	0.0049
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	100.61			2.6797	3.0051
No. of Oxygens	4				
F	1.493				

End Member Calculation		
X_{fo}	1.7098	85.5
X_{fa}	0.2904	14.5
	2.0002	100.0

Analysis No.	158				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.75	60.10	0.6614	1.3228	0.9958
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0003	0.0005	0.0005
Cr2O3	0.03	76.00	0.0004	0.0005	0.0005
FeO	15.34	71.80	0.2136	0.2136	0.3217
MnO	0.27	70.94	0.0038	0.0038	0.0057
MgO	44.81	40.30	1.1119	1.1119	1.6741
CaO	0.20	56.10	0.0035	0.0035	0.0053
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	100.41			2.6568	3.0037
No. of Oxygens	4				
F	1.506				

End Member Calculation		
X_{fo}	1.6741	83.9
X_{fa}	0.3217	16.1
	1.9958	100.0

Analysis No.	160				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.73	60.10	0.6611	1.3221	0.9975
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.03	51.00	0.0006	0.0009	0.0009
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	14.75	71.80	0.2054	0.2054	0.3100
MnO	0.21	70.94	0.0030	0.0030	0.0045
MgO	44.99	40.30	1.1164	1.1164	1.6845
CaO	0.17	56.10	0.0031	0.0031	0.0047
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	99.88			2.6509	3.0021
No. of Oxygens	4				
F	1.509				

End Member Calculation

X_{fo}	1.6845	84.5
X_{fa}	0.3100	15.5
	1.9945	100.0

Analysis No.	161				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.41	60.10	0.6557	1.3115	0.9925
TiO2	0.02	79.87	0.0003	0.0006	0.0004
Al2O3	0.02	51.00	0.0005	0.0007	0.0007
Cr2O3	0.04	76.00	0.0005	0.0007	0.0007
FeO	15.23	71.80	0.2121	0.2121	0.3210
MnO	0.24	70.94	0.0033	0.0033	0.0050
MgO	44.72	40.30	1.1097	1.1097	1.6795
CaO	0.22	56.10	0.0040	0.0040	0.0060
Na2O	0.02	31.00	0.0005	0.0003	0.0008
Total	99.92			2.6428	3.0068
No. of Oxygens	4				
F	1.514				

End Member Calculation		
X_{fo}	1.6795	84.0
X_{fa}	0.3210	16.0
	2.0006	100.0

Analysis No.	162				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.68	60.10	0.6602	1.3205	0.9936
TiO2	0.05	79.87	0.0007	0.0013	0.0010
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.02	76.00	0.0002	0.0003	0.0003
FeO	15.86	71.80	0.2209	0.2209	0.3324
MnO	0.23	70.94	0.0033	0.0033	0.0050
MgO	44.67	40.30	1.1084	1.1084	1.6680
CaO	0.17	56.10	0.0030	0.0030	0.0045
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	100.69			2.6580	3.0051
No. of Oxygens	4				
F	1.505				

End Member Calculation		
X_{fo}	1.6680	83.4
X_{fa}	0.3324	16.6
	2.0005	100.0

Analysis No.	163				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.49	60.10	0.6571	1.3141	0.9878
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.01	76.00	0.0001	0.0001	0.0001
FeO	15.27	71.80	0.2127	0.2127	0.3197
MnO	0.26	70.94	0.0036	0.0036	0.0055
MgO	45.40	40.30	1.1266	1.1266	1.6935
CaO	0.18	56.10	0.0033	0.0033	0.0049
Na2O	0.03	31.00	0.0009	0.0005	0.0014
Total	100.64			2.6608	3.0129
No. of Oxygens	4				
F	1.503				

End Member Calculation		
X_{fo}	1.6935	84.1
X_{fa}	0.3197	15.9
	2.0132	100.0

Analysis No.	164				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.21	60.10	0.6691	1.3381	0.9947
TiO2	0.00	79.87	0.0000	0.0001	0.0001
Al2O3	0.00	51.00	0.0001	0.0001	0.0001
Cr2O3	0.07	76.00	0.0009	0.0014	0.0014
FeO	11.30	71.80	0.1574	0.1574	0.2340
MnO	0.18	70.94	0.0025	0.0025	0.0037
MgO	47.84	40.30	1.1871	1.1871	1.7649
CaO	0.21	56.10	0.0037	0.0037	0.0055
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	99.82			2.6904	3.0045
No. of Oxygens	4				
F	1.487				

End Member Calculation		
X_{fo}	1.7649	88.3
X_{fa}	0.2340	11.7
	1.9989	100.0

Analysis No.	288				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.41	60.10	0.6391	1.2782	0.9863
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.03	51.00	0.0005	0.0008	0.0008
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.33	71.80	0.3249	0.3249	0.5015
MnO	0.39	70.94	0.0055	0.0055	0.0085
MgO	39.46	40.30	0.9792	0.9792	1.5112
CaO	0.18	56.10	0.0033	0.0033	0.0051
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.80			2.5918	3.0133
No. of Oxygens	4				
F	1.543				

End Member Calculation		
X_{fo}	1.5112	75.1
X_{fa}	0.5015	24.9
	2.0126	100.0

Analysis No.	289				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.21	60.10	0.6358	1.2715	0.9843
TiO2	0.01	79.87	0.0001	0.0003	0.0002
Al2O3	0.03	51.00	0.0005	0.0008	0.0008
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.49	71.80	0.3272	0.3272	0.5065
MnO	0.38	70.94	0.0053	0.0053	0.0082
MgO	39.29	40.30	0.9749	0.9749	1.5094
CaO	0.20	56.10	0.0036	0.0036	0.0056
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.61			2.5836	3.0151
No. of Oxygens	4				
F	1.548				

End Member Calculation		
X_{fo}	1.5094	74.9
X_{fa}	0.5065	25.1
	2.0159	100.0

Analysis No.	294				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.37	60.10	0.6384	1.2769	0.9862
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.03	51.00	0.0005	0.0008	0.0008
Cr2O3	0.02	76.00	0.0002	0.0003	0.0003
FeO	23.37	71.80	0.3255	0.3255	0.5028
MnO	0.37	70.94	0.0052	0.0052	0.0080
MgO	39.38	40.30	0.9772	0.9772	1.5095
CaO	0.19	56.10	0.0034	0.0034	0.0053
Na2O	0.01	31.00	0.0004	0.0002	0.0006
Total	101.73			2.5894	3.0135
No. of Oxygens	4				
F	1.545				

End Member Calculation		
X_{fo}	1.5095	75.0
X_{fa}	0.5028	25.0
	2.0123	100.0

Analysis No.	295				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.10	60.10	0.6339	1.2679	0.9877
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0003	0.0005	0.0005
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.58	71.80	0.3284	0.3284	0.5117
MnO	0.39	70.94	0.0055	0.0055	0.0086

MgO	38.71	40.30	0.9605	0.9605	1.4966
CaO	0.23	56.10	0.0041	0.0041	0.0063
Na2O	0.02	31.00	0.0007	0.0003	0.0011
Total	101.05			2.5672	3.0125
No. of Oxygens	4				
F	1.558				

End Member Calculation		
X_{fo}	1.4966	74.5
X_{fa}	0.5117	25.5
	2.0083	100.0

Analysis No.	301				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.51	60.10	0.6408	1.2815	0.9898
TiO2	0.01	79.87	0.0001	0.0002	0.0001
Al2O3	0.03	51.00	0.0005	0.0008	0.0008
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.50	71.80	0.3134	0.3134	0.4841
MnO	0.32	70.94	0.0046	0.0046	0.0071
MgO	39.75	40.30	0.9864	0.9864	1.5237
CaO	0.14	56.10	0.0025	0.0025	0.0039
Na2O	0.01	31.00	0.0002	0.0001	0.0003
Total	101.27			2.5894	3.0098
No. of Oxygens	4				
F	1.545				

End Member Calculation		
X_{fo}	1.5237	75.9
X_{fa}	0.4841	24.1
	2.0077	100.0

Analysis No.	302				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.23	60.10	0.6361	1.2722	0.9858
TiO2	0.04	79.87	0.0005	0.0009	0.0007
Al2O3	0.03	51.00	0.0006	0.0008	0.0009
Cr2O3	0.02	76.00	0.0003	0.0004	0.0004
FeO	23.07	71.80	0.3213	0.3213	0.4979
MnO	0.31	70.94	0.0043	0.0043	0.0067
MgO	39.42	40.30	0.9782	0.9782	1.5159
CaO	0.16	56.10	0.0028	0.0028	0.0044
Na2O	0.01	31.00	0.0002	0.0001	0.0003
Total	101.28			2.5811	3.0130
No. of Oxygens	4				
F	1.550				

End Member Calculation		
X_{fo}	1.5159	75.3
X_{fa}	0.4979	24.7
	2.0138	100.0

Analysis No.	311				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.27	60.10	0.6368	1.2735	0.9818
TiO2	0.01	79.87	0.0001	0.0002	0.0001
Al2O3	0.03	51.00	0.0006	0.0009	0.0010
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.78	71.80	0.3312	0.3312	0.5106
MnO	0.35	70.94	0.0050	0.0050	0.0077
MgO	39.49	40.30	0.9799	0.9799	1.5108
CaO	0.19	56.10	0.0034	0.0034	0.0052
Na2O	0.02	31.00	0.0005	0.0003	0.0008
Total	102.14			2.5944	3.0180
No. of Oxygens	4				
F	1.542				

End Member Calculation		
X_{fo}	1.5108	74.7
X_{fa}	0.5106	25.3
	2.0214	100.0

Analysis No.	312				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.28	60.10	0.6369	1.2739	0.9838
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0001	0.0002	0.0002
Cr2O3	0.01	76.00	0.0001	0.0002	0.0002
FeO	24.05	71.80	0.3350	0.3350	0.5174
MnO	0.36	70.94	0.0051	0.0051	0.0079
MgO	39.15	40.30	0.9715	0.9715	1.5006
CaO	0.19	56.10	0.0033	0.0033	0.0051
Na2O	0.03	31.00	0.0009	0.0005	0.0015
Total	102.07			2.5896	3.0167
No. of Oxygens	4				
F	1.545				

End Member Calculation		
X_{fo}	1.5006	74.4
X_{fa}	0.5174	25.6
	2.0180	100.0

Analysis No.	331				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.25	60.10	0.6364	1.2729	0.9858
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0001	0.0002	0.0002
Cr2O3	0.01	76.00	0.0001	0.0002	0.0002
FeO	23.28	71.80	0.3242	0.3242	0.5022
MnO	0.37	70.94	0.0052	0.0052	0.0081
MgO	39.35	40.30	0.9764	0.9764	1.5125
CaO	0.17	56.10	0.0030	0.0030	0.0046
Na2O	0.01	31.00	0.0004	0.0002	0.0006
Total	101.45			2.5823	3.0143
No. of Oxygens	4				
F	1.549				

End Member Calculation		
X_{fo}	1.5125	75.1
X_{fa}	0.5022	24.9
	2.0147	100.0

Analysis No.	332				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.19	60.10	0.6354	1.2709	0.9864
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0003	0.0004	0.0004
Cr2O3	0.02	76.00	0.0003	0.0004	0.0004
FeO	23.38	71.80	0.3256	0.3256	0.5055
MnO	0.38	70.94	0.0053	0.0053	0.0082
MgO	39.12	40.30	0.9707	0.9707	1.5068
CaO	0.18	56.10	0.0032	0.0032	0.0049
Na2O	0.02	31.00	0.0007	0.0003	0.0010
Total	101.30			2.5769	3.0137
No. of Oxygens	4				
F	1.552				

End Member Calculation		
X_{fo}	1.5068	74.9
X_{fa}	0.5055	25.1
	2.0123	100.0

Analysis No.	137				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.87	60.10	0.6468	1.2935	0.9873
TiO2	0.02	79.87	0.0002	0.0005	0.0004
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.02	76.00	0.0002	0.0003	0.0004
FeO	19.91	71.80	0.2773	0.2773	0.4233
MnO	0.30	70.94	0.0043	0.0043	0.0065
MgO	41.97	40.30	1.0414	1.0414	1.5898
CaO	0.15	56.10	0.0026	0.0026	0.0040
Na2O	0.02	31.00	0.0005	0.0002	0.0008
Total	101.25			2.6202	3.0125
No. of Oxygens	4				
F	1.527				

End Member Calculation		
X_{fo}	1.5898	79.0
X_{fa}	0.4233	21.0
	2.0132	100.0

Analysis No.	138				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.19	60.10	0.6354	1.2709	0.9826
TiO2	0.03	79.87	0.0004	0.0008	0.0006
Al2O3	0.03	51.00	0.0006	0.0009	0.0009
Cr2O3	0.01	76.00	0.0001	0.0002	0.0002
FeO	22.73	71.80	0.3166	0.3166	0.4895
MnO	0.35	70.94	0.0049	0.0049	0.0076
MgO	39.74	40.30	0.9861	0.9861	1.5249
CaO	0.21	56.10	0.0037	0.0037	0.0058
Na2O	0.17	31.00	0.0054	0.0027	0.0083
Total	101.45			2.5867	3.0204
No. of Oxygens	4				
F	1.546				

End Member Calculation		
X_{fo}	1.5249	75.7
X_{fa}	0.4895	24.3
	2.0144	100.0

Analysis No.	139				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.07	60.10	0.6501	1.3002	0.9866
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0003	0.0004	0.0004
Cr2O3	0.02	76.00	0.0002	0.0003	0.0003
FeO	20.68	71.80	0.2880	0.2880	0.4371
MnO	0.34	70.94	0.0048	0.0048	0.0073
MgO	41.84	40.30	1.0382	1.0382	1.5756
CaO	0.20	56.10	0.0035	0.0035	0.0054
Na2O	0.02	31.00	0.0005	0.0002	0.0007
Total	102.18			2.6358	3.0134
No. of Oxygens	4				
F	1.518				

End Member Calculation		
X_{fo}	1.5756	78.3
X_{fa}	0.4371	21.7
	2.0127	100.0

Analysis No.	153				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.07	60.10	0.6501	1.3002	0.9866
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0003	0.0004	0.0004
Cr2O3	0.02	76.00	0.0002	0.0003	0.0003
FeO	20.68	71.80	0.2880	0.2880	0.4371
MnO	0.34	70.94	0.0048	0.0048	0.0073
MgO	41.84	40.30	1.0382	1.0382	1.5756
CaO	0.20	56.10	0.0035	0.0035	0.0054
Na2O	0.02	31.00	0.0005	0.0002	0.0007
Total	102.18			2.6358	3.0134
No. of Oxygens	4				
F	1.518				

End Member Calculation		
X_{fo}	1.5756	78.3
X_{fa}	0.4371	21.7
	2.0127	100.0

Analysis No.	158				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.56	60.10	0.6416	1.2832	0.9781
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0004	0.0006	0.0007
Cr2O3	0.05	76.00	0.0007	0.0010	0.0010
FeO	20.94	71.80	0.2916	0.2916	0.4446
MnO	0.38	70.94	0.0054	0.0054	0.0082
MgO	41.85	40.30	1.0385	1.0385	1.5831
CaO	0.19	56.10	0.0035	0.0035	0.0053
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	102.00			2.6238	3.0210

No. of Oxygens	4
F	1.524

End Member Calculation		
X_{fo}	1.5831	78.1
X_{fa}	0.4446	21.9
	2.0277	100.0

Analysis No.	168				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.74	60.10	0.6446	1.2892	0.9861
TiO2	0.05	79.87	0.0006	0.0012	0.0009
Al2O3	0.00	51.00	0.0001	0.0001	0.0001
Cr2O3	0.02	76.00	0.0002	0.0003	0.0003
FeO	20.63	71.80	0.2873	0.2873	0.4396
MnO	0.35	70.94	0.0050	0.0050	0.0076
MgO	41.45	40.30	1.0285	1.0285	1.5735
CaO	0.17	56.10	0.0030	0.0030	0.0046
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.41			2.6147	3.0127
No. of Oxygens	4				
F	1.530				

End Member Calculation		
X_{fo}	1.5735	78.2
X_{fa}	0.4396	21.8
	2.0130	100.0

Analysis No.	170				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.71	60.10	0.6441	1.2882	0.9857
TiO2	0.02	79.87	0.0002	0.0004	0.0003
Al2O3	0.01	51.00	0.0003	0.0004	0.0004
Cr2O3	0.01	76.00	0.0001	0.0001	0.0001
FeO	21.13	71.80	0.2943	0.2943	0.4504
MnO	0.34	70.94	0.0048	0.0048	0.0073
MgO	41.19	40.30	1.0221	1.0221	1.5641
CaO	0.20	56.10	0.0036	0.0036	0.0056
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.61			2.6139	3.0138
No. of Oxygens	4				
F	1.530				

End Member Calculation		
X_{fo}	1.5641	77.6
X_{fa}	0.4504	22.4
	2.0144	100.0

Analysis No.	165				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.71	60.10	0.6441	1.2882	0.9891
TiO2	0.03	79.87	0.0004	0.0009	0.0007
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.01	76.00	0.0001	0.0002	0.0002
FeO	20.15	71.80	0.2806	0.2806	0.4310
MnO	0.31	70.94	0.0043	0.0043	0.0067
MgO	41.37	40.30	1.0266	1.0266	1.5765
CaO	0.19	56.10	0.0034	0.0034	0.0052
Na2O	0.01	31.00	0.0004	0.0002	0.0007
Total	100.80			2.6047	3.0103
No. of Oxygens	4				
F	1.536				

End Member Calculation		
X_{fo}	1.5765	78.5
X_{fa}	0.4310	21.5
	2.0075	100.0

Analysis No.	166				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.75	60.10	0.6448	1.2895	0.9856
TiO2	0.04	79.87	0.0005	0.0010	0.0008
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.02	76.00	0.0003	0.0004	0.0004
FeO	20.75	71.80	0.2890	0.2890	0.4418
MnO	0.34	70.94	0.0048	0.0048	0.0074
MgO	41.45	40.30	1.0285	1.0285	1.5722
CaO	0.20	56.10	0.0035	0.0035	0.0053
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.55			2.6168	3.0134
No. of Oxygens	4				
F	1.529				

End Member Calculation		
X_{fo}	1.5722	78.1
X_{fa}	0.4418	21.9
	2.0139	100.0

Analysis No.	355				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.51	60.10	0.6408	1.2815	0.9880
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.03	51.00	0.0007	0.0010	0.0010
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.28	71.80	0.3242	0.3242	0.4999
MnO	0.36	70.94	0.0050	0.0050	0.0077
MgO	39.45	40.30	0.9789	0.9789	1.5093
CaO	0.20	56.10	0.0036	0.0036	0.0056
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.83			2.5943	3.0115
No. of Oxygens	4				
F	1.542				

End Member Calculation		
X_{fo}	1.5093	75.1
X_{fa}	0.4999	24.9
	2.0092	100.0

Analysis No.	356				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.46	60.10	0.6399	1.2799	0.9894
TiO2	0.03	79.87	0.0003	0.0007	0.0005
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.20	71.80	0.3231	0.3231	0.4996
MnO	0.34	70.94	0.0047	0.0047	0.0073
MgO	39.29	40.30	0.9749	0.9749	1.5073
CaO	0.21	56.10	0.0037	0.0037	0.0057
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.53			2.5873	3.0100
No. of Oxygens	4				
F	1.546				

End Member Calculation		
X_{fo}	1.5073	75.1
X_{fa}	0.4996	24.9
	2.0068	100.0

Analysis No.	360				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.33	60.10	0.6378	1.2755	0.9830
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.10	71.80	0.3217	0.3217	0.4959
MnO	0.36	70.94	0.0050	0.0050	0.0077
MgO	39.87	40.30	0.9893	0.9893	1.5248
CaO	0.20	56.10	0.0036	0.0036	0.0056
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.86			2.5953	3.0170
No. of Oxygens	4				
F	1.541				

End Member Calculation		
X_{fo}	1.5248	75.5
X_{fa}	0.4959	24.5
	2.0207	100.0

Analysis No.	361				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.48	60.10	0.6403	1.2805	0.9874
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0001	0.0002	0.0002
Cr2O3	0.00	76.00	0.0001	0.0001	0.0001
FeO	23.24	71.80	0.3237	0.3237	0.4992
MnO	0.35	70.94	0.0050	0.0050	0.0076
MgO	39.51	40.30	0.9804	0.9804	1.5119
CaO	0.22	56.10	0.0039	0.0039	0.0061
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.81			2.5938	3.0125
No. of Oxygens	4				
F	1.542				

End Member Calculation		
X_{fo}	1.5119	75.2
X_{fa}	0.4992	24.8
	2.0111	100.0

Analysis No.	363				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.30	60.10	0.6373	1.2745	0.9830
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0001	0.0001	0.0001
Cr2O3	0.03	76.00	0.0004	0.0005	0.0005
FeO	22.93	71.80	0.3194	0.3194	0.4926
MnO	0.31	70.94	0.0044	0.0044	0.0068
MgO	39.93	40.30	0.9908	0.9908	1.5283
CaO	0.20	56.10	0.0035	0.0035	0.0054

Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.70			2.5933	3.0167
No. of Oxygens	4				
F	1.542				

End Member Calculation		
X_{fo}	1.5283	75.6
X_{fa}	0.4926	24.4
	2.0209	100.0

Analysis No.	364				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.44	60.10	0.6396	1.2792	0.9863
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0004	0.0006	0.0006
Cr2O3	0.01	76.00	0.0001	0.0001	0.0001
FeO	22.98	71.80	0.3201	0.3201	0.4936
MnO	0.34	70.94	0.0048	0.0048	0.0074
MgO	39.71	40.30	0.9854	0.9854	1.5195
CaO	0.20	56.10	0.0036	0.0036	0.0056
Na2O	0.01	31.00	0.0003	0.0001	0.0004
Total	101.71			2.5939	3.0135
No. of Oxygens	4				
F	1.542				

End Member Calculation		
X_{fo}	1.5195	75.5
X_{fa}	0.4936	24.5
	2.0131	100.0

Analysis No.	365				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.38	60.10	0.6386	1.2772	0.9887
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.01	76.00	0.0001	0.0002	0.0002
FeO	22.53	71.80	0.3138	0.3138	0.4858
MnO	0.39	70.94	0.0055	0.0055	0.0085
MgO	39.62	40.30	0.9831	0.9831	1.5221
CaO	0.21	56.10	0.0038	0.0038	0.0059
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.14			2.5835	3.0112
No. of Oxygens	4				
F	1.548				

End Member Calculation		
X_{fo}	1.5221	75.8
X_{fa}	0.4858	24.2
	2.0080	100.0

Analysis No.	366				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.40	60.10	0.6389	1.2779	0.9894
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0005	0.0007	0.0008
Cr2O3	0.02	76.00	0.0002	0.0003	0.0003
FeO	22.95	71.80	0.3196	0.3196	0.4950
MnO	0.38	70.94	0.0054	0.0054	0.0083
MgO	39.32	40.30	0.9757	0.9757	1.5108
CaO	0.20	56.10	0.0036	0.0036	0.0055
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.29			2.5832	3.0101
No. of Oxygens	4				
F	1.548				

End Member Calculation		
X_{fo}	1.5108	75.3
X_{fa}	0.4950	24.7
	2.0058	100.0

Analysis No.	367				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.08	60.10	0.6336	1.2672	0.9852
TiO2	0.03	79.87	0.0004	0.0008	0.0007
Al2O3	0.03	51.00	0.0006	0.0009	0.0010
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.79	71.80	0.3174	0.3174	0.4935
MnO	0.32	70.94	0.0046	0.0046	0.0071
MgO	39.40	40.30	0.9777	0.9777	1.5202
CaO	0.22	56.10	0.0039	0.0039	0.0060
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	100.87			2.5725	3.0137
No. of Oxygens	4				
F	1.555				

End Member Calculation		
X_{fo}	1.5202	75.5

X_{fa}	0.4935	24.5
	2.0137	100.0

Analysis No.	368				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.59	60.10	0.6421	1.2842	0.9874
TiO2	0.02	79.87	0.0003	0.0006	0.0004
Al2O3	0.02	51.00	0.0004	0.0006	0.0006
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.15	71.80	0.3224	0.3224	0.4958
MnO	0.36	70.94	0.0050	0.0050	0.0077
MgO	39.67	40.30	0.9844	0.9844	1.5137
CaO	0.21	56.10	0.0037	0.0037	0.0056
Na2O	0.02	31.00	0.0008	0.0004	0.0012
Total	102.04			2.6012	3.0125
No. of Oxygens	4				
F	1.538				

End Member Calculation		
X_{fo}	1.5137	75.3
X_{fa}	0.4958	24.7
	2.0095	100.0

Analysis No.	394				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.40	60.10	0.6389	1.2779	0.9895
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.05	51.00	0.0010	0.0015	0.0015
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.91	71.80	0.3191	0.3191	0.4941
MnO	0.33	70.94	0.0047	0.0047	0.0073
MgO	39.34	40.30	0.9762	0.9762	1.5117
CaO	0.20	56.10	0.0036	0.0036	0.0056
Na2O	0.00	31.00	0.0001	0.0001	0.0002
Total	101.24			2.5829	3.0099
No. of Oxygens	4				
F	1.549				

End Member Calculation		
X_{fo}	1.5117	75.4
X_{fa}	0.4941	24.6
	2.0059	100.0

Analysis No.	395				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.51	60.10	0.6408	1.2815	0.9880
TiO2	0.04	79.87	0.0005	0.0010	0.0008
Al2O3	0.02	51.00	0.0004	0.0006	0.0006
Cr2O3	0.02	76.00	0.0002	0.0003	0.0003
FeO	22.99	71.80	0.3202	0.3202	0.4937
MnO	0.34	70.94	0.0047	0.0047	0.0073
MgO	39.57	40.30	0.9819	0.9819	1.5139
CaO	0.22	56.10	0.0040	0.0040	0.0061
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.71			2.5943	3.0108
No. of Oxygens	4				
F	1.542				

End Member Calculation		
X_{fo}	1.5139	75.4
X_{fa}	0.4937	24.6
	2.0076	100.0

Analysis No.	403				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.36	60.10	0.6383	1.2765	0.9868
TiO2	0.05	79.87	0.0006	0.0012	0.0009
Al2O3	0.02	51.00	0.0005	0.0007	0.0007
Cr2O3	0.03	76.00	0.0004	0.0007	0.0007
FeO	22.67	71.80	0.3157	0.3157	0.4881
MnO	0.39	70.94	0.0055	0.0055	0.0084
MgO	39.63	40.30	0.9834	0.9834	1.5203
CaO	0.20	56.10	0.0036	0.0036	0.0056
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.36			2.5873	3.0116
No. of Oxygens	4				
F	1.546				

End Member Calculation		
X_{fo}	1.5203	75.7
X_{fa}	0.4881	24.3
	2.0085	100.0

Analysis No.	404				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.44	60.10	0.6396	1.2792	0.9859
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0004	0.0006	0.0006
Cr2O3	0.03	76.00	0.0004	0.0006	0.0006
FeO	23.31	71.80	0.3247	0.3247	0.5004

MnO	0.32	70.94	0.0045	0.0045	0.0070
MgO	39.54	40.30	0.9811	0.9811	1.5123
CaO	0.21	56.10	0.0038	0.0038	0.0058
Na2O	0.03	31.00	0.0011	0.0006	0.0017
Total	101.91			2.5950	3.0144
No. of Oxygens	4				
F	1.541				

End Member Calculation		
X_{fo}	1.5123	75.1
X_{fa}	0.5004	24.9
	2.0128	100.0

Analysis No.	405				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	37.98	60.10	0.6319	1.2639	0.9884
TiO2	0.01	79.87	0.0001	0.0003	0.0002
Al2O3	0.03	51.00	0.0006	0.0009	0.0009
Cr2O3	0.01	76.00	0.0001	0.0002	0.0002
FeO	24.10	71.80	0.3357	0.3357	0.5250
MnO	0.37	70.94	0.0052	0.0052	0.0081
MgO	38.13	40.30	0.9462	0.9462	1.4799
CaO	0.28	56.10	0.0050	0.0050	0.0079
Na2O	0.01	31.00	0.0002	0.0001	0.0003
Total	100.92			2.5574	3.0109
No. of Oxygens	4				
F	1.564				

End Member Calculation		
X_{fo}	1.4799	73.8
X_{fa}	0.5250	26.2
	2.0049	100.0

Analysis No.	407				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.72	60.10	0.6443	1.2885	0.9926
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.03	51.00	0.0005	0.0008	0.0008
Cr2O3	0.00	76.00	0.0000	0.0001	0.0001
FeO	23.42	71.80	0.3262	0.3262	0.5025
MnO	0.36	70.94	0.0051	0.0051	0.0079
MgO	39.13	40.30	0.9710	0.9710	1.4959
CaO	0.25	56.10	0.0044	0.0044	0.0068
Na2O	0.02	31.00	0.0007	0.0003	0.0010
Total	101.93			2.5963	3.0075
No. of Oxygens	4				
F	1.541				

End Member Calculation		
X_{fo}	1.4959	74.9
X_{fa}	0.5025	25.1
	1.9984	100.0

Analysis No.	408				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	37.99	60.10	0.6321	1.2642	0.9881
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.04	51.00	0.0008	0.0012	0.0013
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.83	71.80	0.3319	0.3319	0.5188
MnO	0.41	70.94	0.0058	0.0058	0.0090
MgO	38.32	40.30	0.9509	0.9509	1.4863
CaO	0.27	56.10	0.0047	0.0047	0.0074
Na2O	0.02	31.00	0.0005	0.0003	0.0008
Total	100.87			2.5590	3.0117
No. of Oxygens	4				
F	1.563				

End Member Calculation		
X_{fo}	1.4863	74.1
X_{fa}	0.5188	25.9
	2.0051	100.0

Analysis No.	415				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.33	60.10	0.6378	1.2755	0.9889
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0001	0.0002	0.0002
Cr2O3	0.01	76.00	0.0001	0.0002	0.0002
FeO	23.56	71.80	0.3281	0.3281	0.5088
MnO	0.35	70.94	0.0049	0.0049	0.0076
MgO	38.92	40.30	0.9658	0.9658	1.4975
CaO	0.26	56.10	0.0047	0.0047	0.0072
Na2O	0.02	31.00	0.0005	0.0002	0.0008
Total	101.45			2.5796	3.0113
No. of Oxygens	4				
F	1.551				

End Member Calculation		
X_{fo}	1.4975	74.6
X_{fa}	0.5088	25.4
	2.0063	100.0

Analysis No.	419				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.35	60.10	0.6381	1.2762	0.9918
TiO2	0.02	79.87	0.0003	0.0006	0.0004
Al2O3	0.02	51.00	0.0004	0.0006	0.0006
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.19	71.80	0.3091	0.3091	0.4804
MnO	0.34	70.94	0.0049	0.0049	0.0075
MgO	39.42	40.30	0.9782	0.9782	1.5204
CaO	0.21	56.10	0.0038	0.0038	0.0059
Na2O	0.01	31.00	0.0004	0.0002	0.0006
Total	100.57			2.5735	3.0077
No. of Oxygens	4				
F	1.554				

End Member Calculation		
X_{fo}	1.5204	76.0
X_{fa}	0.4804	24.0
	2.0008	100.0

Analysis No.	420				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.35	60.10	0.6381	1.2762	0.9891
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.03	51.00	0.0006	0.0009	0.0009
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	23.08	71.80	0.3214	0.3214	0.4983
MnO	0.38	70.94	0.0054	0.0054	0.0083
MgO	39.16	40.30	0.9717	0.9717	1.5062
CaO	0.27	56.10	0.0049	0.0049	0.0075
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.27			2.5805	3.0104
No. of Oxygens	4				
F	1.550				

End Member Calculation		
X_{fo}	1.5062	75.1
X_{fa}	0.4983	24.9
	2.0045	100.0

Analysis No.	422				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.41	60.10	0.6391	1.2782	0.9857
TiO2	0.01	79.87	0.0002	0.0004	0.0003
Al2O3	0.01	51.00	0.0002	0.0002	0.0002
Cr2O3	0.01	76.00	0.0002	0.0003	0.0003
FeO	23.07	71.80	0.3213	0.3213	0.4955
MnO	0.35	70.94	0.0050	0.0050	0.0077
MgO	39.68	40.30	0.9846	0.9846	1.5185
CaO	0.20	56.10	0.0036	0.0036	0.0056
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.75			2.5936	3.0138
No. of Oxygens	4				
F	1.542				

End Member Calculation		
X_{fo}	1.5185	75.4
X_{fa}	0.4955	24.6
	2.0141	100.0

Analysis No.	423				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	38.60	60.10	0.6423	1.2845	0.9910
TiO2	0.02	79.87	0.0002	0.0005	0.0004
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	22.99	71.80	0.3202	0.3202	0.4941
MnO	0.37	70.94	0.0053	0.0053	0.0081
MgO	39.39	40.30	0.9774	0.9774	1.5082
CaO	0.23	56.10	0.0040	0.0040	0.0062
Na2O	0.01	31.00	0.0002	0.0001	0.0004
Total	101.62			2.5923	3.0087
No. of Oxygens	4				
F	1.543				

End Member Calculation		
X_{fo}	1.5082	75.3
X_{fa}	0.4941	24.7
	2.0022	100.0

Analysis No.	232				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.52	60.10	0.6576	1.3151	1.0742
TiO2	0.07	79.87	0.0008	0.0017	0.0014
Al2O3	0.02	51.00	0.0004	0.0006	0.0006
Cr2O3	0.01	76.00	0.0002	0.0002	0.0002
FeO	4.45	71.80	0.0620	0.0620	0.1012
MnO	0.23	70.94	0.0032	0.0032	0.0053
MgO	42.81	40.30	1.0623	1.0623	1.7353
CaO	0.18	56.10	0.0032	0.0032	0.0053
Na2O	0.02	31.00	0.0006	0.0003	0.0009
Total	87.31			2.4486	2.9245
					Cation Deficiency
No. of Oxygens	4				
F	1.634				

End Member Calculation		
X_{fo}	1.7353	94.5
X_{fa}	0.1012	5.5
	1.8366	100.0

Analysis No.	233				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.64	60.10	0.6596	1.3191	0.9915
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.02	76.00	0.0003	0.0005	0.0005
FeO	15.33	71.80	0.2135	0.2135	0.3210
MnO	0.22	70.94	0.0031	0.0031	0.0046
MgO	45.16	40.30	1.1206	1.1206	1.6846
CaO	0.19	56.10	0.0035	0.0035	0.0052
Na2O	0.02	31.00	0.0006	0.0003	0.0009
Total	100.60			2.6609	3.0086
No. of Oxygens	4				
F	1.503				

End Member Calculation		
X_{fo}	1.6846	84.0
X_{fa}	0.3210	16.0
	2.0055	100.0

Analysis No.	241				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.78	60.10	0.6619	1.3238	0.9935
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.04	51.00	0.0007	0.0010	0.0010
Cr2O3	0.01	76.00	0.0001	0.0002	0.0002
FeO	14.08	71.80	0.1961	0.1961	0.2943
MnO	0.20	70.94	0.0028	0.0028	0.0043
MgO	45.86	40.30	1.1380	1.1380	1.7081
CaO	0.17	56.10	0.0030	0.0030	0.0045
Na2O	0.00	31.00	0.0001	0.0000	0.0001
Total	100.14			2.6649	3.0060
No. of Oxygens	4				
F	1.501				

End Member Calculation		
X_{fo}	1.7081	85.3
X_{fa}	0.2943	14.7
	2.0024	100.0

Analysis No.	242				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.84	60.10	0.6629	1.3258	0.9900
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0001	0.0001	0.0001
Cr2O3	0.01	76.00	0.0002	0.0002	0.0002
FeO	15.12	71.80	0.2106	0.2106	0.3145
MnO	0.23	70.94	0.0032	0.0032	0.0048
MgO	45.73	40.30	1.1347	1.1347	1.6947
CaO	0.20	56.10	0.0035	0.0035	0.0052
Na2O	0.00	31.00	0.0001	0.0000	0.0001
Total	101.13			2.6783	3.0098
No. of Oxygens	4				
F	1.494				

End Member Calculation		
X_{fo}	1.6947	84.3
X_{fa}	0.3145	15.7
	2.0093	100.0

Analysis No.	251				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.40	60.10	0.6556	1.3111	0.9894
TiO2	0.00	79.87	0.0000	0.0001	0.0001
Al2O3	0.00	51.00	0.0000	0.0001	0.0001
Cr2O3	0.00	76.00	0.0000	0.0001	0.0001
FeO	17.30	71.80	0.2409	0.2409	0.3636
MnO	0.27	70.94	0.0038	0.0038	0.0058
MgO	43.99	40.30	1.0916	1.0916	1.6474
CaO	0.15	56.10	0.0026	0.0026	0.0040
Na2O	0.01	31.00	0.0003	0.0001	0.0004
Total	101.13			2.6504	3.0107
No. of Oxygens	4				
F	1.509				

End Member Calculation		
X_{fo}	1.6474	81.9
X_{fa}	0.3636	18.1
	2.0110	100.0

Analysis No.	252				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.22	60.10	0.6526	1.3052	0.9883
TiO2	0.01	79.87	0.0001	0.0002	0.0001
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	18.95	71.80	0.2639	0.2639	0.3997
MnO	0.26	70.94	0.0036	0.0036	0.0055
MgO	42.94	40.30	1.0655	1.0655	1.6137
CaO	0.15	56.10	0.0027	0.0027	0.0041
Na2O	0.00	31.00	0.0001	0.0001	0.0002
Total	101.53			2.6412	3.0116
No. of Oxygens	4				
F	1.514				

End Member Calculation		
X_{fo}	1.6137	80.1
X_{fa}	0.3997	19.9
	2.0134	100.0

Analysis No.	253				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.65	60.10	0.6597	1.3195	0.9900
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.02	76.00	0.0003	0.0004	0.0004
FeO	16.19	71.80	0.2255	0.2255	0.3384
MnO	0.24	70.94	0.0034	0.0034	0.0051
MgO	44.88	40.30	1.1136	1.1136	1.6712
CaO	0.16	56.10	0.0029	0.0029	0.0043
Na2O	0.01	31.00	0.0002	0.0001	0.0003
Total	101.16			2.6655	3.0099
No. of Oxygens	4				
F	1.501				

End Member Calculation		
X_{fo}	1.6712	83.2
X_{fa}	0.3384	16.8
	2.0096	100.0

Analysis No.	255				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.96	60.10	0.6649	1.3298	0.9859
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0000	0.0001	0.0001
Cr2O3	0.07	76.00	0.0009	0.0013	0.0013
FeO	14.81	71.80	0.2063	0.2063	0.3058
MnO	0.22	70.94	0.0031	0.0031	0.0046
MgO	46.52	40.30	1.1543	1.1543	1.7116
CaO	0.16	56.10	0.0029	0.0029	0.0042
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.74			2.6977	3.0135
No. of Oxygens	4				
F	1.483				

End Member Calculation		
X_{fo}	1.7116	84.8
X_{fa}	0.3058	15.2
	2.0174	100.0

Analysis No.	256				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.64	60.10	0.6596	1.3191	0.9870
TiO2	0.02	79.87	0.0002	0.0004	0.0003
Al2O3	0.03	51.00	0.0005	0.0008	0.0008
Cr2O3	0.01	76.00	0.0001	0.0002	0.0002
FeO	15.48	71.80	0.2156	0.2156	0.3226
MnO	0.24	70.94	0.0034	0.0034	0.0050
MgO	45.55	40.30	1.1303	1.1303	1.6913
CaO	0.19	56.10	0.0033	0.0033	0.0050
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	101.15			2.6731	3.0122
No. of Oxygens	4				
F	1.496				

End Member Calculation		
X_{fo}	1.6913	84.0
X_{fa}	0.3226	16.0
	2.0140	100.0

Analysis No.	258				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.88	60.10	0.6636	1.3271	0.9877
TiO2	0.02	79.87	0.0002	0.0005	0.0004
Al2O3	0.03	51.00	0.0006	0.0008	0.0008
Cr2O3	0.02	76.00	0.0003	0.0004	0.0004
FeO	15.04	71.80	0.2095	0.2095	0.3118
MnO	0.24	70.94	0.0034	0.0034	0.0051
MgO	45.94	40.30	1.1400	1.1400	1.6967
CaO	0.18	56.10	0.0033	0.0033	0.0049
Na2O	0.15	31.00	0.0049	0.0025	0.0073
Total	101.51			2.6874	3.0150
No. of Oxygens	4				
F	1.488				

End Member Calculation		
X_{fo}	1.6967	84.5
X_{fa}	0.3118	15.5
	2.0085	100.0

Analysis No.	259				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.76	60.10	0.6616	1.3231	0.9894
TiO2	0.03	79.87	0.0004	0.0008	0.0006
Al2O3	0.01	51.00	0.0001	0.0002	0.0002
Cr2O3	0.01	76.00	0.0001	0.0002	0.0002
FeO	14.81	71.80	0.2063	0.2063	0.3085
MnO	0.24	70.94	0.0033	0.0033	0.0050
MgO	45.81	40.30	1.1367	1.1367	1.6999
CaO	0.20	56.10	0.0036	0.0036	0.0054
Na2O	0.03	31.00	0.0008	0.0004	0.0013
Total	100.90			2.6747	3.0105
No. of Oxygens	4				
F	1.495				

End Member Calculation		
X_{fo}	1.6999	84.6
X_{fa}	0.3085	15.4
	2.0084	100.0

Analysis No.	265				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.35	60.10	0.6547	1.3095	0.9890
TiO2	0.02	79.87	0.0003	0.0006	0.0004
Al2O3	0.01	51.00	0.0002	0.0002	0.0002
Cr2O3	0.00	76.00	0.0000	0.0001	0.0001
FeO	19.06	71.80	0.2655	0.2655	0.4010
MnO	0.26	70.94	0.0037	0.0037	0.0056
MgO	42.94	40.30	1.0655	1.0655	1.6095
CaO	0.14	56.10	0.0025	0.0025	0.0038
Na2O	0.03	31.00	0.0010	0.0005	0.0015
Total	101.82			2.6480	3.0111
No. of Oxygens	4				
F	1.511				

End Member Calculation		
X_{fo}	1.6095	80.1
X_{fa}	0.4010	19.9
	2.0105	100.0

Analysis No.	266				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.51	60.10	0.6574	1.3148	0.9827
TiO2	0.03	79.87	0.0003	0.0007	0.0005
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.02	76.00	0.0003	0.0004	0.0004
FeO	16.77	71.80	0.2336	0.2336	0.3491
MnO	0.28	70.94	0.0040	0.0040	0.0059
MgO	45.10	40.30	1.1191	1.1191	1.6728
CaO	0.17	56.10	0.0030	0.0030	0.0045
Na2O	0.00	31.00	0.0001	0.0001	0.0002
Total	101.89			2.6759	3.0165
No. of Oxygens	4				
F	1.495				

End Member Calculation		
X_{fo}	1.6728	82.7
X_{fa}	0.3491	17.3
	2.0220	100.0

Analysis No.	267				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.01	60.10	0.6657	1.3314	0.9896
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0001	0.0001	0.0001
Cr2O3	0.00	76.00	0.0000	0.0000	0.0000
FeO	15.76	71.80	0.2195	0.2195	0.3263
MnO	0.25	70.94	0.0035	0.0035	0.0052
MgO	45.64	40.30	1.1325	1.1325	1.6835
CaO	0.20	56.10	0.0035	0.0035	0.0052
Na2O	0.01	31.00	0.0004	0.0002	0.0007
Total	101.87			2.6908	3.0106
No. of Oxygens	4				
F	1.487				

End Member Calculation		
X_{fo}	1.6835	83.8
X_{fa}	0.3263	16.2
	2.0098	100.0

Analysis No.	275				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.67	60.10	0.6601	1.3201	0.9893
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.01	76.00	0.0002	0.0002	0.0002
FeO	15.28	71.80	0.2128	0.2128	0.3190
MnO	0.21	70.94	0.0030	0.0030	0.0044
MgO	45.49	40.30	1.1288	1.1288	1.6919
CaO	0.19	56.10	0.0034	0.0034	0.0052
Na2O	0.00	31.00	0.0001	0.0000	0.0001
Total	100.87			2.6687	3.0104
No. of Oxygens	4				
F	1.499				

End Member Calculation		
X_{fo}	1.6919	84.1
X_{fa}	0.3190	15.9
	2.0109	100.0

Analysis No.	276				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	39.67	60.10	0.6601	1.3201	0.9905
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.04	76.00	0.0005	0.0008	0.0008
FeO	15.48	71.80	0.2156	0.2156	0.3235
MnO	0.24	70.94	0.0034	0.0034	0.0051
MgO	45.20	40.30	1.1216	1.1216	1.6831
CaO	0.21	56.10	0.0037	0.0037	0.0056
Na2O	0.02	31.00	0.0005	0.0003	0.0008
Total	100.86			2.6655	3.0094
No. of Oxygens	4				
F	1.501				

End Member Calculation		
X_{fo}	1.6831	83.9
X_{fa}	0.3235	16.1
	2.0066	100.0

Analysis No.	302				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.24	60.10	0.6696	1.3391	0.9894
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.01	51.00	0.0001	0.0002	0.0002
Cr2O3	0.08	76.00	0.0010	0.0015	0.0015
FeO	9.96	71.80	0.1387	0.1387	0.2050
MnO	0.15	70.94	0.0022	0.0022	0.0032
MgO	49.18	40.30	1.2203	1.2203	1.8033
CaO	0.25	56.10	0.0044	0.0044	0.0065
Na2O	0.03	31.00	0.0010	0.0005	0.0014
Total	99.89			2.7069	3.0105
No. of Oxygens	4				
F	1.478				

End Member Calculation		
X_{fo}	1.8033	89.8
X_{fa}	0.2050	10.2
	2.0083	100.0

Analysis No.	303				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.42	60.10	0.6725	1.3451	0.9850
TiO2	0.01	79.87	0.0001	0.0003	0.0002
Al2O3	0.01	51.00	0.0002	0.0003	0.0003
Cr2O3	0.04	76.00	0.0006	0.0008	0.0008
FeO	9.03	71.80	0.1258	0.1258	0.1842
MnO	0.17	70.94	0.0024	0.0024	0.0035
MgO	50.46	40.30	1.2521	1.2521	1.8338
CaO	0.25	56.10	0.0044	0.0044	0.0064
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	100.39			2.7312	3.0143
No. of Oxygens	4				
F	1.465				

End Member Calculation		
X_{fo}	1.8338	90.9
X_{fa}	0.1842	9.1
	2.0180	100.0

Analysis No.	304				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.32	60.10	0.6709	1.3418	0.9837
TiO2	0.05	79.87	0.0006	0.0013	0.0009
Al2O3	0.01	51.00	0.0002	0.0004	0.0003
Cr2O3	0.03	76.00	0.0004	0.0006	0.0006
FeO	9.52	71.80	0.1326	0.1326	0.1944
MnO	0.17	70.94	0.0024	0.0024	0.0035
MgO	50.15	40.30	1.2444	1.2444	1.8247
CaO	0.26	56.10	0.0046	0.0046	0.0067
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	100.51			2.7280	3.0149
No. of Oxygens	4				
F	1.466				

End Member Calculation		
X_{fo}	1.8247	90.4
X_{fa}	0.1944	9.6
	2.0191	100.0

Analysis No.	308				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.58	60.10	0.6752	1.3504	0.9926
TiO2	0.02	79.87	0.0002	0.0004	0.0003
Al2O3	0.03	51.00	0.0005	0.0008	0.0008
Cr2O3	0.08	76.00	0.0011	0.0016	0.0016
FeO	8.30	71.80	0.1156	0.1156	0.1699
MnO	0.16	70.94	0.0022	0.0022	0.0032
MgO	50.18	40.30	1.2452	1.2452	1.8305
CaO	0.25	56.10	0.0044	0.0044	0.0065
Na2O	0.02	31.00	0.0005	0.0002	0.0007
Total	99.60			2.7208	3.0062
No. of Oxygens	4				
F	1.470				

End Member Calculation		
X_{fo}	1.8305	91.5
X_{fa}	0.1699	8.5
	2.0005	100.0

Analysis No.	312				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.43	60.10	0.6727	1.3454	0.9897
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.02	51.00	0.0003	0.0004	0.0004
Cr2O3	0.08	76.00	0.0010	0.0015	0.0015
FeO	9.08	71.80	0.1265	0.1265	0.1861
MnO	0.17	70.94	0.0024	0.0024	0.0036
MgO	49.90	40.30	1.2382	1.2382	1.8216
CaO	0.23	56.10	0.0041	0.0041	0.0061
Na2O	0.01	31.00	0.0005	0.0002	0.0007
Total	99.92			2.7189	3.0097

No. of Oxygens	4
F	1.471

End Member Calculation		
X_{fo}	1.8216	90.7
X_{fa}	0.1861	9.3
	2.0077	100.0

Analysis No.	314				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.14	60.10	0.6679	1.3358	0.9870
TiO2	0.06	79.87	0.0008	0.0015	0.0011
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.26	76.00	0.0034	0.0051	0.0050
FeO	10.08	71.80	0.1404	0.1404	0.2075
MnO	0.18	70.94	0.0025	0.0025	0.0038
MgO	49.04	40.30	1.2169	1.2169	1.7983
CaO	0.25	56.10	0.0045	0.0045	0.0067
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	100.01			2.7067	3.0093
No. of Oxygens	4				
F	1.478				

End Member Calculation		
X_{fo}	1.7983	89.7
X_{fa}	0.2075	10.3
	2.0058	100.0

Analysis No.	315				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.57	60.10	0.6750	1.3501	0.9925
TiO2	0.01	79.87	0.0001	0.0002	0.0001
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.03	76.00	0.0004	0.0006	0.0006
FeO	8.52	71.80	0.1187	0.1187	0.1745
MnO	0.15	70.94	0.0021	0.0021	0.0031
MgO	50.13	40.30	1.2439	1.2439	1.8290
CaO	0.27	56.10	0.0047	0.0047	0.0070
Na2O	0.01	31.00	0.0004	0.0002	0.0005
Total	99.68			2.7205	3.0073
No. of Oxygens	4				
F	1.470				

End Member Calculation		
X_{fo}	1.8290	91.3
X_{fa}	0.1745	8.7
	2.0034	100.0

Analysis No.	316				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.25	60.10	0.6697	1.3394	0.9854
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	0.00	51.00	0.0000	0.0000	0.0000
Cr2O3	0.04	76.00	0.0005	0.0008	0.0008
FeO	9.15	71.80	0.1274	0.1274	0.1875
MnO	0.17	70.94	0.0023	0.0023	0.0035
MgO	50.13	40.30	1.2439	1.2439	1.8302
CaO	0.26	56.10	0.0046	0.0046	0.0068
Na2O	0.00	31.00	0.0000	0.0000	0.0000
Total	100.00			2.7186	3.0142
No. of Oxygens	4				
F	1.471				

End Member Calculation		
X_{fo}	1.8302	90.7
X_{fa}	0.1875	9.3
	2.0177	100.0

Analysis No.	316				
	Molecular %	EW	Molecular prop	Atomic Prop	Cation Prop
SiO2	40.44	60.10	0.6729	1.3458	0.9944
TiO2	0.02	79.87	0.0002	0.0004	0.0003
Al2O3	0.01	51.00	0.0001	0.0002	0.0002
Cr2O3	0.06	76.00	0.0009	0.0013	0.0013
FeO	8.56	71.80	0.1192	0.1192	0.1762
MnO	0.15	70.94	0.0021	0.0021	0.0031
MgO	49.70	40.30	1.2333	1.2333	1.8226
CaO	0.23	56.10	0.0041	0.0041	0.0061
Na2O	0.02	31.00	0.0006	0.0003	0.0008
Total	99.19			2.7066	3.0050
No. of Oxygens	4				
F	1.478				

End Member Calculation		
X_{fo}	1.8226	91.2
X_{fa}	0.1762	8.8
	1.9987	100.0

Sample	SiO_2	TiO_2	Al_2O_3	Cr_2O_3	FeO*	MnO	MgO	CaO	Na_2O	Analysis No.	Total	Fo	Fa
7-1_2_olivine rim	38.32	0.01	0.03	0.00	22.58	0.41	39.25	0.25	0.01	14	100.85	76	24
7-1_2_olivine core	38.42	0.01	0.01	0.00	22.86	0.40	39.27	0.27	0.02	15	101.27	75	25
7-1_3 olivine core	38.43	0.12	0.02	0.00	23.28	0.43	38.98	0.31	0.01	19	101.58	75	25
7-1_3 olivine rim	38.50	0.00	0.01	0.00	23.63	0.32	39.01	0.25	0.00	20	101.73	75	25
7-1_4 olivine core	38.90	0.00	0.01	0.00	22.62	0.35	39.91	0.28	0.03	21	102.11	76	24
7-1_4 olivine rim	38.61	0.00	0.02	0.00	23.71	0.40	39.18	0.28	0.00	22	102.20	75	25
7-1_10 olivine rim	38.39	0.03	0.04	0.00	23.50	0.45	38.98	0.30	0.02	46	101.72	75	25
7-1_9 olivine core	38.40	0.05	0.00	0.00	23.88	0.39	38.66	0.27	0.02	48	101.67	74	26
7-1_9 olivine rim	38.32	0.00	0.01	0.00	23.22	0.34	38.63	0.29	0.01	49	100.82	75	25
7-1_8 olivine core	38.18	0.03	0.04	0.00	23.08	0.37	38.50	0.32	0.00	52	100.53	75	25
7-1_8 olivine rim	37.91	0.00	0.02	0.00	22.97	0.41	38.79	0.27	0.03	53	100.40	75	25
46-1_6 olivine core	38.87	0.02	0.00	0.02	19.91	0.30	41.97	0.15	0.02	137	101.25	79	21
46-1_6 olivine rim	38.19	0.03	0.03	0.01	22.73	0.35	39.74	0.21	0.17	138	101.45	76	24
46-1_3 olivine core	39.07	0.00	0.01	0.02	20.68	0.34	41.84	0.20	0.02	153	102.18	78	22
46-1_3 olivine2 core	38.56	0.00	0.02	0.05	20.94	0.38	41.85	0.19	0.00	158	102.00	78	22
46-1_1 olivine core	38.74	0.05	0.00	0.02	20.63	0.35	41.45	0.17	0.00	168	101.41	78	22
43-1_1 olivine core	40.05	0.05	0.00	0.04	15.18	0.23	45.50	0.18	0.00	181	101.23	80	20
43-1_1 olivine rim	39.73	0.03	0.05	0.02	16.53	0.28	44.40	0.20	0.02	182	101.27	80	20
43-1_2 olivine core	40.10	0.02	0.00	0.04	13.21	0.22	47.37	0.21	0.03	188	101.19	82	18
43-1_2 olivine rim	39.69	0.07	0.01	0.03	16.35	0.27	44.50	0.21	0.03	189	101.16	83	17
43-1_3 olivine core	39.82	0.00	0.04	0.07	15.28	0.25	45.63	0.19	0.00	196	101.27	83	17
43-1_4 olivine core	40.89	0.04	0.01	0.05	10.19	0.16	49.50	0.19	0.00	199	101.04	83	17
43-1_4 olivine rim	40.31	0.05	0.00	0.07	12.40	0.19	47.97	0.23	0.02	200	101.24	83	17
5-1_2 olivine core	40.65	0.00	0.02	0.04	9.35	0.15	50.34	0.26	0.02	229	100.82	91	9
5-1_2 olivine rim	39.90	0.03	0.02	0.07	13.97	0.23	46.62	0.26	0.01	230	101.10	86	14
5-1_2 olivine nearchromite	40.66	0.03	0.00	0.04	10.39	0.19	49.80	0.27	0.00	231	101.38	90	10
5-1_5 olivine rim	40.37	0.04	0.03	0.08	8.98	0.13	49.89	0.28	0.02	267	99.82	91	9
5-1_5 olivine core	40.38	0.03	0.02	0.04	9.92	0.16	49.44	0.23	0.01	268	100.22	90	10
48-2_2 olivine core	40.42	0.01	0.01	0.04	9.03	0.17	50.46	0.25	0.00	303	100.39	83	17
48-2_2 olivine rim	40.32	0.05	0.01	0.03	9.52	0.17	50.15	0.26	0.00	304	100.51	83	17
48-2_4 olivine	40.14	0.06	0.00	0.26	10.08	0.18	49.04	0.25	0.00	314	100.01	84	16
48-2_5 olivine	40.57	0.01	0.00	0.03	8.52	0.15	50.13	0.27	0.01	315	99.68	84	16
48-2_5 olivine rim	40.25	0.00	0.00	0.04	9.15	0.17	50.13	0.26	0.00	316	100.00	84	16
5-1_10 opx light core (olivine)	39.37	0.04	0.00	0.02	14.30	0.21	45.34	0.23	0.00	290	99.51	85	15
5-1_10 opx rim (olivine)	40.46	0.02	0.04	0.06	8.50	0.13	49.32	0.26	0.00	291	98.79	91	9
7-1_4 olivine(darkcore) rim	38.47	0.00	0.01	0.00	22.66	0.42	39.54	0.28	0.00	26	101.38	76	24
7-1_6 cpx core (olivine)	38.40	0.08	0.01	0.00	23.71	0.35	39.03	0.27	0.01	33	101.86	75	25
7-1_6 cpx rim (olivine)	38.75	0.02	0.01	0.00	23.44	0.39	38.94	0.30	0.01	34	101.86	75	25
7-1_6 cpx 2 core (olivine)	38.47	0.01	0.02	0.00	23.83	0.41	38.80	0.31	0.01	35	101.86	74	26
7-1_7 cpx core (olivine)	38.01	0.00	0.00	0.00	23.71	0.38	38.84	0.26	0.00	54	101.21	74	26
7-1_7 cpx rim (olivine)	38.19	0.00	0.02	0.00	23.70	0.39	38.98	0.28	0.00	55	101.56	75	25
7-1_8 opx core (olivine)	38.44	0.00	0.02	0.00	22.96	0.41	38.88	0.30	0.02	50	101.03	75	25
46-1_2 opx core (olivine)	38.71	0.03	0.01	0.01	20.15	0.31	41.37	0.19	0.01	165	100.80	79	21
46-1_2 opx rim (olivine)	38.75	0.04	0.00	0.02	20.75	0.34	41.45	0.20	0.00	166	101.55	78	22
43-4_1 olivine core	39.39	0.00	0.00	0.02	15.58	0.23	44.85	0.17	0.01	139	100.26	84	16
43-4_1 olivine rim	39.56	0.00	0.02	0.01	15.76	0.21	44.63	0.23	0.02	140	100.44	84	16
43-4_3 olivine core_a	39.99	0.05	0.00	0.04	12.08	0.20	47.24	0.22	0.00	147	99.83	84	16
43-4_3 olivine core_b	39.99	0.03	0.01	0.04	13.18	0.23	46.87	0.20	0.01	148	100.56	84	16
43-4_3 olivine rim_c	39.62	0.00	0.02	0.02	15.34	0.23	45.42	0.18	0.01	149	100.84	84	16
43-4_5 olivine core	40.04	0.00	0.02	0.01	13.97	0.22	46.16	0.19	0.00	157	100.61	84	16
43-4_5 olivine rim	39.75	0.00	0.02	0.03	15.34	0.27	44.81	0.20	0.00	158	100.41	84	16
43-4_5 olivine2 core	39.73	0.00	0.03	0.00	14.75	0.21	44.99	0.17	0.00	160	99.88	84	16
43-4_5 olivine2 rim	39.41	0.02	0.02	0.04	15.23	0.24	44.72	0.22	0.02	161	99.92	84	16
43-4_6 olivine core	39.68	0.05	0.01	0.02	15.86	0.23	44.67	0.17	0.00	162	100.69	84	16
43-4_6 olivine rim	39.49	0.00	0.00	0.01	15.27	0.26	45.40	0.18	0.03	163	100.64	84	16
43-4_6 olivine2 core	40.21	0.00	0.00	0.07	11.30	0.18	47.84	0.21	0.00	164	99.82	84	16
8-2_cpx olivine core	38.02	0.00	0.00	0.00	22.72	0.38	39.67	0.22	0.01	219	101.02	76	24
8-2_cpx olivine rim	38.15	0.00	0.01	0.00	21.65	0.36	39.15	0.24	0.03	220	99.60	76	24
48-1_6 olivine rim	39.64	0.00	0.01	0.02	15.33	0.22	45.16	0.19	0.02	233	100.60	85	15
48-1_4 olivine core	39.78	0.00	0.04	0.01	14.08	0.20	45.86	0.17	0.00	241	100.14	85	15
48-1_4 olivine rim	39.84	0.00	0.00	0.01	15.12	0.23	45.73	0.20	0.00	242	101.13	85	15
48-1_3 olivine core_a	39.40	0.00	0.00	0.00	17.30	0.27	43.99	0.15	0.01	251	101.13	85	15
48-1_3 olivine core_b	39.22	0.01	0.00	0.00	18.95	0.26	42.94	0.15	0.00	252	101.53	86	14
48-1_3 olivine rim_c	39.65	0.00	0.00	0.02	16.19	0.24	44.88	0.16	0.01	253	101.16	86	14
48-1_2 olivine core	39.96	0.00	0.00	0.07	14.81	0.22	46.52	0.16	0.00	255	101.74	87	13
48-1_2 olivine rim	39.64	0.02	0.03	0.01	15.48	0.24	45.55	0.19	0.00	256	101.15	87	13
48-1_2 olivine2 core	39.88	0.02	0.03	0.02	15.04	0.24	45.94	0.18	0.15	258	101.51	88	12
48-1_2 olivine2 rim	39.76	0.03	0.01	0.01	14.81	0.24	45.81	0.20	0.03	259	100.90	90	10
48-1_1 olivine core	39.35	0.02	0.01	0.00	19.06	0.26	42.94	0.14	0.03	265	101.82	90	10
48-1_1 olivine core_b	39.51	0.03	0.01	0.02	16.77	0.28	45.10	0.17	0.00	266	101.89	90	10
48-1_1 olivine rim_c	40.01	0.00	0.00	0.00	15.76	0.25	45.64	0.20	0.01	267	101.87	91	9
48-1_1 olivine2 core	39.67	0.00	0.01	0.01	15.28	0.21	45.49	0.19	0.00	275	100.87	91	9
48-1_1 olivine2 rim	39.67	0.00	0.00	0.04	15.48	0.24	45.20	0.21	0.02	276	100.86	91	9
45-1_1 olivine core_a	38.41	0.00	0.03	0.00	23.33	0.39	39.46	0.18	0.00	288	101.80	75	25
45-1_1 olivine rim	38.21	0.01	0.03	0.00	23.49	0.38	39.29	0.20	0.00	289	101.61	75	25
45-1_1 olivine2 core	38.37	0.00	0.03	0.02	23.37	0.37	39.38	0.19	0.01	294	101.73	75	25
45-1_1 olivine2 rim	38.10	0.00	0.02	0.00	23.58	0.39	38.71	0.23	0.02	295	101.05	75	25
45-1_2 olivine core	38.51	0.01	0.03	0.00	22.50	0.32	39.75	0.14	0.01	301	101.27	76	24
45-1_2 olivine rim	38.23	0.04	0.03	0.02	23.07	0.31	39.42	0.16	0.01	302	101.28	75	25
45-1_3 olivine core	38.27	0.01	0.03	0.00	23.78	0.35	39.49	0.19	0.02	311	102.14	75	25
45-1_3 olivine rim	38.28	0.00	0.01	0.01	24.05	0.36	39.15	0.19	0.03	312	102.07	74	26
45-1_5 olivine core	38.25	0.00	0.01	0.01	23.28	0.37	39.35	0.17	0.01	331	101.45	75	25
45-1_5 olivine rim	38.19	0.00	0.01	0.02	23.38	0.38	39.12	0.18	0.02	332	101.30	75	25
47-1_1 olivine core	38.51	0.00	0.03	0.00	23.28	0.36	39.45	0.20	0.00	355	101.83	75	25
47-1_1 olivine rim	38.46	0.03	0.01	0.00	23.20	0.34	39.29	0.21	0.00	356	101.53	75	25
47-1_1 olivine2	38.33	0.00	0.00	0.00	23.10	0.36	39.87	0.20	0.00	360	101.86	75	25
47-1_1 olivine2 rim	38.48	0.00	0.01	0.00	23.24	0.35	39.51	0.22	0.00	361	101.81	75	25
47-1_2 olivine core	38.30	0.00	0.00	0.03	22.93	0.31	39.93	0.20	0.00	363	101.70	76	24
47-1_2 olivine rim	38.44	0.00	0.02	0.01	22.98	0.34	39.71	0.20	0.01	364	101.71	75	25
47-1_2 olivine2 core	38.38	0.00	0.00	0.01	22.53	0.39	39.62	0.21	0.00	365	101.14	76	24
47-1_2 olivine2 rim	38.40	0.00	0.02	0.02	22.95	0.38	39.32	0.20	0.00	366	101.29	75	25
47-1_2 olivine3 core	38.08	0.03	0.03	0.00	22.79	0.32	39.40	0.22	0.00	367	100.87	75	25
47-1_2 olivine3 rim	38.59	0.02	0.02	0.00	23.15	0.36	39.67	0.21	0.02	368	102.04	75	25
47-1_4 olivine core	38.40	0.00	0.05	0.00	22.91	0.33	39.34	0.20	0.00	394	101.24	75	25
47-1_4 olivine rim	38.51	0.04	0.02	0.02	22.99	0.34	39.57	0.22	0.00	395	101.71	75	25
47-1_5 olivine core	38.36	0.05	0.02	0.03	22.67	0.39	39.63	0.20	0.00	403	101.36	76	24
47-1_5 olivine rim	38.44	0.00	0.02	0.03	23.31	0.32	39.54	0.21	0.03	404	101.91	75	25
47-1_olivine core	38.35	0.02	0.02	0.00	22.19	0.34	39.42	0.21	0.01	419	100.57	76	24
47-1_olivine rim	38.35	0.00	0.03	0.00	23.08	0.38	39.16	0.27	0.00	420	101.27	75	25
47-1_olivine2 core	38.41	0.01	0.01	0.01	23.07	0.35	39.68	0.20	0.00	422	101.75	75	25
47-1_olivine2 rim	38.60	0.02	0.01	0.00	22.99	0.37	39.39	0.23	0.01	423	101.62	75	25

Sample	SiO_2	TiO_2	Al_2O_3	Cr_2O_3	FeO*	MnO	MgO	CaO	Na_2O	Analysis No.	Total	Fo	Fa
7-1_10 gm olivine core	38.18	0.07	0.02	0.00	24.18	0.37	37.80	0.35	0.02	47	100.98	74	26
48-2_1 gm olivine core	40.24	0.00	0.01	0.08	9.96	0.15	49.18	0.25	0.03	302	99.89	90	10
48-2_3 gm olivine	40.58	0.02	0.03	0.08	8.30	0.16	50.18	0.25	0.02	308	99.60	92	8
48-2_3 gm olivine	40.43	0.00	0.02	0.08	9.08	0.17	49.90	0.23	0.01	312	99.92	91	9
48-2_3 gm opx (olivine)	40.44	0.02	0.01	0.06	8.56	0.15	49.70	0.23	0.02	309	99.19	91	9
47-1_5a gm olivine	37.98	0.01	0.03	0.01	24.10	0.37	38.13	0.28	0.01	405	100.92	74	26
47-1_5a gm olivine2	38.72	0.00	0.03	0.00	23.42	0.36	39.13	0.25	0.02	407	101.93	75	25
47-1_5a gm olivine3	37.99	0.00	0.04	0.00	23.83	0.41	38.32	0.27	0.02	408	100.87	74	26
47-1_6 gm olivine	38.33	0.00	0.01	0.01	23.56	0.35	38.92	0.26	0.02	415	101.45	75	25
7-1_2 gm olivine	38.02	0.00	0.03	0.00	24.29	0.39	37.92	0.34	0.03	535	101.02	74	26

Sample	SiO2	TiO2	Al2O3	Cr2O3	FeO*	MnO	MgO	CaO	Na2O	K2O	Analysis No.	Total	XWo	XEn	XFs	Fo	Fa	An	Ab	Or
43-1_2 olivine spinel incl	0.09	0.12	9.25	53.88	26.37	0.32	9.99	0.05	0.01	0.01	186	100.08								
43-1_2 olivine incl pair	39.79	0.00	0.01	0.03	16.48	0.25	44.87	0.18	0.02	0.01	187	101.64				82.91	17.09			
7-1_4 olivine dark core (cpx incl)	47.20	0.00	33.13	0.00	1.03	0.01	0.17	16.85	2.01	0.02	23	100.41	bad							
7-1_4 olivine dark core rim (cpx incl)	46.70	0.00	33.95	0.00	1.01	0.00	0.16	17.64	1.61	0.02	24	101.09	bad							
7-1_10 olivine darkcore (cpx incl)	46.06	0.04	33.81	0.00	1.38	0.02	0.14	17.72	1.53	0.02	45	100.72	bad							
43-4_3 olivine chrome incl	0.05	0.03	8.05	52.32	27.90	0.30	9.80	0.01	0.00	0.01	150	98.48								
43-4_5 olivine2 chromite incl	0.06	0.03	7.92	55.15	25.84	0.38	9.19	0.15	0.00	0.00	159	98.73								
48-1_2 olivine chromite incl	0.06	0.14	11.51	46.39	29.80	0.32	10.52	0.00	0.03	0.01	254	98.79								
48-1_2 olivine2 glass incl	57.22	0.15	17.42	0.00	5.95	0.12	1.30	10.63	0.46	0.48	257	93.72								
48-1_1 olivine cpx incl	53.29	0.01	1.73	0.66	5.46	0.16	18.39	20.90	0.14	0.00	268	100.75	41.17	50.43	8.40					
48-1_1 olivine glass incl	53.99	0.17	16.17	0.02	9.00	0.18	4.76	10.70	1.09	0.52	269	96.60								
45-1_1 olivine glass incl	52.39	0.13	14.89	0.00	12.53	0.21	3.85	9.97	1.06	0.31	290	95.34								
45-1_1 olivine glass2 incl	52.30	0.13	15.58	0.02	12.16	0.17	3.26	10.02	0.87	0.29	291	94.80								
45-1_1 olivine glass3 incl	52.85	0.16	14.90	0.00	12.55	0.21	4.06	10.03	1.18	0.34	292	96.27								
45-1_3 olivine glass incl	53.68	0.14	16.98	0.00	9.92	0.17	2.05	10.38	0.80	0.39	313	94.51								
45-1_3 olivine glass2 incl	53.02	0.14	16.08	0.01	10.74	0.19	2.15	11.00	0.77	0.29	314	94.39								
45-1_5 olivine ill incl	0.10	0.47	6.15	1.31	81.79	0.25	4.26	0.01	0.01	0.00	333	94.36								
47-1_1 olivine glass incl	53.66	0.20	15.95	0.00	11.36	0.21	1.80	11.60	1.13	0.80	357	96.72								
47-1_1 olivine2 glass incl	45.16	0.04	33.64	0.00	1.44	0.01	0.13	18.24	1.15	0.03	362	99.85								
47-1_olivine glass incl	54.08	0.05	1.45	0.00	14.41	0.34	27.75	1.95	0.02	0.00	421	100.04								
47-1_olivine2 glassincl	56.59	0.10	18.21	0.00	6.55	0.12	0.95	11.34	1.41	0.82	424	96.08								

Analysis No.	324							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.38	60.10	0.8715	0.8715	1.7430	1.9695	1.9695	Si
TiO2	0.17	79.87	0.0022	0.0022	0.0043	0.0049	0.0049	Ti
Al2O3	0.84	101.96	0.0083	0.0166	0.0248	0.0374	0.0374	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	23.01	71.85	0.3203	0.3203	0.3203	0.7238	0.7238	Fe^{2+}
MnO	0.92	70.94	0.0130	0.0130	0.0130	0.0293	0.0293	Mn
MgO	21.01	40.30	0.5214	0.5214	0.5214	1.1783	1.1783	Mg
CaO	1.56	56.10	0.0278	0.0278	0.0278	0.0628	0.0628	Ca
Na2O	0.04	61.98	0.0007	0.0013	0.0003	0.0029	0.0029	Na
Total	99.94				2.6549	4.0091	4.0091	

	Normalized Analysis
SiO2	52.38
TiO2	0.17
Al2O3	0.84
Cr2O3	0.00
Fe2O3	0.00
FeO	23.01
MnO	0.92
MgO	21.01
CaO	1.56
Na2O	0.04
Total	99.94

No of Oxygens	6
F	2.2599
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.970	XWo = Ca/Ca+Mg+FeT	3.20
Ti		0.005		XEn = Mg/Ca+Mg+FeT	59.97
Al		0.007	0.030	XFs = FeT/Ca+Mg+FeT	36.84
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.344	0.379		FeT/FeT+Mg	0.38
Mn	0.029			Fe2/Fe2+Mg	0.38
Mg	0.561	0.618			
Ca	0.063				
Na	0.003				
sum	1.000	1.009	2.000		
ideal	1.000	1.000	2.000		

Analysis No.	325							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.14	60.10	0.8676	0.8676	1.7352	1.9639	1.9639	Si
TiO2	0.20	79.87	0.0024	0.0024	0.0049	0.0055	0.0055	Ti
Al2O3	0.83	101.96	0.0082	0.0164	0.0245	0.0370	0.0370	Al
Cr2O3	0.01	159.69	0.0001	0.0001	0.0002	0.0003	0.0003	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	23.53	71.85	0.3274	0.3274	0.3274	0.7412	0.7412	Fe^{2+}
MnO	1.01	70.94	0.0142	0.0142	0.0142	0.0321	0.0321	Mn
MgO	20.78	40.30	0.5155	0.5155	0.5155	1.1671	1.1671	Mg
CaO	1.59	56.10	0.0283	0.0283	0.0283	0.0642	0.0642	Ca
Na2O	0.03	61.98	0.0004	0.0009	0.0002	0.0020	0.0020	Na
Total	100.11				2.6505	4.0133	4.0133	

	Normalized Analysis
SiO2	52.14
TiO2	0.20
Al2O3	0.83
Cr2O3	0.01
Fe2O3	0.00
FeO	23.53
MnO	1.01
MgO	20.78
CaO	1.59
Na2O	0.03
Total	100.11

No of Oxygens	6
F	2.2637
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.964	XWo = Ca/Ca+Mg+FeT	3.25
Ti		0.006		XEn = Mg/Ca+Mg+FeT	59.17
Al		0.001	0.036	XFs = FeT/Ca+Mg+FeT	37.58
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.350	0.391		FeT/FeT+Mg	0.39
Mn	0.032			Fe2/Fe2+Mg	0.39
Mg	0.552	0.616			
Ca	0.064				
Na	0.002				
sum	1.000	1.013	2.000		
ideal	1.000	1.000	2.000		

Analysis No.	339							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.22	60.10	0.8689	0.8689	1.7379	1.9725	1.9725	Si
TiO2	0.13	79.87	0.0016	0.0016	0.0032	0.0036	0.0036	Ti
Al2O3	0.62	101.96	0.0061	0.0122	0.0183	0.0277	0.0277	Al
Cr2O3	0.02	159.69	0.0001	0.0003	0.0004	0.0006	0.0006	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	22.25	71.85	0.3097	0.3097	0.3097	0.7031	0.7031	Fe^{2+}
MnO	0.93	70.94	0.0131	0.0131	0.0131	0.0298	0.0298	Mn
MgO	21.44	40.30	0.5321	0.5321	0.5321	1.2079	1.2079	Mg
CaO	1.57	56.10	0.0280	0.0280	0.0280	0.0635	0.0635	Ca
Na2O	0.06	61.98	0.0009	0.0019	0.0005	0.0043	0.0043	Na
Total	99.25				2.6432	4.0129	4.0129	

	Normalized Analysis
SiO2	52.22
TiO2	0.13
Al2O3	0.62
Cr2O3	0.02
Fe2O3	0.00
FeO	22.25
MnO	0.93
MgO	21.44
CaO	1.57
Na2O	0.06
Total	99.25

No of Oxygens	6
F	2.2700
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.972	XWo = Ca/Ca+Mg+FeT	3.22
Ti		0.004		XEn = Mg/Ca+Mg+FeT	61.17
Al		0.000	0.028	XFs = FeT/Ca+Mg+FeT	35.61
Cr		0.001		total	100.00
Fe3		0.000			
Fe2	0.332	0.371		FeT/FeT+Mg	0.37
Mn	0.030			Fe2/Fe2+Mg	0.37
Mg	0.570	0.637			

Ca	0.064		
Na	0.004		
sum	1.000	1.013	2.000
ideal	1.000	1.000	2.000

Analysis No. 348

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	52.04	60.10	0.8659	0.8659	1.7317	1.9647	1.9647	Si	52.04
TiO2	0.15	79.87	0.0019	0.0019	0.0037	0.0042	0.0042	Ti	0.15
Al2O3	0.72	101.96	0.0070	0.0140	0.0210	0.0318	0.0318	Al	0.72
Cr2O3	0.01	159.69	0.0001	0.0001	0.0002	0.0002	0.0002	Cr	0.01
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	23.78	71.85	0.3310	0.3310	0.3310	0.7511	0.7511	Fe^{2+}	23.78
MnO	0.99	70.94	0.0140	0.0140	0.0140	0.0317	0.0317	Mn	0.99
MgO	20.71	40.30	0.5140	0.5140	0.5140	1.1663	1.1663	Mg	20.71
CaO	1.60	56.10	0.0285	0.0285	0.0285	0.0647	0.0647	Ca	1.60
Na2O	0.02	61.98	0.0003	0.0006	0.0001	0.0013	0.0013	Na	0.02
Total	100.02				2.6443	4.0160	4.0160		Total 100.02

No of Oxygens	6
F	2.2690
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.965	XWo = Ca/Ca+Mg+FeT	3.27
Ti		0.004		XEn = Mg/Ca+Mg+FeT	58.84
Al			0.032	XFs = FeT/Ca+Mg+FeT	37.89
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.353	0.398		FeT/FeT+Mg	0.39
Mn	0.032			Fe2/Fe2+Mg	0.39
Mg	0.549	0.617			
Ca	0.065				
Na	0.001				
sum	1.000	1.020	1.996		
ideal	1.000	1.000	2.000		

Analysis No. 352

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	52.16	60.10	0.8679	0.8679	1.7358	1.9671	1.9671	Si	52.16
TiO2	0.09	79.87	0.0011	0.0011	0.0022	0.0025	0.0025	Ti	0.09
Al2O3	0.88	101.96	0.0086	0.0172	0.0258	0.0390	0.0390	Al	0.88
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	21.92	71.85	0.3050	0.3050	0.3050	0.6913	0.6913	Fe^{2+}	21.92
MnO	0.96	70.94	0.0135	0.0135	0.0135	0.0307	0.0307	Mn	0.96
MgO	21.57	40.30	0.5351	0.5351	0.5351	1.2129	1.2129	Mg	21.57
CaO	1.65	56.10	0.0294	0.0294	0.0294	0.0667	0.0667	Ca	1.65
Na2O	0.04	61.98	0.0006	0.0013	0.0003	0.0028	0.0028	Na	0.04
Total	99.26				2.6473	4.0130	4.0130		Total 99.26

No of Oxygens	6
F	2.2664
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.967	XWo = Ca/Ca+Mg+FeT	3.39
Ti		0.003		XEn = Mg/Ca+Mg+FeT	61.54
Al		0.006	0.033	XFs = FeT/Ca+Mg+FeT	35.07
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.327	0.365		FeT/FeT+Mg	0.36
Mn	0.031			Fe2/Fe2+Mg	0.36
Mg	0.573	0.640			
Ca	0.067				
Na	0.003				
sum	1.000	1.013	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 372

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	52.59	60.10	0.8751	0.8751	1.7502	1.9634	1.9634	Si	52.59
TiO2	0.18	79.87	0.0023	0.0023	0.0046	0.0052	0.0052	Ti	0.18
Al2O3	0.68	101.96	0.0066	0.0133	0.0199	0.0297	0.0297	Al	0.68
Cr2O3	0.02	159.69	0.0001	0.0002	0.0003	0.0005	0.0005	Cr	0.02
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	23.83	71.85	0.3317	0.3317	0.3317	0.7443	0.7443	Fe^{2+}	23.83
MnO	0.99	70.94	0.0139	0.0139	0.0139	0.0313	0.0313	Mn	0.99
MgO	21.22	40.30	0.5265	0.5265	0.5265	1.1813	1.1813	Mg	21.22
CaO	1.51	56.10	0.0269	0.0269	0.0269	0.0603	0.0603	Ca	1.51
Na2O	0.02	61.98	0.0004	0.0007	0.0002	0.0016	0.0016	Na	0.02
Total	101.04				2.6742	4.0175	4.0175		Total 101.04

No of Oxygens	6
F	2.2437
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.963	XWo = Ca/Ca+Mg+FeT	3.04
Ti		0.005		XEn = Mg/Ca+Mg+FeT	59.48

Al			0.030	XFs = FeT/Ca+Mg+FeT	37.48
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.351	0.394		FeT/FeT+Mg	0.39
Mn	0.031			Fe2/Fe2+Mg	0.39
Mg	0.556	0.625			
Ca	0.060				
Na	0.002				
sum	1.000	1.024	1.993		
ideal	1.000	1.000	2.000		

Analysis No. 373

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	52.41	60.10	0.8720	0.8720	1.7440	1.9799	1.9799	Si	52.41
TiO2	0.17	79.87	0.0021	0.0021	0.0042	0.0048	0.0048	Ti	0.17
Al2O3	0.83	101.96	0.0081	0.0163	0.0244	0.0369	0.0369	Al	0.83
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	22.76	71.85	0.3167	0.3167	0.3167	0.7191	0.7191	Fe^{2+}	22.76
MnO	0.99	70.94	0.0140	0.0140	0.0140	0.0317	0.0317	Mn	0.99
MgO	20.45	40.30	0.5074	0.5074	0.5074	1.1520	1.1520	Mg	20.45
CaO	1.76	56.10	0.0315	0.0315	0.0315	0.0714	0.0714	Ca	1.76
Na2O	0.06	61.98	0.0009	0.0018	0.0005	0.0042	0.0042	Na	0.06
Total	99.42				2.6426	4.0000	4.0000		99.42

No of Oxygens	6
F	2.2705

calculated charge 12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.980	XWo = Ca/Ca+Mg+FeT	3.68
Ti		0.005		XEn = Mg/Ca+Mg+FeT	59.30
Al		0.017	0.020	XFs = FeT/Ca+Mg+FeT	37.02
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.343	0.376		FeT/FeT+Mg	0.38
Mn	0.032			Fe2/Fe2+Mg	0.38
Mg	0.550	0.602			
Ca	0.071				
Na	0.004				
sum	1.000	1.000	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 85

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	52.10	60.10	0.8669	0.8669	1.7338	1.9635	1.9635	Si	52.10
TiO2	0.25	79.87	0.0032	0.0032	0.0063	0.0071	0.0071	Ti	0.25
Al2O3	0.83	101.96	0.0082	0.0163	0.0245	0.0370	0.0370	Al	0.83
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	22.81	71.85	0.3175	0.3175	0.3175	0.7191	0.7191	Fe^{2+}	22.81
MnO	1.00	70.94	0.0141	0.0141	0.0141	0.0320	0.0320	Mn	1.00
MgO	21.04	40.30	0.5221	0.5221	0.5221	1.1825	1.1825	Mg	21.04
CaO	1.70	56.10	0.0303	0.0303	0.0303	0.0686	0.0686	Ca	1.70
Na2O	0.05	61.98	0.0008	0.0016	0.0004	0.0037	0.0037	Na	0.05
Total	99.79				2.6490	4.0136	4.0136		99.79

No of Oxygens	6
F	2.2650

calculated charge 12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.964	XWo = Ca/Ca+Mg+FeT	3.48
Ti		0.007		XEn = Mg/Ca+Mg+FeT	60.02
Al		0.001	0.036	XFs = FeT/Ca+Mg+FeT	36.50
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.339	0.380		FeT/FeT+Mg	0.38
Mn	0.032			Fe2/Fe2+Mg	0.38
Mg	0.557	0.626			
Ca	0.069				
Na	0.004				
sum	1.000	1.014	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 88

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	52.09	60.10	0.8667	0.8667	1.7334	1.9740	1.9740	Si	52.09
TiO2	0.17	79.87	0.0022	0.0022	0.0043	0.0049	0.0049	Ti	0.17
Al2O3	0.67	101.96	0.0066	0.0132	0.0198	0.0301	0.0301	Al	0.67
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	23.56	71.85	0.3279	0.3279	0.3279	0.7468	0.7468	Fe^{2+}	23.56
MnO	1.07	70.94	0.0151	0.0151	0.0151	0.0344	0.0344	Mn	1.07
MgO	20.35	40.30	0.5050	0.5050	0.5050	1.1501	1.1501	Mg	20.35
CaO	1.60	56.10	0.0285	0.0285	0.0285	0.0650	0.0650	Ca	1.60
Na2O	0.04	61.98	0.0006	0.0012	0.0003	0.0028	0.0028	Na	0.04
Total	99.55				2.6344	4.0081	4.0081		99.55

No of Oxygens	6
F	2.2776

calculated charge 12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.974	XWo = Ca/Ca+Mg+FeT	3.31
Ti		0.005		XEn = Mg/Ca+Mg+FeT	58.62
Al		0.004	0.026	XFs = FeT/Ca+Mg+FeT	38.07
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.354	0.393		FeT/FeT+Mg	0.39
Mn	0.034			Fe2/Fe2+Mg	0.39
Mg	0.544	0.606			
Ca	0.065				
Na	0.003				
sum	1.000	1.008	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 117

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.34	60.10	0.8709	0.8709	1.7418	1.9555	1.9555	Si
TiO2	0.17	79.87	0.0021	0.0021	0.0042	0.0048	0.0048	Ti
Al2O3	1.02	101.96	0.0100	0.0199	0.0299	0.0448	0.0448	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	23.20	71.85	0.3229	0.3229	0.3229	0.7250	0.7250	Fe^{2+}
MnO	0.92	70.94	0.0130	0.0130	0.0130	0.0291	0.0291	Mn
MgO	21.47	40.30	0.5328	0.5328	0.5328	1.1963	1.1963	Mg
CaO	1.51	56.10	0.0269	0.0269	0.0269	0.0604	0.0604	Ca
Na2O	0.08	61.98	0.0013	0.0026	0.0007	0.0059	0.0059	Na
Total	100.71				2.6721	4.0218	4.0218	

	Normalized Analysis
SiO2	52.34
TiO2	0.17
Al2O3	1.02
Cr2O3	0.00
Fe2O3	0.00
FeO	23.20
MnO	0.92
MgO	21.47
CaO	1.51
Na2O	0.08
Total	100.71

No of Oxygens	6
F	2.2454
calculated charge	12.003

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.956	XWo = Ca/Ca+Mg+FeT	3.05
Ti		0.005		XEn = Mg/Ca+Mg+FeT	60.36
Al		0.000	0.044	XFs = FeT/Ca+Mg+FeT	36.59
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.341	0.384		FeT/FeT+Mg	0.38
Mn	0.029			Fe2/Fe2+Mg	0.38
Mg	0.563	0.633			
Ca	0.060				
Na	0.006				
sum	1.000	1.022	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 118

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.21	60.10	0.8687	0.8687	1.7374	1.9638	1.9638	Si
TiO2	0.12	79.87	0.0016	0.0016	0.0031	0.0035	0.0035	Ti
Al2O3	0.82	101.96	0.0081	0.0161	0.0242	0.0365	0.0365	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	23.51	71.85	0.3272	0.3272	0.3272	0.7397	0.7397	Fe^{2+}
MnO	1.02	70.94	0.0143	0.0143	0.0143	0.0324	0.0324	Mn
MgO	20.92	40.30	0.5191	0.5191	0.5191	1.1735	1.1735	Mg
CaO	1.60	56.10	0.0285	0.0285	0.0285	0.0645	0.0645	Ca
Na2O	0.04	61.98	0.0006	0.0012	0.0003	0.0027	0.0027	Na
Total	100.24				2.6542	4.0165	4.0165	

	Normalized Analysis
SiO2	52.21
TiO2	0.12
Al2O3	0.82
Cr2O3	0.00
Fe2O3	0.00
FeO	23.51
MnO	1.02
MgO	20.92
CaO	1.60
Na2O	0.04
Total	100.24

No of Oxygens	6
F	2.2606
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.964	XWo = Ca/Ca+Mg+FeT	3.26
Ti		0.004		XEn = Mg/Ca+Mg+FeT	59.34
Al		0.000	0.036	XFs = FeT/Ca+Mg+FeT	37.40
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.348	0.392		FeT/FeT+Mg	0.39
Mn	0.032			Fe2/Fe2+Mg	0.39
Mg	0.552	0.621			
Ca	0.064				
Na	0.003				
sum	1.000	1.017	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 121

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	50.01	60.10	0.8321	0.8321	1.6642	1.9927	1.9927	Si
TiO2	0.03	79.87	0.0004	0.0004	0.0008	0.0010	0.0010	Ti
Al2O3	0.32	101.96	0.0032	0.0063	0.0095	0.0152	0.0152	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	30.86	71.85	0.4295	0.4295	0.4295	1.0285	1.0285	Fe^{2+}
MnO	1.57	70.94	0.0221	0.0221	0.0221	0.0530	0.0530	Mn
MgO	12.89	40.30	0.3199	0.3199	0.3199	0.7659	0.7659	Mg
CaO	3.29	56.10	0.0586	0.0586	0.0586	0.1404	0.1404	Ca
Na2O	0.10	61.98	0.0017	0.0033	0.0008	0.0079	0.0079	Na

	Normalized Analysis
SiO2	50.01
TiO2	0.03
Al2O3	0.32
Cr2O3	0.00
Fe2O3	0.00
FeO	30.86
MnO	1.57
MgO	12.89
CaO	3.29
Na2O	0.10

Total	99.08				2.5055	4.0047	4.0047		

Total	99.08

No of Oxygens	6
F	2.3947

calculated charge	12.004

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.993	XWo = Ca/Ca+Mg+FeT	7.26
Ti		0.001		XEn = Mg/Ca+Mg+FeT	39.59
Al		0.008	0.007	XFs = FeT/Ca+Mg+FeT	53.16
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.458	0.571		FeT/FeT+Mg	0.57
Mn	0.053			Fe2/Fe2+Mg	0.57
Mg	0.341	0.425			
Ca	0.140				
Na	0.008				
sum	1.000	1.005	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 75

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.03	60.10	0.8657	0.8657	1.7314	1.9781	1.9781	Si
TiO2	0.13	79.87	0.0016	0.0016	0.0032	0.0036	0.0036	Ti
Al2O3	0.57	101.96	0.0056	0.0112	0.0169	0.0257	0.0257	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	23.20	71.85	0.3229	0.3229	0.3229	0.7378	0.7378	Fe^{2+}
MnO	1.07	70.94	0.0150	0.0150	0.0150	0.0343	0.0343	Mn
MgO	20.48	40.30	0.5082	0.5082	0.5082	1.1612	1.1612	Mg
CaO	1.57	56.10	0.0280	0.0280	0.0280	0.0639	0.0639	Ca
Na2O	0.04	61.98	0.0006	0.0012	0.0003	0.0028	0.0028	Na
Total	99.08				2.6259	4.0075	4.0075	

	Normalized Analysis
SiO2	52.03
TiO2	0.13
Al2O3	0.57
Cr2O3	0.00
Fe2O3	0.00
FeO	23.20
MnO	1.07
MgO	20.48
CaO	1.57
Na2O	0.04
Total	99.08

No of Oxygens	6
F	2.2850

calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.978	XWo = Ca/Ca+Mg+FeT	3.26
Ti		0.004		XEn = Mg/Ca+Mg+FeT	59.16
Al		0.004	0.022	XFs = FeT/Ca+Mg+FeT	37.59
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.349	0.389		FeT/FeT+Mg	0.39
Mn	0.034			Fe2/Fe2+Mg	0.39
Mg	0.550	0.612			
Ca	0.064				
Na	0.003				
sum	1.000	1.008	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 76

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	51.17	60.10	0.8514	0.8514	1.7028	1.9611	1.9611	Si
TiO2	0.17	79.87	0.0021	0.0021	0.0042	0.0048	0.0048	Ti
Al2O3	1.10	101.96	0.0108	0.0215	0.0323	0.0496	0.0496	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	23.17	71.85	0.3225	0.3225	0.3225	0.7428	0.7428	Fe^{2+}
MnO	0.90	70.94	0.0127	0.0127	0.0127	0.0293	0.0293	Mn
MgO	20.04	40.30	0.4973	0.4973	0.4973	1.1454	1.1454	Mg
CaO	1.83	56.10	0.0326	0.0326	0.0326	0.0751	0.0751	Ca
Na2O	0.07	61.98	0.0011	0.0022	0.0005	0.0050	0.0050	Na
Total	98.45				2.6050	4.0131	4.0131	

	Normalized Analysis
SiO2	51.17
TiO2	0.17
Al2O3	1.10
Cr2O3	0.00
Fe2O3	0.00
FeO	23.17
MnO	0.90
MgO	20.04
CaO	1.83
Na2O	0.07
Total	98.45

No of Oxygens	6
F	2.3033

calculated charge	12.003

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.961	XWo = Ca/Ca+Mg+FeT	3.83
Ti		0.005		XEn = Mg/Ca+Mg+FeT	58.34
Al		0.011	0.039	XFs = FeT/Ca+Mg+FeT	37.83
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.350	0.392		FeT/FeT+Mg	0.39
Mn	0.029			Fe2/Fe2+Mg	0.39
Mg	0.540	0.605			
Ca	0.075				
Na	0.005				
sum	1.000	1.013	2.000		
ideal	1.000	1.000	2.000		

Analysis No.	210							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.75	60.10	0.8777	0.8777	1.7554	1.9552	1.9552	Si
TiO2	0.12	79.87	0.0016	0.0016	0.0031	0.0035	0.0035	Ti
Al2O3	0.88	101.96	0.0087	0.0173	0.0260	0.0386	0.0386	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0001	0.0001	0.0001	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	22.88	71.85	0.3184	0.3184	0.3184	0.7094	0.7094	Fe^{2+}
MnO	0.77	70.94	0.0109	0.0109	0.0109	0.0243	0.0243	Mn
MgO	22.10	40.30	0.5484	0.5484	0.5484	1.2216	1.2216	Mg
CaO	1.71	56.10	0.0305	0.0305	0.0305	0.0679	0.0679	Ca
Na2O	0.09	61.98	0.0014	0.0028	0.0007	0.0061	0.0061	Na
Total	101.31				2.6935	4.0266	4.0266	

	Normalized Analysis	
SiO2	52.75	
TiO2	0.12	
Al2O3	0.88	
Cr2O3	0.00	
Fe2O3	0.00	
FeO	22.88	
MnO	0.77	
MgO	22.10	
CaO	1.71	
Na2O	0.09	
Total	101.31	

No of Oxygens	6	
F	2.2276	
calculated charge		12.003

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.955	XWo = Ca/Ca+Mg+FeT	3.40
Ti		0.003		XEn = Mg/Ca+Mg+FeT	61.11
Al			0.039	XFs = FeT/Ca+Mg+FeT	35.49
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.331	0.378		FeT/FeT+Mg	0.37
Mn	0.024			Fe2/Fe2+Mg	0.37
Mg	0.570	0.651			
Ca	0.068				
Na	0.006				
sum	1.000	1.033	1.994		
ideal	1.000	1.000	2.000		

Analysis No.	211							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.81	60.10	0.8787	0.8787	1.7574	1.9317	1.9317	Si
TiO2	0.17	79.87	0.0022	0.0022	0.0044	0.0048	0.0048	Ti
Al2O3	1.37	101.96	0.0134	0.0269	0.0403	0.0591	0.0591	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	19.09	71.85	0.2657	0.2657	0.2657	0.5841	0.5841	Fe^{2+}
MnO	0.59	70.94	0.0082	0.0082	0.0082	0.0181	0.0181	Mn
MgO	25.02	40.30	0.6208	0.6208	0.6208	1.3649	1.3649	Mg
CaO	1.80	56.10	0.0321	0.0321	0.0321	0.0705	0.0705	Ca
Na2O	0.03	61.98	0.0005	0.0011	0.0003	0.0024	0.0024	Na
Total	100.88				2.7292	4.0357	4.0357	

	Normalized Analysis	
SiO2	52.81	
TiO2	0.17	
Al2O3	1.37	
Cr2O3	0.00	
Fe2O3	0.00	
FeO	19.09	
MnO	0.59	
MgO	25.02	
CaO	1.80	
Na2O	0.03	
Total	100.88	

No of Oxygens	6	
F	2.1984	
calculated charge		12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.932	XWo = Ca/Ca+Mg+FeT	3.49
Ti		0.005		XEn = Mg/Ca+Mg+FeT	67.58
Al			0.059	XFs = FeT/Ca+Mg+FeT	28.92
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.272	0.312		FeT/FeT+Mg	0.30
Mn	0.018			Fe2/Fe2+Mg	0.30
Mg	0.637	0.728			
Ca	0.071				
Na	0.002				
sum	1.000	1.045	1.991		
ideal	1.000	1.000	2.000		

Analysis No.	243							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.94	60.10	0.8809	0.8809	1.7617	1.9526	1.9526	Si
TiO2	0.14	79.87	0.0018	0.0018	0.0036	0.0040	0.0040	Ti
Al2O3	0.93	101.96	0.0091	0.0183	0.0274	0.0405	0.0405	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	21.58	71.85	0.3003	0.3003	0.3003	0.6658	0.6658	Fe^{2+}
MnO	0.74	70.94	0.0104	0.0104	0.0104	0.0231	0.0231	Mn
MgO	23.00	40.30	0.5707	0.5707	0.5707	1.2651	1.2651	Mg
CaO	1.81	56.10	0.0323	0.0323	0.0323	0.0715	0.0715	Ca
Na2O	0.03	61.98	0.0005	0.0011	0.0003	0.0024	0.0024	Na
Total	101.18				2.7068	4.0250	4.0250	

	Normalized Analysis	
SiO2	52.94	
TiO2	0.14	
Al2O3	0.93	
Cr2O3	0.00	
Fe2O3	0.00	
FeO	21.58	
MnO	0.74	
MgO	23.00	
CaO	1.81	
Na2O	0.03	
Total	101.18	

No of Oxygens	6
F	2.2167
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.953	XWo = Ca/Ca+Mg+FeT	3.57
Ti		0.004		XEn = Mg/Ca+Mg+FeT	63.18
Al			0.041	XFs = FeT/Ca+Mg+FeT	33.25
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.311	0.354		FeT/FeT+Mg	0.34
Mn	0.023			Fe2/Fe2+Mg	0.34
Mg	0.592	0.673			
Ca	0.072				
Na	0.002				
sum	1.000	1.032	1.993		
ideal	1.000	1.000	2.000		

Analysis No. 260

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.61	60.10	0.8754	0.8754	1.7507	1.9513	1.9513	Si
TiO2	0.14	79.87	0.0017	0.0017	0.0035	0.0039	0.0039	Ti
Al2O3	1.11	101.96	0.0109	0.0218	0.0327	0.0486	0.0486	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0001	0.0001	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	21.05	71.85	0.2930	0.2930	0.2930	0.6531	0.6531	Fe^{2+}
MnO	0.73	70.94	0.0103	0.0103	0.0103	0.0229	0.0229	Mn
MgO	23.05	40.30	0.5720	0.5720	0.5720	1.2749	1.2749	Mg
CaO	1.64	56.10	0.0292	0.0292	0.0292	0.0652	0.0652	Ca
Na2O	0.04	61.98	0.0006	0.0011	0.0003	0.0025	0.0025	Na
Total	100.37				2.6917	4.0224	4.0224	

	Normalized Analysis
SiO2	52.61
TiO2	0.14
Al2O3	1.11
Cr2O3	0.00
Fe2O3	0.00
FeO	21.05
MnO	0.73
MgO	23.05
CaO	1.64
Na2O	0.04
Total	100.37

No of Oxygens	6
F	2.2291
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.951	XWo = Ca/Ca+Mg+FeT	3.27
Ti		0.004		XEn = Mg/Ca+Mg+FeT	63.97
Al			0.049	XFs = FeT/Ca+Mg+FeT	32.76
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.308	0.345		FeT/FeT+Mg	0.34
Mn	0.023			Fe2/Fe2+Mg	0.34
Mg	0.601	0.674			
Ca	0.065				
Na	0.003				
sum	1.000	1.023	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 261

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.15	60.10	0.8677	0.8677	1.7354	1.9539	1.9539	Si
TiO2	0.17	79.87	0.0022	0.0022	0.0043	0.0049	0.0049	Ti
Al2O3	0.91	101.96	0.0089	0.0178	0.0267	0.0401	0.0401	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	23.13	71.85	0.3219	0.3219	0.3219	0.7249	0.7249	Fe^{2+}
MnO	0.86	70.94	0.0121	0.0121	0.0121	0.0272	0.0272	Mn
MgO	21.40	40.30	0.5310	0.5310	0.5310	1.1957	1.1957	Mg
CaO	1.83	56.10	0.0326	0.0326	0.0326	0.0735	0.0735	Ca
Na2O	0.05	61.98	0.0009	0.0017	0.0004	0.0039	0.0039	Na
Total	100.50				2.6645	4.0240	4.0240	

	Normalized Analysis
SiO2	52.15
TiO2	0.17
Al2O3	0.91
Cr2O3	0.00
Fe2O3	0.00
FeO	23.13
MnO	0.86
MgO	21.40
CaO	1.83
Na2O	0.05
Total	100.50

No of Oxygens	6
F	2.2518
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.954	XWo = Ca/Ca+Mg+FeT	3.68
Ti		0.005		XEn = Mg/Ca+Mg+FeT	59.96
Al			0.040	XFs = FeT/Ca+Mg+FeT	36.35
Cr		0.000		total	100.00

Fe3		0.000			
Fe2	0.338	0.387		FeT/FeT+Mg	0.38
Mn	0.027			Fe2/Fe2+Mg	0.38
Mg	0.558	0.638			
Ca	0.073				
Na	0.004				
sum	1.000	1.030	1.994		
ideal	1.000	1.000	2.000		

Analysis No. 278

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	51.76	60.10	0.8612	0.8612	1.7225	1.9630	1.9630	Si	SiO2 51.76
TiO2	0.18	79.87	0.0023	0.0023	0.0045	0.0051	0.0051	Ti	TiO2 0.18
Al2O3	0.86	101.96	0.0085	0.0170	0.0254	0.0386	0.0386	Al	Al2O3 0.86
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	Cr2O3 0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	Fe2O3 0.00
FeO	22.17	71.85	0.3086	0.3086	0.3086	0.7033	0.7033	Fe^{2+}	FeO 22.17
MnO	0.84	70.94	0.0118	0.0118	0.0118	0.0269	0.0269	Mn	MnO 0.84
MgO	21.40	40.30	0.5310	0.5310	0.5310	1.2104	1.2104	Mg	MgO 21.40
CaO	1.58	56.10	0.0282	0.0282	0.0282	0.0642	0.0642	Ca	CaO 1.58
Na2O	0.05	61.98	0.0008	0.0017	0.0004	0.0038	0.0038	Na	Na2O 0.05
Total	98.84				2.6324	4.0154	4.0154		Total 98.84

No of Oxygens	6
F	2.2793
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.963	XWo = Ca/Ca+Mg+FeT	3.25
Ti		0.005		XEn = Mg/Ca+Mg+FeT	61.20
Al		0.002	0.037	XFs = FeT/Ca+Mg+FeT	35.56
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.333	0.371		FeT/FeT+Mg	0.37
Mn	0.027			Fe2/Fe2+Mg	0.37
Mg	0.572	0.638			
Ca	0.064				
Na	0.004				
sum	1.000	1.015	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 279

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	52.40	60.10	0.8719	0.8719	1.7438	1.9535	1.9535	Si	SiO2 52.40
TiO2	0.19	79.87	0.0024	0.0024	0.0047	0.0053	0.0053	Ti	TiO2 0.19
Al2O3	1.30	101.96	0.0128	0.0255	0.0383	0.0571	0.0571	Al	Al2O3 1.30
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	Cr2O3 0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	Fe2O3 0.00
FeO	17.74	71.85	0.2469	0.2469	0.2469	0.5532	0.5532	Fe^{2+}	FeO 17.74
MnO	0.51	70.94	0.0072	0.0072	0.0072	0.0162	0.0162	Mn	MnO 0.51
MgO	24.42	40.30	0.6060	0.6060	0.6060	1.3577	1.3577	Mg	MgO 24.42
CaO	1.72	56.10	0.0307	0.0307	0.0307	0.0687	0.0687	Ca	CaO 1.72
Na2O	0.05	61.98	0.0008	0.0015	0.0004	0.0034	0.0034	Na	Na2O 0.05
Total	98.33				2.6779	4.0151	4.0151		Total 98.33

No of Oxygens	6
F	2.2406
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.954	XWo = Ca/Ca+Mg+FeT	3.47
Ti		0.005		XEn = Mg/Ca+Mg+FeT	68.58
Al		0.011	0.046	XFs = FeT/Ca+Mg+FeT	27.95
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.264	0.289		FeT/FeT+Mg	0.29
Mn	0.016			Fe2/Fe2+Mg	0.29
Mg	0.648	0.710			
Ca	0.069				
Na	0.003				
sum	1.000	1.015	2.000		
ideal	1.000	1.000	2.000		

Analysis No.	32								
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	53.46	60.10	0.8895	0.8895	1.7790	1.9603	1.9603	Si	53.46
TiO2	0.10	79.87	0.0013	0.0013	0.0026	0.0028	0.0028	Ti	0.10
Al2O3	1.02	101.96	0.0100	0.0200	0.0300	0.0441	0.0441	Al	1.02
Cr2O3	0.01	159.69	0.0001	0.0002	0.0003	0.0004	0.0004	Cr	0.01
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	20.52	71.85	0.2856	0.2856	0.2856	0.6294	0.6294	Fe^{2+}	20.52
MnO	0.63	70.94	0.0089	0.0089	0.0089	0.0197	0.0197	Mn	0.63
MgO	23.68	40.30	0.5876	0.5876	0.5876	1.2949	1.2949	Mg	23.68
CaO	1.60	56.10	0.0285	0.0285	0.0285	0.0629	0.0629	Ca	1.60
Na2O	0.02	61.98	0.0003	0.0005	0.0001	0.0011	0.0011	Na	0.02
Total	101.05				2.7227	4.0155	4.0155		Total 101.05

No of Oxygens	6
F	2.2037
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.960	XWo = Ca/Ca+Mg+FeT	3.16
Ti		0.003		XEn = Mg/Ca+Mg+FeT	65.16
Al		0.004	0.040	XFs = FeT/Ca+Mg+FeT	31.67
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.300	0.330		FeT/FeT+Mg	0.33
Mn	0.020			Fe2/Fe2+Mg	0.33
Mg	0.617	0.678			
Ca	0.063				
Na	0.001				
sum	1.000	1.016	2.000		
ideal	1.000	1.000	2.000		

Analysis No.	33								
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	53.77	60.10	0.8947	0.8947	1.7894	1.9612	1.9612	Si	53.77
TiO2	0.06	79.87	0.0007	0.0007	0.0014	0.0016	0.0016	Ti	0.06
Al2O3	0.79	101.96	0.0077	0.0155	0.0232	0.0339	0.0339	Al	0.79
Cr2O3	0.01	159.69	0.0001	0.0001	0.0002	0.0003	0.0003	Cr	0.01
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	20.81	71.85	0.2896	0.2896	0.2896	0.6349	0.6349	Fe^{2+}	20.81
MnO	0.60	70.94	0.0084	0.0084	0.0084	0.0185	0.0185	Mn	0.60
MgO	24.04	40.30	0.5965	0.5965	0.5965	1.3076	1.3076	Mg	24.04
CaO	1.58	56.10	0.0282	0.0282	0.0282	0.0617	0.0617	Ca	1.58
Na2O	0.03	61.98	0.0006	0.0011	0.0003	0.0024	0.0024	Na	0.03
Total	101.69				2.7372	4.0220	4.0220		Total 101.69

No of Oxygens	6
F	2.1920
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.961	XWo = Ca/Ca+Mg+FeT	3.08
Ti		0.002		XEn = Mg/Ca+Mg+FeT	65.24
Al			0.034	XFs = FeT/Ca+Mg+FeT	31.68
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.300	0.335		FeT/FeT+Mg	0.33
Mn	0.018			Fe2/Fe2+Mg	0.33
Mg	0.618	0.690			
Ca	0.062				
Na	0.002				
sum	1.000	1.027	1.995		
ideal	1.000	1.000	2.000		

Analysis No.	34								
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	53.12	60.10	0.8839	0.8839	1.7677	1.9495	1.9495	Si	53.12
TiO2	0.16	79.87	0.0020	0.0020	0.0040	0.0044	0.0044	Ti	0.16
Al2O3	1.28	101.96	0.0126	0.0252	0.0377	0.0555	0.0555	Al	1.28
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	20.25	71.85	0.2818	0.2818	0.2818	0.6216	0.6216	Fe^{2+}	20.25
MnO	0.49	70.94	0.0069	0.0069	0.0069	0.0151	0.0151	Mn	0.49
MgO	23.88	40.30	0.5926	0.5926	0.5926	1.3070	1.3070	Mg	23.88
CaO	1.65	56.10	0.0294	0.0294	0.0294	0.0649	0.0649	Ca	1.65
Na2O	0.02	61.98	0.0004	0.0007	0.0002	0.0016	0.0016	Na	0.02
Total	100.85				2.7203	4.0196	4.0196		Total 100.85

No of Oxygens	6
F	2.2057
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.949	XWo = Ca/Ca+Mg+FeT	3.25
Ti		0.004		XEn = Mg/Ca+Mg+FeT	65.56
Al		0.005	0.051	XFs = FeT/Ca+Mg+FeT	31.18
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.296	0.326		FeT/FeT+Mg	0.32
Mn	0.015			Fe2/Fe2+Mg	0.32
Mg	0.622	0.685			
Ca	0.065				
Na	0.002				
sum	1.000	1.020	2.000		

ideal	1.000	1.000	2.000

Analysis No. 43

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.21	60.10	0.8854	0.8854	1.7707	1.9489	1.9489	Si
TiO2	0.16	79.87	0.0019	0.0019	0.0039	0.0043	0.0043	Ti
Al2O3	2.95	101.96	0.0289	0.0579	0.0868	0.1274	0.1274	Al
Cr2O3	0.02	159.69	0.0001	0.0002	0.0003	0.0005	0.0005	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	19.37	71.85	0.2696	0.2696	0.2696	0.5934	0.5934	Fe^{2+}
MnO	0.47	70.94	0.0066	0.0066	0.0066	0.0144	0.0144	Mn
MgO	21.70	40.30	0.5385	0.5385	0.5385	1.1853	1.1853	Mg
CaO	2.69	56.10	0.0480	0.0480	0.0480	0.1056	0.1056	Ca
Na2O	0.17	61.98	0.0028	0.0056	0.0014	0.0123	0.0123	Na
Total	100.73				2.7257	3.9921	3.9921	

	Normalized Analysis
SiO2	53.21
TiO2	0.16
Al2O3	2.95
Cr2O3	0.02
Fe2O3	0.00
FeO	19.37
MnO	0.47
MgO	21.70
CaO	2.69
Na2O	0.17
Total	100.73

No of Oxygens	6
F	2.2013
calculated charge	12.006

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.949	XWo = Ca/Ca+Mg+FeT	5.60
Ti		0.004		XEn = Mg/Ca+Mg+FeT	62.90
Al		0.076	0.051	XFs = FeT/Ca+Mg+FeT	31.49
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.289	0.304		FeT/FeT+Mg	0.33
Mn	0.014			Fe2/Fe2+Mg	0.33
Mg	0.578	0.607			
Ca	0.106				
Na	0.012				
sum	1.000	0.992	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 49

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.43	60.10	0.8890	0.8890	1.7780	1.9628	1.9628	Si
TiO2	0.19	79.87	0.0024	0.0024	0.0048	0.0053	0.0053	Ti
Al2O3	1.22	101.96	0.0120	0.0240	0.0360	0.0530	0.0530	Al
Cr2O3	0.01	159.69	0.0001	0.0001	0.0002	0.0003	0.0003	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	19.70	71.85	0.2742	0.2742	0.2742	0.6054	0.6054	Fe^{2+}
MnO	0.54	70.94	0.0075	0.0075	0.0075	0.0167	0.0167	Mn
MgO	23.83	40.30	0.5913	0.5913	0.5913	1.3055	1.3055	Mg
CaO	1.41	56.10	0.0251	0.0251	0.0251	0.0555	0.0555	Ca
Na2O	0.03	61.98	0.0006	0.0011	0.0003	0.0025	0.0025	Na
Total	100.37				2.7176	4.0070	4.0070	

	Normalized Analysis
SiO2	53.43
TiO2	0.19
Al2O3	1.22
Cr2O3	0.01
Fe2O3	0.00
FeO	19.70
MnO	0.54
MgO	23.83
CaO	1.41
Na2O	0.03
Total	100.37

No of Oxygens	6
F	2.2079
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.963	XWo = Ca/Ca+Mg+FeT	2.82
Ti		0.005		XEn = Mg/Ca+Mg+FeT	66.39
Al		0.016	0.037	XFs = FeT/Ca+Mg+FeT	30.79
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.293	0.312		FeT/FeT+Mg	0.32
Mn	0.017			Fe2/Fe2+Mg	0.32
Mg	0.632	0.673			
Ca	0.055				
Na	0.002				
sum	1.000	1.007	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 50

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.37	60.10	0.8880	0.8880	1.7760	1.9628	1.9628	Si
TiO2	0.10	79.87	0.0012	0.0012	0.0025	0.0027	0.0027	Ti
Al2O3	1.02	101.96	0.0100	0.0201	0.0301	0.0444	0.0444	Al
Cr2O3	0.01	159.69	0.0000	0.0001	0.0001	0.0001	0.0001	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	20.53	71.85	0.2857	0.2857	0.2857	0.6316	0.6316	Fe^{2+}
MnO	0.64	70.94	0.0090	0.0090	0.0090	0.0199	0.0199	Mn
MgO	23.43	40.30	0.5814	0.5814	0.5814	1.2851	1.2851	Mg
CaO	1.65	56.10	0.0294	0.0294	0.0294	0.0650	0.0650	Ca
Na2O	0.03	61.98	0.0005	0.0010	0.0003	0.0023	0.0023	Na
Total	100.78				2.7145	4.0139	4.0139	

	Normalized Analysis
SiO2	53.37
TiO2	0.10
Al2O3	1.02
Cr2O3	0.01
Fe2O3	0.00
FeO	20.53
MnO	0.64
MgO	23.43
CaO	1.65
Na2O	0.03
Total	100.78

No of Oxygens	6
F	2.2103
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.963	XWo = Ca/Ca+Mg+FeT	3.28
Ti		0.003		XEn = Mg/Ca+Mg+FeT	64.85
Al		0.007	0.037	XFs = FeT/Ca+Mg+FeT	31.87
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.301	0.331		FeT/FeT+Mg	0.33
Mn	0.020			Fe2/Fe2+Mg	0.33
Mg	0.612	0.673			
Ca	0.065				

Na	0.002		
sum	1.000	1.014	2.000
ideal	1.000	1.000	2.000

Analysis No. 50

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.01	60.10	0.8820	0.8820	1.7641	1.9539	1.9539	Si
TiO2	0.05	79.87	0.0006	0.0006	0.0011	0.0013	0.0013	Ti
Al2O3	1.25	101.96	0.0122	0.0245	0.0367	0.0542	0.0542	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	20.71	71.85	0.2882	0.2882	0.2882	0.6385	0.6385	Fe^{2+}
MnO	0.57	70.94	0.0081	0.0081	0.0081	0.0178	0.0178	Mn
MgO	23.38	40.30	0.5801	0.5801	0.5801	1.2851	1.2851	Mg
CaO	1.69	56.10	0.0301	0.0301	0.0301	0.0667	0.0667	Ca
Na2O	0.02	61.98	0.0003	0.0005	0.0001	0.0011	0.0011	Na
Total	100.67				2.7086	4.0186	4.0186	

	Normalized Analysis
SiO2	53.01
TiO2	0.05
Al2O3	1.25
Cr2O3	0.00
Fe2O3	0.00
FeO	20.71
MnO	0.57
MgO	23.38
CaO	1.69
Na2O	0.02
Total	100.67

No of Oxygens	6
F	2.2152
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.954	XWo = Ca/Ca+Mg+FeT	3.35
Ti		0.001		XEn = Mg/Ca+Mg+FeT	64.57
Al		0.008	0.046	XFs = FeT/Ca+Mg+FeT	32.08
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.303	0.335		FeT/FeT+Mg	0.33
Mn	0.018			Fe2/Fe2+Mg	0.33
Mg	0.611	0.674			
Ca	0.067				
Na	0.001				
sum	1.000	1.019	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 53

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.77	60.10	0.8947	0.8947	1.7894	1.9458	1.9458	Si
TiO2	0.13	79.87	0.0017	0.0017	0.0033	0.0036	0.0036	Ti
Al2O3	1.76	101.96	0.0172	0.0344	0.0517	0.0749	0.0749	Al
Cr2O3	0.04	159.69	0.0002	0.0005	0.0007	0.0010	0.0010	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	16.51	71.85	0.2298	0.2298	0.2298	0.4998	0.4998	Fe^{2+}
MnO	0.43	70.94	0.0060	0.0060	0.0060	0.0131	0.0131	Mn
MgO	25.56	40.30	0.6342	0.6342	0.6342	1.3794	1.3794	Mg
CaO	2.44	56.10	0.0435	0.0435	0.0435	0.0946	0.0946	Ca
Na2O	0.02	61.98	0.0004	0.0007	0.0002	0.0015	0.0015	Na
Total	100.66				2.7588	4.0137	4.0137	

	Normalized Analysis
SiO2	53.77
TiO2	0.13
Al2O3	1.76
Cr2O3	0.04
Fe2O3	0.00
FeO	16.51
MnO	0.43
MgO	25.56
CaO	2.44
Na2O	0.02
Total	100.66

No of Oxygens	6
F	2.1749
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.946	XWo = Ca/Ca+Mg+FeT	4.79
Ti		0.004		XEn = Mg/Ca+Mg+FeT	69.89
Al		0.021	0.054	XFs = FeT/Ca+Mg+FeT	25.32
Cr		0.001		total	100.00
Fe3		0.000			
Fe2	0.237	0.263		FeT/FeT+Mg	0.27
Mn	0.013			Fe2/Fe2+Mg	0.27
Mg	0.654	0.726			
Ca	0.095				
Na	0.002				
sum	1.000	1.014	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 61

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.37	60.10	0.8880	0.8880	1.7760	1.9682	1.9682	Si
TiO2	0.08	79.87	0.0010	0.0010	0.0021	0.0023	0.0023	Ti
Al2O3	0.67	101.96	0.0066	0.0131	0.0197	0.0290	0.0290	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	20.29	71.85	0.2824	0.2824	0.2824	0.6259	0.6259	Fe^{2+}
MnO	0.61	70.94	0.0086	0.0086	0.0086	0.0191	0.0191	Mn
MgO	23.79	40.30	0.5903	0.5903	0.5903	1.3084	1.3084	Mg
CaO	1.55	56.10	0.0276	0.0276	0.0276	0.0612	0.0612	Ca
Na2O	0.04	61.98	0.0007	0.0014	0.0003	0.0030	0.0030	Na
Total	100.40				2.7071	4.0172	4.0172	

	Normalized Analysis
SiO2	53.37
TiO2	0.08
Al2O3	0.67
Cr2O3	0.00
Fe2O3	0.00
FeO	20.29
MnO	0.61
MgO	23.79
CaO	1.55
Na2O	0.04
Total	100.40

No of Oxygens	6
F	2.2164
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.968	XWo = Ca/Ca+Mg+FeT	3.07
Ti		0.002		XEn = Mg/Ca+Mg+FeT	65.57
Al			0.029	XFs = FeT/Ca+Mg+FeT	31.37
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.297	0.329		FeT/FeT+Mg	0.32

Mn	0.019			Fe2/Fe2+Mg	0.32
Mg	0.620	0.688			
Ca	0.061				
Na	0.003				
sum	1.000	1.020	1.997		
ideal	1.000	1.000	2.000		

Analysis No. 62

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.68	60.10	0.8765	0.8765	1.7531	1.9456	1.9456	Si
TiO2	0.15	79.87	0.0018	0.0018	0.0037	0.0041	0.0041	Ti
Al2O3	1.34	101.96	0.0131	0.0263	0.0394	0.0583	0.0583	Al
Cr2O3	0.02	159.69	0.0001	0.0002	0.0003	0.0004	0.0004	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	20.61	71.85	0.2868	0.2868	0.2868	0.6367	0.6367	Fe^{2+}
MnO	0.57	70.94	0.0081	0.0081	0.0081	0.0179	0.0179	Mn
MgO	23.48	40.30	0.5826	0.5826	0.5826	1.2932	1.2932	Mg
CaO	1.61	56.10	0.0287	0.0287	0.0287	0.0637	0.0637	Ca
Na2O	0.06	61.98	0.0009	0.0019	0.0005	0.0041	0.0041	Na
Total	100.51				2.7032	4.0240	4.0240	

	Normalized Analysis
SiO2	52.68
TiO2	0.15
Al2O3	1.34
Cr2O3	0.02
Fe2O3	0.00
FeO	20.61
MnO	0.57
MgO	23.48
CaO	1.61
Na2O	0.06
Total	100.51

No of Oxygens	6
F	2.2196
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.946	XWo = Ca/Ca+Mg+FeT	3.20
Ti		0.004		XEn = Mg/Ca+Mg+FeT	64.87
Al		0.004	0.054	XFs = FeT/Ca+Mg+FeT	31.94
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.302	0.335		FeT/FeT+Mg	0.33
Mn	0.018			Fe2/Fe2+Mg	0.33
Mg	0.613	0.681			
Ca	0.064				
Na	0.004				
sum	1.000	1.024	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 63

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.54	60.10	0.8908	0.8908	1.7817	1.9460	1.9460	Si
TiO2	0.19	79.87	0.0023	0.0023	0.0046	0.0051	0.0051	Ti
Al2O3	1.27	101.96	0.0124	0.0249	0.0373	0.0544	0.0544	Al
Cr2O3	0.06	159.69	0.0004	0.0007	0.0011	0.0016	0.0016	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	18.94	71.85	0.2636	0.2636	0.2636	0.5758	0.5758	Fe^{2+}
MnO	0.49	70.94	0.0069	0.0069	0.0069	0.0151	0.0151	Mn
MgO	25.05	40.30	0.6216	0.6216	0.6216	1.3578	1.3578	Mg
CaO	1.65	56.10	0.0294	0.0294	0.0294	0.0642	0.0642	Ca
Na2O	0.05	61.98	0.0008	0.0017	0.0004	0.0036	0.0036	Na
Total	101.23				2.7467	4.0237	4.0237	

	Normalized Analysis
SiO2	53.54
TiO2	0.19
Al2O3	1.27
Cr2O3	0.06
Fe2O3	0.00
FeO	18.94
MnO	0.49
MgO	25.05
CaO	1.65
Na2O	0.05
Total	101.23

No of Oxygens	6
F	2.1844
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.946	XWo = Ca/Ca+Mg+FeT	3.22
Ti		0.005		XEn = Mg/Ca+Mg+FeT	67.96
Al		0.000	0.054	XFs = FeT/Ca+Mg+FeT	28.82
Cr		0.002		total	100.00
Fe3		0.000			
Fe2	0.273	0.303		FeT/FeT+Mg	0.30
Mn	0.015			Fe2/Fe2+Mg	0.30
Mg	0.644	0.714			
Ca	0.064				
Na	0.004				
sum	1.000	1.024	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 64

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.95	60.10	0.8810	0.8810	1.7621	1.9522	1.9522	Si
TiO2	0.10	79.87	0.0013	0.0013	0.0026	0.0028	0.0028	Ti
Al2O3	1.43	101.96	0.0141	0.0281	0.0422	0.0623	0.0623	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	19.51	71.85	0.2715	0.2715	0.2715	0.6017	0.6017	Fe^{2+}
MnO	0.50	70.94	0.0070	0.0070	0.0070	0.0155	0.0155	Mn
MgO	23.83	40.30	0.5913	0.5913	0.5913	1.3102	1.3102	Mg
CaO	1.73	56.10	0.0308	0.0308	0.0308	0.0683	0.0683	Ca
Na2O	0.05	61.98	0.0008	0.0016	0.0004	0.0037	0.0037	Na
Total	100.10				2.7079	4.0166	4.0166	

	Normalized Analysis
SiO2	52.95
TiO2	0.10
Al2O3	1.43
Cr2O3	0.00
Fe2O3	0.00
FeO	19.51
MnO	0.50
MgO	23.83
CaO	1.73
Na2O	0.05
Total	100.10

No of Oxygens	6
F	2.2158
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.952	XWo = Ca/Ca+Mg+FeT	3.45
Ti		0.003		XEn = Mg/Ca+Mg+FeT	66.17
Al		0.014	0.048	XFs = FeT/Ca+Mg+FeT	30.38

Cr		0.000			total	100.00
Fe3		0.000				
Fe2	0.287	0.314			FeT/FeT+Mg	0.31
Mn	0.015				Fe2/Fe2+Mg	0.31
Mg	0.625	0.685				
Ca	0.068					
Na	0.004					
sum	1.000	1.017	2.000			
ideal	1.000	1.000	2.000			

Analysis No. 78

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	53.61	60.10	0.8920	0.8920	1.7840	1.9445	1.9445	Si	53.61
TiO2	0.10	79.87	0.0013	0.0013	0.0026	0.0028	0.0028	Ti	0.10
Al2O3	1.80	101.96	0.0177	0.0353	0.0530	0.0770	0.0770	Al	1.80
Cr2O3	0.05	159.69	0.0003	0.0006	0.0009	0.0013	0.0013	Cr	0.05
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	16.76	71.85	0.2333	0.2333	0.2333	0.5085	0.5085	Fe^{2+}	16.76
MnO	0.38	70.94	0.0054	0.0054	0.0054	0.0117	0.0117	Mn	0.38
MgO	25.75	40.30	0.6390	0.6390	0.6390	1.3929	1.3929	Mg	25.75
CaO	1.90	56.10	0.0339	0.0339	0.0339	0.0738	0.0738	Ca	1.90
Na2O	0.06	61.98	0.0010	0.0020	0.0005	0.0043	0.0043	Na	0.06
Total	100.41				2.7524	4.0168	4.0168		100.41

No of Oxygens	6
F	2.1799
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.944	XWo = Ca/Ca+Mg+FeT	3.74
Ti		0.003		XEn = Mg/Ca+Mg+FeT	70.52
Al		0.022	0.056	XFs = FeT/Ca+Mg+FeT	25.74
Cr		0.001		total	100.00
Fe3		0.000			
Fe2	0.243	0.265		FeT/FeT+Mg	0.27
Mn	0.012			Fe2/Fe2+Mg	0.27
Mg	0.667	0.726			
Ca	0.074				
Na	0.004				
sum	1.000	1.017	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 82

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	54.37	60.10	0.9047	0.9047	1.8093	1.9711	1.9711	Si	54.37
TiO2	0.02	79.87	0.0003	0.0003	0.0006	0.0006	0.0006	Ti	0.02
Al2O3	0.96	101.96	0.0094	0.0188	0.0283	0.0411	0.0411	Al	0.96
Cr2O3	0.05	159.69	0.0003	0.0007	0.0010	0.0015	0.0015	Cr	0.05
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	15.64	71.85	0.2177	0.2177	0.2177	0.4743	0.4743	Fe^{2+}	15.64
MnO	0.41	70.94	0.0058	0.0058	0.0058	0.0125	0.0125	Mn	0.41
MgO	26.39	40.30	0.6548	0.6548	0.6548	1.4268	1.4268	Mg	26.39
CaO	2.01	56.10	0.0358	0.0358	0.0358	0.0781	0.0781	Ca	2.01
Na2O	0.06	61.98	0.0009	0.0018	0.0005	0.0039	0.0039	Na	0.06
Total	99.91				2.7537	4.0099	4.0099		99.91

No of Oxygens	6
F	2.1789
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.971	XWo = Ca/Ca+Mg+FeT	3.94
Ti		0.001		XEn = Mg/Ca+Mg+FeT	72.09
Al		0.012	0.029	XFs = FeT/Ca+Mg+FeT	23.96
Cr		0.001		total	100.00
Fe3		0.000			
Fe2	0.226	0.248		FeT/FeT+Mg	0.25
Mn	0.013			Fe2/Fe2+Mg	0.25
Mg	0.680	0.747			
Ca	0.078				
Na	0.004				
sum	1.000	1.010	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 88

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	54.78	60.10	0.9115	0.9115	1.8230	1.9706	1.9706	Si	54.78
TiO2	0.08	79.87	0.0011	0.0011	0.0021	0.0023	0.0023	Ti	0.08
Al2O3	1.07	101.96	0.0105	0.0209	0.0314	0.0452	0.0452	Al	1.07
Cr2O3	0.11	159.69	0.0007	0.0013	0.0020	0.0029	0.0029	Cr	0.11
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	13.65	71.85	0.1900	0.1900	0.1900	0.4107	0.4107	Fe^{2+}	13.65
MnO	0.34	70.94	0.0048	0.0048	0.0048	0.0105	0.0105	Mn	0.34
MgO	27.43	40.30	0.6806	0.6806	0.6806	1.4715	1.4715	Mg	27.43
CaO	2.30	56.10	0.0410	0.0410	0.0410	0.0886	0.0886	Ca	2.30
Na2O	0.04	61.98	0.0007	0.0013	0.0003	0.0029	0.0029	Na	0.04
Total	99.80				2.7752	4.0052	4.0052		99.80

No of Oxygens	6
F	2.1620
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%

Si			1.971	XWo = Ca/Ca+Mg+FeT	4.50
Ti		0.002		XEn = Mg/Ca+Mg+FeT	74.66
Al		0.016	0.029	XFs = FeT/Ca+Mg+FeT	20.84
Cr		0.003		total	100.00
Fe3		0.000			
Fe2	0.196	0.215		FeT/FeT+Mg	0.22
Mn	0.010			Fe2/Fe2+Mg	0.22
Mg	0.702	0.769			
Ca	0.089				
Na	0.003				
sum	1.000	1.005	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 95

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis	
SiO2	52.99	60.10	0.8817	0.8817	1.7634	1.9583	1.9583	Si	SiO2	52.99
TiO2	0.04	79.87	0.0005	0.0005	0.0009	0.0010	0.0010	Ti	TiO2	0.04
Al2O3	1.05	101.96	0.0103	0.0207	0.0310	0.0459	0.0459	Al	Al2O3	1.05
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	Cr2O3	0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	Fe2O3	0.00
FeO	19.80	71.85	0.2756	0.2756	0.2756	0.6121	0.6121	Fe^{2+}	FeO	19.80
MnO	0.52	70.94	0.0073	0.0073	0.0073	0.0162	0.0162	Mn	MnO	0.52
MgO	23.97	40.30	0.5948	0.5948	0.5948	1.3211	1.3211	Mg	MgO	23.97
CaO	1.57	56.10	0.0280	0.0280	0.0280	0.0622	0.0622	Ca	CaO	1.57
Na2O	0.05	61.98	0.0008	0.0017	0.0004	0.0037	0.0037	Na	Na2O	0.05
Total	99.99				2.7014	4.0205	4.0205		Total	99.99

No of Oxygens	6
F	2.2211
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.958	XWo = Ca/Ca+Mg+FeT	3.12
Ti		0.001		XEn = Mg/Ca+Mg+FeT	66.21
Al		0.004	0.042	XFs = FeT/Ca+Mg+FeT	30.68
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.291	0.321		FeT/FeT+Mg	0.32
Mn	0.016			Fe2/Fe2+Mg	0.32
Mg	0.627	0.694			
Ca	0.062				
Na	0.004				
sum	1.000	1.021	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 96

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis	
SiO2	53.11	60.10	0.8837	0.8837	1.7674	1.9623	1.9623	Si	SiO2	53.11
TiO2	0.06	79.87	0.0008	0.0008	0.0016	0.0018	0.0018	Ti	TiO2	0.06
Al2O3	1.15	101.96	0.0113	0.0226	0.0339	0.0502	0.0502	Al	Al2O3	1.15
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	Cr2O3	0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	Fe2O3	0.00
FeO	19.85	71.85	0.2763	0.2763	0.2763	0.6135	0.6135	Fe^{2+}	FeO	19.85
MnO	0.52	70.94	0.0074	0.0074	0.0074	0.0163	0.0163	Mn	MnO	0.52
MgO	23.61	40.30	0.5859	0.5859	0.5859	1.3009	1.3009	Mg	MgO	23.61
CaO	1.64	56.10	0.0292	0.0292	0.0292	0.0649	0.0649	Ca	CaO	1.64
Na2O	0.05	61.98	0.0008	0.0017	0.0004	0.0037	0.0037	Na	Na2O	0.05
Total	100.00				2.7020	4.0136	4.0136		Total	100.00

No of Oxygens	6
F	2.2205
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.962	XWo = Ca/Ca+Mg+FeT	3.28
Ti		0.002		XEn = Mg/Ca+Mg+FeT	65.73
Al		0.012	0.038	XFs = FeT/Ca+Mg+FeT	30.99
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.293	0.320		FeT/FeT+Mg	0.32
Mn	0.016			Fe2/Fe2+Mg	0.32
Mg	0.622	0.679			
Ca	0.065				
Na	0.004				
sum	1.000	1.014	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 105

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis	
SiO2	53.28	60.10	0.8865	0.8865	1.7730	1.9705	1.9705	Si	SiO2	53.28
TiO2	0.00	79.87	0.0000	0.0000	0.0000	0.0000	0.0000	Ti	TiO2	0.00
Al2O3	1.13	101.96	0.0111	0.0221	0.0332	0.0492	0.0492	Al	Al2O3	1.13
Cr2O3	0.01	159.69	0.0000	0.0001	0.0001	0.0002	0.0002	Cr	Cr2O3	0.01
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	Fe2O3	0.00
FeO	18.40	71.85	0.2561	0.2561	0.2561	0.5692	0.5692	Fe^{2+}	FeO	18.40
MnO	0.52	70.94	0.0074	0.0074	0.0074	0.0164	0.0164	Mn	MnO	0.52
MgO	24.28	40.30	0.6025	0.6025	0.6025	1.3392	1.3392	Mg	MgO	24.28
CaO	1.49	56.10	0.0266	0.0266	0.0266	0.0590	0.0590	Ca	CaO	1.49
Na2O	0.06	61.98	0.0009	0.0018	0.0004	0.0040	0.0040	Na	Na2O	0.06
Total	99.17				2.6994	4.0077	4.0077		Total	99.17

No of Oxygens	6
F	2.2227
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.971	XWo = Ca/Ca+Mg+FeT	3.00
Ti		0.000		XEn = Mg/Ca+Mg+FeT	68.07
Al		0.020	0.029	XFs = FeT/Ca+Mg+FeT	28.93
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.275	0.295		FeT/FeT+Mg	0.30
Mn	0.016			Fe2/Fe2+Mg	0.30
Mg	0.646	0.693			
Ca	0.059				
Na	0.004				
sum	1.000	1.008	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 106

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	53.80	60.10	0.8952	0.8952	1.7903	1.9697	1.9697	Si	53.80
TiO2	0.03	79.87	0.0004	0.0004	0.0009	0.0009	0.0009	Ti	0.03
Al2O3	0.74	101.96	0.0072	0.0145	0.0217	0.0318	0.0318	Al	0.74
Cr2O3	0.01	159.69	0.0000	0.0001	0.0001	0.0002	0.0002	Cr	0.01
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	17.46	71.85	0.2430	0.2430	0.2430	0.5347	0.5347	Fe^{2+}	17.46
MnO	0.47	70.94	0.0066	0.0066	0.0066	0.0145	0.0145	Mn	0.47
MgO	25.60	40.30	0.6352	0.6352	0.6352	1.3977	1.3977	Mg	25.60
CaO	1.61	56.10	0.0287	0.0287	0.0287	0.0631	0.0631	Ca	1.61
Na2O	0.04	61.98	0.0007	0.0014	0.0003	0.0030	0.0030	Na	0.04
Total	99.76				2.7269	4.0156	4.0156		99.76

No of Oxygens 6
F 2.2003

calculated charge 12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.970	XWo = Ca/Ca+Mg+FeT	3.16
Ti		0.001		XEn = Mg/Ca+Mg+FeT	70.04
Al		0.002	0.030	XFs = FeT/Ca+Mg+FeT	26.79
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.254	0.280		FeT/FeT+Mg	0.28
Mn	0.014			Fe2/Fe2+Mg	0.28
Mg	0.665	0.733			
Ca	0.063				
Na	0.003				
sum	1.000	1.016	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 107

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	52.99	60.10	0.8817	0.8817	1.7634	1.9629	1.9629	Si	52.99
TiO2	0.07	79.87	0.0009	0.0009	0.0017	0.0019	0.0019	Ti	0.07
Al2O3	1.13	101.96	0.0111	0.0221	0.0332	0.0493	0.0493	Al	1.13
Cr2O3	0.00	159.69	0.0000	0.0001	0.0001	0.0001	0.0001	Cr	0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	18.47	71.85	0.2571	0.2571	0.2571	0.5723	0.5723	Fe^{2+}	18.47
MnO	0.51	70.94	0.0073	0.0073	0.0073	0.0161	0.0161	Mn	0.51
MgO	24.37	40.30	0.6047	0.6047	0.6047	1.3462	1.3462	Mg	24.37
CaO	1.54	56.10	0.0275	0.0275	0.0275	0.0611	0.0611	Ca	1.54
Na2O	0.03	61.98	0.0005	0.0011	0.0003	0.0024	0.0024	Na	0.03
Total	99.12				2.6951	4.0123	4.0123		99.12

No of Oxygens 6
F 2.2262

calculated charge 12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.963	XWo = Ca/Ca+Mg+FeT	3.09
Ti		0.002		XEn = Mg/Ca+Mg+FeT	68.00
Al		0.012	0.037	XFs = FeT/Ca+Mg+FeT	28.91
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.275	0.298		FeT/FeT+Mg	0.30
Mn	0.016			Fe2/Fe2+Mg	0.30
Mg	0.646	0.700			
Ca	0.061				
Na	0.002				
sum	1.000	1.012	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 108

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	52.66	60.10	0.8762	0.8762	1.7524	1.9650	1.9650	Si	52.66
TiO2	0.09	79.87	0.0011	0.0011	0.0023	0.0025	0.0025	Ti	0.09
Al2O3	1.22	101.96	0.0119	0.0239	0.0358	0.0535	0.0535	Al	1.22
Cr2O3	0.02	159.69	0.0001	0.0002	0.0003	0.0005	0.0005	Cr	0.02
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	19.38	71.85	0.2697	0.2697	0.2697	0.6049	0.6049	Fe^{2+}	19.38
MnO	0.49	70.94	0.0069	0.0069	0.0069	0.0154	0.0154	Mn	0.49
MgO	23.29	40.30	0.5779	0.5779	0.5779	1.2961	1.2961	Mg	23.29
CaO	1.66	56.10	0.0296	0.0296	0.0296	0.0664	0.0664	Ca	1.66
Na2O	0.06	61.98	0.0010	0.0021	0.0005	0.0046	0.0046	Na	0.06
Total	98.87				2.6754	4.0089	4.0089		98.87

No of Oxygens 6
F 2.2426

calculated charge						12.002		

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)		end member*	%
Si			1.965	XWo = Ca/Ca+Mg+FeT		3.37
Ti		0.003		XEn = Mg/Ca+Mg+FeT		65.88
Al		0.019	0.035	XFs = FeT/Ca+Mg+FeT		30.75
Cr		0.000		total		100.00
Fe3		0.000				
Fe2	0.291	0.314		FeT/FeT+Mg		0.32
Mn	0.015			Fe2/Fe2+Mg		0.32
Mg	0.623	0.673				
Ca	0.066					
Na	0.005					
sum	1.000	1.009	2.000			
ideal	1.000	1.000	2.000			

Analysis No. 116

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.74	60.10	0.8942	0.8942	1.7884	1.9719	1.9719	Si
TiO2	0.03	79.87	0.0004	0.0004	0.0008	0.0008	0.0008	Ti
Al2O3	1.05	101.96	0.0103	0.0207	0.0310	0.0455	0.0455	Al
Cr2O3	0.00	159.69	0.0000	0.0001	0.0001	0.0001	0.0001	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	16.40	71.85	0.2283	0.2283	0.2283	0.5034	0.5034	Fe^{2+}
MnO	0.36	70.94	0.0050	0.0050	0.0050	0.0111	0.0111	Mn
MgO	25.55	40.30	0.6340	0.6340	0.6340	1.3981	1.3981	Mg
CaO	1.85	56.10	0.0330	0.0330	0.0330	0.0727	0.0727	Ca
Na2O	0.05	61.98	0.0007	0.0015	0.0004	0.0032	0.0032	Na
Total	99.03				2.7208	4.0069	4.0069	

	Normalized Analysis
SiO2	53.74
TiO2	0.03
Al2O3	1.05
Cr2O3	0.00
Fe2O3	0.00
FeO	16.40
MnO	0.36
MgO	25.55
CaO	1.85
Na2O	0.05
Total	99.03

No of Oxygens	6
F	2.2052

calculated charge						12.002		

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)		end member*	%
Si			1.972	XWo = Ca/Ca+Mg+FeT		3.68
Ti		0.001		XEn = Mg/Ca+Mg+FeT		70.82
Al		0.017	0.028	XFs = FeT/Ca+Mg+FeT		25.50
Cr		0.000		total		100.00
Fe3		0.000				
Fe2	0.242	0.262		FeT/FeT+Mg		0.26
Mn	0.011			Fe2/Fe2+Mg		0.26
Mg	0.671	0.727				
Ca	0.073					
Na	0.003					
sum	1.000	1.007	2.000			
ideal	1.000	1.000	2.000			

Analysis No. 117

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.03	60.10	0.8824	0.8824	1.7647	1.9426	1.9426	Si
TiO2	0.08	79.87	0.0010	0.0010	0.0021	0.0023	0.0023	Ti
Al2O3	1.62	101.96	0.0159	0.0319	0.0478	0.0701	0.0701	Al
Cr2O3	0.06	159.69	0.0004	0.0008	0.0011	0.0017	0.0017	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	16.44	71.85	0.2288	0.2288	0.2288	0.5037	0.5037	Fe^{2+}
MnO	0.38	70.94	0.0054	0.0054	0.0054	0.0118	0.0118	Mn
MgO	25.67	40.30	0.6370	0.6370	0.6370	1.4023	1.4023	Mg
CaO	2.14	56.10	0.0381	0.0381	0.0381	0.0840	0.0840	Ca
Na2O	0.04	61.98	0.0006	0.0013	0.0003	0.0028	0.0028	Na
Total	99.47				2.7254	4.0213	4.0213	

	Normalized Analysis
SiO2	53.03
TiO2	0.08
Al2O3	1.62
Cr2O3	0.06
Fe2O3	0.00
FeO	16.44
MnO	0.38
MgO	25.67
CaO	2.14
Na2O	0.04
Total	99.47

No of Oxygens	6
F	2.2015

calculated charge						12.001		

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)		end member*	%
Si			1.943	XWo = Ca/Ca+Mg+FeT		4.22
Ti		0.002		XEn = Mg/Ca+Mg+FeT		70.47
Al		0.013	0.057	XFs = FeT/Ca+Mg+FeT		25.31
Cr		0.002		total		100.00
Fe3		0.000				
Fe2	0.238	0.266		FeT/FeT+Mg		0.26
Mn	0.012			Fe2/Fe2+Mg		0.26
Mg	0.663	0.739				
Ca	0.084					
Na	0.003					
sum	1.000	1.021	2.000			
ideal	1.000	1.000	2.000			

Analysis No. 126

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.58	60.10	0.8915	0.8915	1.7830	1.9727	1.9727	Si
TiO2	0.01	79.87	0.0001	0.0001	0.0002	0.0002	0.0002	Ti
Al2O3	0.72	101.96	0.0071	0.0141	0.0212	0.0312	0.0312	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	19.57	71.85	0.2724	0.2724	0.2724	0.6027	0.6027	Fe^{2+}
MnO	0.55	70.94	0.0077	0.0077	0.0077	0.0170	0.0170	Mn
MgO	24.13	40.30	0.5988	0.5988	0.5988	1.3249	1.3249	Mg
CaO	1.57	56.10	0.0280	0.0280	0.0280	0.0619	0.0619	Ca
Na2O	0.05	61.98	0.0008	0.0016	0.0004	0.0036	0.0036	Na
Total	100.17				2.7116	4.0142	4.0142	

	Normalized Analysis
SiO2	53.58
TiO2	0.01
Al2O3	0.72
Cr2O3	0.00
Fe2O3	0.00
FeO	19.57
MnO	0.55
MgO	24.13
CaO	1.57
Na2O	0.05
Total	100.17

No of Oxygens	6
F	2.2127
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.973	XWo = Ca/Ca+Mg+FeT	3.11
Ti		0.000		XEn = Mg/Ca+Mg+FeT	66.59
Al		0.004	0.027	XFs = FeT/Ca+Mg+FeT	30.29
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.287	0.316		FeT/FeT+Mg	0.31
Mn	0.017			Fe2/Fe2+Mg	0.31
Mg	0.631	0.694			
Ca	0.062				
Na	0.004				
sum	1.000	1.014	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 127

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	53.11	60.10	0.8837	0.8837	1.7674	1.9699	1.9699	Si	53.11
TiO2	0.02	79.87	0.0002	0.0002	0.0004	0.0004	0.0004	Ti	0.02
Al2O3	0.82	101.96	0.0080	0.0160	0.0240	0.0357	0.0357	Al	0.82
Cr2O3	0.01	159.69	0.0000	0.0001	0.0001	0.0001	0.0001	Cr	0.01
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	19.64	71.85	0.2733	0.2733	0.2733	0.6093	0.6093	Fe^{2+}	19.64
MnO	0.53	70.94	0.0075	0.0075	0.0075	0.0167	0.0167	Mn	0.53
MgO	23.86	40.30	0.5921	0.5921	0.5921	1.3198	1.3198	Mg	23.86
CaO	1.49	56.10	0.0266	0.0266	0.0266	0.0592	0.0592	Ca	1.49
Na2O	0.03	61.98	0.0005	0.0010	0.0002	0.0022	0.0022	Na	0.03
Total	99.50				2.6915	4.0134	4.0134		Total 99.50

No of Oxygens	6
F	2.2292
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.970	XWo = Ca/Ca+Mg+FeT	2.98
Ti		0.000		XEn = Mg/Ca+Mg+FeT	66.38
Al		0.006	0.030	XFs = FeT/Ca+Mg+FeT	30.65
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.291	0.318		FeT/FeT+Mg	0.32
Mn	0.017			Fe2/Fe2+Mg	0.32
Mg	0.631	0.689			
Ca	0.059				
Na	0.002				
sum	1.000	1.013	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 128

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis
SiO2	52.66	60.10	0.8762	0.8762	1.7524	1.9561	1.9561	Si	52.66
TiO2	0.05	79.87	0.0006	0.0006	0.0011	0.0013	0.0013	Ti	0.05
Al2O3	1.13	101.96	0.0111	0.0222	0.0333	0.0495	0.0495	Al	1.13
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	0.00
FeO	20.67	71.85	0.2877	0.2877	0.2877	0.6422	0.6422	Fe^{2+}	20.67
MnO	0.51	70.94	0.0072	0.0072	0.0072	0.0160	0.0160	Mn	0.51
MgO	23.23	40.30	0.5764	0.5764	0.5764	1.2869	1.2869	Mg	23.23
CaO	1.64	56.10	0.0292	0.0292	0.0292	0.0653	0.0653	Ca	1.64
Na2O	0.03	61.98	0.0006	0.0011	0.0003	0.0025	0.0025	Na	0.03
Total	99.92				2.6876	4.0197	4.0197		Total 99.92

No of Oxygens	6
F	2.2325
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.956	XWo = Ca/Ca+Mg+FeT	3.27
Ti		0.001		XEn = Mg/Ca+Mg+FeT	64.52
Al		0.006	0.044	XFs = FeT/Ca+Mg+FeT	32.20
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.305	0.337		FeT/FeT+Mg	0.33
Mn	0.016			Fe2/Fe2+Mg	0.33
Mg	0.611	0.676			
Ca	0.065				
Na	0.003				
sum	1.000	1.020	2.000		
ideal	1.000	1.000	2.000		

Analysis No.	323							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	38.16	60.10	0.6349	0.6349	1.2699	1.4851	1.4851	Si
TiO2	0.00	79.87	0.0000	0.0000	0.0000	0.0000	0.0000	Ti
Al2O3	0.05	101.96	0.0005	0.0011	0.0016	0.0025	0.0025	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	24.68	71.85	0.3435	0.3435	0.3435	0.8034	0.8034	Fe^{2+}
MnO	0.35	70.94	0.0049	0.0049	0.0049	0.0116	0.0116	Mn
MgO	37.93	40.30	0.9412	0.9412	0.9412	2.2015	2.2015	Mg
CaO	0.23	56.10	0.0040	0.0040	0.0040	0.0094	0.0094	Ca
Na2O	0.01	61.98	0.0001	0.0002	0.0001	0.0005	0.0005	Na
Total	101.41				2.5652	4.5140	4.5140	
						Cation Excess		
No of Oxygens	6							
F	2.3390							
calculated charge						12.000		

	Normalized Analysis
SiO2	38.16
TiO2	0.00
Al2O3	0.05
Cr2O3	0.00
Fe2O3	0.00
FeO	24.68
MnO	0.35
MgO	37.93
CaO	0.23
Na2O	0.01
Total	101.41

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)		end member*	%
Si			1.485		XWo = Ca/Ca+Mg+FeT	0.31
Ti		0.000			XEn = Mg/Ca+Mg+FeT	73.03
Al			0.002		XFs = FeT/Ca+Mg+FeT	26.65
Cr		0.000			total	100.00
Fe3		0.000				
Fe2	0.262	0.542			FeT/FeT+Mg	0.27
Mn	0.012				Fe2/Fe2+Mg	0.27
Mg	0.717	1.485				
Ca	0.009					
Na	0.001					
sum	1.000	2.026	1.488	Note: excess octahedral cations		
ideal	1.000	1.000	2.000	Note: difficiency of tetrahedral cations		

Analysis No.	324							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	38.00	60.10	0.6323	0.6323	1.2646	1.4851	1.4851	Si
TiO2	0.03	79.87	0.0004	0.0004	0.0008	0.0009	0.0009	Ti
Al2O3	0.03	101.96	0.0003	0.0006	0.0009	0.0014	0.0014	Al
Cr2O3	0.01	159.69	0.0001	0.0001	0.0002	0.0003	0.0003	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	24.28	71.85	0.3379	0.3379	0.3379	0.7937	0.7937	Fe^{2+}
MnO	0.41	70.94	0.0058	0.0058	0.0058	0.0137	0.0137	Mn
MgO	37.88	40.30	0.9400	0.9400	0.9400	2.2077	2.2077	Mg
CaO	0.24	56.10	0.0043	0.0043	0.0043	0.0101	0.0101	Ca
Na2O	0.02	61.98	0.0003	0.0007	0.0002	0.0016	0.0016	Na
Total	100.91				2.5546	4.5144	4.5144	
						Cation Excess		
No of Oxygens	6							
F	2.3487							
calculated charge						12.001		

	Normalized Analysis
SiO2	38.00
TiO2	0.03
Al2O3	0.03
Cr2O3	0.01
Fe2O3	0.00
FeO	24.28
MnO	0.41
MgO	37.88
CaO	0.24
Na2O	0.02
Total	100.91

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)		end member*	%
Si			1.485		XWo = Ca/Ca+Mg+FeT	0.34
Ti		0.001			XEn = Mg/Ca+Mg+FeT	73.31
Al			0.001		XFs = FeT/Ca+Mg+FeT	26.36
Cr		0.000			total	100.00
Fe3		0.000				
Fe2	0.258	0.536			FeT/FeT+Mg	0.26
Mn	0.014				Fe2/Fe2+Mg	0.26
Mg	0.717	1.491				
Ca	0.010					
Na	0.002					
sum	1.000	2.028	1.486	Note: excess octahedral cations		
ideal	1.000	1.000	2.000	Note: difficiency of tetrahedral cations		

Analysis No.	328							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	54.43	60.10	0.9057	0.9057	1.8113	1.9602	1.9602	Si
TiO2	0.05	79.87	0.0007	0.0007	0.0013	0.0014	0.0014	Ti
Al2O3	0.91	101.96	0.0089	0.0179	0.0268	0.0387	0.0387	Al
Cr2O3	0.01	159.69	0.0001	0.0001	0.0002	0.0003	0.0003	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	15.55	71.85	0.2164	0.2164	0.2164	0.4684	0.4684	Fe^{2+}
MnO	0.41	70.94	0.0057	0.0057	0.0057	0.0124	0.0124	Mn
MgO	27.10	40.30	0.6725	0.6725	0.6725	1.4554	1.4554	Mg
CaO	2.11	56.10	0.0376	0.0376	0.0376	0.0814	0.0814	Ca
Na2O	0.04	61.98	0.0006	0.0012	0.0003	0.0026	0.0026	Na
Total	100.61				2.7722	4.0209	4.0209	
No of Oxygens	6							
F	2.1644							
calculated charge						12.001		

	Normalized Analysis
SiO2	54.43
TiO2	0.05
Al2O3	0.91
Cr2O3	0.01
Fe2O3	0.00
FeO	15.55
MnO	0.41
MgO	27.10
CaO	2.11
Na2O	0.04
Total	100.61

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)		end member*	%
Si			1.960		XWo = Ca/Ca+Mg+FeT	4.06
Ti		0.001			XEn = Mg/Ca+Mg+FeT	72.58
Al			0.039		XFs = FeT/Ca+Mg+FeT	23.36
Cr		0.000			total	100.00
Fe3		0.000				
Fe2	0.220	0.248			FeT/FeT+Mg	0.24
Mn	0.012				Fe2/Fe2+Mg	0.24
Mg	0.684	0.772				
Ca	0.081					
Na	0.003					
sum	1.000	1.022	1.999			
ideal	1.000	1.000	2.000			

Analysis No.	329

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	52.69	60.10	0.8767	0.8767	1.7534	1.9261	1.9261	Si
TiO2	0.00	79.87	0.0000	0.0000	0.0000	0.0000	0.0000	Ti
Al2O3	2.45	101.96	0.0240	0.0481	0.0721	0.1056	0.1056	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	15.95	71.85	0.2220	0.2220	0.2220	0.4877	0.4877	Fe^{2+}
MnO	0.34	70.94	0.0047	0.0047	0.0047	0.0104	0.0104	Mn
MgO	25.81	40.30	0.6404	0.6404	0.6404	1.4071	1.4071	Mg
CaO	2.14	56.10	0.0381	0.0381	0.0381	0.0838	0.0838	Ca
Na2O	0.02	61.98	0.0003	0.0006	0.0002	0.0013	0.0013	Na
Total	99.39				2.7310	4.0221	4.0221	

	Normalized Analysis
SiO2	52.69
TiO2	0.00
Al2O3	2.45
Cr2O3	0.00
Fe2O3	0.00
FeO	15.95
MnO	0.34
MgO	25.81
CaO	2.14
Na2O	0.02
Total	99.39

No of Oxygens 6
F 2.1970

calculated charge 12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.926	XWo = Ca/Ca+Mg+FeT	4.24
Ti		0.000		XEn = Mg/Ca+Mg+FeT	71.11
Al		0.032	0.074	XFs = FeT/Ca+Mg+FeT	24.65
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.233	0.255		FeT/FeT+Mg	0.26
Mn	0.010			Fe2/Fe2+Mg	0.26
Mg	0.672	0.735			
Ca	0.084				
Na	0.001				
sum	1.000	1.022	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 330

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.51	60.10	0.8903	0.8903	1.7807	1.9556	1.9556	Si
TiO2	0.02	79.87	0.0002	0.0002	0.0005	0.0005	0.0005	Ti
Al2O3	1.25	101.96	0.0123	0.0245	0.0368	0.0538	0.0538	Al
Cr2O3	0.01	159.69	0.0001	0.0001	0.0002	0.0002	0.0002	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	16.23	71.85	0.2259	0.2259	0.2259	0.4961	0.4961	Fe^{2+}
MnO	0.65	70.94	0.0092	0.0092	0.0092	0.0202	0.0202	Mn
MgO	26.54	40.30	0.6586	0.6586	0.6586	1.4465	1.4465	Mg
CaO	1.09	56.10	0.0194	0.0194	0.0194	0.0425	0.0425	Ca
Na2O	0.08	61.98	0.0013	0.0026	0.0006	0.0057	0.0057	Na
Total	99.38				2.7317	4.0211	4.0211	

	Normalized Analysis
SiO2	53.51
TiO2	0.02
Al2O3	1.25
Cr2O3	0.01
Fe2O3	0.00
FeO	16.23
MnO	0.65
MgO	26.54
CaO	1.09
Na2O	0.08
Total	99.38

No of Oxygens 6
F 2.1964

calculated charge 12.003

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.956	XWo = Ca/Ca+Mg+FeT	2.14
Ti		0.001		XEn = Mg/Ca+Mg+FeT	72.87
Al		0.009	0.044	XFs = FeT/Ca+Mg+FeT	24.99
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.238	0.258		FeT/FeT+Mg	0.26
Mn	0.020			Fe2/Fe2+Mg	0.26
Mg	0.694	0.753			
Ca	0.043				
Na	0.006				
sum	1.000	1.021	2.000		
ideal	1.000	1.000	2.000		

Analysis No. 347

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	37.82	60.10	0.6293	0.6293	1.2586	1.4784	1.4784	Si
TiO2	0.04	79.87	0.0005	0.0005	0.0009	0.0011	0.0011	Ti
Al2O3	0.01	101.96	0.0001	0.0002	0.0003	0.0005	0.0005	Al
Cr2O3	0.02	159.69	0.0001	0.0002	0.0003	0.0005	0.0005	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	24.77	71.85	0.3447	0.3447	0.3447	0.8099	0.8099	Fe^{2+}
MnO	0.42	70.94	0.0060	0.0060	0.0060	0.0141	0.0141	Mn
MgO	37.83	40.30	0.9387	0.9387	0.9387	2.2054	2.2054	Mg
CaO	0.23	56.10	0.0041	0.0041	0.0041	0.0097	0.0097	Ca
Na2O	0.02	61.98	0.0003	0.0006	0.0001	0.0013	0.0013	Na
Total	101.16				2.5539	4.5210	4.5210	

Cation Excess

	Normalized Analysis	
SiO2	37.82	37.82
TiO2	0.04	0.04
Al2O3	0.01	0.01
Cr2O3	0.02	0.02
Fe2O3	0.00	0.00
FeO	24.77	24.77
MnO	0.42	0.42
MgO	37.83	37.83
CaO	0.23	0.23
Na2O	0.02	0.02
Total	101.16	

No of Oxygens 6
F 2.3494

calculated charge 12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.478	XWo = Ca/Ca+Mg+FeT	0.32
Ti		0.001		XEn = Mg/Ca+Mg+FeT	72.90
Al			0.001	XFs = FeT/Ca+Mg+FeT	26.77
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.262	0.548		FeT/FeT+Mg	0.27
Mn	0.014			Fe2/Fe2+Mg	0.27
Mg	0.713	1.492			
Ca	0.010				
Na	0.001				
sum	1.000	2.042	1.479	Note: excess octahedral cations	
ideal	1.000	1.000	2.000	Note: difficiency of tetrahedral cations	

Analysis No.	171							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	54.37	60.10	0.9047	0.9047	1.8093	1.9578	1.9578	Si
TiO2	0.10	79.87	0.0013	0.0013	0.0026	0.0028	0.0028	Ti
Al2O3	1.03	101.96	0.0101	0.0202	0.0303	0.0437	0.0437	Al
Cr2O3	0.04	159.69	0.0003	0.0005	0.0008	0.0011	0.0011	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	15.61	71.85	0.2173	0.2173	0.2173	0.4702	0.4702	Fe^{2+}
MnO	0.40	70.94	0.0056	0.0056	0.0056	0.0121	0.0121	Mn
MgO	26.94	40.30	0.6685	0.6685	0.6685	1.4467	1.4467	Mg
CaO	2.13	56.10	0.0380	0.0380	0.0380	0.0822	0.0822	Ca
Na2O	0.02	61.98	0.0003	0.0006	0.0001	0.0013	0.0013	Na
Total	100.64				2.7724	4.0179	4.0179	

	Normalized Analysis
SiO2	54.37
TiO2	0.10
Al2O3	1.03
Cr2O3	0.04
Fe2O3	0.00
FeO	15.61
MnO	0.40
MgO	26.94
CaO	2.13
Na2O	0.02
Total	100.64

No of Oxygens	6
F	2.1642
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)
Si			1.958
Ti		0.003	
Al		0.002	0.042
Cr		0.001	
Fe3		0.000	
Fe2	0.222	0.248	
Mn	0.012		
Mg	0.683	0.764	
Ca	0.082		
Na	0.001		
sum	1.000	1.018	2.000
ideal	1.000	1.000	2.000

end member*	%
XWo = Ca/Ca+Mg+FeT	4.11
XEn = Mg/Ca+Mg+FeT	72.37
XFs = FeT/Ca+Mg+FeT	23.52
total	100.00
FeT/FeT+Mg	0.25
Fe2/Fe2+Mg	0.25

Analysis No.	358							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	53.99	60.10	0.8983	0.8983	1.7967	1.9525	1.9525	Si
TiO2	0.08	79.87	0.0010	0.0010	0.0020	0.0022	0.0022	Ti
Al2O3	0.93	101.96	0.0091	0.0182	0.0272	0.0394	0.0394	Al
Cr2O3	0.04	159.69	0.0002	0.0004	0.0007	0.0010	0.0010	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	15.72	71.85	0.2188	0.2188	0.2188	0.4755	0.4755	Fe^{2+}
MnO	0.46	70.94	0.0065	0.0065	0.0065	0.0142	0.0142	Mn
MgO	26.24	40.30	0.6511	0.6511	0.6511	1.4152	1.4152	Mg
CaO	3.20	56.10	0.0570	0.0570	0.0570	0.1240	0.1240	Ca
Na2O	0.06	61.98	0.0009	0.0019	0.0005	0.0041	0.0041	Na
Total	100.71				2.7605	4.0282	4.0282	

	Normalized Analysis
SiO2	53.99
TiO2	0.08
Al2O3	0.93
Cr2O3	0.04
Fe2O3	0.00
FeO	15.72
MnO	0.46
MgO	26.24
CaO	3.20
Na2O	0.06
Total	100.71

No of Oxygens	6
F	2.1735
calculated charge	12.002

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.953	XWo = Ca/Ca+Mg+FeT	6.15
Ti		0.002		XEn = Mg/Ca+Mg+FeT	70.24
Al			0.039	XFs = FeT/Ca+Mg+FeT	23.60
Cr		0.001		total	100.00
Fe3		0.000			
Fe2	0.216	0.260		FeT/FeT+Mg	0.25
Mn	0.014			Fe2/Fe2+Mg	0.25
Mg	0.642	0.773			
Ca	0.124				
Na	0.004				
sum	1.000	1.036	1.992		
ideal	1.000	1.000	2.000		

Analysis No.	372							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	38.10	60.10	0.6339	0.6339	1.2679	1.4827	1.4827	Si
TiO2	0.00	79.87	0.0000	0.0000	0.0000	0.0000	0.0000	Ti
Al2O3	0.02	101.96	0.0002	0.0004	0.0006	0.0009	0.0009	Al
Cr2O3	0.01	159.69	0.0001	0.0001	0.0002	0.0003	0.0003	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	23.80	71.85	0.3312	0.3312	0.3312	0.7747	0.7747	Fe^{2+}
MnO	0.38	70.94	0.0054	0.0054	0.0054	0.0125	0.0125	Mn
MgO	38.51	40.30	0.9556	0.9556	0.9556	2.2349	2.2349	Mg
CaO	0.25	56.10	0.0044	0.0044	0.0044	0.0104	0.0104	Ca
Na2O	0.02	61.98	0.0003	0.0006	0.0001	0.0014	0.0014	Na
Total	101.09				2.5654	4.5178	4.5178	
						Cation Excess		

	Normalized Analysis
SiO2	38.10
TiO2	0.00
Al2O3	0.02
Cr2O3	0.01
Fe2O3	0.00
FeO	23.80
MnO	0.38
MgO	38.51
CaO	0.25
Na2O	0.02
Total	101.09

No of Oxygens	6
F	2.3388
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)		end member*	%
Si			1.483		XWo = Ca/Ca+Mg+FeT	0.34
Ti		0.000			XEn = Mg/Ca+Mg+FeT	74.00
Al			0.001		XFs = FeT/Ca+Mg+FeT	25.65
Cr		0.000			total	100.00
Fe3		0.000				
Fe2	0.251	0.524			FeT/FeT+Mg	0.26
Mn	0.013				Fe2/Fe2+Mg	0.26
Mg	0.725	1.510				
Ca	0.010					
Na	0.001					
sum	1.000	2.034	1.484	Note: excess octahedral cations		
ideal	1.000	1.000	2.000	Note: difficiency of tetrahedral cations		

Analysis No.	379							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	38.31	60.10	0.6374	0.6374	1.2749	1.4893	1.4893	Si
TiO2	0.03	79.87	0.0003	0.0003	0.0007	0.0008	0.0008	Ti
Al2O3	0.02	101.96	0.0002	0.0004	0.0006	0.0009	0.0009	Al
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	23.52	71.85	0.3273	0.3273	0.3273	0.7648	0.7648	Fe^{2+}
MnO	0.41	70.94	0.0058	0.0058	0.0058	0.0134	0.0134	Mn
MgO	38.44	40.30	0.9538	0.9538	0.9538	2.2286	2.2286	Mg
CaO	0.27	56.10	0.0048	0.0048	0.0048	0.0113	0.0113	Ca
Na2O	0.01	61.98	0.0002	0.0005	0.0001	0.0011	0.0011	Na
Total	101.01				2.5680	4.5103	4.5103	
						Cation Excess		

	Normalized Analysis
SiO2	38.31
TiO2	0.03
Al2O3	0.02
Cr2O3	0.00
Fe2O3	0.00
FeO	23.52
MnO	0.41
MgO	38.44
CaO	0.27
Na2O	0.01
Total	101.01

No of Oxygens	6
F	2.3365
calculated charge	12.001

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)	end member*	%
Si			1.489	XWo = Ca/Ca+Mg+FeT	0.38

Ti		0.001		XEn = Mg/Ca+Mg+FeT	74.17
Al			0.001	XFs = FeT/Ca+Mg+FeT	25.45
Cr		0.000		total	100.00
Fe3		0.000			
Fe2	0.249	0.516		FeT/FeT+Mg	0.26
Mn	0.013			Fe2/Fe2+Mg	0.26
Mg	0.725	1.503			
Ca	0.011				
Na	0.001				
sum	1.000	2.020	1.490	Note: excess octahedral cations	
ideal	1.000	1.000	2.000	Note: difficiency of tetrahedral cations	

Analysis No. 381

	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units		Normalized Analysis	
SiO2	38.06	60.10	0.6333	0.6333	1.2666	1.4809	1.4809	Si	SiO2	38.06
TiO2	0.03	79.87	0.0003	0.0003	0.0007	0.0008	0.0008	Ti	TiO2	0.03
Al2O3	0.02	101.96	0.0002	0.0004	0.0007	0.0010	0.0010	Al	Al2O3	0.02
Cr2O3	0.00	159.69	0.0000	0.0000	0.0000	0.0000	0.0000	Cr	Cr2O3	0.00
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}	Fe2O3	0.00
FeO	24.13	71.85	0.3358	0.3358	0.3358	0.7853	0.7853	Fe^{2+}	FeO	24.13
MnO	0.36	70.94	0.0051	0.0051	0.0051	0.0119	0.0119	Mn	MnO	0.36
MgO	38.38	40.30	0.9524	0.9524	0.9524	2.2270	2.2270	Mg	MgO	38.38
CaO	0.26	56.10	0.0046	0.0046	0.0046	0.0108	0.0108	Ca	CaO	0.26
Na2O	0.00	61.98	0.0001	0.0002	0.0000	0.0004	0.0004	Na	Na2O	0.00
Total	101.25				2.5658	4.5181	4.5181		Total	101.25

Cation Excess

No of Oxygens	6		
F	2.3384		
calculated charge		12.000	

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)		end member*	%
Si			1.481		XWo = Ca/Ca+Mg+FeT	0.36
Ti		0.001			XEn = Mg/Ca+Mg+FeT	73.67
Al			0.001		XFs = FeT/Ca+Mg+FeT	25.98
Cr		0.000			total	100.00
Fe3		0.000				
Fe2	0.255	0.531			FeT/FeT+Mg	0.26
Mn	0.012				Fe2/Fe2+Mg	0.26
Mg	0.722	1.505				
Ca	0.011					
Na	0.000					
sum	1.000	2.036	1.482	Note: excess octahedral cations		
ideal	1.000	1.000	2.000	Note: difficiency of tetrahedral cations		

Analysis No.	274							
	Wt %	MW	Moles	No Cations	No of O	Norm Cations	atom units	
SiO2	55.18	60.10	0.9181	0.9181	1.8363	1.9542	1.9542	Si
TiO2	0.02	79.87	0.0002	0.0002	0.0004	0.0004	0.0004	Ti
Al2O3	1.20	101.96	0.0117	0.0235	0.0352	0.0499	0.0499	Al
Cr2O3	0.06	159.69	0.0004	0.0007	0.0011	0.0016	0.0016	Cr
Fe2O3	0.00	160.87	0.0000	0.0000	0.0000	0.0000	0.0000	Fe^{3+}
FeO	12.13	71.85	0.1688	0.1688	0.1688	0.3593	0.3593	Fe^{2+}
MnO	0.26	70.94	0.0037	0.0037	0.0037	0.0078	0.0078	Mn
MgO	29.88	40.30	0.7414	0.7414	0.7414	1.5781	1.5781	Mg
CaO	1.79	56.10	0.0319	0.0319	0.0319	0.0679	0.0679	Ca
Na2O	0.03	61.98	0.0005	0.0010	0.0002	0.0020	0.0020	Na
Total	100.54				2.8190	4.0212	4.0212	
No of Oxygens	6							
F	2.1284							
calculated charge						12.001		

	Normalized Analysis
SiO2	55.18
TiO2	0.02
Al2O3	1.20
Cr2O3	0.06
Fe2O3	0.00
FeO	12.13
MnO	0.26
MgO	29.88
CaO	1.79
Na2O	0.03
Total	100.54

Site Occupancies & End Members

	M2 (VI)	M1 (VI)	T (IV)
Si			1.954
Ti		0.000	
Al		0.004	0.046
Cr		0.002	
Fe3		0.000	
Fe2	0.171	0.188	
Mn	0.008		
Mg	0.751	0.827	
Ca	0.068		
Na	0.002		
sum	1.000	1.021	2.000
ideal	1.000	1.000	2.000

end member*	%
XWo = Ca/Ca+Mg+FeT	3.39
XEn = Mg/Ca+Mg+FeT	78.69
XFs = FeT/Ca+Mg+FeT	17.92
total	100.00
FeT/FeT+Mg	0.19
Fe2/Fe2+Mg	0.19

Sample	SiO2	TiO2	Al2O3	Cr2O3	Fe203	FeO	MnO	MgO	CaO	Na2O	Total	Analysis No.	Wo	En	Fs
2-1_1 opx core	52.38	0.17	0.84	0.00	0.00	23.01	0.92	21.01	1.56	0.04	99.94	324	3	60	37
2-1_1 opx rim	52.14	0.20	0.83	0.01	0.00	23.53	1.01	20.78	1.59	0.03	100.11	325	3	59	38
2-1_3 opx core	52.22	0.13	0.62	0.02	0.00	22.25	0.93	21.44	1.57	0.06	99.25	339	3	61	36
2-1_4 opx rim	52.04	0.15	0.72	0.01	0.00	23.78	0.99	20.71	1.60	0.02	100.02	348	3	59	38
2-1_4 opx core	52.16	0.09	0.88	0.00	0.00	21.92	0.96	21.57	1.65	0.04	99.26	352	3	62	35
2-1_8 opx core	52.59	0.18	0.68	0.02	0.00	23.83	0.99	21.22	1.51	0.02	101.04	372	3	59	37
2-1_8 opx rim	52.41	0.17	0.83	0.00	0.00	22.76	0.99	20.45	1.76	0.06	99.42	373	4	59	37
2-1_12 opx core	52.10	0.25	0.83	0.00	0.00	22.81	1.00	21.04	1.70	0.05	99.79	85	3	60	36
2-1_12 opx rim	52.09	0.17	0.67	0.00	0.00	23.56	1.07	20.35	1.60	0.04	99.55	88	3	59	38
2-1_10 opx1 core	52.34	0.17	1.02	0.00	0.00	23.20	0.92	21.47	1.51	0.08	100.71	117	3	60	37
2-1_10 opx1 rim	52.21	0.12	0.82	0.00	0.00	23.51	1.02	20.92	1.60	0.04	100.24	118	3	59	37
5-1_1 opx core	52.75	0.12	0.88	0.00	0.00	22.88	0.77	22.10	1.71	0.09	101.31	210	3	61	35
5-1_1 opx dark rim	52.81	0.17	1.37	0.00	0.00	19.09	0.59	25.02	1.80	0.03	100.88	211	3	68	29
5-1_3a opx core	52.94	0.14	0.93	0.00	0.00	21.58	0.74	23.00	1.81	0.03	101.18	243	4	63	33
5-1_4a opx core	52.61	0.14	1.11	0.00	0.00	21.05	0.73	23.05	1.64	0.04	100.37	260	3	64	33
5-1_4a opx rim	52.15	0.17	0.91	0.00	0.00	23.13	0.86	21.40	1.83	0.05	100.50	261	4	60	36
5-1_7 opx core	51.76	0.18	0.86	0.00	0.00	22.17	0.84	21.40	1.58	0.05	98.84	278	3	61	36
5-1_7 opx rim	52.40	0.19	1.30	0.00	0.00	17.74	0.51	24.42	1.72	0.05	98.33	279	3	69	28
2-1_13 olivine lightcore	52.03	0.13	0.57	0.00	0.00	23.20	1.07	20.48	1.57	0.04	99.08	75	3	59	38
2-1_13 olivine lightcore2	51.17	0.17	1.10	0.00	0.00	23.17	0.90	20.04	1.83	0.07	98.45	76	4	58	38
41-1_1_opx_core_a	53.46	0.10	1.02	0.01	0.00	20.52	0.63	23.68	1.60	0.02	101.05	32	3	65	32
41-1_1_opx_core_b	53.77	0.06	0.79	0.01	0.00	20.81	0.60	24.04	1.58	0.03	101.69	33	3	65	32
41-1_1_cpx_core_a	53.12	0.16	1.28	0.00	0.00	20.25	0.49	23.88	1.65	0.02	100.85	34	3	66	31
41-1_1_opx2_core_a	53.43	0.19	1.22	0.01	0.00	19.70	0.54	23.83	1.41	0.03	100.37	49	3	66	31
41-1_1_opx2_core_b	53.37	0.10	1.02	0.01	0.00	20.53	0.64	23.43	1.65	0.03	100.78	50	3	65	32
41-1_1_opx2_rim_c	53.01	0.05	1.25	0.00	0.00	20.71	0.57	23.38	1.69	0.02	100.67	51	3	65	32
41-1_2opx core_a	53.37	0.08	0.67	0.00	0.00	20.29	0.61	23.79	1.55	0.04	100.40	61	3	66	31
41-1_2opx core_b	52.68	0.15	1.34	0.02	0.00	20.61	0.57	23.48	1.61	0.06	100.51	62	3	65	32
41-1_2opx core_c	53.54	0.19	1.27	0.06	0.00	18.94	0.49	25.05	1.65	0.05	101.23	63	3	68	29
41-1_2opx rim_d	52.95	0.10	1.43	0.00	0.00	19.51	0.50	23.83	1.73	0.05	100.10	64	3	66	30
41-1_4 opx core_a	52.99	0.04	1.05	0.00	0.00	19.80	0.52	23.97	1.57	0.05	99.99	95	3	66	31
41-1_4 opx rim_b	53.11	0.06	1.15	0.00	0.00	19.85	0.52	23.61	1.64	0.05	100.00	96	3	66	31
41-1_6 opx core_a	53.28	0.00	1.13	0.01	0.00	18.40	0.52	24.28	1.49	0.06	99.17	105	3	68	29
41-1_6 opx core_b	53.80	0.03	0.74	0.01	0.00	17.46	0.47	25.60	1.61	0.04	99.76	106	3	70	27
41-1_6 opx core_c	52.99	0.07	1.13	0.00	0.00	18.47	0.51	24.37	1.54	0.03	99.12	107	3	68	29
41-1_6 opx rim_d	52.66	0.09	1.22	0.02	0.00	19.38	0.49	23.29	1.66	0.06	98.87	108	3	66	31
41-1_7 opx core_a	53.58	0.01	0.72	0.00	0.00	19.57	0.55	24.13	1.57	0.05	100.17	126	3	67	30
41-1_7 opx core_b	53.11	0.02	0.82	0.01	0.00	19.64	0.53	23.86	1.49	0.03	99.50	127	3	66	31
41-1_7 opx rim_c	52.66	0.05	1.13	0.00	0.00	20.67	0.51	23.23	1.64	0.03	99.92	128	3	65	32
45-1_4 opx mp core	54.43	0.05	0.91	0.01	0.00	15.55	0.41	27.10	2.11	0.04	100.61	328	4	73	23
45-1_4 opx mp rim	52.69	0.00	2.45	0.00	0.00	15.95	0.34	25.81	2.14	0.02	99.39	329	4	71	25
45-1_4 opx mp core_b	53.51	0.02	1.25	0.01	0.00	16.23	0.65	26.54	1.09	0.08	99.38	330	2	73	25

Enstatite

Comment	SiO2	TiO2	Al2O3	Cr2O3	Fe203	FeO	MnO	MgO	CaO	Na2O	Total	Analysis No.	Wo	En	Fs
2-1_10 opx gm core	50.01	0.03	0.32	0.00	0.00	30.86	1.57	12.89	3.29	0.10	99.08	121	7	40	53
46-1_1 gm opx core	54.37	0.10	1.03	0.04	0.00	15.61	0.40	26.94	2.13	0.02	100.64	171	4	72	24
41-1_1_gmopx	53.21	0.16	2.95	0.02	0.00	19.37	0.47	21.70	2.69	0.17	100.73	43	6	63	31
41-1_1gm cpx core	53.77	0.13	1.76	0.04	0.00	16.51	0.43	25.56	2.44	0.02	100.66	53	5	70	25
41-1_3 gm opx	53.61	0.10	1.80	0.05	0.00	16.76	0.38	25.75	1.90	0.06	100.41	78	4	71	26
41-1_4 gm opx	54.37	0.02	0.96	0.05	0.00	15.64	0.41	26.39	2.01	0.06	99.91	82	4	72	24
41-1_4 gm opx_a	54.78	0.08	1.07	0.11	0.00	13.65	0.34	27.43	2.30	0.04	99.80	88	4	75	21
41-1_6 gm opx core	53.74	0.03	1.05	0.00	0.00	16.40	0.36	25.55	1.85	0.05	99.03	116	4	71	25
41-1_6 gm opx2 core	53.03	0.08	1.62	0.06	0.00	16.44	0.38	25.67	2.14	0.04	99.47	117	4	70	25
47-1_1 gm opx	53.99	0.08	0.93	0.04	0.00	15.72	0.46	26.24	3.20	0.06	100.71	358	6	70	24

Pigeonite
Enstatite

Analysis No.	65				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.03	60.10	0.8324	1.6649	9.2247
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.69	51.00	0.6018	0.9026	6.6684
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.72	71.80	0.0100	0.0100	0.1104
MnO	0.03	70.94	0.0004	0.0004	0.0049
MgO	0.04	40.30	0.0010	0.0010	0.0115
CaO	14.22	56.10	0.2535	0.2535	2.8089
Na2O	3.36	31.00	0.1084	0.0542	1.2011
K2O	0.10	47.00	0.0021	0.0011	0.0234
P2O5					
Total	99.19			2.8877	20.0533
					Cation Excess
No. of Oxygens	32				
F	11.081				

End Member Calculation		
X_{an}	2.8089	69.6
X_{ab}	1.2011	29.8
X_{or}	0.0234	0.6
	4.0334	100.0

Analysis No.	66				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.43	60.10	0.8391	1.6782	9.2734
TiO2	0.01	79.87	0.0001	0.0003	0.0016
Al2O3	30.52	51.00	0.5984	0.8976	6.6136
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.86	71.80	0.0120	0.0120	0.1329
MnO	0.05	70.94	0.0006	0.0006	0.0072
MgO	0.04	40.30	0.0010	0.0010	0.0107
CaO	13.86	56.10	0.2471	0.2471	2.7304
Na2O	3.55	31.00	0.1145	0.0573	1.2656
K2O	0.13	47.00	0.0028	0.0014	0.0310
P2O5					
Total	99.45			2.8955	20.0665
					Cation Excess
No. of Oxygens	32				
F	11.052				

End Member Calculation		
X_{an}	2.7304	67.8
X_{ab}	1.2656	31.4
X_{or}	0.0310	0.8
	4.0270	100.0

Analysis No.	67				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	52.93	60.10	0.8807	1.7614	9.7273
TiO2	0.08	79.87	0.0010	0.0020	0.0108
Al2O3	28.39	51.00	0.5567	0.8350	6.1484
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.84	71.80	0.0118	0.0118	0.1300
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.03	40.30	0.0008	0.0008	0.0084
CaO	11.61	56.10	0.2070	0.2070	2.2858
Na2O	4.79	31.00	0.1545	0.0773	1.7066
K2O	0.20	47.00	0.0043	0.0022	0.0476
P2O5					
Total	98.88			2.8972	20.0648
					Cation Excess
No. of Oxygens	32				
F	11.045				

End Member Calculation		
X_{an}	2.2858	56.6
X_{ab}	1.7066	42.2
X_{or}	0.0476	1.2
	4.0400	100.0

Analysis No.	70				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.79	60.10	0.7619	1.5238	8.5551
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	33.29	51.00	0.6527	0.9791	7.3295
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.62	71.80	0.0086	0.0086	0.0971
MnO	0.03	70.94	0.0004	0.0004	0.0041
MgO	0.04	40.30	0.0011	0.0011	0.0118
CaO	17.28	56.10	0.3080	0.3080	3.4587
Na2O	1.75	31.00	0.0565	0.0282	0.6339
K2O	0.04	47.00	0.0008	0.0004	0.0094
P2O5					
Total	98.85			2.8498	20.1007
					Cation Excess
No. of Oxygens	32				
F	11.229				

End Member Calculation		
X_{an}	3.4587	84.3
X_{ab}	0.6339	15.5
X_{or}	0.0094	0.2
	4.1020	100.0

Analysis No.	71				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.53	60.10	0.8241	1.6483	9.1909
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	30.78	51.00	0.6035	0.9053	6.7307
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.59	71.80	0.0082	0.0082	0.0912
MnO	0.03	70.94	0.0004	0.0004	0.0041
MgO	0.06	40.30	0.0014	0.0014	0.0160
CaO	14.07	56.10	0.2508	0.2508	2.7970
Na2O	3.36	31.00	0.1084	0.0542	1.2088
K2O	0.06	47.00	0.0013	0.0007	0.0145
P2O5					
Total	98.48			2.8694	20.0543
					Cation Excess
No. of Oxygens	32				
F	11.152				

End Member Calculation		
X_{an}	2.7970	69.6
X_{ab}	1.2088	30.1
X_{or}	0.0145	0.4
	4.0203	100.0

Analysis No.	72				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.98	60.10	0.8483	1.6965	9.4188
TiO2	0.02	79.87	0.0002	0.0005	0.0027
Al2O3	29.79	51.00	0.5841	0.8762	6.4859
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.62	71.80	0.0086	0.0086	0.0958
MnO	0.02	70.94	0.0003	0.0003	0.0029
MgO	0.06	40.30	0.0015	0.0015	0.0170
CaO	13.14	56.10	0.2342	0.2342	2.6008
Na2O	3.90	31.00	0.1258	0.0629	1.3969
K2O	0.11	47.00	0.0023	0.0012	0.0261
P2O5					
Total	98.64			2.8819	20.0470
No. of Oxygens	32				
F	11.104				

End Member Calculation		
X_{an}	2.6008	64.6
X_{ab}	1.3969	34.7
X_{or}	0.0261	0.6
	4.0238	100.0

Analysis No.	73				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	52.52	60.10	0.8739	1.7478	9.6593
TiO2	0.04	79.87	0.0005	0.0010	0.0054
Al2O3	28.88	51.00	0.5663	0.8494	6.2593
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.62	71.80	0.0087	0.0087	0.0960
MnO	0.02	70.94	0.0003	0.0003	0.0037
MgO	0.03	40.30	0.0007	0.0007	0.0075
CaO	11.99	56.10	0.2137	0.2137	2.3624
Na2O	4.45	31.00	0.1435	0.0718	1.5867
K2O	0.16	47.00	0.0034	0.0017	0.0372
P2O5					
Total	98.71			2.8950	20.0175
No. of Oxygens	32				
F	11.053				

End Member Calculation		
X_{an}	2.3624	59.3
X_{ab}	1.5867	39.8
X_{or}	0.0372	0.9
	3.9863	100.0

Analysis No.	80				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.81	60.10	0.7955	1.5910	8.9163
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.71	51.00	0.6218	0.9326	6.9689
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.79	71.80	0.0110	0.0110	0.1229
MnO	0.01	70.94	0.0001	0.0001	0.0015
MgO	0.03	40.30	0.0007	0.0007	0.0082
CaO	15.51	56.10	0.2765	0.2765	3.0988
Na2O	2.61	31.00	0.0842	0.0421	0.9437
K2O	0.09	47.00	0.0019	0.0010	0.0217
P2O5					
Total	98.56			2.8550	20.0819
					Cation Excess
No. of Oxygens	32				
F	11.208				

End Member Calculation		
X_{an}	3.0988	76.2
X_{ab}	0.9437	23.2
X_{or}	0.0217	0.5

	4.0641	100.0

Analysis No.	81				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	51.25	60.10	0.8527	1.7055	9.4890
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	29.36	51.00	0.5757	0.8635	6.4060
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.67	71.80	0.0094	0.0094	0.1041
MnO	0.02	70.94	0.0003	0.0003	0.0037
MgO	0.02	40.30	0.0006	0.0006	0.0067
CaO	12.79	56.10	0.2280	0.2280	2.5369
Na2O	4.10	31.00	0.1323	0.0661	1.4717
K2O	0.18	47.00	0.0038	0.0019	0.0428
P2O5					
Total	98.42			2.8757	20.0631
					Cation Excess
No. of Oxygens	32				
F	11.128				

End Member Calculation		
X_{an}	2.5369	62.6
X_{ab}	1.4717	36.3
X_{or}	0.0428	1.1
	4.0514	100.0

Analysis No.	89				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.38	60.10	0.8050	1.6100	8.9579
TiO2	0.03	79.87	0.0003	0.0007	0.0039
Al2O3	31.88	51.00	0.6251	0.9376	6.9561
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.62	71.80	0.0087	0.0087	0.0966
MnO	0.02	70.94	0.0003	0.0003	0.0038
MgO	0.04	40.30	0.0009	0.0009	0.0102
CaO	15.32	56.10	0.2731	0.2731	3.0389
Na2O	2.73	31.00	0.0881	0.0440	0.9800
K2O	0.02	47.00	0.0005	0.0003	0.0056
P2O5					
Total	99.05			2.8756	20.0529
					Cation Excess
No. of Oxygens	32				
F	11.128				

End Member Calculation		
X_{an}	3.0389	75.5
X_{ab}	0.9800	24.4
X_{or}	0.0056	0.1
	4.0244	100.0

Analysis No.	90				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.35	60.10	0.8877	1.7754	9.7363
TiO2	0.02	79.87	0.0003	0.0006	0.0033
Al2O3	28.70	51.00	0.5627	0.8441	6.1723
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.65	71.80	0.0091	0.0091	0.0994
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.05	40.30	0.0013	0.0013	0.0142
CaO	11.65	56.10	0.2077	0.2077	2.2777
Na2O	4.83	31.00	0.1558	0.0779	1.7089
K2O	0.14	47.00	0.0030	0.0015	0.0333
P2O5					
Total	99.40			2.9175	20.0454
No. of Oxygens	32				
F	10.968				

End Member Calculation		
X_{an}	2.2777	56.7
X_{ab}	1.7089	42.5
X_{or}	0.0333	0.8
	4.0199	100.0

Analysis No.	93				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.33	60.10	0.8042	1.6083	8.9363
TiO2	0.04	79.87	0.0004	0.0009	0.0050
Al2O3	32.00	51.00	0.6275	0.9412	6.9726
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.64	71.80	0.0089	0.0089	0.0986
MnO	0.04	70.94	0.0006	0.0006	0.0061
MgO	0.06	40.30	0.0015	0.0015	0.0165
CaO	15.46	56.10	0.2756	0.2756	3.0624
Na2O	2.62	31.00	0.0845	0.0423	0.9392
K2O	0.04	47.00	0.0010	0.0005	0.0106
P2O5					
Total	99.23			2.8796	20.0473
No. of Oxygens	32				
F	11.113				

End Member Calculation		
X_{an}	3.0624	76.3
X_{ab}	0.9392	23.4

X_{or}	0.0106	0.3
	4.0122	100.0

Analysis No.	94				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.71	60.10	0.8937	1.7874	9.8274
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	28.26	51.00	0.5541	0.8312	6.0934
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.60	71.80	0.0083	0.0083	0.0913
MnO	0.02	70.94	0.0003	0.0003	0.0032
MgO	0.05	40.30	0.0012	0.0012	0.0130
CaO	11.27	56.10	0.2009	0.2009	2.2091
Na2O	4.91	31.00	0.1584	0.0792	1.7417
K2O	0.15	47.00	0.0032	0.0016	0.0354
P2O5					
Total	98.97			2.9100	20.0145
No. of Oxygens	32				
F	10.997				

End Member Calculation		
X_{an}	2.2091	55.4
X_{ab}	1.7417	43.7
X_{or}	0.0354	0.9
	3.9862	100.0

Analysis No.	95				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.73	60.10	0.8275	1.6549	9.1631
TiO2	0.02	79.87	0.0003	0.0006	0.0033
Al2O3	31.04	51.00	0.6086	0.9129	6.7398
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.57	71.80	0.0079	0.0079	0.0873
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.06	40.30	0.0014	0.0014	0.0155
CaO	14.35	56.10	0.2558	0.2558	2.8326
Na2O	3.44	31.00	0.1110	0.0555	1.2288
K2O	0.07	47.00	0.0014	0.0007	0.0155
P2O5					
Total	99.27			2.8897	20.0859
					Cation Excess
No. of Oxygens	32				
F	11.074				

End Member Calculation		
X_{an}	2.8326	69.5
X_{ab}	1.2288	30.1
X_{or}	0.0155	0.4
	4.0769	100.0

Analysis No.	96				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.26	60.10	0.8862	1.7724	9.7356
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	28.64	51.00	0.5616	0.8424	6.1693
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.61	71.80	0.0085	0.0085	0.0931
MnO	0.04	70.94	0.0005	0.0005	0.0055
MgO	0.06	40.30	0.0014	0.0014	0.0156
CaO	11.59	56.10	0.2066	0.2066	2.2696
Na2O	4.93	31.00	0.1590	0.0795	1.7471
K2O	0.15	47.00	0.0032	0.0016	0.0351
P2O5					
Total	99.27			2.9128	20.0709
					Cation Excess
No. of Oxygens	32				
F	10.986				

End Member Calculation		
X_{an}	2.2696	56.0
X_{ab}	1.7471	43.1
X_{or}	0.0351	0.9
	4.0518	100.0

Analysis No.	107				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	52.26	60.10	0.8696	1.7391	9.6663
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	28.69	51.00	0.5625	0.8438	6.2535
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	1.09	71.80	0.0152	0.0152	0.1687
MnO	0.01	70.94	0.0001	0.0001	0.0016
MgO	0.04	40.30	0.0011	0.0011	0.0118
CaO	12.03	56.10	0.2144	0.2144	2.3838
Na2O	3.89	31.00	0.1255	0.0627	1.3949
K2O	0.20	47.00	0.0043	0.0021	0.0475
P2O5					
Total	98.21			2.8786	19.9281
					Cation Deficiency
No. of Oxygens	32				
F	11.116				

End Member Calculation		
X_{an}	2.3838	62.3

X_{ab}	1.3949	36.5
X_{or}	0.0475	1.2
	3.8262	100.0

Analysis No.	109				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	52.54	60.10	0.8742	1.7484	9.6742
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	28.86	51.00	0.5659	0.8488	6.2622
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	1.04	71.80	0.0144	0.0144	0.1599
MnO	0.04	70.94	0.0005	0.0005	0.0059
MgO	0.04	40.30	0.0010	0.0010	0.0111
CaO	12.28	56.10	0.2189	0.2189	2.4223
Na2O	3.53	31.00	0.1139	0.0569	1.2601
K2O	0.21	47.00	0.0044	0.0022	0.0491
P2O5					
Total	98.55			2.8917	19.8471
					Cation Deficiency
No. of Oxygens	32				
F	11.066				

End Member Calculation		
X_{an}	2.4223	64.9
X_{ab}	1.2601	33.8
X_{or}	0.0491	1.3
	3.7316	100.0

Analysis No.	112				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.77	60.10	0.8281	1.6562	9.1242
TiO2	0.06	79.87	0.0007	0.0014	0.0077
Al2O3	31.32	51.00	0.6141	0.9212	6.7664
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.70	71.80	0.0097	0.0097	0.1070
MnO	0.04	70.94	0.0005	0.0005	0.0055
MgO	0.05	40.30	0.0013	0.0013	0.0140
CaO	14.93	56.10	0.2661	0.2661	2.9322
Na2O	2.91	31.00	0.0939	0.0469	1.0343
K2O	0.09	47.00	0.0019	0.0010	0.0213
P2O5					
Total	99.86			2.9043	20.0127
No. of Oxygens	32				
F	11.018				

End Member Calculation		
X_{an}	2.9322	73.5
X_{ab}	1.0343	25.9
X_{or}	0.0213	0.5
	3.9878	100.0

Analysis No.	113				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.73	60.10	0.8940	1.7880	9.7749
TiO2	0.01	79.87	0.0002	0.0003	0.0016
Al2O3	28.97	51.00	0.5680	0.8521	6.2108
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.55	71.80	0.0076	0.0076	0.0836
MnO	0.02	70.94	0.0002	0.0002	0.0026
MgO	0.07	40.30	0.0017	0.0017	0.0183
CaO	11.88	56.10	0.2118	0.2118	2.3154
Na2O	3.95	31.00	0.1274	0.0637	1.3932
K2O	0.12	47.00	0.0026	0.0013	0.0285
P2O5					
Total	99.30			2.9267	19.8289
					Cation Deficiency
No. of Oxygens	32				
F	10.934				

End Member Calculation		
X_{an}	2.3154	62.0
X_{ab}	1.3932	37.3
X_{or}	0.0285	0.8
	3.7371	100.0

Analysis No.	114				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.37	60.10	0.8381	1.6762	9.2114
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	31.17	51.00	0.6112	0.9168	6.7173
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.68	71.80	0.0095	0.0095	0.1042
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.08	40.30	0.0021	0.0021	0.0229
CaO	14.32	56.10	0.2553	0.2553	2.8055
Na2O	3.14	31.00	0.1013	0.0506	1.1133
K2O	0.07	47.00	0.0014	0.0007	0.0152
P2O5					
Total	99.85			2.9115	19.9920
No. of Oxygens	32				
F	10.991				

End Member Calculation

X_{an}	2.8055	71.3
X_{ab}	1.1133	28.3
X_{or}	0.0152	0.4
	3.9340	100.0

Analysis No.	115				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	54.25	60.10	0.9027	1.8053	9.8762
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	28.69	51.00	0.5625	0.8438	6.1549
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.64	71.80	0.0090	0.0090	0.0981
MnO	0.00	70.94	0.0001	0.0001	0.0006
MgO	0.04	40.30	0.0011	0.0011	0.0119
CaO	11.15	56.10	0.1988	0.1988	2.1746
Na2O	4.01	31.00	0.1294	0.0647	1.4153
K2O	0.19	47.00	0.0041	0.0020	0.0448
P2O5					
Total	98.98			2.9247	19.7764
					Cation Deficiency
No. of Oxygens	32				
F	10.941				

End Member Calculation		
X_{an}	2.1746	59.8
X_{ab}	1.4153	38.9
X_{or}	0.0448	1.2
	3.6346	100.0

Analysis No.	116				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.64	60.10	0.8925	1.7850	9.7901
TiO2	0.03	79.87	0.0004	0.0008	0.0044
Al2O3	28.75	51.00	0.5637	0.8456	6.1836
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.63	71.80	0.0088	0.0088	0.0965
MnO	0.00	70.94	0.0000	0.0000	0.0004
MgO	0.06	40.30	0.0015	0.0015	0.0166
CaO	11.78	56.10	0.2100	0.2100	2.3033
Na2O	4.00	31.00	0.1290	0.0645	1.4154
K2O	0.10	47.00	0.0020	0.0010	0.0223
P2O5					
Total	98.99			2.9173	19.8326
					Cation Deficiency
No. of Oxygens	32				
F	10.969				

End Member Calculation		
X_{an}	2.3033	61.6
X_{ab}	1.4154	37.8
X_{or}	0.0223	0.6
	3.7410	100.0

Analysis No.	326				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.83	60.10	0.8457	1.6914	9.3128
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	30.41	51.00	0.5963	0.8944	6.5661
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.99	71.80	0.0138	0.0138	0.1522
MnO	0.03	70.94	0.0005	0.0005	0.0051
MgO	0.06	40.30	0.0015	0.0015	0.0160
CaO	13.95	56.10	0.2487	0.2487	2.7389
Na2O	3.39	31.00	0.1092	0.0546	1.2027
K2O	0.09	47.00	0.0019	0.0010	0.0211
P2O5					
Total	99.76			2.9060	20.0155
No. of Oxygens	32				
F	11.012				

End Member Calculation		
X_{an}	2.7389	69.1
X_{ab}	1.2027	30.4
X_{or}	0.0211	0.5
	3.9627	100.0

Analysis No.	327				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	54.24	60.10	0.9026	1.8051	9.8394
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	28.64	51.00	0.5615	0.8422	6.1210
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.86	71.80	0.0119	0.0119	0.1298
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.04	40.30	0.0009	0.0009	0.0097
CaO	11.57	56.10	0.2063	0.2063	2.2490
Na2O	4.12	31.00	0.1330	0.0665	1.4504
K2O	0.19	47.00	0.0039	0.0020	0.0430
P2O5					
Total	99.67			2.9354	19.8445
					Cation Deficiency
No. of Oxygens	32				
F	10.902				

End Member Calculation		
X_{an}	2.2490	60.1
X_{ab}	1.4504	38.8
X_{or}	0.0430	1.1
	3.7424	100.0

Analysis No.	329				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	51.86	60.10	0.8630	1.7259	9.5208
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	29.73	51.00	0.5830	0.8745	6.4321
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.77	71.80	0.0107	0.0107	0.1180
MnO	0.01	70.94	0.0001	0.0001	0.0015
MgO	0.05	40.30	0.0011	0.0011	0.0126
CaO	12.60	56.10	0.2246	0.2246	2.4778
Na2O	3.85	31.00	0.1241	0.0621	1.3693
K2O	0.13	47.00	0.0027	0.0013	0.0295
P2O5					
Total	99.00			2.9005	19.9620
No. of Oxygens	32				
F	11.033				

End Member Calculation		
X_{an}	2.4778	63.9
X_{ab}	1.3693	35.3
X_{or}	0.0295	0.8
	3.8765	100.0

Analysis No.	330				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	54.56	60.10	0.9079	1.8157	9.9563
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	28.38	51.00	0.5565	0.8347	6.1024
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.71	71.80	0.0099	0.0099	0.1090
MnO	0.02	70.94	0.0002	0.0002	0.0024
MgO	0.03	40.30	0.0008	0.0008	0.0084
CaO	10.44	56.10	0.1862	0.1862	2.0418
Na2O	4.23	31.00	0.1364	0.0682	1.4954
K2O	0.21	47.00	0.0045	0.0022	0.0491
P2O5					
Total	98.58			2.9179	19.7648
					Cation Deficiency
No. of Oxygens	32				
F	10.967				

End Member Calculation		
X_{an}	2.0418	56.9
X_{ab}	1.4954	41.7
X_{or}	0.0491	1.4
	3.5863	100.0

Analysis No.	332				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.97	60.10	0.8148	1.6296	9.0574
TiO2	0.05	79.87	0.0007	0.0013	0.0074
Al2O3	31.28	51.00	0.6134	0.9201	6.8182
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.55	71.80	0.0077	0.0077	0.0856
MnO	0.01	70.94	0.0001	0.0001	0.0016
MgO	0.06	40.30	0.0016	0.0016	0.0173
CaO	15.13	56.10	0.2698	0.2698	2.9986
Na2O	2.99	31.00	0.0963	0.0482	1.0706
K2O	0.04	47.00	0.0009	0.0004	0.0098
P2O5					
Total	99.09			2.8788	20.0663
					Cation Excess
No. of Oxygens	32				
F	11.116				

End Member Calculation		
X_{an}	2.9986	73.5
X_{ab}	1.0706	26.2
X_{or}	0.0098	0.2
	4.0789	100.0

Analysis No.	333				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.04	60.10	0.8160	1.6320	9.0639
TiO2	0.01	79.87	0.0002	0.0003	0.0017
Al2O3	31.19	51.00	0.6116	0.9174	6.7930
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.65	71.80	0.0090	0.0090	0.1004
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.04	40.30	0.0010	0.0010	0.0112
CaO	15.35	56.10	0.2736	0.2736	3.0390
Na2O	2.92	31.00	0.0943	0.0472	1.0477
K2O	0.04	47.00	0.0009	0.0004	0.0096
P2O5					
Total	99.25			2.8810	20.0666
					Cation Excess
No. of Oxygens	32				
F	11.107				

End Member Calculation		
X_{an}	3.0390	74.2
X_{ab}	1.0477	25.6
X_{or}	0.0096	0.2
	4.0963	100.0

Analysis No.	334				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.32	60.10	0.8372	1.6744	9.2228
TiO2	0.02	79.87	0.0003	0.0006	0.0034
Al2O3	31.32	51.00	0.6142	0.9213	6.7662
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.60	71.80	0.0083	0.0083	0.0917
MnO	0.02	70.94	0.0003	0.0003	0.0037
MgO	0.05	40.30	0.0011	0.0011	0.0123
CaO	14.42	56.10	0.2570	0.2570	2.8307
Na2O	2.55	31.00	0.0824	0.0412	0.9079
K2O	0.05	47.00	0.0011	0.0006	0.0122
P2O5					
Total	99.35			2.9048	19.8508
					Cation Deficiency
No. of Oxygens	32				
F	11.016				

End Member Calculation		
X_{an}	2.8307	75.5
X_{ab}	0.9079	24.2
X_{or}	0.0122	0.3
	3.7508	100.0

Analysis No.	335				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.10	60.10	0.8170	1.6341	9.1029
TiO2	0.02	79.87	0.0003	0.0006	0.0034
Al2O3	31.08	51.00	0.6094	0.9140	6.7891
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.60	71.80	0.0084	0.0084	0.0938
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.05	40.30	0.0012	0.0012	0.0129
CaO	15.05	56.10	0.2683	0.2683	2.9892
Na2O	2.79	31.00	0.0900	0.0450	1.0030
K2O	0.05	47.00	0.0011	0.0006	0.0125
P2O5					
Total	98.75			2.8722	20.0068
No. of Oxygens	32				
F	11.141				

End Member Calculation		
X_{an}	2.9892	74.6
X_{ab}	1.0030	25.0
X_{or}	0.0125	0.3
	4.0046	100.0

Analysis No.	336				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	52.43	60.10	0.8724	1.7447	9.6402
TiO2	0.02	79.87	0.0003	0.0006	0.0034
Al2O3	29.09	51.00	0.5703	0.8555	6.3026
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.52	71.80	0.0072	0.0072	0.0800
MnO	0.02	70.94	0.0002	0.0002	0.0026
MgO	0.03	40.30	0.0008	0.0008	0.0088
CaO	12.37	56.10	0.2206	0.2206	2.4374
Na2O	4.01	31.00	0.1294	0.0647	1.4301
K2O	0.13	47.00	0.0027	0.0014	0.0302
P2O5					
Total	98.62			2.8957	19.9353
					Cation Deficiency
No. of Oxygens	32				
F	11.051				

End Member Calculation		
X_{an}	2.4374	62.5
X_{ab}	1.4301	36.7
X_{or}	0.0302	0.8
	3.8977	100.0

Analysis No.	343				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.50	60.10	0.8403	1.6805	9.3435
TiO2	0.03	79.87	0.0004	0.0007	0.0040
Al2O3	30.07	51.00	0.5896	0.8845	6.5567
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.66	71.80	0.0092	0.0092	0.1021
MnO	0.02	70.94	0.0003	0.0003	0.0030
MgO	0.08	40.30	0.0019	0.0019	0.0216
CaO	13.66	56.10	0.2434	0.2434	2.7068
Na2O	3.52	31.00	0.1135	0.0568	1.2623
K2O	0.05	47.00	0.0010	0.0005	0.0109
P2O5					
Total	98.58			2.8778	20.0108
No. of Oxygens	32				

F	11.120

End Member Calculation		
X_{an}	2.7068	68.0
X_{ab}	1.2623	31.7
X_{or}	0.0109	0.3
	3.9800	100.0

Analysis No.	344				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.36	60.10	0.8879	1.7758	9.8340
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	28.18	51.00	0.5526	0.8289	6.1207
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.64	71.80	0.0089	0.0089	0.0991
MnO	0.00	70.94	0.0000	0.0000	0.0002
MgO	0.05	40.30	0.0014	0.0014	0.0150
CaO	11.49	56.10	0.2048	0.2048	2.2687
Na2O	4.19	31.00	0.1350	0.0675	1.4956
K2O	0.13	47.00	0.0028	0.0014	0.0316
P2O5					
Total	98.07			2.8892	19.8670
					Cation Deficiency
No. of Oxygens	32				
F	11.076				

End Member Calculation		
X_{an}	2.2687	59.8
X_{ab}	1.4956	39.4
X_{or}	0.0316	0.8
	3.7958	100.0

Analysis No.	345				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.07	60.10	0.8831	1.7662	9.7269
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	28.77	51.00	0.5641	0.8461	6.2132
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.68	71.80	0.0095	0.0095	0.1048
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.04	40.30	0.0010	0.0010	0.0106
CaO	11.96	56.10	0.2132	0.2132	2.3488
Na2O	4.18	31.00	0.1347	0.0674	1.4837
K2O	0.16	47.00	0.0035	0.0017	0.0384
P2O5					
Total	98.87			2.9053	19.9269
					Cation Deficiency
No. of Oxygens	32				
F	11.014				

End Member Calculation		
X_{an}	2.3488	60.7
X_{ab}	1.4837	38.3
X_{or}	0.0384	1.0
	3.8708	100.0

Analysis No.	353				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.59	60.10	0.8418	1.6836	9.3134
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.38	51.00	0.5957	0.8935	6.5905
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.57	71.80	0.0079	0.0079	0.0878
MnO	0.02	70.94	0.0003	0.0003	0.0036
MgO	0.05	40.30	0.0013	0.0013	0.0142
CaO	14.13	56.10	0.2518	0.2518	2.7862
Na2O	3.29	31.00	0.1062	0.0531	1.1754
K2O	0.07	47.00	0.0014	0.0007	0.0159
P2O5					
Total	99.11			2.8923	19.9870
No. of Oxygens	32				
F	11.064				

End Member Calculation		
X_{an}	2.7862	70.0
X_{ab}	1.1754	29.6
X_{or}	0.0159	0.4
	3.9776	100.0

Analysis No.	354				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.70	60.10	0.8935	1.7870	9.7735
TiO2	0.01	79.87	0.0002	0.0003	0.0017
Al2O3	28.80	51.00	0.5647	0.8471	6.1768
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.56	71.80	0.0078	0.0078	0.0854
MnO	0.02	70.94	0.0003	0.0003	0.0031
MgO	0.08	40.30	0.0019	0.0019	0.0205
CaO	11.98	56.10	0.2136	0.2136	2.3365
Na2O	4.13	31.00	0.1334	0.0667	1.4589
K2O	0.08	47.00	0.0017	0.0009	0.0188
P2O5					
Total	99.37			2.9255	19.8753
					Cation Deficiency

No. of Oxygens	32
F	10.938

End Member Calculation		
X_{an}	2.3365	61.3
X_{ab}	1.4589	38.2
X_{or}	0.0188	0.5
	3.8143	100.0

Analysis No.	355				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.60	60.10	0.8918	1.7836	9.7890
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	28.71	51.00	0.5629	0.8443	6.1786
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.61	71.80	0.0084	0.0084	0.0927
MnO	0.00	70.94	0.0000	0.0000	0.0004
MgO	0.06	40.30	0.0015	0.0015	0.0166
CaO	11.95	56.10	0.2131	0.2131	2.3387
Na2O	3.90	31.00	0.1258	0.0629	1.3805
K2O	0.11	47.00	0.0024	0.0012	0.0262
P2O5					
Total	98.95			2.9153	19.8239
					Cation Deficiency
No. of Oxygens	32				
F	10.977				

End Member Calculation		
X_{an}	2.3387	62.4
X_{ab}	1.3805	36.9
X_{or}	0.0262	0.7
	3.7454	100.0

Analysis No.	356				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.62	60.10	0.8922	1.7843	9.8058
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	28.60	51.00	0.5609	0.8413	6.1647
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.59	71.80	0.0082	0.0082	0.0901
MnO	0.06	70.94	0.0008	0.0008	0.0086
MgO	0.05	40.30	0.0012	0.0012	0.0135
CaO	11.59	56.10	0.2067	0.2067	2.2714
Na2O	4.16	31.00	0.1340	0.0670	1.4733
K2O	0.18	47.00	0.0039	0.0019	0.0423
P2O5					
Total	98.85			2.9115	19.8697
					Cation Deficiency
No. of Oxygens	32				
F	10.991				

End Member Calculation		
X_{an}	2.2714	60.0
X_{ab}	1.4733	38.9
X_{or}	0.0423	1.1
	3.7871	100.0

Analysis No.	357				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.26	60.10	0.8862	1.7724	9.6937
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	29.16	51.00	0.5717	0.8576	6.2541
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.66	71.80	0.0092	0.0092	0.1009
MnO	0.02	70.94	0.0002	0.0002	0.0027
MgO	0.02	40.30	0.0005	0.0005	0.0060
CaO	12.05	56.10	0.2147	0.2147	2.3486
Na2O	4.26	31.00	0.1374	0.0687	1.5024
K2O	0.19	47.00	0.0040	0.0020	0.0440
P2O5					
Total	99.61			2.9254	19.9525
No. of Oxygens	32				
F	10.939				

End Member Calculation		
X_{an}	2.3486	60.3
X_{ab}	1.5024	38.6
X_{or}	0.0440	1.1
	3.8951	100.0

Analysis No.	358				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.93	60.10	0.8474	1.6949	9.3187
TiO2	0.03	79.87	0.0004	0.0007	0.0039
Al2O3	30.37	51.00	0.5955	0.8932	6.5482
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.56	71.80	0.0078	0.0078	0.0857
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.05	40.30	0.0014	0.0014	0.0150
CaO	14.30	56.10	0.2549	0.2549	2.8035
Na2O	3.50	31.00	0.1129	0.0564	1.2411
K2O	0.07	47.00	0.0014	0.0007	0.0154
P2O5					

Total	99.81			2.9100	20.0315

No. of Oxygens 32
F 10.996

End Member Calculation		
X_{an}	2.8035	69.1
X_{ab}	1.2411	30.6
X_{or}	0.0154	0.4
	4.0599	100.0

Analysis No. 359

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	52.49	60.10	0.8734	1.7468	9.5996
TiO2	0.02	79.87	0.0003	0.0005	0.0028
Al2O3	29.35	51.00	0.5756	0.8633	6.3262
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.51	71.80	0.0070	0.0070	0.0774
MnO	0.02	70.94	0.0002	0.0002	0.0027
MgO	0.06	40.30	0.0016	0.0016	0.0173
CaO	12.67	56.10	0.2259	0.2259	2.4826
Na2O	4.03	31.00	0.1301	0.0650	1.4296
K2O	0.09	47.00	0.0020	0.0010	0.0222
P2O5					
Total	99.25			2.9114	19.9604

No. of Oxygens 32
F 10.991

End Member Calculation		
X_{an}	2.4826	63.1
X_{ab}	1.4296	36.3
X_{or}	0.0222	0.6
	3.9344	100.0

Analysis No. 360

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	54.22	60.10	0.9022	1.8045	9.8622
TiO2	0.02	79.87	0.0003	0.0005	0.0028
Al2O3	28.37	51.00	0.5563	0.8344	6.0803
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.61	71.80	0.0085	0.0085	0.0926
MnO	0.01	70.94	0.0002	0.0002	0.0022
MgO	0.05	40.30	0.0012	0.0012	0.0131
CaO	11.49	56.10	0.2048	0.2048	2.2390
Na2O	4.42	31.00	0.1426	0.0713	1.5593
K2O	0.20	47.00	0.0042	0.0021	0.0461
P2O5					
Total	99.40			2.9275	19.8975
					Cation Deficiency

No. of Oxygens 32
F 10.931

End Member Calculation		
X_{an}	2.2390	58.2
X_{ab}	1.5593	40.6
X_{or}	0.0461	1.2
	3.8444	100.0

Analysis No. 361

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.83	60.10	0.8957	1.7915	9.8127
TiO2	0.07	79.87	0.0009	0.0017	0.0094
Al2O3	28.58	51.00	0.5605	0.8407	6.1399
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.50	71.80	0.0069	0.0069	0.0758
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.03	40.30	0.0008	0.0008	0.0083
CaO	11.53	56.10	0.2056	0.2056	2.2519
Na2O	4.42	31.00	0.1426	0.0713	1.5627
K2O	0.24	47.00	0.0052	0.0026	0.0570
P2O5					
Total	99.21			2.9211	19.9178
					Cation Deficiency

No. of Oxygens 32
F 10.955

End Member Calculation		
X_{an}	2.2519	58.2
X_{ab}	1.5627	40.4
X_{or}	0.0570	1.5
	3.8716	100.0

Analysis No. 365

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.56	60.10	0.8911	1.7823	9.7355
TiO2	0.05	79.87	0.0006	0.0012	0.0067
Al2O3	28.88	51.00	0.5663	0.8495	6.1869
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.71	71.80	0.0099	0.0099	0.1085
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.07	40.30	0.0017	0.0017	0.0181
CaO	12.15	56.10	0.2165	0.2165	2.3657
Na2O	4.16	31.00	0.1340	0.0670	1.4644

K2O	0.09	47.00	0.0020	0.0010	0.0221
P2O5					
Total	99.67			2.9291	19.9076
					Cation Deficiency
No. of Oxygens	32				
F	10.925				

End Member Calculation		
X_{an}	2.3657	61.4
X_{ab}	1.4644	38.0
X_{or}	0.0221	0.6
	3.8521	100.0

Analysis No.	366				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.16	60.10	0.8845	1.7690	9.5843
TiO2	0.06	79.87	0.0007	0.0014	0.0077
Al2O3	29.78	51.00	0.5840	0.8760	6.3285
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.64	71.80	0.0089	0.0089	0.0967
MnO	0.02	70.94	0.0003	0.0003	0.0032
MgO	0.07	40.30	0.0016	0.0016	0.0177
CaO	13.10	56.10	0.2335	0.2335	2.5308
Na2O	3.82	31.00	0.1231	0.0616	1.3341
K2O	0.07	47.00	0.0015	0.0007	0.0158
P2O5					
Total	100.71			2.9531	19.9187
					Cation Deficiency
No. of Oxygens	32				
F	10.836				

End Member Calculation		
X_{an}	2.5308	65.2
X_{ab}	1.3341	34.4
X_{or}	0.0158	0.4
	3.8807	100.0

Analysis No.	367				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.00	60.10	0.8819	1.7638	9.6607
TiO2	0.03	79.87	0.0004	0.0007	0.0039
Al2O3	29.29	51.00	0.5744	0.8615	6.2916
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.56	71.80	0.0078	0.0078	0.0851
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.08	40.30	0.0019	0.0019	0.0206
CaO	12.31	56.10	0.2195	0.2195	2.4041
Na2O	4.03	31.00	0.1301	0.0650	1.4248
K2O	0.10	47.00	0.0021	0.0010	0.0226
P2O5					
Total	99.40			2.9213	19.9134
					Cation Deficiency
No. of Oxygens	32				
F	10.954				

End Member Calculation		
X_{an}	2.4041	62.4
X_{ab}	1.4248	37.0
X_{or}	0.0226	0.6
	3.8515	100.0

Analysis No.	368				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	54.51	60.10	0.9070	1.8140	9.8593
TiO2	0.04	79.87	0.0005	0.0009	0.0050
Al2O3	28.72	51.00	0.5631	0.8446	6.1209
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.58	71.80	0.0081	0.0081	0.0878
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.07	40.30	0.0018	0.0018	0.0201
CaO	11.74	56.10	0.2092	0.2092	2.2743
Na2O	3.99	31.00	0.1287	0.0644	1.3995
K2O	0.07	47.00	0.0015	0.0008	0.0168
P2O5					
Total	99.72			2.9439	19.7835
					Cation Deficiency
No. of Oxygens	32				
F	10.870				

End Member Calculation		
X_{an}	2.2743	61.6
X_{ab}	1.3995	37.9
X_{or}	0.0168	0.5
	3.6906	100.0

Analysis No.	369				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	54.04	60.10	0.8992	1.7983	9.8116
TiO2	0.03	79.87	0.0004	0.0007	0.0039
Al2O3	28.77	51.00	0.5641	0.8461	6.1555
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.63	71.80	0.0088	0.0088	0.0961
MnO	0.01	70.94	0.0002	0.0002	0.0019
MgO	0.04	40.30	0.0011	0.0011	0.0119

CaO	11.73	56.10	0.2090	0.2090	2.2811
Na2O	4.15	31.00	0.1337	0.0669	1.4591
K2O	0.13	47.00	0.0028	0.0014	0.0306
P2O5					
Total	99.53			2.9325	19.8516
					Cation Deficiency
No. of Oxygens	32				
F	10.912				

End Member Calculation		
X_{an}	2.2811	60.5
X_{ab}	1.4591	38.7
X_{or}	0.0306	0.8
	3.7707	100.0

Analysis No.	370				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.97	60.10	0.8481	1.6962	9.2870
TiO2	0.04	79.87	0.0005	0.0009	0.0050
Al2O3	30.76	51.00	0.6031	0.9047	6.6044
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.73	71.80	0.0101	0.0101	0.1111
MnO	0.02	70.94	0.0002	0.0002	0.0025
MgO	0.04	40.30	0.0009	0.0009	0.0099
CaO	14.18	56.10	0.2528	0.2528	2.7677
Na2O	3.41	31.00	0.1099	0.0549	1.2032
K2O	0.14	47.00	0.0030	0.0015	0.0333
P2O5					
Total	100.28			2.9223	20.0241
No. of Oxygens	32				
F	10.950				

End Member Calculation		
X_{an}	2.7677	69.1
X_{ab}	1.2032	30.0
X_{or}	0.0333	0.8
	4.0042	100.0

Analysis No.	374				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	52.04	60.10	0.8659	1.7317	9.5057
TiO2	0.06	79.87	0.0008	0.0016	0.0089
Al2O3	29.68	51.00	0.5820	0.8730	6.3894
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.60	71.80	0.0083	0.0083	0.0917
MnO	0.00	70.94	0.0000	0.0000	0.0004
MgO	0.07	40.30	0.0017	0.0017	0.0181
CaO	13.06	56.10	0.2328	0.2328	2.5559
Na2O	3.98	31.00	0.1284	0.0642	1.4098
K2O	0.13	47.00	0.0029	0.0014	0.0314
P2O5					
Total	99.63			2.9149	20.0113
No. of Oxygens	32				
F	10.978				

End Member Calculation		
X_{an}	2.5559	63.9
X_{ab}	1.4098	35.3
X_{or}	0.0314	0.8
	3.9971	100.0

Analysis No.	375				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	53.22	60.10	0.8855	1.7710	9.7333
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	28.71	51.00	0.5629	0.8443	6.1872
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.56	71.80	0.0078	0.0078	0.0857
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.04	40.30	0.0011	0.0011	0.0118
CaO	12.27	56.10	0.2187	0.2187	2.4043
Na2O	4.12	31.00	0.1330	0.0665	1.4625
K2O	0.17	47.00	0.0035	0.0018	0.0389
P2O5					
Total	99.09			2.9112	19.9237
					Cation Deficiency
No. of Oxygens	32				
F	10.992				

End Member Calculation		
X_{an}	2.4043	61.6
X_{ab}	1.4625	37.4
X_{or}	0.0389	1.0
	3.9057	100.0

Analysis No.	221				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	54.53	60.10	0.9073	1.8146	9.9022
TiO2	0.13	79.87	0.0017	0.0034	0.0184
Al2O3	27.70	51.00	0.5431	0.8147	5.9276
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	1.31	71.80	0.0182	0.0182	0.1991
MnO	0.01	70.94	0.0001	0.0001	0.0012
MgO	0.18	40.30	0.0046	0.0046	0.0499
CaO	11.38	56.10	0.2029	0.2029	2.2139
Na2O	4.45	31.00	0.1435	0.0718	1.5666
K2O	0.17	47.00	0.0037	0.0018	0.0399
P2O5					
Total	99.87			2.9321	19.9188
					Cation Deficiency
No. of Oxygens	32				
F	10.914				

End Member Calculation		
X_{an}	2.2139	57.9
X_{ab}	1.5666	41.0
X_{or}	0.0399	1.0
	3.8204	100.0

Analysis No.	224				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	51.55	60.10	0.8577	1.7155	9.4061
TiO2	0.00	79.87	0.0001	0.0001	0.0005
Al2O3	30.32	51.00	0.5945	0.8918	6.5195
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.93	71.80	0.0130	0.0130	0.1422
MnO	0.01	70.94	0.0001	0.0001	0.0008
MgO	0.13	40.30	0.0031	0.0031	0.0345
CaO	13.31	56.10	0.2373	0.2373	2.6018
Na2O	3.50	31.00	0.1129	0.0565	1.2381
K2O	0.08	47.00	0.0017	0.0008	0.0184
P2O5					
Total	99.83			2.9181	19.9619
No. of Oxygens	32				
F	10.966				

End Member Calculation		
X_{an}	2.6018	67.4
X_{ab}	1.2381	32.1
X_{or}	0.0184	0.5
	3.8583	100.0

Analysis No.	227				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	52.75	60.10	0.8777	1.7554	9.6146
TiO2	0.11	79.87	0.0013	0.0027	0.0147
Al2O3	28.93	51.00	0.5673	0.8509	6.2138
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	1.04	71.80	0.0145	0.0145	0.1593
MnO	0.01	70.94	0.0001	0.0001	0.0015
MgO	0.16	40.30	0.0039	0.0039	0.0432
CaO	12.72	56.10	0.2267	0.2267	2.4837
Na2O	4.07	31.00	0.1313	0.0656	1.4382
K2O	0.12	47.00	0.0025	0.0013	0.0278
P2O5					
Total	99.91			2.9212	19.9969
No. of Oxygens	32				
F	10.954				

End Member Calculation		
X_{an}	2.4837	62.9
X_{ab}	1.4382	36.4
X_{or}	0.0278	0.7
	3.9497	100.0

Analysis No.	237				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.51	60.10	0.8404	1.6809	9.3059
TiO2	0.06	79.87	0.0007	0.0015	0.0082
Al2O3	30.20	51.00	0.5922	0.8882	6.5568
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.80	71.80	0.0112	0.0112	0.1240
MnO	0.02	70.94	0.0003	0.0003	0.0033
MgO	0.09	40.30	0.0023	0.0023	0.0249
CaO	14.06	56.10	0.2506	0.2506	2.7751
Na2O	3.36	31.00	0.1084	0.0542	1.2001
K2O	0.08	47.00	0.0017	0.0008	0.0183
P2O5					
Total	99.18			2.8900	20.0167
No. of Oxygens	32				

F	11.073

End Member Calculation		
X_{an}	2.7751	69.5
X_{ab}	1.2001	30.1
X_{or}	0.0183	0.5
	3.9936	100.0

Analysis No.	239				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.52	60.10	0.8240	1.6479	9.1268
TiO2	0.03	79.87	0.0003	0.0007	0.0038
Al2O3	31.06	51.00	0.6090	0.9135	6.7460
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.81	71.80	0.0113	0.0113	0.1247
MnO	0.02	70.94	0.0003	0.0003	0.0032
MgO	0.08	40.30	0.0020	0.0020	0.0225
CaO	14.74	56.10	0.2627	0.2627	2.9104
Na2O	3.09	31.00	0.0997	0.0498	1.1041
K2O	0.06	47.00	0.0012	0.0006	0.0136
P2O5					
Total	99.41			2.8889	20.0551
					Cation Excess
No. of Oxygens	32				
F	11.077				

End Member Calculation		
X_{an}	2.9104	72.3
X_{ab}	1.1041	27.4
X_{or}	0.0136	0.3
	4.0280	100.0

Analysis No.	240				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	52.92	60.10	0.8805	1.7611	9.7078
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	28.84	51.00	0.5655	0.8482	6.2345
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.79	71.80	0.0110	0.0110	0.1208
MnO	0.00	70.94	0.0001	0.0001	0.0006
MgO	0.08	40.30	0.0021	0.0021	0.0228
CaO	12.22	56.10	0.2178	0.2178	2.4015
Na2O	3.80	31.00	0.1226	0.0613	1.3514
K2O	0.10	47.00	0.0020	0.0010	0.0224
P2O5					
Total	98.75			2.9025	19.8619
					Cation Deficiency
No. of Oxygens	32				
F	11.025				

End Member Calculation		
X_{an}	2.4015	63.6
X_{ab}	1.3514	35.8
X_{or}	0.0224	0.6
	3.7753	100.0

Analysis No.	250				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.08	60.10	0.7501	1.5002	8.3821
TiO2	0.08	79.87	0.0009	0.0019	0.0105
Al2O3	34.18	51.00	0.6702	1.0053	7.4894
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.64	71.80	0.0089	0.0089	0.0992
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.04	40.30	0.0009	0.0009	0.0100
CaO	18.40	56.10	0.3280	0.3280	3.6652
Na2O	1.14	31.00	0.0368	0.0184	0.4116
K2O	0.00	47.00	0.0001	0.0000	0.0010
P2O5					
Total	99.55			2.8636	20.0690
					Cation Excess
No. of Oxygens	32				
F	11.175				

End Member Calculation		
X_{an}	3.6652	89.9
X_{ab}	0.4116	10.1
X_{or}	0.0010	0.0
	4.0779	100.0

Analysis No.	251				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.34	60.10	0.7544	1.5088	8.4338
TiO2	0.03	79.87	0.0004	0.0008	0.0045
Al2O3	34.04	51.00	0.6675	1.0012	7.4616
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000

FeO	0.55	71.80	0.0076	0.0076	0.0854
MnO	0.01	70.94	0.0002	0.0002	0.0022
MgO	0.06	40.30	0.0015	0.0015	0.0163
CaO	18.07	56.10	0.3221	0.3221	3.6009
Na2O	1.24	31.00	0.0399	0.0200	0.4462
K2O	0.03	47.00	0.0006	0.0003	0.0064
P2O5					
Total	99.37			2.8624	20.0573
					Cation Excess
No. of Oxygens	32				
F	11.179				

End Member Calculation		
X_{an}	3.6009	88.8
X_{ab}	0.4462	11.0
X_{or}	0.0064	0.2
	4.0535	100.0

Analysis No.	252				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.64	60.10	0.8260	1.6519	9.1212
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.23	51.00	0.6124	0.9185	6.7623
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.75	71.80	0.0104	0.0104	0.1147
MnO	0.02	70.94	0.0003	0.0003	0.0028
MgO	0.06	40.30	0.0015	0.0015	0.0164
CaO	14.98	56.10	0.2670	0.2670	2.9488
Na2O	2.94	31.00	0.0948	0.0474	1.0473
K2O	0.07	47.00	0.0014	0.0007	0.0157
P2O5					
Total	99.68			2.8977	20.0291
No. of Oxygens	32				
F	11.043				

End Member Calculation		
X_{an}	2.9488	73.5
X_{ab}	1.0473	26.1
X_{or}	0.0157	0.4
	4.0118	100.0

Analysis No.	253				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.61	60.10	0.8421	1.6842	9.3018
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.49	51.00	0.5978	0.8968	6.6038
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.83	71.80	0.0115	0.0115	0.1275
MnO	0.01	70.94	0.0002	0.0002	0.0017
MgO	0.09	40.30	0.0023	0.0023	0.0257
CaO	14.11	56.10	0.2515	0.2515	2.7782
Na2O	3.09	31.00	0.0997	0.0498	1.1010
K2O	0.06	47.00	0.0013	0.0006	0.0143
P2O5					
Total	99.29			2.8970	19.9540
No. of Oxygens	32				
F	11.046				

End Member Calculation		
X_{an}	2.7782	71.4
X_{ab}	1.1010	28.3
X_{or}	0.0143	0.4
	3.8936	100.0

Analysis No.	255				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.59	60.10	0.7419	1.4839	8.3123
TiO2	0.01	79.87	0.0001	0.0003	0.0017
Al2O3	34.50	51.00	0.6765	1.0147	7.5789
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.63	71.80	0.0087	0.0087	0.0979
MnO	0.01	70.94	0.0001	0.0001	0.0008
MgO	0.04	40.30	0.0009	0.0009	0.0101
CaO	18.50	56.10	0.3298	0.3298	3.6946
Na2O	1.10	31.00	0.0353	0.0177	0.3958
K2O	0.02	47.00	0.0004	0.0002	0.0046
P2O5					
Total	99.39			2.8562	20.0967
					Cation Excess
No. of Oxygens	32				
F	11.204				

End Member Calculation		
X_{an}	3.6946	90.2

X_{ab}	0.3958	9.7
X_{or}	0.0046	0.1
	4.0950	100.0

Analysis No.	256				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.86	60.10	0.8296	1.6592	9.1706
TiO2	0.05	79.87	0.0006	0.0012	0.0066
Al2O3	31.15	51.00	0.6108	0.9162	6.7516
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.80	71.80	0.0111	0.0111	0.1225
MnO	0.01	70.94	0.0001	0.0001	0.0015
MgO	0.09	40.30	0.0022	0.0022	0.0242
CaO	14.55	56.10	0.2594	0.2594	2.8669
Na2O	2.79	31.00	0.0900	0.0450	0.9949
K2O	0.05	47.00	0.0010	0.0005	0.0115
P2O5					
Total	99.34			2.8949	19.9502
No. of Oxygens	32				
F	11.054				

End Member Calculation		
X_{an}	2.8669	74.0
X_{ab}	0.9949	25.7
X_{or}	0.0115	0.3
	3.8733	100.0

Analysis No.	257				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.36	60.10	0.8379	1.6759	9.2518
TiO2	0.10	79.87	0.0012	0.0025	0.0137
Al2O3	30.55	51.00	0.5990	0.8985	6.6139
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.95	71.80	0.0132	0.0132	0.1453
MnO	0.01	70.94	0.0001	0.0001	0.0014
MgO	0.09	40.30	0.0023	0.0023	0.0252
CaO	14.31	56.10	0.2551	0.2551	2.8164
Na2O	3.10	31.00	0.1000	0.0500	1.1041
K2O	0.07	47.00	0.0014	0.0007	0.0153
P2O5					
Total	99.53			2.8982	19.9873
No. of Oxygens	32				
F	11.041				

End Member Calculation		
X_{an}	2.8164	71.6
X_{ab}	1.1041	28.1
X_{or}	0.0153	0.4
	3.9359	100.0

Analysis No.	270				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.89	60.10	0.8135	1.6270	9.0564
TiO2	0.03	79.87	0.0004	0.0008	0.0044
Al2O3	31.14	51.00	0.6106	0.9159	6.7977
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.82	71.80	0.0114	0.0114	0.1269
MnO	0.03	70.94	0.0004	0.0004	0.0046
MgO	0.08	40.30	0.0020	0.0020	0.0222
CaO	15.04	56.10	0.2681	0.2681	2.9847
Na2O	3.00	31.00	0.0968	0.0484	1.0774
K2O	0.04	47.00	0.0009	0.0004	0.0097
P2O5					
Total	99.07			2.8743	20.0839
					Cation Excess
No. of Oxygens	32				
F	11.133				

End Member Calculation		
X_{an}	2.9847	73.3
X_{ab}	1.0774	26.5
X_{or}	0.0097	0.2
	4.0718	100.0

Analysis No.	271				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	51.80	60.10	0.8619	1.7238	9.5521
TiO2	0.03	79.87	0.0003	0.0007	0.0038
Al2O3	29.25	51.00	0.5735	0.8603	6.3562
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.79	71.80	0.0111	0.0111	0.1227
MnO	0.01	70.94	0.0001	0.0001	0.0014
MgO	0.07	40.30	0.0018	0.0018	0.0195
CaO	12.90	56.10	0.2299	0.2299	2.5484
Na2O	3.64	31.00	0.1174	0.0587	1.3013
K2O	0.10	47.00	0.0020	0.0010	0.0226

P2O5				
Total	98.59		2.8874	19.9280
				Cation Deficiency
No. of Oxygens	32			
F	11.083			

End Member Calculation		
X_{an}	2.5484	65.8
X_{ab}	1.3013	33.6
X_{or}	0.0226	0.6
	3.8724	100.0

Analysis No.	272				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.91	60.10	0.8138	1.6276	9.0680
TiO2	0.06	79.87	0.0008	0.0016	0.0088
Al2O3	31.19	51.00	0.6116	0.9174	6.8145
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.76	71.80	0.0105	0.0105	0.1175
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.06	40.30	0.0015	0.0015	0.0172
CaO	14.97	56.10	0.2668	0.2668	2.9734
Na2O	2.85	31.00	0.0919	0.0460	1.0244
K2O	0.04	47.00	0.0008	0.0004	0.0085
P2O5					
Total	98.84			2.8718	20.0323
No. of Oxygens	32				
F	11.143				

End Member Calculation		
X_{an}	2.9734	74.2
X_{ab}	1.0244	25.6
X_{or}	0.0085	0.2
	4.0062	100.0

Analysis No.	284				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.91	60.10	0.8138	1.6276	9.0752
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.13	51.00	0.6104	0.9156	6.8068
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.94	71.80	0.0130	0.0130	0.1454
MnO	0.02	70.94	0.0003	0.0003	0.0031
MgO	0.07	40.30	0.0017	0.0017	0.0190
CaO	14.86	56.10	0.2649	0.2649	2.9539
Na2O	2.85	31.00	0.0919	0.0460	1.0252
K2O	0.05	47.00	0.0010	0.0005	0.0109
P2O5					
Total	98.82			2.8696	20.0394
No. of Oxygens	32				
F	11.152				

End Member Calculation		
X_{an}	2.9539	74.0
X_{ab}	1.0252	25.7
X_{or}	0.0109	0.3
	3.9899	100.0

Analysis No.	285				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.41	60.10	0.7889	1.5777	8.8475
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	31.81	51.00	0.6237	0.9356	6.9955
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.95	71.80	0.0132	0.0132	0.1479
MnO	0.01	70.94	0.0002	0.0002	0.0021
MgO	0.06	40.30	0.0014	0.0014	0.0160
CaO	16.21	56.10	0.2889	0.2889	3.2407
Na2O	2.19	31.00	0.0706	0.0353	0.7923
K2O	0.04	47.00	0.0008	0.0004	0.0088
P2O5					
Total	98.69			2.8532	20.0531
					Cation Excess
No. of Oxygens	32				
F	11.216				

End Member Calculation		
X_{an}	3.2407	80.2
X_{ab}	0.7923	19.6
X_{or}	0.0088	0.2
	4.0419	100.0

Analysis No.	16				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.04	60.10	0.7661	1.5321	8.5479
TiO2	0.03	79.87	0.0004	0.0008	0.0044
Al2O3	33.67	51.00	0.6602	0.9903	7.3667
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.68	71.80	0.0095	0.0095	0.1058
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.14	40.30	0.0034	0.0034	0.0381
CaO	17.27	56.10	0.3078	0.3078	3.4350
Na2O	1.47	31.00	0.0474	0.0237	0.5291
K2O	0.02	47.00	0.0004	0.0002	0.0040
P2O5					
Total	99.32			2.8678	20.0309
No. of Oxygens	32				
F	11.158				

End Member Calculation		
X_{an}	3.4350	86.6
X_{ab}	0.5291	13.3
X_{or}	0.0040	0.1
	3.9681	100.0

Analysis No.	17				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.18	60.10	0.7684	1.5368	8.5509
TiO2	0.05	79.87	0.0006	0.0013	0.0071
Al2O3	33.59	51.00	0.6586	0.9879	7.3295
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.74	71.80	0.0103	0.0103	0.1150
MnO	0.03	70.94	0.0004	0.0004	0.0040
MgO	0.13	40.30	0.0033	0.0033	0.0364
CaO	17.44	56.10	0.3109	0.3109	3.4595
Na2O	1.51	31.00	0.0487	0.0244	0.5421
K2O	0.03	47.00	0.0007	0.0003	0.0073
P2O5					
Total	99.70			2.8755	20.0519
					Cation Excess
No. of Oxygens	32				
F	11.128				

End Member Calculation		
X_{an}	3.4595	86.3
X_{ab}	0.5421	13.5
X_{or}	0.0073	0.2
	4.0089	100.0

Analysis No.	18				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.11	60.10	0.7839	1.5677	8.7057
TiO2	0.07	79.87	0.0009	0.0018	0.0098
Al2O3	32.78	51.00	0.6427	0.9641	7.1384
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.70	71.80	0.0097	0.0097	0.1078
MnO	0.02	70.94	0.0003	0.0003	0.0037
MgO	0.16	40.30	0.0040	0.0040	0.0445
CaO	16.95	56.10	0.3021	0.3021	3.3556
Na2O	1.93	31.00	0.0623	0.0311	0.6914
K2O	0.03	47.00	0.0007	0.0004	0.0078
P2O5					
Total	99.76			2.8813	20.0649
					Cation Excess
No. of Oxygens	32				
F	11.106				

End Member Calculation		
X_{an}	3.3556	82.8
X_{ab}	0.6914	17.1
X_{or}	0.0078	0.2
	4.0549	100.0

Analysis No.	27				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.86	60.10	0.7797	1.5594	8.6040
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	33.56	51.00	0.6580	0.9871	7.2614
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.66	71.80	0.0092	0.0092	0.1011
MnO	0.00	70.94	0.0001	0.0001	0.0006
MgO	0.15	40.30	0.0037	0.0037	0.0411
CaO	17.53	56.10	0.3125	0.3125	3.4482
Na2O	1.70	31.00	0.0548	0.0274	0.6051
K2O	0.02	47.00	0.0004	0.0002	0.0042
P2O5					
Total	100.50			2.8999	20.0678
					Cation Excess
No. of Oxygens	32				
F	11.035				

End Member Calculation		
X_{an}	3.4482	85.0
X_{ab}	0.6051	14.9

X_{or}	0.0042	0.1
	4.0575	100.0

Analysis No.	28				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.78	60.10	0.7784	1.5567	8.6018
TiO2	0.06	79.87	0.0007	0.0014	0.0076
Al2O3	33.48	51.00	0.6565	0.9847	7.2547
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.71	71.80	0.0099	0.0099	0.1095
MnO	0.00	70.94	0.0001	0.0001	0.0006
MgO	0.15	40.30	0.0036	0.0036	0.0400
CaO	17.39	56.10	0.3100	0.3100	3.4256
Na2O	1.80	31.00	0.0581	0.0290	0.6417
K2O	0.02	47.00	0.0004	0.0002	0.0049
P2O5					
Total	100.39			2.8956	20.0865
					Cation Excess
No. of Oxygens	32				
F	11.051				

End Member Calculation		
X_{an}	3.4256	84.1
X_{ab}	0.6417	15.8
X_{or}	0.0049	0.1
	4.0722	100.0

Analysis No.	29				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.27	60.10	0.8198	1.6396	8.9823
TiO2	0.05	79.87	0.0007	0.0014	0.0075
Al2O3	31.92	51.00	0.6259	0.9388	6.8576
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.70	71.80	0.0098	0.0098	0.1072
MnO	0.01	70.94	0.0001	0.0001	0.0014
MgO	0.20	40.30	0.0049	0.0049	0.0542
CaO	15.74	56.10	0.2806	0.2806	3.0741
Na2O	2.78	31.00	0.0897	0.0448	0.9826
K2O	0.05	47.00	0.0011	0.0005	0.0117
P2O5					
Total	100.73			2.9206	20.0785
					Cation Excess
No. of Oxygens	32				
F	10.957				

End Member Calculation		
X_{an}	3.0741	75.6
X_{ab}	0.9826	24.2
X_{or}	0.0117	0.3
	4.0683	100.0

Analysis No.	30				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.16	60.10	0.8013	1.6027	8.8049
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.81	51.00	0.6433	0.9650	7.0689
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.79	71.80	0.0110	0.0110	0.1206
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.21	40.30	0.0053	0.0053	0.0579
CaO	16.40	56.10	0.2923	0.2923	3.2121
Na2O	2.22	31.00	0.0716	0.0358	0.7869
K2O	0.02	47.00	0.0005	0.0002	0.0054
P2O5					
Total	100.61			2.9123	20.0567
					Cation Excess
No. of Oxygens	32				
F	10.988				

End Member Calculation		
X_{an}	3.2121	80.2
X_{ab}	0.7869	19.7
X_{or}	0.0054	0.1
	4.0044	100.0

Analysis No.	31				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.57	60.10	0.7749	1.5498	8.5534
TiO2	0.04	79.87	0.0005	0.0010	0.0054
Al2O3	33.83	51.00	0.6633	0.9950	7.3222
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.70	71.80	0.0097	0.0097	0.1076
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.13	40.30	0.0031	0.0031	0.0343
CaO	17.69	56.10	0.3153	0.3153	3.4808
Na2O	1.54	31.00	0.0497	0.0248	0.5484
K2O	0.02	47.00	0.0004	0.0002	0.0043
P2O5					
Total	100.51			2.8989	20.0563
					Cation Excess
No. of Oxygens	32				
F	11.038				

End Member Calculation

X_{an}	3.4808	86.3
X_{ab}	0.5484	13.6
X_{or}	0.0043	0.1
	4.0334	100.0

Analysis No.	32				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.09	60.10	0.7835	1.5671	8.6491
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.20	51.00	0.6510	0.9765	7.1860
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.70	71.80	0.0097	0.0097	0.1074
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.17	40.30	0.0041	0.0041	0.0457
CaO	17.53	56.10	0.3125	0.3125	3.4493
Na2O	1.78	31.00	0.0574	0.0287	0.6338
K2O	0.03	47.00	0.0006	0.0003	0.0067
P2O5					
Total	100.49			2.8989	20.0782
					Cation Excess
No. of Oxygens	32				
F	11.039				

End Member Calculation		
X_{an}	3.4493	84.3
X_{ab}	0.6338	15.5
X_{or}	0.0067	0.2
	4.0899	100.0

Analysis No.	37				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.62	60.10	0.7757	1.5514	8.5926
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	33.46	51.00	0.6561	0.9841	7.2674
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.73	71.80	0.0101	0.0101	0.1124
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.16	40.30	0.0039	0.0039	0.0434
CaO	17.51	56.10	0.3121	0.3121	3.4574
Na2O	1.63	31.00	0.0526	0.0263	0.5824
K2O	0.04	47.00	0.0009	0.0005	0.0100
P2O5					
Total	100.16			2.8889	20.0678
					Cation Excess
No. of Oxygens	32				
F	11.077				

End Member Calculation		
X_{an}	3.4574	85.4
X_{ab}	0.5824	14.4
X_{or}	0.0100	0.2
	4.0498	100.0

Analysis No.	38				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.56	60.10	0.7747	1.5494	8.5680
TiO2	0.00	79.87	0.0000	0.0001	0.0005
Al2O3	33.73	51.00	0.6614	0.9921	7.3145
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.75	71.80	0.0104	0.0104	0.1151
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.14	40.30	0.0035	0.0035	0.0392
CaO	17.63	56.10	0.3143	0.3143	3.4756
Na2O	1.44	31.00	0.0465	0.0232	0.5137
K2O	0.04	47.00	0.0008	0.0004	0.0089
P2O5					
Total	100.29			2.8934	20.0355
No. of Oxygens	32				
F	11.060				

End Member Calculation		
X_{an}	3.4756	86.9
X_{ab}	0.5137	12.8
X_{or}	0.0089	0.2
	3.9982	100.0

Analysis No.	39				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.69	60.10	0.7769	1.5537	8.6154
TiO2	0.03	79.87	0.0004	0.0008	0.0044
Al2O3	33.35	51.00	0.6539	0.9809	7.2519
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.69	71.80	0.0097	0.0097	0.1073
MnO	0.04	70.94	0.0005	0.0005	0.0060
MgO	0.13	40.30	0.0033	0.0033	0.0368
CaO	17.36	56.10	0.3094	0.3094	3.4317
Na2O	1.67	31.00	0.0539	0.0269	0.5974
K2O	0.02	47.00	0.0004	0.0002	0.0043
P2O5					
Total	99.99			2.8855	20.0552
					Cation Excess
No. of Oxygens	32				
F	11.090				

End Member Calculation		
X_{an}	3.4317	85.1
X_{ab}	0.5974	14.8
X_{or}	0.0043	0.1
	4.0335	100.0

Analysis No.	40				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.86	60.10	0.7963	1.5927	8.7724
TiO2	0.01	79.87	0.0001	0.0003	0.0016
Al2O3	32.79	51.00	0.6429	0.9644	7.0826
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.83	71.80	0.0115	0.0115	0.1270
MnO	0.02	70.94	0.0003	0.0003	0.0037
MgO	0.18	40.30	0.0044	0.0044	0.0487
CaO	16.51	56.10	0.2943	0.2943	3.2419
Na2O	2.26	31.00	0.0729	0.0365	0.8031
K2O	0.04	47.00	0.0009	0.0005	0.0105
P2O5					
Total	100.51			2.9049	20.0915
					Cation Excess
No. of Oxygens	32				
F	11.016				

End Member Calculation		
X_{an}	3.2419	79.9
X_{ab}	0.8031	19.8
X_{or}	0.0105	0.3
	4.0555	100.0

Analysis No.	41				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.33	60.10	0.8208	1.6416	9.0270
TiO2	0.07	79.87	0.0008	0.0017	0.0092
Al2O3	31.66	51.00	0.6208	0.9312	6.8273
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.72	71.80	0.0101	0.0101	0.1106
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.20	40.30	0.0049	0.0049	0.0534
CaO	15.44	56.10	0.2752	0.2752	3.0269
Na2O	2.76	31.00	0.0890	0.0445	0.9792
K2O	0.05	47.00	0.0011	0.0006	0.0124
P2O5					
Total	100.23			2.9097	20.0459
No. of Oxygens	32				
F	10.998				

End Member Calculation		
X_{an}	3.0269	75.3
X_{ab}	0.9792	24.4
X_{or}	0.0124	0.3
	4.0184	100.0

Analysis No.	42				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.56	60.10	0.8246	1.6493	9.0218
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.83	51.00	0.6241	0.9362	6.8281
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.72	71.80	0.0101	0.0101	0.1102
MnO	0.02	70.94	0.0003	0.0003	0.0031
MgO	0.19	40.30	0.0048	0.0048	0.0525
CaO	15.71	56.10	0.2800	0.2800	3.0637
Na2O	2.71	31.00	0.0874	0.0437	0.9564
K2O	0.06	47.00	0.0012	0.0006	0.0129
P2O5					
Total	100.80			2.9249	20.0488
No. of Oxygens	32				
F	10.940				

End Member Calculation		
X_{an}	3.0637	76.0
X_{ab}	0.9564	23.7
X_{or}	0.0129	0.3
	4.0330	100.0

Analysis No.	43				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.20	60.10	0.8186	1.6373	9.0136
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	31.79	51.00	0.6233	0.9350	6.8632
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.77	71.80	0.0108	0.0108	0.1185
MnO	0.01	70.94	0.0002	0.0002	0.0017
MgO	0.19	40.30	0.0048	0.0048	0.0525
CaO	15.33	56.10	0.2733	0.2733	3.0088
Na2O	2.74	31.00	0.0884	0.0442	0.9732
K2O	0.05	47.00	0.0010	0.0005	0.0112
P2O5					
Total	100.10			2.9063	20.0448

No. of Oxygens	32
F	11.011

End Member Calculation		
X_{an}	3.0088	75.3
X_{ab}	0.9732	24.4
X_{or}	0.0112	0.3
	3.9931	100.0

Analysis No.	56				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.31	60.10	0.7373	1.4745	8.2162
TiO2	0.00	79.87	0.0000	0.0001	0.0005
Al2O3	35.06	51.00	0.6875	1.0312	7.6610
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.70	71.80	0.0098	0.0098	0.1093
MnO	0.04	70.94	0.0006	0.0006	0.0066
MgO	0.06	40.30	0.0016	0.0016	0.0175
CaO	19.05	56.10	0.3396	0.3396	3.7842
Na2O	0.86	31.00	0.0277	0.0139	0.3090
K2O	0.02	47.00	0.0005	0.0003	0.0058
P2O5					
Total	100.12			2.8715	20.1102
					Cation Excess
No. of Oxygens	32				
F	11.144				

End Member Calculation		
X_{an}	3.7842	92.3
X_{ab}	0.3090	7.5
X_{or}	0.0058	0.1
	4.0991	100.0

Analysis No.	57				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.87	60.10	0.7799	1.5597	8.6874
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.94	51.00	0.6459	0.9688	7.1948
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.65	71.80	0.0091	0.0091	0.1013
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.15	40.30	0.0037	0.0037	0.0414
CaO	16.76	56.10	0.2988	0.2988	3.3280
Na2O	1.99	31.00	0.0642	0.0321	0.7151
K2O	0.04	47.00	0.0009	0.0004	0.0096
P2O5					
Total	99.40			2.8726	20.0775
					Cation Excess
No. of Oxygens	32				
F	11.140				

End Member Calculation		
X_{an}	3.3280	82.1
X_{ab}	0.7151	17.6
X_{or}	0.0096	0.2
	4.0526	100.0

Analysis No.	518				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.70	60.10	0.7770	1.5541	8.6456
TiO2	0.02	79.87	0.0002	0.0005	0.0027
Al2O3	33.22	51.00	0.6514	0.9771	7.2474
FeO	0.10	71.80	0.0014	0.0014	0.0151
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.16	40.30	0.0039	0.0039	0.0429
CaO	17.45	56.10	0.3111	0.3111	3.4609
Na2O	1.73	31.00	0.0558	0.0279	0.6209
K2O	0.02	47.00	0.0005	0.0003	0.0058
P2O5					
Total	99.40			2.8761	20.0414
No. of Oxygens	32				
F	11.126				

End Member Calculation		
X_{an}	3.4609	84.7
X_{ab}	0.6209	15.2
X_{or}	0.0058	0.1
	4.0876	100.0

Analysis No.	519				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	47.61	60.10	0.7922	1.5844	8.8121
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.33	51.00	0.6339	0.9509	7.0517
FeO	0.10	71.80	0.0014	0.0014	0.0152
MnO	0.00	70.94	0.0000	0.0000	0.0004
MgO	0.19	40.30	0.0047	0.0047	0.0519
CaO	16.91	56.10	0.3014	0.3014	3.3530
Na2O	2.08	31.00	0.0671	0.0335	0.7464
K2O	0.04	47.00	0.0008	0.0004	0.0091
P2O5					

Total	99.26			2.8767	20.0398

No. of Oxygens 32
F 11.124

End Member Calculation		
X_{an}	3.3530	81.6
X_{ab}	0.7464	18.2
X_{or}	0.0091	0.2
	4.1085	100.0

Analysis No. 520

	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.96	60.10	0.7814	1.5627	8.7242
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.65	51.00	0.6402	0.9603	7.1480
FeO	0.18	71.80	0.0025	0.0025	0.0279
MnO	0.02	70.94	0.0002	0.0002	0.0026
MgO	0.16	40.30	0.0040	0.0040	0.0449
CaO	17.14	56.10	0.3055	0.3055	3.4113
Na2O	1.88	31.00	0.0606	0.0303	0.6771
K2O	0.04	47.00	0.0008	0.0004	0.0086
P2O5					
Total	99.02			2.8660	20.0447

No. of Oxygens 32
F 11.165

End Member Calculation		
X_{an}	3.4113	83.3
X_{ab}	0.6771	16.5
X_{or}	0.0086	0.2
	4.0970	100.0

Analysis No. 521

	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.34	60.10	0.7710	1.5421	8.5903
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	33.34	51.00	0.6537	0.9806	7.2832
FeO	0.17	71.80	0.0024	0.0024	0.0270
MnO	0.00	70.94	0.0000	0.0000	0.0004
MgO	0.15	40.30	0.0038	0.0038	0.0421
CaO	17.67	56.10	0.3150	0.3150	3.5091
Na2O	1.72	31.00	0.0555	0.0277	0.6181
K2O	0.02	47.00	0.0005	0.0002	0.0053
P2O5					
Total	99.44			2.8723	20.0777
					Cation Excess

No. of Oxygens 32
F 11.141

End Member Calculation		
X_{an}	3.5091	84.9
X_{ab}	0.6181	15.0
X_{or}	0.0053	0.1
	4.1326	100.0

Analysis No. 522

	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	47.35	60.10	0.7879	1.5757	8.8004
TiO2	0.00	79.87	0.0000	0.0001	0.0005
Al2O3	32.18	51.00	0.6310	0.9465	7.0481
FeO	0.18	71.80	0.0025	0.0025	0.0284
MnO	0.01	70.94	0.0001	0.0001	0.0012
MgO	0.17	40.30	0.0041	0.0041	0.0459
CaO	16.72	56.10	0.2980	0.2980	3.3291
Na2O	2.31	31.00	0.0745	0.0373	0.8324
K2O	0.04	47.00	0.0009	0.0005	0.0101
P2O5					
Total	98.96			2.8648	20.0962
					Cation Excess

No. of Oxygens 32
F 11.170

End Member Calculation		
X_{an}	3.3291	79.8
X_{ab}	0.8324	20.0
X_{or}	0.0101	0.2
	4.1716	100.0

Analysis No. 523

	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.96	60.10	0.7814	1.5627	8.6859
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.98	51.00	0.6467	0.9700	7.1885
FeO	0.19	71.80	0.0027	0.0027	0.0297
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.15	40.30	0.0038	0.0038	0.0425
CaO	17.42	56.10	0.3105	0.3105	3.4518
Na2O	1.77	31.00	0.0571	0.0285	0.6347
K2O	0.03	47.00	0.0007	0.0004	0.0082
P2O5					
Total	99.51			2.8787	20.0413

No. of Oxygens	32
F	11.116

End Member Calculation		
X_{an}	3.4518	84.3
X_{ab}	0.6347	15.5
X_{or}	0.0082	0.2
	4.0947	100.0

Analysis No.	524				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	47.10	60.10	0.7837	1.5674	8.7090
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.87	51.00	0.6445	0.9668	7.1623
FeO	0.12	71.80	0.0016	0.0016	0.0182
MnO	0.01	70.94	0.0001	0.0001	0.0009
MgO	0.16	40.30	0.0039	0.0039	0.0434
CaO	17.35	56.10	0.3093	0.3093	3.4368
Na2O	1.88	31.00	0.0606	0.0303	0.6739
K2O	0.02	47.00	0.0004	0.0002	0.0044
P2O5					
Total	99.50			2.8796	20.0490

No. of Oxygens	32
F	11.113

End Member Calculation		
X_{an}	3.4368	83.5
X_{ab}	0.6739	16.4
X_{or}	0.0044	0.1
	4.1152	100.0

Analysis No.	525				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	49.05	60.10	0.8161	1.6323	9.0021
TiO2	0.04	79.87	0.0005	0.0010	0.0054
Al2O3	31.79	51.00	0.6233	0.9350	6.8754
FeO	0.07	71.80	0.0010	0.0010	0.0114
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.20	40.30	0.0049	0.0049	0.0543
CaO	15.98	56.10	0.2848	0.2848	3.1419
Na2O	2.59	31.00	0.0835	0.0418	0.9215
K2O	0.03	47.00	0.0006	0.0003	0.0071
P2O5					
Total	99.75			2.9012	20.0192

No. of Oxygens	32
F	11.030

End Member Calculation		
X_{an}	3.1419	77.2
X_{ab}	0.9215	22.6
X_{or}	0.0071	0.2
	4.0705	100.0

Analysis No.	526				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	49.65	60.10	0.8261	1.6522	9.1123
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.26	51.00	0.6129	0.9194	6.7609
FeO	0.18	71.80	0.0024	0.0024	0.0270
MnO	0.03	70.94	0.0005	0.0005	0.0054
MgO	0.23	40.30	0.0056	0.0056	0.0618
CaO	15.31	56.10	0.2729	0.2729	3.0102
Na2O	2.94	31.00	0.0948	0.0474	1.0461
K2O	0.06	47.00	0.0012	0.0006	0.0134
P2O5					
Total	99.65			2.9011	20.0370

No. of Oxygens	32
F	11.030

End Member Calculation		
X_{an}	3.0102	74.0
X_{ab}	1.0461	25.7
X_{or}	0.0134	0.3
	4.0697	100.0

Analysis No.	527				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.16	60.10	0.7681	1.5361	8.6003
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.09	51.00	0.6488	0.9732	7.2652
FeO	0.13	71.80	0.0018	0.0018	0.0206
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.13	40.30	0.0032	0.0032	0.0358
CaO	17.74	56.10	0.3162	0.3162	3.5409
Na2O	1.66	31.00	0.0535	0.0268	0.5996
K2O	0.04	47.00	0.0008	0.0004	0.0089
P2O5					
Total	98.95			2.8578	20.0714
					Cation Excess

No. of Oxygens	32
F	11.198

End Member Calculation		
X_{an}	3.5409	85.3
X_{ab}	0.5996	14.5
X_{or}	0.0089	0.2
	4.1494	100.0

Analysis No.	528				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	47.35	60.10	0.7879	1.5757	8.7198
TiO2	0.05	79.87	0.0006	0.0013	0.0071
Al2O3	32.96	51.00	0.6463	0.9694	7.1528
FeO	0.13	71.80	0.0019	0.0019	0.0207
MnO	0.01	70.94	0.0001	0.0001	0.0012
MgO	0.16	40.30	0.0039	0.0039	0.0427
CaO	17.26	56.10	0.3077	0.3077	3.4052
Na2O	1.93	31.00	0.0623	0.0311	0.6891
K2O	0.02	47.00	0.0005	0.0003	0.0057
P2O5					
Total	99.87			2.8913	20.0442

No. of Oxygens	32
F	11.068

End Member Calculation		
X_{an}	3.4052	83.1
X_{ab}	0.6891	16.8
X_{or}	0.0057	0.1
	4.0999	100.0

Analysis No.	529				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	49.60	60.10	0.8253	1.6506	9.0931
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	31.30	51.00	0.6137	0.9206	6.7620
FeO	0.18	71.80	0.0024	0.0024	0.0269
MnO	0.00	70.94	0.0000	0.0000	0.0003
MgO	0.19	40.30	0.0048	0.0048	0.0531
CaO	15.54	56.10	0.2770	0.2770	3.0520
Na2O	2.97	31.00	0.0958	0.0479	1.0556
K2O	0.05	47.00	0.0012	0.0006	0.0127
P2O5					
Total	99.85			2.9043	20.0579
					Cation Excess

No. of Oxygens	32
F	11.018

End Member Calculation		
X_{an}	3.0520	74.1
X_{ab}	1.0556	25.6
X_{or}	0.0127	0.3
	4.1204	100.0

Analysis No.	530				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.26	60.10	0.7697	1.5394	8.6373
TiO2	0.03	79.87	0.0003	0.0007	0.0039
Al2O3	32.87	51.00	0.6445	0.9668	7.2323
FeO	0.19	71.80	0.0026	0.0026	0.0290
MnO	0.02	70.94	0.0003	0.0003	0.0037
MgO	0.16	40.30	0.0039	0.0039	0.0440
CaO	17.54	56.10	0.3127	0.3127	3.5084
Na2O	1.55	31.00	0.0500	0.0250	0.5611
K2O	0.03	47.00	0.0007	0.0003	0.0073
P2O5					
Total	98.64			2.8517	20.0269

No. of Oxygens	32
F	11.221

End Member Calculation		
X_{an}	3.5084	86.1
X_{ab}	0.5611	13.8
X_{or}	0.0073	0.2
	4.0768	100.0

Analysis No.	531				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	47.55	60.10	0.7912	1.5824	8.8849
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.79	51.00	0.6233	0.9350	7.0000
FeO	0.11	71.80	0.0016	0.0016	0.0177
MnO	0.03	70.94	0.0005	0.0005	0.0053
MgO	0.17	40.30	0.0043	0.0043	0.0481
CaO	16.18	56.10	0.2884	0.2884	3.2389
Na2O	2.29	31.00	0.0739	0.0369	0.8296
K2O	0.05	47.00	0.0010	0.0005	0.0111
P2O5					
Total	98.18			2.8495	20.0354

No. of Oxygens	32

F	11.230

End Member Calculation		
X_{an}	3.2389	79.4
X_{ab}	0.8296	20.3
X_{or}	0.0111	0.3
	4.0795	100.0

Analysis No.	532				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.57	60.10	0.7749	1.5498	8.6892
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.81	51.00	0.6433	0.9650	7.2141
FeO	0.12	71.80	0.0017	0.0017	0.0191
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.16	40.30	0.0039	0.0039	0.0439
CaO	17.15	56.10	0.3057	0.3057	3.4281
Na2O	1.70	31.00	0.0548	0.0274	0.6149
K2O	0.02	47.00	0.0003	0.0002	0.0038
P2O5					
Total	98.53			2.8537	20.0131
No. of Oxygens	32				
F	11.214				

End Member Calculation		
X_{an}	3.4281	84.7
X_{ab}	0.6149	15.2
X_{or}	0.0038	0.1
	4.0468	100.0

Analysis No.	533				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.86	60.10	0.7797	1.5594	8.7719
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.35	51.00	0.6343	0.9515	7.1362
FeO	0.10	71.80	0.0013	0.0013	0.0150
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.16	40.30	0.0039	0.0039	0.0439
CaO	16.74	56.10	0.2984	0.2984	3.3570
Na2O	1.83	31.00	0.0590	0.0295	0.6641
K2O	0.03	47.00	0.0007	0.0003	0.0077
P2O5					
Total	98.07			2.8444	19.9959
No. of Oxygens	32				
F	11.250				

End Member Calculation		
X_{an}	3.3570	83.3
X_{ab}	0.6641	16.5
X_{or}	0.0077	0.2
	4.0289	100.0

Analysis No.	534				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.92	60.10	0.7807	1.5614	8.7724
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.28	51.00	0.6329	0.9494	7.1121
FeO	0.18	71.80	0.0025	0.0025	0.0277
MnO	0.03	70.94	0.0004	0.0004	0.0048
MgO	0.15	40.30	0.0037	0.0037	0.0415
CaO	16.81	56.10	0.2996	0.2996	3.3670
Na2O	1.89	31.00	0.0610	0.0305	0.6851
K2O	0.03	47.00	0.0006	0.0003	0.0069
P2O5					
Total	98.29			2.8478	20.0175
No. of Oxygens	32				
F	11.237				

End Member Calculation		
X_{an}	3.3670	83.0
X_{ab}	0.6851	16.9
X_{or}	0.0069	0.2
	4.0589	100.0

Analysis No.	172				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.37	60.10	0.7715	1.5431	8.6398
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.76	51.00	0.6424	0.9635	7.1931
FeO	0.80	71.80	0.0111	0.0111	0.1245
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.11	40.30	0.0028	0.0028	0.0313
CaO	17.38	56.10	0.3098	0.3098	3.4692
Na2O	1.68	31.00	0.0542	0.0271	0.6069
K2O	0.02	47.00	0.0004	0.0002	0.0046
P2O5					
Total	99.12			2.8576	20.0694
					Cation Excess
No. of Oxygens	32				
F	11.198				

End Member Calculation		
X_{an}	3.4692	85.0
X_{ab}	0.6069	14.9
X_{or}	0.0046	0.1
	4.0807	100.0

Analysis No.	173				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.05	60.10	0.7496	1.4992	8.4186
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.71	51.00	0.6610	0.9915	7.4235
FeO	0.71	71.80	0.0098	0.0098	0.1106
MnO	0.02	70.94	0.0003	0.0003	0.0032
MgO	0.11	40.30	0.0028	0.0028	0.0310
CaO	18.28	56.10	0.3258	0.3258	3.6596
Na2O	1.22	31.00	0.0394	0.0197	0.4424
K2O	0.02	47.00	0.0004	0.0002	0.0043
P2O5					
Total	99.12			2.8493	20.0931
					Cation Excess
No. of Oxygens	32				
F	11.231				

End Member Calculation		
X_{an}	3.6596	89.1
X_{ab}	0.4424	10.8
X_{or}	0.0043	0.1
	4.1063	100.0

Analysis No.	174				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.66	60.10	0.7597	1.5195	8.5172
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.37	51.00	0.6543	0.9815	7.3354
FeO	0.75	71.80	0.0104	0.0104	0.1167
MnO	0.03	70.94	0.0004	0.0004	0.0041
MgO	0.11	40.30	0.0027	0.0027	0.0302
CaO	17.78	56.10	0.3169	0.3169	3.5531
Na2O	1.42	31.00	0.0458	0.0229	0.5135
K2O	0.01	47.00	0.0003	0.0001	0.0033
P2O5					
Total	99.13			2.8544	20.0735
					Cation Excess
No. of Oxygens	32				
F	11.211				

End Member Calculation		
X_{an}	3.5531	87.3
X_{ab}	0.5135	12.6
X_{or}	0.0033	0.1
	4.0699	100.0

Analysis No.	175				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.33	60.10	0.8208	1.6416	9.1200
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.73	51.00	0.6025	0.9038	6.6950
FeO	0.88	71.80	0.0123	0.0123	0.1368
MnO	0.00	70.94	0.0001	0.0001	0.0007
MgO	0.20	40.30	0.0050	0.0050	0.0552
CaO	15.20	56.10	0.2709	0.2709	3.0105
Na2O	2.84	31.00	0.0916	0.0458	1.0179
K2O	0.04	47.00	0.0009	0.0005	0.0103
P2O5					
Total	99.23			2.8800	20.0466
No. of Oxygens	32				
F	11.111				

End Member Calculation		
X_{an}	3.0105	74.5
X_{ab}	1.0179	25.2
X_{or}	0.0103	0.3
	4.0388	100.0

Analysis No.	177				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.23	60.10	0.8358	1.6715	9.3105
TiO2	0.00	79.87	0.0000	0.0000	0.0000

Al2O3	29.63	51.00	0.5810	0.8715	6.4721
FeO	1.10	71.80	0.0153	0.0153	0.1704
MnO	0.01	70.94	0.0002	0.0002	0.0020
MgO	0.19	40.30	0.0047	0.0047	0.0524
CaO	14.05	56.10	0.2504	0.2504	2.7900
Na2O	3.62	31.00	0.1168	0.0584	1.3009
K2O	0.05	47.00	0.0010	0.0005	0.0112
P2O5					
Total	98.88			2.8725	20.1094
					Cation Excess
No. of Oxygens	32				
F	11.140				

End Member Calculation		
X_{an}	2.7900	68.0
X_{ab}	1.3009	31.7
X_{or}	0.0112	0.3
	4.1020	100.0

Analysis No.	179				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.74	60.10	0.7611	1.5221	8.6190
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.73	51.00	0.6418	0.9626	7.2680
FeO	0.70	71.80	0.0097	0.0097	0.1099
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.12	40.30	0.0030	0.0030	0.0339
CaO	17.12	56.10	0.3052	0.3052	3.4560
Na2O	1.41	31.00	0.0455	0.0227	0.5151
K2O	0.02	47.00	0.0005	0.0002	0.0053
P2O5					
Total	97.84			2.8256	20.0072
No. of Oxygens	32				
F	11.325				

End Member Calculation		
X_{an}	3.4560	86.9
X_{ab}	0.5151	13.0
X_{or}	0.0053	0.1
	3.9765	100.0

Analysis No.	182				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	43.72	60.10	0.7275	1.4549	8.2788
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	34.01	51.00	0.6669	1.0003	7.5892
FeO	0.61	71.80	0.0085	0.0085	0.0964
MnO	0.00	70.94	0.0000	0.0000	0.0005
MgO	0.07	40.30	0.0017	0.0017	0.0191
CaO	18.78	56.10	0.3348	0.3348	3.8097
Na2O	0.72	31.00	0.0233	0.0116	0.2649
K2O	0.00	47.00	0.0001	0.0000	0.0010
P2O5					
Total	97.91			2.8118	20.0596
					Cation Excess
No. of Oxygens	32				
F	11.380				

End Member Calculation		
X_{an}	3.8097	93.5
X_{ab}	0.2649	6.5
X_{or}	0.0010	0.0
	4.0757	100.0

Analysis No.	183				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.75	60.10	0.7446	1.4892	8.4477
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.30	51.00	0.6529	0.9794	7.4078
FeO	0.60	71.80	0.0083	0.0083	0.0947
MnO	0.03	70.94	0.0004	0.0004	0.0044
MgO	0.11	40.30	0.0027	0.0027	0.0302
CaO	18.08	56.10	0.3223	0.3223	3.6564
Na2O	1.12	31.00	0.0361	0.0180	0.4092
K2O	0.02	47.00	0.0004	0.0002	0.0051
P2O5					
Total	98.00			2.8205	20.0556
					Cation Excess
No. of Oxygens	32				
F	11.345				

End Member Calculation		
X_{an}	3.6564	89.8
X_{ab}	0.4092	10.1
X_{or}	0.0051	0.1
	4.0707	100.0

Analysis No.	184				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.34	60.10	0.8210	1.6419	9.2039
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.14	51.00	0.5910	0.8865	6.6255
FeO	0.89	71.80	0.0124	0.0124	0.1395
MnO	0.03	70.94	0.0004	0.0004	0.0041
MgO	0.16	40.30	0.0041	0.0041	0.0456

CaO	14.65	56.10	0.2611	0.2611	2.9277
Na2O	2.95	31.00	0.0952	0.0476	1.0669
K2O	0.03	47.00	0.0006	0.0003	0.0073
P2O5					
Total	98.19			2.8543	20.0204
No. of Oxygens	32				
F	11.211				

End Member Calculation		
X_{an}	2.9277	73.2
X_{ab}	1.0669	26.7
X_{or}	0.0073	0.2
	4.0018	100.0

Analysis No.	186				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.77	60.10	0.8115	1.6230	9.1339
TiO2	0.03	79.87	0.0003	0.0007	0.0039
Al2O3	30.23	51.00	0.5927	0.8891	6.6718
FeO	0.91	71.80	0.0126	0.0126	0.1424
MnO	0.02	70.94	0.0003	0.0003	0.0035
MgO	0.17	40.30	0.0043	0.0043	0.0483
CaO	14.90	56.10	0.2656	0.2656	2.9895
Na2O	2.91	31.00	0.0939	0.0469	1.0566
K2O	0.04	47.00	0.0009	0.0004	0.0096
P2O5					
Total	97.98			2.8430	20.0595
					Cation Excess
No. of Oxygens	32				
F	11.256				

End Member Calculation		
X_{an}	2.9895	73.7
X_{ab}	1.0566	26.1
X_{or}	0.0096	0.2
	4.0557	100.0

Analysis No.	192				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.81	60.10	0.7789	1.5577	8.8194
TiO2	0.02	79.87	0.0002	0.0005	0.0028
Al2O3	31.56	51.00	0.6188	0.9282	7.0071
FeO	0.82	71.80	0.0115	0.0115	0.1300
MnO	0.00	70.94	0.0000	0.0000	0.0005
MgO	0.10	40.30	0.0025	0.0025	0.0284
CaO	16.34	56.10	0.2913	0.2913	3.2981
Na2O	2.11	31.00	0.0681	0.0340	0.7707
K2O	0.02	47.00	0.0005	0.0002	0.0054
P2O5					
Total	97.79			2.8260	20.0624
					Cation Excess
No. of Oxygens	32				
F	11.323				

End Member Calculation		
X_{an}	3.2981	80.9
X_{ab}	0.7707	18.9
X_{or}	0.0054	0.1
	4.0742	100.0

Analysis No.	193				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.08	60.10	0.7834	1.5667	8.8128
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	31.82	51.00	0.6239	0.9359	7.0191
FeO	0.84	71.80	0.0117	0.0117	0.1314
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.10	40.30	0.0024	0.0024	0.0267
CaO	16.40	56.10	0.2923	0.2923	3.2888
Na2O	2.16	31.00	0.0697	0.0348	0.7839
K2O	0.02	47.00	0.0005	0.0002	0.0051
P2O5					
Total	98.43			2.8445	20.0700
					Cation Excess
No. of Oxygens	32				
F	11.250				

End Member Calculation		
X_{an}	3.2888	80.7
X_{ab}	0.7839	19.2
X_{or}	0.0051	0.1
	4.0777	100.0

Analysis No.	194				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.80	60.10	0.7454	1.4908	8.4845
TiO2	0.01	79.87	0.0001	0.0003	0.0017
Al2O3	33.00	51.00	0.6471	0.9706	7.3649
FeO	0.80	71.80	0.0112	0.0112	0.1275
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.10	40.30	0.0026	0.0026	0.0291
CaO	17.65	56.10	0.3146	0.3146	3.5810
Na2O	1.32	31.00	0.0425	0.0213	0.4840
K2O	0.01	47.00	0.0001	0.0001	0.0015
P2O5					

Total	97.69			2.8114	20.0742
					Cation Excess
No. of Oxygens	32				
F	11.382				

End Member Calculation		
X_{an}	3.5810	88.1
X_{ab}	0.4840	11.9
X_{or}	0.0015	0.0
	4.0665	100.0

Analysis No.	197				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.87	60.10	0.8298	1.6596	9.3179
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	29.42	51.00	0.5769	0.8653	6.4778
FeO	1.11	71.80	0.0154	0.0154	0.1734
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.21	40.30	0.0052	0.0052	0.0588
CaO	14.14	56.10	0.2520	0.2520	2.8304
Na2O	3.21	31.00	0.1035	0.0518	1.1628
K2O	0.03	47.00	0.0006	0.0003	0.0072
P2O5					
Total	97.99			2.8497	20.0282
No. of Oxygens	32				
F	11.229				

End Member Calculation		
X_{an}	2.8304	70.8
X_{ab}	1.1628	29.1
X_{or}	0.0072	0.2
	4.0004	100.0

Analysis No.	199				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.87	60.10	0.7466	1.4932	8.3539
TiO2	0.05	79.87	0.0006	0.0012	0.0066
Al2O3	34.27	51.00	0.6720	1.0079	7.5188
FeO	0.66	71.80	0.0091	0.0091	0.1023
MnO	0.02	70.94	0.0003	0.0003	0.0029
MgO	0.08	40.30	0.0021	0.0021	0.0230
CaO	18.48	56.10	0.3294	0.3294	3.6859
Na2O	1.03	31.00	0.0334	0.0167	0.3734
K2O	0.00	47.00	0.0000	0.0000	0.0000
P2O5					
Total	99.46			2.8599	20.0668
					Cation Excess
No. of Oxygens	32				
F	11.189				

End Member Calculation		
X_{an}	3.6859	90.8
X_{ab}	0.3734	9.2
X_{or}	0.0000	0.0
	4.0593	100.0

Analysis No.	200				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.24	60.10	0.7527	1.5055	8.4397
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.78	51.00	0.6624	0.9935	7.4262
FeO	0.69	71.80	0.0096	0.0096	0.1072
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.10	40.30	0.0025	0.0025	0.0283
CaO	18.19	56.10	0.3242	0.3242	3.6354
Na2O	1.16	31.00	0.0374	0.0187	0.4196
K2O	0.01	47.00	0.0001	0.0001	0.0013
P2O5					
Total	99.16			2.8541	20.0577
					Cation Excess
No. of Oxygens	32				
F	11.212				

End Member Calculation		
X_{an}	3.6354	89.6
X_{ab}	0.4196	10.3
X_{or}	0.0013	0.0
	4.0563	100.0

Analysis No.	201				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.49	60.10	0.7569	1.5138	8.4598
TiO2	0.02	79.87	0.0002	0.0005	0.0028
Al2O3	33.84	51.00	0.6635	0.9953	7.4161
FeO	0.70	71.80	0.0098	0.0098	0.1091
MnO	0.03	70.94	0.0004	0.0004	0.0043
MgO	0.10	40.30	0.0025	0.0025	0.0282
CaO	18.07	56.10	0.3221	0.3221	3.6001
Na2O	1.15	31.00	0.0371	0.0185	0.4145
K2O	0.02	47.00	0.0003	0.0002	0.0037
P2O5					
Total	99.41			2.8631	20.0385
No. of Oxygens	32				
F	11.177				

End Member Calculation		
X_{an}	3.6001	89.6
X_{ab}	0.4145	10.3
X_{or}	0.0037	0.1
	4.0183	100.0

Analysis No.	202				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.00	60.10	0.8153	1.6306	9.0160
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.24	51.00	0.6125	0.9188	6.7738
FeO	0.98	71.80	0.0137	0.0137	0.1514
MnO	0.01	70.94	0.0001	0.0001	0.0016
MgO	0.16	40.30	0.0041	0.0041	0.0451
CaO	15.80	56.10	0.2816	0.2816	3.1145
Na2O	2.76	31.00	0.0890	0.0445	0.9846
K2O	0.02	47.00	0.0005	0.0002	0.0050
P2O5					
Total	99.98			2.8937	20.0919
					Cation Excess
No. of Oxygens	32				
F	11.058				

End Member Calculation		
X_{an}	3.1145	75.9
X_{ab}	0.9846	24.0
X_{or}	0.0050	0.1
	4.1040	100.0

Analysis No.	205				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.91	60.10	0.7473	1.4945	8.3677
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	34.06	51.00	0.6678	1.0018	7.4784
FeO	0.72	71.80	0.0100	0.0100	0.1124
MnO	0.00	70.94	0.0000	0.0000	0.0002
MgO	0.09	40.30	0.0021	0.0021	0.0238
CaO	18.60	56.10	0.3316	0.3316	3.7127
Na2O	1.10	31.00	0.0354	0.0177	0.3960
K2O	0.00	47.00	0.0000	0.0000	0.0000
P2O5					
Total	99.47			2.8577	20.0911
					Cation Excess
No. of Oxygens	32				
F	11.198				

End Member Calculation		
X_{an}	3.7127	90.4
X_{ab}	0.3960	9.6
X_{or}	0.0000	0.0
	4.1087	100.0

Analysis No.	206				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.94	60.10	0.7478	1.4955	8.4142
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	33.69	51.00	0.6606	0.9909	7.4334
FeO	0.61	71.80	0.0086	0.0086	0.0962
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.11	40.30	0.0028	0.0028	0.0310
CaO	18.40	56.10	0.3280	0.3280	3.6907
Na2O	1.10	31.00	0.0356	0.0178	0.4008
K2O	0.01	47.00	0.0002	0.0001	0.0019
P2O5					
Total	98.88			2.8438	20.0694
					Cation Excess
No. of Oxygens	32				
F	11.253				

End Member Calculation		
X_{an}	3.6907	90.2
X_{ab}	0.4008	9.8
X_{or}	0.0019	0.0
	4.0935	100.0

Analysis No.	207				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.63	60.10	0.7426	1.4852	8.3350
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	34.27	51.00	0.6720	1.0079	7.5422
FeO	0.65	71.80	0.0091	0.0091	0.1016
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.07	40.30	0.0019	0.0019	0.0209
CaO	18.64	56.10	0.3323	0.3323	3.7294
Na2O	0.90	31.00	0.0290	0.0145	0.3253
K2O	0.02	47.00	0.0004	0.0002	0.0045
P2O5					
Total	99.18			2.8510	20.0589
					Cation Excess
No. of Oxygens	32				
F	11.224				

End Member Calculation

X_{an}	3.7294	91.9
X_{ab}	0.3253	8.0
X_{or}	0.0045	0.1
	4.0592	100.0

Analysis No.	208				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.85	60.10	0.7629	1.5258	8.5215
TiO2	0.05	79.87	0.0006	0.0013	0.0072
Al2O3	33.42	51.00	0.6553	0.9829	7.3196
FeO	0.76	71.80	0.0106	0.0106	0.1183
MnO	0.00	70.94	0.0000	0.0000	0.0002
MgO	0.12	40.30	0.0030	0.0030	0.0332
CaO	17.84	56.10	0.3180	0.3180	3.5521
Na2O	1.43	31.00	0.0461	0.0231	0.5153
K2O	0.01	47.00	0.0003	0.0002	0.0034
P2O5					
Total	99.49			2.8648	20.0708
					Cation Excess
No. of Oxygens	32				
F	11.170				

End Member Calculation		
X_{an}	3.5521	87.3
X_{ab}	0.5153	12.7
X_{or}	0.0034	0.1
	4.0707	100.0

Analysis No.	209				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.94	60.10	0.7644	1.5288	8.5504
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.21	51.00	0.6512	0.9768	7.2840
FeO	0.76	71.80	0.0106	0.0106	0.1185
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.13	40.30	0.0031	0.0031	0.0349
CaO	17.79	56.10	0.3171	0.3171	3.5472
Na2O	1.50	31.00	0.0484	0.0242	0.5413
K2O	0.02	47.00	0.0003	0.0002	0.0036
P2O5					
Total	99.34			2.8607	20.0800
					Cation Excess
No. of Oxygens	32				
F	11.186				

End Member Calculation		
X_{an}	3.5472	86.7
X_{ab}	0.5413	13.2
X_{or}	0.0036	0.1
	4.0921	100.0

Analysis No.	210				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	51.80	60.10	0.8619	1.7238	9.5111
TiO2	0.05	79.87	0.0007	0.0014	0.0076
Al2O3	28.97	51.00	0.5680	0.8521	6.2683
FeO	1.14	71.80	0.0158	0.0158	0.1747
MnO	0.01	70.94	0.0001	0.0001	0.0009
MgO	0.16	40.30	0.0039	0.0039	0.0430
CaO	13.26	56.10	0.2364	0.2364	2.6083
Na2O	4.08	31.00	0.1316	0.0658	1.4524
K2O	0.06	47.00	0.0013	0.0006	0.0143
P2O5					
Total	99.53			2.8999	20.0805
					Cation Excess
No. of Oxygens	32				
F	11.035				

End Member Calculation		
X_{an}	2.6083	64.0
X_{ab}	1.4524	35.6
X_{or}	0.0143	0.3
	4.0749	100.0

Analysis No.	214				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.72	60.10	0.7940	1.5880	8.8473
TiO2	0.00	79.87	0.0000	0.0001	0.0005
Al2O3	31.91	51.00	0.6257	0.9385	6.9718
FeO	0.81	71.80	0.0113	0.0113	0.1259
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.16	40.30	0.0039	0.0039	0.0436
CaO	16.36	56.10	0.2916	0.2916	3.2494
Na2O	2.37	31.00	0.0765	0.0382	0.8519
K2O	0.01	47.00	0.0003	0.0002	0.0035
P2O5					
Total	99.35			2.8719	20.0939
					Cation Excess
No. of Oxygens	32				
F	11.143				

End Member Calculation		
X_{an}	3.2494	79.2
X_{ab}	0.8519	20.8
X_{or}	0.0035	0.1
	4.1048	100.0

Analysis No.	215				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.59	60.10	0.7586	1.5171	8.5105
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	33.26	51.00	0.6522	0.9782	7.3166
FeO	0.76	71.80	0.0106	0.0106	0.1190
MnO	0.01	70.94	0.0002	0.0002	0.0021
MgO	0.13	40.30	0.0032	0.0032	0.0364
CaO	17.91	56.10	0.3193	0.3193	3.5817
Na2O	1.44	31.00	0.0465	0.0232	0.5211
K2O	0.02	47.00	0.0004	0.0002	0.0044
P2O5					
Total	99.13			2.8523	20.0929
					Cation Excess
No. of Oxygens	32				
F	11.219				

End Member Calculation		
X_{an}	3.5817	87.2
X_{ab}	0.5211	12.7
X_{or}	0.0044	0.1
	4.1073	100.0

Analysis No.	216				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.98	60.10	0.7484	1.4968	8.3996
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	33.89	51.00	0.6645	0.9968	7.4579
FeO	0.67	71.80	0.0093	0.0093	0.1044
MnO	0.01	70.94	0.0002	0.0002	0.0022
MgO	0.09	40.30	0.0023	0.0023	0.0263
CaO	18.37	56.10	0.3275	0.3275	3.6750
Na2O	1.12	31.00	0.0361	0.0181	0.4055
K2O	0.01	47.00	0.0002	0.0001	0.0018
P2O5					
Total	99.15			2.8512	20.0739
					Cation Excess
No. of Oxygens	32				
F	11.223				

End Member Calculation		
X_{an}	3.6750	90.0
X_{ab}	0.4055	9.9
X_{or}	0.0018	0.0
	4.0823	100.0

Analysis No.	217				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.52	60.10	0.7574	1.5148	8.5302
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.06	51.00	0.6482	0.9724	7.3007
FeO	0.70	71.80	0.0098	0.0098	0.1104
MnO	0.01	70.94	0.0001	0.0001	0.0016
MgO	0.11	40.30	0.0028	0.0028	0.0316
CaO	17.90	56.10	0.3191	0.3191	3.5935
Na2O	1.37	31.00	0.0442	0.0221	0.4977
K2O	0.02	47.00	0.0005	0.0002	0.0053
P2O5					
Total	98.70			2.8413	20.0710
					Cation Excess
No. of Oxygens	32				
F	11.262				

End Member Calculation		
X_{an}	3.5935	87.7
X_{ab}	0.4977	12.1
X_{or}	0.0053	0.1
	4.0966	100.0

Analysis No.	218				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.72	60.10	0.8439	1.6879	9.3281
TiO2	0.03	79.87	0.0004	0.0008	0.0043
Al2O3	29.81	51.00	0.5845	0.8768	6.4607
FeO	1.08	71.80	0.0151	0.0151	0.1667
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.19	40.30	0.0046	0.0046	0.0514
CaO	14.19	56.10	0.2529	0.2529	2.7958
Na2O	3.51	31.00	0.1132	0.0566	1.2515
K2O	0.04	47.00	0.0008	0.0004	0.0091
P2O5					
Total	99.57			2.8951	20.0675
					Cation Excess
No. of Oxygens	32				
F	11.053				

End Member Calculation		
X_{an}	2.7958	68.9
X_{ab}	1.2515	30.9
X_{or}	0.0091	0.2
	4.0564	100.0

Analysis No.	39				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.38	60.10	0.7717	1.5434	8.6184
TiO2	0.08	79.87	0.0009	0.0019	0.0106
Al2O3	33.11	51.00	0.6492	0.9738	7.2503
FeO	0.90	71.80	0.0125	0.0125	0.1394
MnO	0.01	70.94	0.0002	0.0002	0.0021
MgO	0.07	40.30	0.0017	0.0017	0.0185
CaO	17.09	56.10	0.3046	0.3046	3.4021
Na2O	1.68	31.00	0.0542	0.0271	0.6052
K2O	0.02	47.00	0.0004	0.0002	0.0040
P2O5					
Total	99.33			2.8654	20.0506
					Cation Excess
No. of Oxygens	32				
F	11.168				

End Member Calculation		
X_{an}	3.4021	84.8
X_{ab}	0.6052	15.1
X_{or}	0.0040	0.1
	4.0114	100.0

Analysis No.	40				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.60	60.10	0.7920	1.5840	8.7940
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	32.37	51.00	0.6347	0.9521	7.0474
FeO	1.01	71.80	0.0141	0.0141	0.1566
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.09	40.30	0.0023	0.0023	0.0250
CaO	16.59	56.10	0.2957	0.2957	3.2835
Na2O	2.04	31.00	0.0658	0.0329	0.7307
K2O	0.05	47.00	0.0011	0.0005	0.0118
P2O5					
Total	99.77			2.8820	20.0513
					Cation Excess
No. of Oxygens	32				
F	11.103				

End Member Calculation		
X_{an}	3.2835	81.6
X_{ab}	0.7307	18.1
X_{or}	0.0118	0.3
	4.0260	100.0

Analysis No.	41				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.46	60.10	0.8063	1.6126	8.9376
TiO2	0.05	79.87	0.0006	0.0013	0.0072
Al2O3	31.79	51.00	0.6233	0.9350	6.9093
FeO	0.96	71.80	0.0134	0.0134	0.1490
MnO	0.00	70.94	0.0000	0.0000	0.0003
MgO	0.09	40.30	0.0021	0.0021	0.0234
CaO	15.84	56.10	0.2824	0.2824	3.1297
Na2O	2.44	31.00	0.0787	0.0394	0.8725
K2O	0.07	47.00	0.0014	0.0007	0.0157
P2O5					
Total	99.70			2.8869	20.0446
No. of Oxygens	32				
F	11.084				

End Member Calculation		
X_{an}	3.1297	77.9
X_{ab}	0.8725	21.7
X_{or}	0.0157	0.4
	4.0179	100.0

Analysis No.	44				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.39	60.10	0.8384	1.6769	9.2545
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.40	51.00	0.5961	0.8941	6.5794
FeO	1.17	71.80	0.0162	0.0162	0.1793
MnO	0.01	70.94	0.0001	0.0001	0.0012
MgO	0.16	40.30	0.0039	0.0039	0.0430
CaO	14.41	56.10	0.2569	0.2569	2.8352
Na2O	3.11	31.00	0.1003	0.0502	1.1073
K2O	0.08	47.00	0.0017	0.0008	0.0185
P2O5					
Total	99.72			2.8991	20.0187
No. of Oxygens	32				
F	11.038				

End Member Calculation

X_{an}	2.8352	71.6
X_{ab}	1.1073	28.0
X_{or}	0.0185	0.5
	3.9611	100.0

Analysis No.	45				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.21	60.10	0.8354	1.6709	9.2035
TiO2	0.02	79.87	0.0002	0.0005	0.0027
Al2O3	30.53	51.00	0.5986	0.8979	6.5947
FeO	1.09	71.80	0.0152	0.0152	0.1670
MnO	0.02	70.94	0.0003	0.0003	0.0035
MgO	0.16	40.30	0.0041	0.0041	0.0448
CaO	14.88	56.10	0.2652	0.2652	2.9220
Na2O	3.10	31.00	0.1000	0.0500	1.1016
K2O	0.06	47.00	0.0014	0.0007	0.0149
P2O5					
Total	100.08			2.9048	20.0547
					Cation Excess
No. of Oxygens	32				
F	11.016				

End Member Calculation		
X_{an}	2.9220	72.4
X_{ab}	1.1016	27.3
X_{or}	0.0149	0.4
	4.0385	100.0

Analysis No.	46				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.67	60.10	0.8431	1.6862	9.2862
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	30.19	51.00	0.5920	0.8879	6.5201
FeO	1.11	71.80	0.0155	0.0155	0.1710
MnO	0.01	70.94	0.0002	0.0002	0.0020
MgO	0.17	40.30	0.0042	0.0042	0.0461
CaO	14.59	56.10	0.2601	0.2601	2.8645
Na2O	3.12	31.00	0.1006	0.0503	1.1085
K2O	0.07	47.00	0.0015	0.0008	0.0169
P2O5					
Total	99.94			2.9053	20.0159
No. of Oxygens	32				
F	11.014				

End Member Calculation		
X_{an}	2.8645	71.8
X_{ab}	1.1085	27.8
X_{or}	0.0169	0.4
	3.9900	100.0

Analysis No.	66				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.91	60.10	0.7972	1.5943	8.8905
TiO2	0.06	79.87	0.0008	0.0016	0.0088
Al2O3	31.65	51.00	0.6206	0.9309	6.9211
FeO	1.07	71.80	0.0149	0.0149	0.1659
MnO	0.01	70.94	0.0002	0.0002	0.0021
MgO	0.15	40.30	0.0038	0.0038	0.0420
CaO	16.00	56.10	0.2852	0.2852	3.1808
Na2O	2.34	31.00	0.0755	0.0377	0.8418
K2O	0.07	47.00	0.0014	0.0007	0.0158
P2O5					
Total	99.26			2.8693	20.0689
					Cation Excess
No. of Oxygens	32				
F	11.153				

End Member Calculation		
X_{an}	3.1808	78.8
X_{ab}	0.8418	20.8
X_{or}	0.0158	0.4
	4.0384	100.0

Analysis No.	67				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.57	60.10	0.8082	1.6163	8.9673
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.54	51.00	0.6184	0.9276	6.8621
FeO	1.06	71.80	0.0148	0.0148	0.1640
MnO	0.01	70.94	0.0001	0.0001	0.0013
MgO	0.13	40.30	0.0032	0.0032	0.0360
CaO	15.95	56.10	0.2843	0.2843	3.1547
Na2O	2.28	31.00	0.0735	0.0368	0.8161
K2O	0.07	47.00	0.0015	0.0007	0.0162
P2O5					
Total	99.61			2.8839	20.0179

No. of Oxygens	32
F	11.096

End Member Calculation		
X_{an}	3.1547	79.1
X_{ab}	0.8161	20.5
X_{or}	0.0162	0.4
	3.9871	100.0

Analysis No.	71				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.23	60.10	0.7859	1.5717	8.7409
TiO2	0.02	79.87	0.0002	0.0005	0.0028
Al2O3	32.64	51.00	0.6400	0.9600	7.1186
FeO	0.70	71.80	0.0098	0.0098	0.1086
MnO	0.00	70.94	0.0000	0.0000	0.0004
MgO	0.07	40.30	0.0018	0.0018	0.0199
CaO	16.92	56.10	0.3016	0.3016	3.3547
Na2O	1.94	31.00	0.0626	0.0313	0.6961
K2O	0.03	47.00	0.0006	0.0003	0.0065
P2O5					
Total	99.55			2.8770	20.0483
No. of Oxygens	32				
F	11.123				

End Member Calculation		
X_{an}	3.3547	82.7
X_{ab}	0.6961	17.2
X_{or}	0.0065	0.2
	4.0572	100.0

Analysis No.	72				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.69	60.10	0.7769	1.5537	8.6831
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.71	51.00	0.6414	0.9621	7.1686
FeO	0.76	71.80	0.0106	0.0106	0.1184
MnO	0.02	70.94	0.0003	0.0003	0.0036
MgO	0.08	40.30	0.0020	0.0020	0.0219
CaO	16.95	56.10	0.3021	0.3021	3.3770
Na2O	1.97	31.00	0.0635	0.0318	0.7103
K2O	0.04	47.00	0.0009	0.0004	0.0099
P2O5					
Total	99.22			2.8630	20.0927
					Cation Excess
No. of Oxygens	32				
F	11.177				

End Member Calculation		
X_{an}	3.3770	82.4
X_{ab}	0.7103	17.3
X_{or}	0.0099	0.2
	4.0971	100.0

Analysis No.	73				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.56	60.10	0.8246	1.6493	9.0909
TiO2	0.02	79.87	0.0003	0.0006	0.0033
Al2O3	31.25	51.00	0.6127	0.9191	6.7551
FeO	0.91	71.80	0.0126	0.0126	0.1393
MnO	0.03	70.94	0.0004	0.0004	0.0039
MgO	0.12	40.30	0.0029	0.0029	0.0316
CaO	15.30	56.10	0.2727	0.2727	3.0066
Na2O	2.74	31.00	0.0884	0.0442	0.9744
K2O	0.09	47.00	0.0019	0.0009	0.0206
P2O5					
Total	100.01			2.9027	20.0258
No. of Oxygens	32				
F	11.024				

End Member Calculation		
X_{an}	3.0066	75.1
X_{ab}	0.9744	24.4
X_{or}	0.0206	0.5
	4.0016	100.0

Analysis No.	74				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.26	60.10	0.7697	1.5394	8.6102
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.99	51.00	0.6469	0.9703	7.2359
FeO	0.86	71.80	0.0120	0.0120	0.1343
MnO	0.03	70.94	0.0005	0.0005	0.0053

MgO	0.07	40.30	0.0018	0.0018	0.0196
CaO	17.44	56.10	0.3109	0.3109	3.4775
Na2O	1.59	31.00	0.0513	0.0256	0.5737
K2O	0.02	47.00	0.0004	0.0002	0.0046
P2O5					
Total	99.27			2.8607	20.0611
					Cation Excess
No. of Oxygens	32				
F	11.186				

End Member Calculation		
X_{an}	3.4775	85.7
X_{ab}	0.5737	14.1
X_{or}	0.0046	0.1
	4.0558	100.0

Analysis No.	75				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.87	60.10	0.7632	1.5265	8.5884
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	33.18	51.00	0.6506	0.9759	7.3209
FeO	0.80	71.80	0.0112	0.0112	0.1258
MnO	0.00	70.94	0.0000	0.0000	0.0005
MgO	0.08	40.30	0.0020	0.0020	0.0223
CaO	17.12	56.10	0.3052	0.3052	3.4340
Na2O	1.40	31.00	0.0452	0.0226	0.5082
K2O	0.04	47.00	0.0007	0.0004	0.0084
P2O5					
Total	98.49			2.8438	20.0089
No. of Oxygens	32				
F	11.253				

End Member Calculation		
X_{an}	3.4340	86.9
X_{ab}	0.5082	12.9
X_{or}	0.0084	0.2
	3.9506	100.0

Analysis No.	84				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.87	60.10	0.8298	1.6596	9.2147
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.19	51.00	0.5920	0.8879	6.5737
FeO	1.20	71.80	0.0167	0.0167	0.1858
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.22	40.30	0.0055	0.0055	0.0614
CaO	14.79	56.10	0.2636	0.2636	2.9277
Na2O	2.94	31.00	0.0948	0.0474	1.0532
K2O	0.07	47.00	0.0015	0.0008	0.0172
P2O5					
Total	99.29			2.8816	20.0337
No. of Oxygens	32				
F	11.105				

End Member Calculation		
X_{an}	2.9277	73.2
X_{ab}	1.0532	26.3
X_{or}	0.0172	0.4
	3.9980	100.0

Analysis No.	85				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.19	60.10	0.8351	1.6702	9.2468
TiO2	0.02	79.87	0.0003	0.0006	0.0033
Al2O3	30.17	51.00	0.5916	0.8874	6.5502
FeO	1.17	71.80	0.0163	0.0163	0.1803
MnO	0.01	70.94	0.0001	0.0001	0.0014
MgO	0.16	40.30	0.0039	0.0039	0.0435
CaO	14.58	56.10	0.2599	0.2599	2.8777
Na2O	3.15	31.00	0.1016	0.0508	1.1251
K2O	0.08	47.00	0.0016	0.0008	0.0181
P2O5					
Total	99.53			2.8900	20.0465
No. of Oxygens	32				
F	11.073				

End Member Calculation		
X_{an}	2.8777	71.6
X_{ab}	1.1251	28.0
X_{or}	0.0181	0.5
	4.0209	100.0

Analysis No.	86

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	52.33	60.10	0.8707	1.7414	9.5964
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	28.55	51.00	0.5598	0.8397	6.1697
FeO	1.42	71.80	0.0198	0.0198	0.2180
MnO	0.06	70.94	0.0008	0.0008	0.0087
MgO	0.16	40.30	0.0040	0.0040	0.0444
CaO	13.47	56.10	0.2401	0.2401	2.6463
Na2O	3.46	31.00	0.1116	0.0558	1.2301
K2O	0.17	47.00	0.0037	0.0018	0.0406
P2O5					
Total	99.62			2.9035	19.9541
No. of Oxygens	32				
F	11.021				

End Member Calculation		
X_{an}	2.6463	67.6
X_{ab}	1.2301	31.4
X_{or}	0.0406	1.0
	3.9170	100.0

Analysis No.	100				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.41	60.10	0.7722	1.5444	8.6209
TiO2	0.03	79.87	0.0003	0.0006	0.0035
Al2O3	33.11	51.00	0.6492	0.9738	7.2478
FeO	0.69	71.80	0.0097	0.0097	0.1080
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.06	40.30	0.0016	0.0016	0.0179
CaO	17.40	56.10	0.3102	0.3102	3.4626
Na2O	1.60	31.00	0.0516	0.0258	0.5762
K2O	0.02	47.00	0.0005	0.0003	0.0059
P2O5					
Total	99.33			2.8664	20.0427
No. of Oxygens	32				
F	11.164				

End Member Calculation		
X_{an}	3.4626	85.6
X_{ab}	0.5762	14.2
X_{or}	0.0059	0.1
	4.0447	100.0

Analysis No.	101				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.99	60.10	0.7819	1.5637	8.7484
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.47	51.00	0.6367	0.9550	7.1238
FeO	0.72	71.80	0.0100	0.0100	0.1115
MnO	0.05	70.94	0.0007	0.0007	0.0077
MgO	0.06	40.30	0.0016	0.0016	0.0180
CaO	16.63	56.10	0.2964	0.2964	3.3169
Na2O	1.99	31.00	0.0642	0.0321	0.7183
K2O	0.04	47.00	0.0008	0.0004	0.0086
P2O5					
Total	98.95			2.8599	20.0531
					Cation Excess
No. of Oxygens	32				
F	11.189				

End Member Calculation		
X_{an}	3.3169	82.0
X_{ab}	0.7183	17.8
X_{or}	0.0086	0.2
	4.0437	100.0

Analysis No.	102				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.92	60.10	0.7641	1.5281	8.6082
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	32.96	51.00	0.6463	0.9694	7.2812
FeO	0.39	71.80	0.0054	0.0054	0.0604
MnO	0.01	70.94	0.0001	0.0001	0.0011
MgO	0.05	40.30	0.0012	0.0012	0.0141
CaO	17.34	56.10	0.3091	0.3091	3.4823
Na2O	1.65	31.00	0.0532	0.0266	0.5997
K2O	0.03	47.00	0.0005	0.0003	0.0061
P2O5					
Total	98.34			2.8403	20.0536
					Cation Excess
No. of Oxygens	32				
F	11.266				

End Member Calculation

X_{an}	3.4823	85.2
X_{ab}	0.5997	14.7
X_{or}	0.0061	0.1
	4.0881	100.0

Analysis No.	103				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.41	60.10	0.7722	1.5444	8.6933
TiO2	0.04	79.87	0.0005	0.0010	0.0056
Al2O3	32.54	51.00	0.6380	0.9571	7.1828
FeO	0.42	71.80	0.0058	0.0058	0.0658
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.09	40.30	0.0023	0.0023	0.0254
CaO	17.16	56.10	0.3059	0.3059	3.4435
Na2O	1.60	31.00	0.0516	0.0258	0.5810
K2O	0.02	47.00	0.0005	0.0003	0.0057
P2O5					
Total	98.28			2.8425	20.0031
No. of Oxygens	32				
F	11.258				

End Member Calculation		
X_{an}	3.4435	85.4
X_{ab}	0.5810	14.4
X_{or}	0.0057	0.1
	4.0303	100.0

Analysis No.	113				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.78	60.10	0.8116	1.6233	9.0831
TiO2	0.02	79.87	0.0003	0.0006	0.0033
Al2O3	30.52	51.00	0.5984	0.8976	6.6970
FeO	1.10	71.80	0.0153	0.0153	0.1708
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.15	40.30	0.0038	0.0038	0.0424
CaO	15.37	56.10	0.2740	0.2740	3.0660
Na2O	2.74	31.00	0.0884	0.0442	0.9891
K2O	0.07	47.00	0.0014	0.0007	0.0160
P2O5					
Total	98.75			2.8595	20.0677
					Cation Excess
No. of Oxygens	32				
F	11.191				

End Member Calculation		
X_{an}	3.0660	75.3
X_{ab}	0.9891	24.3
X_{or}	0.0160	0.4
	4.0711	100.0

Analysis No.	114				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.28	60.10	0.8033	1.6067	8.9655
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.32	51.00	0.6141	0.9212	6.8538
FeO	1.06	71.80	0.0147	0.0147	0.1645
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.16	40.30	0.0039	0.0039	0.0439
CaO	15.80	56.10	0.2816	0.2816	3.1432
Na2O	2.38	31.00	0.0768	0.0384	0.8568
K2O	0.07	47.00	0.0015	0.0007	0.0162
P2O5					
Total	99.07			2.8673	20.0441
No. of Oxygens	32				
F	11.160				

End Member Calculation		
X_{an}	3.1432	78.3
X_{ab}	0.8568	21.3
X_{or}	0.0162	0.4
	4.0163	100.0

Analysis No.	118				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.46	60.10	0.7897	1.5794	8.8370
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	31.96	51.00	0.6267	0.9400	7.0127
FeO	0.79	71.80	0.0110	0.0110	0.1235
MnO	0.02	70.94	0.0002	0.0002	0.0027
MgO	0.06	40.30	0.0016	0.0016	0.0174
CaO	16.35	56.10	0.2914	0.2914	3.2614
Na2O	2.18	31.00	0.0703	0.0352	0.7869
K2O	0.03	47.00	0.0007	0.0004	0.0079
P2O5					
Total	98.87			2.8596	20.0518
					Cation Excess

No. of Oxygens	32
F	11.191

End Member Calculation		
X_{an}	3.2614	80.4
X_{ab}	0.7869	19.4
X_{or}	0.0079	0.2
	4.0563	100.0

Analysis No.	119				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.07	60.10	0.7666	1.5331	8.6055
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.98	51.00	0.6467	0.9700	7.2596
FeO	0.72	71.80	0.0100	0.0100	0.1121
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.05	40.30	0.0013	0.0013	0.0148
CaO	17.32	56.10	0.3087	0.3087	3.4659
Na2O	1.67	31.00	0.0539	0.0269	0.6048
K2O	0.04	47.00	0.0008	0.0004	0.0085
P2O5					
Total	98.85			2.8505	20.0713
					Cation Excess
No. of Oxygens	32				
F	11.226				

End Member Calculation		
X_{an}	3.4659	85.0
X_{ab}	0.6048	14.8
X_{or}	0.0085	0.2
	4.0792	100.0

Analysis No.	120				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.50	60.10	0.7737	1.5474	8.6610
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	32.85	51.00	0.6441	0.9662	7.2103
FeO	0.73	71.80	0.0102	0.0102	0.1142
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.07	40.30	0.0017	0.0017	0.0194
CaO	17.02	56.10	0.3034	0.3034	3.3961
Na2O	1.80	31.00	0.0581	0.0290	0.6500
K2O	0.03	47.00	0.0006	0.0003	0.0070
P2O5					
Total	99.02			2.8587	20.0601
					Cation Excess
No. of Oxygens	32				
F	11.194				

End Member Calculation		
X_{an}	3.3961	83.8
X_{ab}	0.6500	16.0
X_{or}	0.0070	0.2
	4.0531	100.0

Analysis No.	121				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	49.24	60.10	0.8193	1.6386	9.1177
TiO2	0.02	79.87	0.0003	0.0006	0.0033
Al2O3	30.82	51.00	0.6043	0.9065	6.7252
FeO	0.82	71.80	0.0114	0.0114	0.1272
MnO	0.00	70.94	0.0000	0.0000	0.0001
MgO	0.10	40.30	0.0024	0.0024	0.0263
CaO	15.12	56.10	0.2695	0.2695	2.9994
Na2O	2.83	31.00	0.0913	0.0456	1.0159
K2O	0.08	47.00	0.0017	0.0008	0.0187
P2O5					
Total	99.03			2.8755	20.0337
No. of Oxygens	32				
F	11.129				

End Member Calculation		
X_{an}	2.9994	74.4
X_{ab}	1.0159	25.2
X_{or}	0.0187	0.5
	4.0340	100.0

Analysis No.	122				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.97	60.10	0.7815	1.5631	8.7534
TiO2	0.03	79.87	0.0004	0.0008	0.0044
Al2O3	32.17	51.00	0.6308	0.9462	7.0650
FeO	0.97	71.80	0.0134	0.0134	0.1506
MnO	0.02	70.94	0.0003	0.0003	0.0031
MgO	0.11	40.30	0.0028	0.0028	0.0317

CaO	16.73	56.10	0.2982	0.2982	3.3401
Na2O	1.96	31.00	0.0632	0.0316	0.7082
K2O	0.06	47.00	0.0013	0.0006	0.0145
P2O5					
Total	99.02			2.8571	20.0710
					Cation Excess
No. of Oxygens	32				
F	11.200				

End Member Calculation		
X_{an}	3.3401	82.2
X_{ab}	0.7082	17.4
X_{or}	0.0145	0.4
	4.0628	100.0

Analysis No.	130				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.08	60.10	0.8000	1.6000	8.9767
TiO2	0.02	79.87	0.0003	0.0006	0.0033
Al2O3	31.10	51.00	0.6098	0.9147	6.8425
FeO	0.93	71.80	0.0129	0.0129	0.1446
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.13	40.30	0.0033	0.0033	0.0365
CaO	15.71	56.10	0.2800	0.2800	3.1422
Na2O	2.46	31.00	0.0794	0.0397	0.8904
K2O	0.06	47.00	0.0014	0.0007	0.0152
P2O5					
Total	98.49			2.8518	20.0515
					Cation Excess
No. of Oxygens	32				
F	11.221				

End Member Calculation		
X_{an}	3.1422	77.6
X_{ab}	0.8904	22.0
X_{or}	0.0152	0.4
	4.0479	100.0

Analysis No.	131				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.35	60.10	0.8378	1.6755	9.3591
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	29.46	51.00	0.5776	0.8665	6.4532
FeO	0.98	71.80	0.0136	0.0136	0.1521
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.14	40.30	0.0034	0.0034	0.0381
CaO	14.24	56.10	0.2538	0.2538	2.8357
Na2O	3.13	31.00	0.1010	0.0505	1.1280
K2O	0.08	47.00	0.0018	0.0009	0.0200
P2O5					
Total	98.39			2.8644	19.9872
No. of Oxygens	32				
F	11.171				

End Member Calculation		
X_{an}	2.8357	71.2
X_{ab}	1.1280	28.3
X_{or}	0.0200	0.5
	3.9836	100.0

Analysis No.	132				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.98	60.10	0.7983	1.5967	8.9759
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.83	51.00	0.6045	0.9068	6.7967
FeO	1.32	71.80	0.0184	0.0184	0.2067
MnO	0.05	70.94	0.0007	0.0007	0.0082
MgO	0.23	40.30	0.0057	0.0057	0.0643
CaO	15.99	56.10	0.2850	0.2850	3.2046
Na2O	1.95	31.00	0.0629	0.0315	0.7072
K2O	0.13	47.00	0.0028	0.0014	0.0311
P2O5					
Total	98.48			2.8461	19.9949
No. of Oxygens	32				
F	11.243				

End Member Calculation		
X_{an}	3.2046	81.3
X_{ab}	0.7072	17.9
X_{or}	0.0311	0.8
	3.9430	100.0

Analysis No.	190				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	49.00	60.10	0.8153	1.6306	8.9500
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.02	51.00	0.6278	0.9418	6.8921
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.82	71.80	0.0114	0.0114	0.1247
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.24	40.30	0.0059	0.0059	0.0644
CaO	16.08	56.10	0.2866	0.2866	3.1465
Na2O	2.37	31.00	0.0765	0.0382	0.8392
K2O	0.06	47.00	0.0012	0.0006	0.0135
P2O5					
Total	100.58			2.9151	20.0303
No. of Oxygens	32				
F	10.977				

End Member Calculation		
X_{an}	3.1465	78.7
X_{ab}	0.8392	21.0
X_{or}	0.0135	0.3
	3.9992	100.0

Analysis No.	201				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	48.70	60.10	0.8103	1.6206	8.8586
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.58	51.00	0.6388	0.9582	6.9838
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.83	71.80	0.0116	0.0116	0.1271
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.27	40.30	0.0068	0.0068	0.0739
CaO	16.51	56.10	0.2943	0.2943	3.2173
Na2O	2.16	31.00	0.0697	0.0348	0.7617
K2O	0.07	47.00	0.0015	0.0007	0.0161
P2O5					
Total	101.13			2.9271	20.0385
No. of Oxygens	32				
F	10.932				

End Member Calculation		
X_{an}	3.2173	80.5
X_{ab}	0.7617	19.1
X_{or}	0.0161	0.4
	3.9952	100.0

Analysis No.	206				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	50.70	60.10	0.8436	1.6872	9.2319
TiO2	0.01	79.87	0.0001	0.0003	0.0016
Al2O3	30.86	51.00	0.6051	0.9076	6.6219
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.86	71.80	0.0120	0.0120	0.1316
MnO	0.03	70.94	0.0005	0.0005	0.0049
MgO	0.23	40.30	0.0057	0.0057	0.0626
CaO	14.84	56.10	0.2645	0.2645	2.8949
Na2O	2.81	31.00	0.0906	0.0453	0.9920
K2O	0.09	47.00	0.0019	0.0009	0.0203
P2O5					
Total	100.44			2.9241	19.9617
No. of Oxygens	32				
F	10.944				

End Member Calculation		
X_{an}	2.8949	74.1
X_{ab}	0.9920	25.4
X_{or}	0.0203	0.5
	3.9072	100.0

Analysis No.	282				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.83	60.10	0.7792	1.5584	8.6837
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.63	51.00	0.6398	0.9597	7.1302
FeO	1.02	71.80	0.0142	0.0142	0.1586
MnO	0.01	70.94	0.0001	0.0001	0.0016
MgO	0.13	40.30	0.0032	0.0032	0.0360
CaO	17.25	56.10	0.3075	0.3075	3.4267
Na2O	1.74	31.00	0.0561	0.0281	0.6255
K2O	0.01	47.00	0.0003	0.0001	0.0032
P2O5					
Total	99.63			2.8714	20.0656
					Cation Excess
No. of Oxygens	32				
F	11.144				

End Member Calculation		
X_{an}	3.4267	84.5
X_{ab}	0.6255	15.4
X_{or}	0.0032	0.1
	4.0555	100.0

Analysis No.	283				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.41	60.10	0.7722	1.5444	8.6266
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.91	51.00	0.6453	0.9679	7.2088
FeO	0.92	71.80	0.0128	0.0128	0.1428
MnO	0.01	70.94	0.0001	0.0001	0.0009
MgO	0.15	40.30	0.0036	0.0036	0.0402
CaO	17.41	56.10	0.3103	0.3103	3.4669
Na2O	1.57	31.00	0.0506	0.0253	0.5658
K2O	0.00	47.00	0.0000	0.0000	0.0000
P2O5					
Total	99.37			2.8645	20.0519
					Cation Excess
No. of Oxygens	32				
F	11.171				

End Member Calculation		
X_{an}	3.4669	86.0
X_{ab}	0.5658	14.0
X_{or}	0.0000	0.0
	4.0326	100.0

Analysis No.	284				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.49	60.10	0.7569	1.5138	8.4751
TiO2	0.04	79.87	0.0005	0.0010	0.0056
Al2O3	33.52	51.00	0.6573	0.9859	7.3594
FeO	0.92	71.80	0.0128	0.0128	0.1429
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.13	40.30	0.0033	0.0033	0.0369
CaO	18.01	56.10	0.3210	0.3210	3.5946
Na2O	1.24	31.00	0.0399	0.0200	0.4469
K2O	0.01	47.00	0.0003	0.0001	0.0030
P2O5					
Total	99.36			2.8579	20.0646
					Cation Excess
No. of Oxygens	32				
F	11.197				

End Member Calculation		
X_{an}	3.5946	88.9
X_{ab}	0.4469	11.0
X_{or}	0.0030	0.1
	4.0446	100.0

Analysis No.	285				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.14	60.10	0.7511	1.5022	8.4140
TiO2	0.06	79.87	0.0007	0.0014	0.0078
Al2O3	33.67	51.00	0.6602	0.9903	7.3958
FeO	1.04	71.80	0.0144	0.0144	0.1617
MnO	0.02	70.94	0.0003	0.0003	0.0039
MgO	0.12	40.30	0.0030	0.0030	0.0333
CaO	18.22	56.10	0.3248	0.3248	3.6383
Na2O	1.24	31.00	0.0399	0.0200	0.4472
K2O	0.02	47.00	0.0003	0.0002	0.0038
P2O5					
Total	99.52			2.8565	20.1058
					Cation Excess
No. of Oxygens	32				

F	11.202

End Member Calculation		
X_{an}	3.6383	89.0
X_{ab}	0.4472	10.9
X_{or}	0.0038	0.1
	4.0893	100.0

Analysis No.	306				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.43	60.10	0.7725	1.5451	8.6139
TiO2	0.03	79.87	0.0003	0.0007	0.0039
Al2O3	32.86	51.00	0.6443	0.9665	7.1841
FeO	1.01	71.80	0.0140	0.0140	0.1563
MnO	0.03	70.94	0.0004	0.0004	0.0045
MgO	0.14	40.30	0.0036	0.0036	0.0396
CaO	17.57	56.10	0.3132	0.3132	3.4921
Na2O	1.63	31.00	0.0526	0.0263	0.5863
K2O	0.02	47.00	0.0004	0.0002	0.0050
P2O5					
Total	99.72			2.8699	20.0857
					Cation Excess
No. of Oxygens	32				
F	11.150				

End Member Calculation		
X_{an}	3.4921	85.5
X_{ab}	0.5863	14.4
X_{or}	0.0050	0.1
	4.0834	100.0

Analysis No.	307				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.63	60.10	0.7426	1.4852	8.3143
TiO2	0.06	79.87	0.0008	0.0016	0.0090
Al2O3	34.24	51.00	0.6714	1.0071	7.5169
FeO	0.84	71.80	0.0116	0.0116	0.1304
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.08	40.30	0.0019	0.0019	0.0213
CaO	18.89	56.10	0.3367	0.3367	3.7700
Na2O	0.86	31.00	0.0278	0.0139	0.3112
K2O	0.01	47.00	0.0001	0.0001	0.0015
P2O5					
Total	99.61			2.8581	20.0746
					Cation Excess
No. of Oxygens	32				
F	11.196				

End Member Calculation		
X_{an}	3.7700	92.3
X_{ab}	0.3112	7.6
X_{or}	0.0015	0.0
	4.0827	100.0

Analysis No.	308				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.84	60.10	0.7627	1.5255	8.5515
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.02	51.00	0.6475	0.9712	7.2591
FeO	0.94	71.80	0.0131	0.0131	0.1469
MnO	0.00	70.94	0.0000	0.0000	0.0006
MgO	0.12	40.30	0.0029	0.0029	0.0330
CaO	17.83	56.10	0.3178	0.3178	3.5634
Na2O	1.45	31.00	0.0468	0.0234	0.5244
K2O	0.02	47.00	0.0004	0.0002	0.0045
P2O5					
Total	99.22			2.8541	20.0834
					Cation Excess
No. of Oxygens	32				
F	11.212				

End Member Calculation		
X_{an}	3.5634	87.1
X_{ab}	0.5244	12.8
X_{or}	0.0045	0.1
	4.0923	100.0

Analysis No.	309				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.74	60.10	0.7444	1.4889	8.3400
TiO2	0.04	79.87	0.0004	0.0009	0.0050

Al2O3	34.05	51.00	0.6676	1.0015	7.4798
FeO	1.03	71.80	0.0144	0.0144	0.1614
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.08	40.30	0.0019	0.0019	0.0214
CaO	18.68	56.10	0.3330	0.3330	3.7304
Na2O	0.97	31.00	0.0312	0.0156	0.3498
K2O	0.02	47.00	0.0004	0.0002	0.0041
P2O5					
Total	99.60			2.8563	20.0920
					Cation Excess
No. of Oxygens	32				
F	11.203				

End Member Calculation		
X_{an}	3.7304	91.3
X_{ab}	0.3498	8.6
X_{or}	0.0041	0.1
	4.0844	100.0

Analysis No.	316				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.94	60.10	0.8143	1.6286	9.0496
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	30.80	51.00	0.6039	0.9059	6.7115
FeO	1.34	71.80	0.0187	0.0187	0.2074
MnO	0.02	70.94	0.0002	0.0002	0.0025
MgO	0.20	40.30	0.0048	0.0048	0.0538
CaO	15.52	56.10	0.2766	0.2766	3.0745
Na2O	2.73	31.00	0.0881	0.0440	0.9787
K2O	0.04	47.00	0.0009	0.0005	0.0100
P2O5					
Total	99.59			2.8795	20.0885
					Cation Excess
No. of Oxygens	32				
F	11.113				

End Member Calculation		
X_{an}	3.0745	75.7
X_{ab}	0.9787	24.1
X_{or}	0.0100	0.2
	4.0631	100.0

Analysis No.	317				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.81	60.10	0.8121	1.6243	9.0263
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	30.90	51.00	0.6059	0.9088	6.7339
FeO	1.31	71.80	0.0182	0.0182	0.2028
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.17	40.30	0.0042	0.0042	0.0468
CaO	15.66	56.10	0.2791	0.2791	3.1024
Na2O	2.72	31.00	0.0877	0.0439	0.9752
K2O	0.04	47.00	0.0009	0.0004	0.0096
P2O5					
Total	99.62			2.8792	20.0981
					Cation Excess
No. of Oxygens	32				
F	11.114				

End Member Calculation		
X_{an}	3.1024	75.9
X_{ab}	0.9752	23.9
X_{or}	0.0096	0.2
	4.0873	100.0

Analysis No.	318				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.72	60.10	0.7774	1.5547	8.7037
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.34	51.00	0.6341	0.9512	7.0998
FeO	0.97	71.80	0.0136	0.0136	0.1520
MnO	0.00	70.94	0.0000	0.0000	0.0005
MgO	0.17	40.30	0.0041	0.0041	0.0463
CaO	17.12	56.10	0.3052	0.3052	3.4168
Na2O	1.79	31.00	0.0577	0.0289	0.6465
K2O	0.03	47.00	0.0007	0.0004	0.0082
P2O5					
Total	99.15			2.8581	20.0738
					Cation Excess
No. of Oxygens	32				
F	11.196				

End Member Calculation

X_{an}	3.4168	83.9
X_{ab}	0.6465	15.9
X_{or}	0.0082	0.2
	4.0715	100.0

Analysis No.	319				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.96	60.10	0.7481	1.4962	8.4708
TiO2	0.04	79.87	0.0005	0.0010	0.0056
Al2O3	33.28	51.00	0.6525	0.9788	7.3890
FeO	0.89	71.80	0.0125	0.0125	0.1411
MnO	0.03	70.94	0.0004	0.0004	0.0045
MgO	0.12	40.30	0.0029	0.0029	0.0331
CaO	17.61	56.10	0.3139	0.3139	3.5544
Na2O	1.25	31.00	0.0403	0.0202	0.4564
K2O	0.02	47.00	0.0004	0.0002	0.0044
P2O5					
Total	98.20			2.8260	20.0594
					Cation Excess
No. of Oxygens	32				
F	11.323				

End Member Calculation		
X_{an}	3.5544	88.5
X_{ab}	0.4564	11.4
X_{or}	0.0044	0.1
	4.0152	100.0

Analysis No.	320				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.88	60.10	0.7634	1.5268	8.5485
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.99	51.00	0.6469	0.9703	7.2436
FeO	0.96	71.80	0.0134	0.0134	0.1499
MnO	0.02	70.94	0.0002	0.0002	0.0025
MgO	0.14	40.30	0.0034	0.0034	0.0386
CaO	17.94	56.10	0.3198	0.3198	3.5810
Na2O	1.47	31.00	0.0474	0.0237	0.5310
K2O	0.00	47.00	0.0000	0.0000	0.0000
P2O5					
Total	99.40			2.8576	20.0952
					Cation Excess
No. of Oxygens	32				
F	11.198				

End Member Calculation		
X_{an}	3.5810	87.1
X_{ab}	0.5310	12.9
X_{or}	0.0000	0.0
	4.1120	100.0

Analysis No.	321				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.82	60.10	0.7624	1.5248	8.5511
TiO2	0.05	79.87	0.0006	0.0012	0.0067
Al2O3	33.00	51.00	0.6471	0.9706	7.2575
FeO	1.06	71.80	0.0147	0.0147	0.1649
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.16	40.30	0.0040	0.0040	0.0450
CaO	17.61	56.10	0.3139	0.3139	3.5208
Na2O	1.47	31.00	0.0474	0.0237	0.5319
K2O	0.01	47.00	0.0003	0.0001	0.0032
P2O5					
Total	99.18			2.8531	20.0810
					Cation Excess
No. of Oxygens	32				
F	11.216				

End Member Calculation		
X_{an}	3.5208	86.8
X_{ab}	0.5319	13.1
X_{or}	0.0032	0.1
	4.0559	100.0

Analysis No.	322				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.57	60.10	0.8082	1.6163	8.9824
TiO2	0.03	79.87	0.0003	0.0007	0.0039
Al2O3	31.18	51.00	0.6114	0.9171	6.7953
FeO	1.23	71.80	0.0171	0.0171	0.1902
MnO	0.01	70.94	0.0002	0.0002	0.0018
MgO	0.19	40.30	0.0048	0.0048	0.0535

CaO	15.84	56.10	0.2824	0.2824	3.1383
Na2O	2.49	31.00	0.0803	0.0402	0.8928
K2O	0.04	47.00	0.0008	0.0004	0.0088
P2O5					
Total	99.58			2.8791	20.0669
					Cation Excess
No. of Oxygens	32				
F	11.115				

End Member Calculation		
X_{an}	3.1383	77.7
X_{ab}	0.8928	22.1
X_{or}	0.0088	0.2
	4.0399	100.0

Analysis No.	334				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.46	60.10	0.7564	1.5128	8.5004
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.19	51.00	0.6508	0.9762	7.3135
FeO	0.91	71.80	0.0127	0.0127	0.1425
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.14	40.30	0.0034	0.0034	0.0385
CaO	18.01	56.10	0.3210	0.3210	3.6078
Na2O	1.31	31.00	0.0424	0.0212	0.4766
K2O	0.02	47.00	0.0003	0.0002	0.0038
P2O5					
Total	99.04			2.8475	20.0830
					Cation Excess
No. of Oxygens	32				
F	11.238				

End Member Calculation		
X_{an}	3.6078	88.2
X_{ab}	0.4766	11.7
X_{or}	0.0038	0.1
	4.0881	100.0

Analysis No.	335				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.19	60.10	0.7519	1.5038	8.4531
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	33.40	51.00	0.6549	0.9824	7.3625
FeO	0.93	71.80	0.0129	0.0129	0.1450
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.14	40.30	0.0034	0.0034	0.0383
CaO	18.22	56.10	0.3248	0.3248	3.6512
Na2O	1.17	31.00	0.0376	0.0188	0.4230
K2O	0.02	47.00	0.0003	0.0002	0.0037
P2O5					
Total	99.06			2.8464	20.0779
					Cation Excess
No. of Oxygens	32				
F	11.242				

End Member Calculation		
X_{an}	3.6512	89.5
X_{ab}	0.4230	10.4
X_{or}	0.0037	0.1
	4.0779	100.0

Analysis No.	336				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.36	60.10	0.7714	1.5428	8.6313
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.80	51.00	0.6431	0.9647	7.1963
FeO	0.97	71.80	0.0136	0.0136	0.1519
MnO	0.01	70.94	0.0002	0.0002	0.0022
MgO	0.15	40.30	0.0037	0.0037	0.0416
CaO	17.40	56.10	0.3102	0.3102	3.4705
Na2O	1.52	31.00	0.0490	0.0245	0.5486
K2O	0.02	47.00	0.0004	0.0002	0.0047
P2O5					
Total	99.24			2.8598	20.0472
No. of Oxygens	32				
F	11.189				

End Member Calculation		
X_{an}	3.4705	86.2
X_{ab}	0.5486	13.6

X_{or}	0.0047	0.1
	4.0239	100.0

Analysis No.	337				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.76	60.10	0.7614	1.5228	8.5237
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.16	51.00	0.6502	0.9753	7.2788
FeO	0.98	71.80	0.0136	0.0136	0.1525
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.14	40.30	0.0035	0.0035	0.0397
CaO	18.02	56.10	0.3212	0.3212	3.5959
Na2O	1.36	31.00	0.0439	0.0219	0.4911
K2O	0.01	47.00	0.0001	0.0001	0.0014
P2O5					
Total	99.43			2.8585	20.0831
					Cation Excess
No. of Oxygens	32				
F	11.195				

End Member Calculation		
X_{an}	3.5959	88.0
X_{ab}	0.4911	12.0
X_{or}	0.0014	0.0
	4.0884	100.0

Analysis No.	338				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.64	60.10	0.7760	1.5521	8.7146
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.44	51.00	0.6361	0.9541	7.1429
FeO	1.02	71.80	0.0142	0.0142	0.1599
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.15	40.30	0.0038	0.0038	0.0431
CaO	16.76	56.10	0.2988	0.2988	3.3549
Na2O	1.64	31.00	0.0529	0.0265	0.5941
K2O	0.01	47.00	0.0003	0.0001	0.0032
P2O5					
Total	98.67			2.8496	20.0126
No. of Oxygens	32				
F	11.230				

End Member Calculation		
X_{an}	3.3549	84.9
X_{ab}	0.5941	15.0
X_{or}	0.0032	0.1
	3.9521	100.0

Analysis No.	340				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	43.59	60.10	0.7253	1.4506	8.1689
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	34.88	51.00	0.6839	1.0259	7.7030
FeO	0.60	71.80	0.0084	0.0084	0.0944
MnO	0.03	70.94	0.0004	0.0004	0.0049
MgO	0.05	40.30	0.0011	0.0011	0.0127
CaO	19.39	56.10	0.3456	0.3456	3.8929
Na2O	0.56	31.00	0.0181	0.0091	0.2039
K2O	0.01	47.00	0.0001	0.0001	0.0016
P2O5					
Total	99.11			2.8412	20.0823
					Cation Excess
No. of Oxygens	32				
F	11.263				

End Member Calculation		
X_{an}	3.8929	95.0
X_{ab}	0.2039	5.0
X_{or}	0.0016	0.0
	4.0984	100.0

Analysis No.	341				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.22	60.10	0.7691	1.5381	8.6055
TiO2	0.02	79.87	0.0003	0.0006	0.0033
Al2O3	32.79	51.00	0.6429	0.9644	7.1943
FeO	1.01	71.80	0.0141	0.0141	0.1581
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.11	40.30	0.0027	0.0027	0.0300
CaO	17.62	56.10	0.3141	0.3141	3.5145
Na2O	1.59	31.00	0.0513	0.0256	0.5739
K2O	0.01	47.00	0.0002	0.0001	0.0026

P2O5					
Total	99.38			2.8598	20.0823
					Cation Excess
No. of Oxygens	32				
F	11.190				

End Member Calculation		
X_{an}	3.5145	85.9
X_{ab}	0.5739	14.0
X_{or}	0.0026	0.1
	4.0910	100.0

Analysis No.	342				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.92	60.10	0.7641	1.5281	8.5586
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.03	51.00	0.6476	0.9715	7.2546
FeO	0.92	71.80	0.0128	0.0128	0.1433
MnO	0.03	70.94	0.0004	0.0004	0.0041
MgO	0.12	40.30	0.0029	0.0029	0.0326
CaO	17.80	56.10	0.3173	0.3173	3.5541
Na2O	1.47	31.00	0.0474	0.0237	0.5312
K2O	0.01	47.00	0.0002	0.0001	0.0024
P2O5					
Total	99.29			2.8568	20.0809
					Cation Excess
No. of Oxygens	32				
F	11.201				

End Member Calculation		
X_{an}	3.5541	86.9
X_{ab}	0.5312	13.0
X_{or}	0.0024	0.1
	4.0877	100.0

Analysis No.	343				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.39	60.10	0.7552	1.5105	8.4599
TiO2	0.07	79.87	0.0008	0.0017	0.0095
Al2O3	33.42	51.00	0.6553	0.9829	7.3404
FeO	1.07	71.80	0.0149	0.0149	0.1674
MnO	0.02	70.94	0.0002	0.0002	0.0028
MgO	0.12	40.30	0.0030	0.0030	0.0337
CaO	18.22	56.10	0.3248	0.3248	3.6380
Na2O	1.15	31.00	0.0369	0.0185	0.4138
K2O	0.02	47.00	0.0003	0.0002	0.0036
P2O5					
Total	99.47			2.8567	20.0691
					Cation Excess
No. of Oxygens	32				
F	11.202				

End Member Calculation		
X_{an}	3.6380	89.7
X_{ab}	0.4138	10.2
X_{or}	0.0036	0.1
	4.0554	100.0

Analysis No.	344				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.29	60.10	0.8035	1.6070	8.9496
TiO2	0.03	79.87	0.0003	0.0007	0.0039
Al2O3	31.33	51.00	0.6143	0.9215	6.8425
FeO	1.16	71.80	0.0161	0.0161	0.1797
MnO	0.02	70.94	0.0002	0.0002	0.0027
MgO	0.21	40.30	0.0053	0.0053	0.0588
CaO	15.80	56.10	0.2816	0.2816	3.1370
Na2O	2.49	31.00	0.0803	0.0402	0.8947
K2O	0.03	47.00	0.0007	0.0003	0.0075
P2O5					
Total	99.36			2.8729	20.0763
					Cation Excess
No. of Oxygens	32				
F	11.138				

End Member Calculation		
X_{an}	3.1370	77.7
X_{ab}	0.8947	22.1
X_{or}	0.0075	0.2
	4.0392	100.0

Analysis No.	123				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	45.85	60.10	0.7629	1.5258	8.5060
TiO2	0.02	79.87	0.0003	0.0005	0.0028
Al2O3	33.54	51.00	0.6576	0.9865	7.3325
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.81	71.80	0.0113	0.0113	0.1260
MnO	0.01	70.94	0.0002	0.0002	0.0022
MgO	0.15	40.30	0.0036	0.0036	0.0407
CaO	17.95	56.10	0.3200	0.3200	3.5675
Na2O	1.36	31.00	0.0439	0.0219	0.4891
K2O	0.02	47.00	0.0005	0.0003	0.0056
P2O5					
Total	99.72			2.8701	20.0724
					Cation Excess
No. of Oxygens	32				
F	11.150				

End Member Calculation		
X_{an}	3.5675	87.8
X_{ab}	0.4891	12.0
X_{or}	0.0056	0.1
	4.0623	100.0

Analysis No.	124				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	45.44	60.10	0.7561	1.5121	8.4661
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.61	51.00	0.6590	0.9885	7.3793
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.86	71.80	0.0120	0.0120	0.1348
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.17	40.30	0.0042	0.0042	0.0476
CaO	17.91	56.10	0.3193	0.3193	3.5748
Na2O	1.33	31.00	0.0428	0.0214	0.4795
K2O	0.02	47.00	0.0003	0.0002	0.0038
P2O5					
Total	99.34			2.8578	20.0859
					Cation Excess
No. of Oxygens	32				
F	11.197				

End Member Calculation		
X_{an}	3.5748	88.1
X_{ab}	0.4795	11.8
X_{or}	0.0038	0.1
	4.0581	100.0

Analysis No.	125				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	45.80	60.10	0.7621	1.5241	8.4901
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	33.64	51.00	0.6596	0.9894	7.3487
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.84	71.80	0.0117	0.0117	0.1305
MnO	0.00	70.94	0.0001	0.0001	0.0007
MgO	0.14	40.30	0.0036	0.0036	0.0397
CaO	17.89	56.10	0.3189	0.3189	3.5528
Na2O	1.48	31.00	0.0477	0.0239	0.5319
K2O	0.02	47.00	0.0005	0.0002	0.0052
P2O5					
Total	99.84			2.8723	20.1019
					Cation Excess
No. of Oxygens	32				
F	11.141				

End Member Calculation		
X_{an}	3.5528	86.9
X_{ab}	0.5319	13.0
X_{or}	0.0052	0.1
	4.0899	100.0

Analysis No.	126				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	46.11	60.10	0.7672	1.5344	8.5641
TiO2	0.07	79.87	0.0008	0.0017	0.0095
Al2O3	33.15	51.00	0.6500	0.9750	7.2556
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.84	71.80	0.0116	0.0116	0.1299
MnO	0.01	70.94	0.0002	0.0002	0.0018
MgO	0.17	40.30	0.0043	0.0043	0.0479
CaO	17.66	56.10	0.3148	0.3148	3.5139
Na2O	1.51	31.00	0.0487	0.0244	0.5437
K2O	0.03	47.00	0.0007	0.0004	0.0082
P2O5					
Total	99.55			2.8668	20.0746
					Cation Excess
No. of Oxygens	32				

F	11.162	

End Member Calculation		
X_{an}	3.5139	86.4
X_{ab}	0.5437	13.4
X_{or}	0.0082	0.2
	4.0658	100.0

Analysis No.	127				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	46.29	60.10	0.7702	1.5404	8.5763
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	33.25	51.00	0.6520	0.9779	7.2595
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.82	71.80	0.0114	0.0114	0.1264
MnO	0.00	70.94	0.0001	0.0001	0.0006
MgO	0.15	40.30	0.0037	0.0037	0.0413
CaO	17.61	56.10	0.3139	0.3139	3.4953
Na2O	1.60	31.00	0.0516	0.0258	0.5747
K2O	0.04	47.00	0.0009	0.0004	0.0097
P2O5					
Total	99.77			2.8738	20.0850
					Cation Excess
No. of Oxygens	32				
F	11.135				

End Member Calculation		
X_{an}	3.4953	85.7
X_{ab}	0.5747	14.1
X_{or}	0.0097	0.2
	4.0797	100.0

Analysis No.	128				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	48.04	60.10	0.7993	1.5987	8.8875
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	31.75	51.00	0.6225	0.9338	6.9219
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	1.06	71.80	0.0148	0.0148	0.1644
MnO	0.01	70.94	0.0002	0.0002	0.0022
MgO	0.20	40.30	0.0049	0.0049	0.0540
CaO	16.13	56.10	0.2875	0.2875	3.1968
Na2O	2.31	31.00	0.0745	0.0373	0.8285
K2O	0.05	47.00	0.0011	0.0005	0.0122
P2O5					
Total	99.57			2.8781	20.0697
					Cation Excess
No. of Oxygens	32				
F	11.119				

End Member Calculation		
X_{an}	3.1968	79.2
X_{ab}	0.8285	20.5
X_{or}	0.0122	0.3
	4.0376	100.0

Analysis No.	146				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	45.57	60.10	0.7582	1.5165	8.4873
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	33.52	51.00	0.6573	0.9859	7.3570
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.73	71.80	0.0102	0.0102	0.1143
MnO	0.00	70.94	0.0000	0.0000	0.0006
MgO	0.14	40.30	0.0036	0.0036	0.0401
CaO	18.01	56.10	0.3210	0.3210	3.5935
Na2O	1.30	31.00	0.0419	0.0210	0.4695
K2O	0.04	47.00	0.0008	0.0004	0.0091
P2O5					
Total	99.33			2.8588	20.0724
					Cation Excess
No. of Oxygens	32				
F	11.193				

End Member Calculation		
X_{an}	3.5935	88.2
X_{ab}	0.4695	11.5
X_{or}	0.0091	0.2
	4.0720	100.0

Analysis No.	147				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	45.56	60.10	0.7581	1.5161	8.4757
TiO2	0.03	79.87	0.0004	0.0008	0.0045
Al2O3	33.60	51.00	0.6588	0.9882	7.3660
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000

FeO	0.75	71.80	0.0105	0.0105	0.1169
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.15	40.30	0.0038	0.0038	0.0426
CaO	17.95	56.10	0.3200	0.3200	3.5774
Na2O	1.38	31.00	0.0445	0.0223	0.4977
K2O	0.04	47.00	0.0009	0.0004	0.0098
P2O5					
Total	99.47			2.8621	20.0906
					Cation Excess
No. of Oxygens	32				
F	11.181				

End Member Calculation		
X_{an}	3.5774	87.6
X_{ab}	0.4977	12.2
X_{or}	0.0098	0.2
	4.0849	100.0

Analysis No.	148				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	47.03	60.10	0.7825	1.5651	8.7108
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.55	51.00	0.6382	0.9574	7.1046
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.95	71.80	0.0132	0.0132	0.1468
MnO	0.02	70.94	0.0003	0.0003	0.0028
MgO	0.19	40.30	0.0048	0.0048	0.0536
CaO	17.09	56.10	0.3046	0.3046	3.3911
Na2O	1.79	31.00	0.0577	0.0289	0.6428
K2O	0.05	47.00	0.0010	0.0005	0.0116
P2O5					
Total	99.67			2.8747	20.0641
					Cation Excess
No. of Oxygens	32				
F	11.132				

End Member Calculation		
X_{an}	3.3911	83.8
X_{ab}	0.6428	15.9
X_{or}	0.0116	0.3
	4.0455	100.0

Analysis No.	149				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	45.13	60.10	0.7509	1.5018	8.4306
TiO2	0.06	79.87	0.0008	0.0016	0.0090
Al2O3	33.62	51.00	0.6592	0.9888	7.4010
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.95	71.80	0.0133	0.0133	0.1493
MnO	0.00	70.94	0.0000	0.0000	0.0002
MgO	0.12	40.30	0.0030	0.0030	0.0339
CaO	18.07	56.10	0.3221	0.3221	3.6163
Na2O	1.19	31.00	0.0385	0.0193	0.4325
K2O	0.03	47.00	0.0006	0.0003	0.0070
P2O5					
Total	99.18			2.8503	20.0797
					Cation Excess
No. of Oxygens	32				
F	11.227				

End Member Calculation		
X_{an}	3.6163	89.2
X_{ab}	0.4325	10.7
X_{or}	0.0070	0.2
	4.0557	100.0

Analysis No.	150				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	45.54	60.10	0.7577	1.5155	8.4242
TiO2	0.06	79.87	0.0007	0.0015	0.0083
Al2O3	33.96	51.00	0.6659	0.9988	7.4030
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	0.90	71.80	0.0125	0.0125	0.1389
MnO	0.02	70.94	0.0003	0.0003	0.0033
MgO	0.14	40.30	0.0034	0.0034	0.0374
CaO	18.44	56.10	0.3287	0.3287	3.6544
Na2O	1.08	31.00	0.0348	0.0174	0.3864
K2O	0.03	47.00	0.0006	0.0003	0.0063
P2O5					
Total	100.16			2.8783	20.0623
					Cation Excess
No. of Oxygens	32				
F	11.118				

End Member Calculation		
X_{an}	3.6544	90.3

X_{ab}	0.3864	9.5
X_{or}	0.0063	0.2
	4.0471	100.0

Analysis No.	152				
	Molecular %	EW	Molecular Prop	Atomic Prop	On 32 O
SiO2	47.87	60.10	0.7965	1.5930	8.8960
TiO2	0.07	79.87	0.0009	0.0018	0.0100
Al2O3	30.64	51.00	0.6008	0.9012	6.7100
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	2.87	71.80	0.0400	0.0400	0.4464
MnO	0.04	70.94	0.0006	0.0006	0.0070
MgO	0.69	40.30	0.0170	0.0170	0.1901
CaO	15.83	56.10	0.2822	0.2822	3.1516
Na2O	1.77	31.00	0.0571	0.0285	0.6377
K2O	0.08	47.00	0.0016	0.0008	0.0181
P2O5					
Total	99.86			2.8651	20.0669
					Cation Excess
No. of Oxygens	32				
F	11.169				

End Member Calculation		
X_{an}	3.1516	82.8
X_{ab}	0.6377	16.7
X_{or}	0.0181	0.5
	3.8073	100.0

Analysis No.	482				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.43	60.10	0.7559	1.5118	8.4877
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	33.66	51.00	0.6600	0.9900	7.4108
FeO	0.18	71.80	0.0026	0.0026	0.0286
MnO	0.01	70.94	0.0002	0.0002	0.0018
MgO	0.17	40.30	0.0042	0.0042	0.0467
CaO	18.00	56.10	0.3209	0.3209	3.6027
Na2O	1.24	31.00	0.0400	0.0200	0.4495
K2O	0.02	47.00	0.0005	0.0002	0.0053
P2O5					
Total	98.72			2.8499	20.0337
No. of Oxygens	32				
F	11.228				

End Member Calculation		
X_{an}	3.6027	88.8
X_{ab}	0.4495	11.1
X_{or}	0.0053	0.1
	4.0575	100.0

Analysis No.	483				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.73	60.10	0.7609	1.5218	8.5464
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.28	51.00	0.6525	0.9788	7.3294
FeO	0.25	71.80	0.0035	0.0035	0.0398
MnO	0.01	70.94	0.0001	0.0001	0.0013
MgO	0.15	40.30	0.0037	0.0037	0.0421
CaO	17.85	56.10	0.3182	0.3182	3.5738
Na2O	1.39	31.00	0.0448	0.0224	0.5036
K2O	0.04	47.00	0.0008	0.0004	0.0085
P2O5					
Total	98.70			2.8490	20.0449
No. of Oxygens	32				
F	11.232				

End Member Calculation		
X_{an}	3.5738	87.5
X_{ab}	0.5036	12.3
X_{or}	0.0085	0.2
	4.0859	100.0

Analysis No.	484				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.09	60.10	0.7669	1.5338	8.6340
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.77	51.00	0.6425	0.9638	7.2341
FeO	0.16	71.80	0.0022	0.0022	0.0248
MnO	0.00	70.94	0.0000	0.0000	0.0003
MgO	0.14	40.30	0.0034	0.0034	0.0388
CaO	17.70	56.10	0.3155	0.3155	3.5521
Na2O	1.44	31.00	0.0465	0.0232	0.5230
K2O	0.03	47.00	0.0006	0.0003	0.0068
P2O5					
Total	98.33			2.8423	20.0139

No. of Oxygens	32
F	11.258

End Member Calculation		
X_{an}	3.5521	87.0
X_{ab}	0.5230	12.8
X_{or}	0.0068	0.2
	4.0819	100.0

Analysis No.	485				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.23	60.10	0.7526	1.5052	8.4704
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	33.78	51.00	0.6624	0.9935	7.4549
FeO	0.14	71.80	0.0020	0.0020	0.0224
MnO	0.03	70.94	0.0004	0.0004	0.0040
MgO	0.12	40.30	0.0030	0.0030	0.0343
CaO	18.00	56.10	0.3209	0.3209	3.6113
Na2O	1.10	31.00	0.0356	0.0178	0.4008
K2O	0.02	47.00	0.0004	0.0002	0.0044
P2O5					
Total	98.43			2.8431	20.0036

No. of Oxygens	32
F	11.255

End Member Calculation		
X_{an}	3.6113	89.9
X_{ab}	0.4008	10.0
X_{or}	0.0044	0.1
	4.0165	100.0

Analysis No.	486				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	48.27	60.10	0.8032	1.6063	8.9838
TiO2	0.04	79.87	0.0005	0.0011	0.0061
Al2O3	31.28	51.00	0.6133	0.9200	6.8605
FeO	0.35	71.80	0.0049	0.0049	0.0546
MnO	0.01	70.94	0.0001	0.0001	0.0011
MgO	0.19	40.30	0.0046	0.0046	0.0516
CaO	16.03	56.10	0.2857	0.2857	3.1962
Na2O	2.31	31.00	0.0745	0.0373	0.8335
K2O	0.08	47.00	0.0017	0.0008	0.0186
P2O5					
Total	98.55			2.8608	20.0059

No. of Oxygens	32
F	11.186

End Member Calculation		
X_{an}	3.1962	79.0
X_{ab}	0.8335	20.6
X_{or}	0.0186	0.5
	4.0482	100.0

Analysis No.	487				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	44.84	60.10	0.7461	1.4922	8.3753
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	34.21	51.00	0.6708	1.0062	7.5299
FeO	0.18	71.80	0.0025	0.0025	0.0275
MnO	0.01	70.94	0.0002	0.0002	0.0022
MgO	0.09	40.30	0.0022	0.0022	0.0252
CaO	18.65	56.10	0.3324	0.3324	3.7318
Na2O	0.92	31.00	0.0296	0.0148	0.3326
K2O	0.01	47.00	0.0003	0.0001	0.0030
P2O5					
Total	98.91			2.8506	20.0276

No. of Oxygens	32
F	11.226

End Member Calculation		
X_{an}	3.7318	91.7
X_{ab}	0.3326	8.2
X_{or}	0.0030	0.1
	4.0674	100.0

Analysis No.	488				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.78	60.10	0.7617	1.5235	8.5751
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	33.17	51.00	0.6504	0.9756	7.3217
FeO	0.16	71.80	0.0022	0.0022	0.0249
MnO	0.03	70.94	0.0004	0.0004	0.0047
MgO	0.15	40.30	0.0038	0.0038	0.0430

CaO	17.70	56.10	0.3155	0.3155	3.5518
Na2O	1.32	31.00	0.0426	0.0213	0.4793
K2O	0.02	47.00	0.0004	0.0002	0.0041
P2O5					
Total	98.33			2.8426	20.0052

No. of Oxygens	32
F	11.257

End Member Calculation		
X_{an}	3.5518	88.0
X_{ab}	0.4793	11.9
X_{or}	0.0041	0.1
	4.0352	100.0

Analysis No.	489				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.28	60.10	0.7534	1.5068	8.4278
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	34.03	51.00	0.6673	1.0009	7.4640
FeO	0.21	71.80	0.0029	0.0029	0.0319
MnO	0.01	70.94	0.0001	0.0001	0.0015
MgO	0.12	40.30	0.0029	0.0029	0.0326
CaO	18.59	56.10	0.3314	0.3314	3.7068
Na2O	0.96	31.00	0.0309	0.0155	0.3461
K2O	0.02	47.00	0.0005	0.0002	0.0052
P2O5					
Total	99.21			2.8607	20.0159

No. of Oxygens	32
F	11.186

End Member Calculation		
X_{an}	3.7068	91.3
X_{ab}	0.3461	8.5
X_{or}	0.0052	0.1
	4.0581	100.0

Analysis No.	490				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	46.48	60.10	0.7734	1.5468	8.6835
TiO2	0.00	79.87	0.0000	0.0001	0.0005
Al2O3	32.77	51.00	0.6425	0.9638	7.2145
FeO	0.15	71.80	0.0020	0.0020	0.0227
MnO	0.01	70.94	0.0002	0.0002	0.0018
MgO	0.16	40.30	0.0041	0.0041	0.0458
CaO	17.25	56.10	0.3075	0.3075	3.4525
Na2O	1.56	31.00	0.0503	0.0252	0.5650
K2O	0.04	47.00	0.0009	0.0004	0.0096
P2O5					
Total	98.43			2.8500	19.9960

No. of Oxygens	32
F	11.228

End Member Calculation		
X_{an}	3.4525	85.7
X_{ab}	0.5650	14.0
X_{or}	0.0096	0.2
	4.0271	100.0

Analysis No.	491				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.43	60.10	0.7559	1.5118	8.5027
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.53	51.00	0.6575	0.9862	7.3952
FeO	0.17	71.80	0.0023	0.0023	0.0260
MnO	0.00	70.94	0.0000	0.0000	0.0004
MgO	0.16	40.30	0.0039	0.0039	0.0442
CaO	18.04	56.10	0.3216	0.3216	3.6171
Na2O	1.17	31.00	0.0377	0.0189	0.4241
K2O	0.02	47.00	0.0004	0.0002	0.0043
P2O5					
Total	98.51			2.8449	20.0139

No. of Oxygens	32
F	11.248

End Member Calculation		
X_{an}	3.6171	89.4
X_{ab}	0.4241	10.5
X_{or}	0.0043	0.1
	4.0455	100.0

Analysis No.	492				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations

SiO2	48.50	60.10	0.8070	1.6140	9.0384
TiO2	0.03	79.87	0.0004	0.0008	0.0044
Al2O3	31.13	51.00	0.6104	0.9156	6.8365
FeO	0.24	71.80	0.0033	0.0033	0.0373
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.17	40.30	0.0042	0.0042	0.0468
CaO	15.61	56.10	0.2783	0.2783	3.1165
Na2O	2.50	31.00	0.0806	0.0403	0.9032
K2O	0.06	47.00	0.0013	0.0007	0.0150
P2O5					
Total	98.24			2.8571	19.9981

No. of Oxygens	32
F	11.200

End Member Calculation		
X_{an}	3.1165	77.2
X_{ab}	0.9032	22.4
X_{or}	0.0150	0.4
	4.0347	100.0

Analysis No.	502				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	44.93	60.10	0.7476	1.4952	8.4355
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.68	51.00	0.6604	0.9906	7.4516
FeO	0.17	71.80	0.0024	0.0024	0.0267
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.13	40.30	0.0033	0.0033	0.0372
CaO	18.37	56.10	0.3275	0.3275	3.6948
Na2O	1.05	31.00	0.0338	0.0169	0.3810
K2O	0.02	47.00	0.0004	0.0002	0.0050
P2O5					
Total	98.35			2.8360	20.0318

No. of Oxygens	32
F	11.284

End Member Calculation		
X_{an}	3.6948	90.5
X_{ab}	0.3810	9.3
X_{or}	0.0050	0.1
	4.0808	100.0

Analysis No.	503				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.96	60.10	0.7647	1.5295	8.5602
TiO2	0.03	79.87	0.0004	0.0008	0.0044
Al2O3	33.37	51.00	0.6543	0.9815	7.3243
FeO	0.13	71.80	0.0018	0.0018	0.0203
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.15	40.30	0.0038	0.0038	0.0427
CaO	17.90	56.10	0.3191	0.3191	3.5717
Na2O	1.37	31.00	0.0442	0.0221	0.4947
K2O	0.02	47.00	0.0004	0.0002	0.0045
P2O5					
Total	98.93			2.8587	20.0228

No. of Oxygens	32
F	11.194

End Member Calculation		
X_{an}	3.5717	87.7
X_{ab}	0.4947	12.2
X_{or}	0.0045	0.1
	4.0709	100.0

Analysis No.	504				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	47.18	60.10	0.7850	1.5700	8.7737
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.44	51.00	0.6361	0.9541	7.1090
FeO	0.18	71.80	0.0026	0.0026	0.0286
MnO	0.01	70.94	0.0002	0.0002	0.0017
MgO	0.17	40.30	0.0041	0.0041	0.0462
CaO	17.00	56.10	0.3030	0.3030	3.3868
Na2O	1.79	31.00	0.0577	0.0289	0.6453
K2O	0.03	47.00	0.0005	0.0003	0.0060
P2O5					
Total	98.80			2.8632	19.9974

No. of Oxygens	32
F	11.176

End Member Calculation		
X_{an}	3.3868	83.9

X_{ab}	0.6453	16.0
X_{or}	0.0060	0.1
	4.0381	100.0

Analysis No.	505				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.58	60.10	0.7584	1.5168	8.5162
TiO2	0.05	79.87	0.0006	0.0013	0.0072
Al2O3	33.49	51.00	0.6567	0.9850	7.3738
FeO	0.16	71.80	0.0023	0.0023	0.0257
MnO	0.01	70.94	0.0001	0.0001	0.0011
MgO	0.12	40.30	0.0031	0.0031	0.0344
CaO	18.04	56.10	0.3216	0.3216	3.6109
Na2O	1.20	31.00	0.0388	0.0194	0.4354
K2O	0.02	47.00	0.0005	0.0002	0.0054
P2O5					
Total	98.68			2.8497	20.0101
No. of Oxygens	32				
F	11.229				

End Member Calculation		
X_{an}	3.6109	89.1
X_{ab}	0.4354	10.7
X_{or}	0.0054	0.1
	4.0518	100.0

Analysis No.	506				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	48.49	60.10	0.8068	1.6136	8.9884
TiO2	0.02	79.87	0.0002	0.0005	0.0027
Al2O3	31.57	51.00	0.6190	0.9285	6.8962
FeO	0.21	71.80	0.0029	0.0029	0.0328
MnO	0.02	70.94	0.0003	0.0003	0.0032
MgO	0.17	40.30	0.0042	0.0042	0.0464
CaO	15.94	56.10	0.2841	0.2841	3.1654
Na2O	2.31	31.00	0.0745	0.0373	0.8301
K2O	0.09	47.00	0.0019	0.0010	0.0214
P2O5					
Total	98.82			2.8724	19.9866
No. of Oxygens	32				
F	11.140				

End Member Calculation		
X_{an}	3.1654	78.8
X_{ab}	0.8301	20.7
X_{or}	0.0214	0.5
	4.0170	100.0

Analysis No.	513				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.83	60.10	0.7626	1.5251	8.5677
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.21	51.00	0.6512	0.9768	7.3162
FeO	0.19	71.80	0.0027	0.0027	0.0300
MnO	0.01	70.94	0.0002	0.0002	0.0022
MgO	0.15	40.30	0.0037	0.0037	0.0419
CaO	17.81	56.10	0.3175	0.3175	3.5669
Na2O	1.36	31.00	0.0439	0.0219	0.4929
K2O	0.02	47.00	0.0005	0.0002	0.0055
P2O5					
Total	98.59			2.8481	20.0234
No. of Oxygens	32				
F	11.235				

End Member Calculation		
X_{an}	3.5669	87.7
X_{ab}	0.4929	12.1
X_{or}	0.0055	0.1
	4.0653	100.0

Analysis No.	514				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.47	60.10	0.7566	1.5131	8.5127
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	33.33	51.00	0.6535	0.9803	7.3533
FeO	0.18	71.80	0.0026	0.0026	0.0287
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.15	40.30	0.0036	0.0036	0.0410
CaO	18.10	56.10	0.3226	0.3226	3.6302
Na2O	1.32	31.00	0.0425	0.0212	0.4778
K2O	0.03	47.00	0.0006	0.0003	0.0069
P2O5					
Total	98.58			2.8440	20.0519
					Cation Excess
No. of Oxygens	32				

F	11.252

End Member Calculation		
X_{an}	3.6302	88.2
X_{ab}	0.4778	11.6
X_{or}	0.0069	0.2
	4.1150	100.0

Analysis No.	515				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.96	60.10	0.7647	1.5295	8.5296
TiO2	0.03	79.87	0.0003	0.0007	0.0039
Al2O3	33.58	51.00	0.6584	0.9876	7.3440
FeO	0.19	71.80	0.0026	0.0026	0.0288
MnO	0.02	70.94	0.0002	0.0002	0.0024
MgO	0.14	40.30	0.0035	0.0035	0.0389
CaO	18.11	56.10	0.3228	0.3228	3.6006
Na2O	1.35	31.00	0.0435	0.0218	0.4857
K2O	0.03	47.00	0.0006	0.0003	0.0067
P2O5					
Total	99.40			2.8690	20.0407
No. of Oxygens	32				
F	11.154				

End Member Calculation		
X_{an}	3.6006	88.0
X_{ab}	0.4857	11.9
X_{or}	0.0067	0.2
	4.0931	100.0

Analysis No.	516				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.71	60.10	0.7606	1.5211	8.5806
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.02	51.00	0.6475	0.9712	7.3044
FeO	0.20	71.80	0.0028	0.0028	0.0316
MnO	0.02	70.94	0.0002	0.0002	0.0026
MgO	0.15	40.30	0.0038	0.0038	0.0429
CaO	17.67	56.10	0.3150	0.3150	3.5535
Na2O	1.35	31.00	0.0435	0.0218	0.4913
K2O	0.05	47.00	0.0011	0.0005	0.0119
P2O5					
Total	98.17			2.8364	20.0188
No. of Oxygens	32				
F	11.282				

End Member Calculation		
X_{an}	3.5535	87.6
X_{ab}	0.4913	12.1
X_{or}	0.0119	0.3
	4.0567	100.0

Analysis No.	517				
	Molecular %	EW	Molecular prop	Atomic Prop	Cations
SiO2	45.94	60.10	0.7644	1.5288	8.5800
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.20	51.00	0.6510	0.9765	7.3070
FeO	0.24	71.80	0.0033	0.0033	0.0372
MnO	0.01	70.94	0.0001	0.0001	0.0015
MgO	0.15	40.30	0.0037	0.0037	0.0413
CaO	17.68	56.10	0.3152	0.3152	3.5375
Na2O	1.43	31.00	0.0461	0.0231	0.5178
K2O	0.02	47.00	0.0005	0.0003	0.0059
P2O5					
Total	98.67			2.8509	20.0283
No. of Oxygens	32				
F	11.225				

End Member Calculation		
X_{an}	3.5375	87.1
X_{ab}	0.5178	12.7
X_{or}	0.0059	0.1
	4.0611	100.0

Analysis No.	350				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.52	60.10	0.7574	1.5148	8.4852
TiO2	0.03	79.87	0.0004	0.0008	0.0045
Al2O3	33.40	51.00	0.6549	0.9824	7.3369
FeO	0.93	71.80	0.0130	0.0130	0.1451
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.12	40.30	0.0030	0.0030	0.0331
CaO	18.09	56.10	0.3225	0.3225	3.6125
Na2O	1.23	31.00	0.0396	0.0198	0.4431
K2O	0.02	47.00	0.0005	0.0003	0.0058
P2O5					
Total	99.34			2.8564	20.0663
					Cation Excess
No. of Oxygens	32				
F	11.203				

End Member Calculation		
X_{an}	3.6125	88.9
X_{ab}	0.4431	10.9
X_{or}	0.0058	0.1
	4.0615	100.0

Analysis No.	351				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.15	60.10	0.7512	1.5025	8.4328
TiO2	0.01	79.87	0.0001	0.0003	0.0017
Al2O3	33.58	51.00	0.6584	0.9876	7.3909
FeO	0.94	71.80	0.0131	0.0131	0.1465
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.12	40.30	0.0029	0.0029	0.0324
CaO	18.30	56.10	0.3262	0.3262	3.6617
Na2O	1.11	31.00	0.0358	0.0179	0.4020
K2O	0.03	47.00	0.0005	0.0003	0.0060
P2O5					
Total	99.23			2.8508	20.0741
					Cation Excess
No. of Oxygens	32				
F	11.225				

End Member Calculation		
X_{an}	3.6617	90.0
X_{ab}	0.4020	9.9
X_{or}	0.0060	0.1
	4.0697	100.0

Analysis No.	352				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.65	60.10	0.7762	1.5524	8.6494
TiO2	0.01	79.87	0.0001	0.0003	0.0017
Al2O3	32.70	51.00	0.6412	0.9618	7.1448
FeO	1.06	71.80	0.0148	0.0148	0.1652
MnO	0.01	70.94	0.0002	0.0002	0.0018
MgO	0.18	40.30	0.0045	0.0045	0.0503
CaO	17.30	56.10	0.3084	0.3084	3.4363
Na2O	1.79	31.00	0.0577	0.0289	0.6434
K2O	0.05	47.00	0.0010	0.0005	0.0108
P2O5					
Total	99.76			2.8717	20.1036
					Cation Excess
No. of Oxygens	32				
F	11.143				

End Member Calculation		
X_{an}	3.4363	84.0
X_{ab}	0.6434	15.7
X_{or}	0.0108	0.3
	4.0905	100.0

Analysis No.	353				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.10	60.10	0.7504	1.5008	8.3969
TiO2	0.01	79.87	0.0001	0.0003	0.0017
Al2O3	33.77	51.00	0.6622	0.9932	7.4093
FeO	0.99	71.80	0.0137	0.0137	0.1538
MnO	0.01	70.94	0.0002	0.0002	0.0017
MgO	0.11	40.30	0.0026	0.0026	0.0296
CaO	18.59	56.10	0.3314	0.3314	3.7079
Na2O	1.07	31.00	0.0345	0.0172	0.3856
K2O	0.03	47.00	0.0006	0.0003	0.0064
P2O5					
Total	99.67			2.8598	20.0928
					Cation Excess
No. of Oxygens	32				
F	11.190				

End Member Calculation		
X_{an}	3.7079	90.4
X_{ab}	0.3856	9.4
X_{or}	0.0064	0.2
	4.0999	100.0

Analysis No.	354				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.86	60.10	0.7963	1.5927	8.8555
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	31.77	51.00	0.6229	0.9344	6.9273
FeO	1.12	71.80	0.0156	0.0156	0.1735
MnO	0.01	70.94	0.0001	0.0001	0.0013
MgO	0.20	40.30	0.0048	0.0048	0.0538
CaO	16.39	56.10	0.2922	0.2922	3.2489
Na2O	2.29	31.00	0.0739	0.0369	0.8215
K2O	0.05	47.00	0.0010	0.0005	0.0111
P2O5					
Total	99.70			2.8776	20.0950
					Cation Excess
No. of Oxygens	32				
F	11.120				

End Member Calculation		
X_{an}	3.2489	79.6
X_{ab}	0.8215	20.1
X_{or}	0.0111	0.3
	4.0814	100.0

Analysis No.	359				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.23	60.10	0.8025	1.6050	8.9044
TiO2	0.02	79.87	0.0002	0.0005	0.0028
Al2O3	31.50	51.00	0.6176	0.9265	6.8533
FeO	1.32	71.80	0.0184	0.0184	0.2040
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.21	40.30	0.0051	0.0051	0.0569
CaO	16.29	56.10	0.2904	0.2904	3.2219
Na2O	2.31	31.00	0.0745	0.0373	0.8268
K2O	0.08	47.00	0.0017	0.0009	0.0191
P2O5					
Total	99.96			2.8840	20.0892
					Cation Excess
No. of Oxygens	32				
F	11.096				

End Member Calculation		
X_{an}	3.2219	79.2
X_{ab}	0.8268	20.3
X_{or}	0.0191	0.5
	4.0679	100.0

Analysis No.	369				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.73	60.10	0.7609	1.5218	8.5179
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.16	51.00	0.6502	0.9753	7.2786
FeO	1.16	71.80	0.0161	0.0161	0.1807
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.14	40.30	0.0035	0.0035	0.0393
CaO	17.95	56.10	0.3200	0.3200	3.5819
Na2O	1.33	31.00	0.0430	0.0215	0.4818
K2O	0.03	47.00	0.0006	0.0003	0.0071
P2O5					
Total	99.50			2.8585	20.0872
					Cation Excess
No. of Oxygens	32				
F	11.195				

End Member Calculation		
X_{an}	3.5819	88.0
X_{ab}	0.4818	11.8
X_{or}	0.0071	0.2
	4.0707	100.0

Analysis No.	370				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.17	60.10	0.8015	1.6030	8.9385
TiO2	0.02	79.87	0.0002	0.0005	0.0028
Al2O3	31.25	51.00	0.6127	0.9191	6.8335
FeO	1.18	71.80	0.0164	0.0164	0.1827
MnO	0.02	70.94	0.0003	0.0003	0.0036
MgO	0.19	40.30	0.0048	0.0048	0.0534
CaO	16.11	56.10	0.2872	0.2872	3.2025
Na2O	2.31	31.00	0.0745	0.0373	0.8310
K2O	0.08	47.00	0.0017	0.0009	0.0194
P2O5					
Total	99.33			2.8694	20.0673
					Cation Excess
No. of Oxygens	32				
F	11.152				

End Member Calculation		
X_{an}	3.2025	79.0
X_{ab}	0.8310	20.5
X_{or}	0.0194	0.5

	4.0530	100.0

Analysis No.	371				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.91	60.10	0.8138	1.6276	9.0820
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.71	51.00	0.6022	0.9032	6.7200
FeO	1.19	71.80	0.0166	0.0166	0.1851
MnO	0.02	70.94	0.0003	0.0003	0.0032
MgO	0.21	40.30	0.0052	0.0052	0.0575
CaO	15.31	56.10	0.2729	0.2729	3.0456
Na2O	2.52	31.00	0.0813	0.0406	0.9072
K2O	0.09	47.00	0.0020	0.0010	0.0218
P2O5					
Total	98.96			2.8674	20.0224
No. of Oxygens	32				
F	11.160				

End Member Calculation		
X_{an}	3.0456	76.6
X_{ab}	0.9072	22.8
X_{or}	0.0218	0.5
	3.9746	100.0

Analysis No.	373				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.25	60.10	0.8361	1.6722	9.2613
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	29.92	51.00	0.5867	0.8800	6.4983
FeO	1.43	71.80	0.0199	0.0199	0.2206
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.23	40.30	0.0057	0.0057	0.0633
CaO	14.55	56.10	0.2594	0.2594	2.8728
Na2O	3.12	31.00	0.1006	0.0503	1.1148
K2O	0.10	47.00	0.0020	0.0010	0.0226
P2O5					
Total	99.61			2.8889	20.0561
					Cation Excess
No. of Oxygens	32				
F	11.077				

End Member Calculation		
X_{an}	2.8728	71.6
X_{ab}	1.1148	27.8
X_{or}	0.0226	0.6
	4.0103	100.0

Analysis No.	374				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.54	60.10	0.7577	1.5155	8.4815
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	33.56	51.00	0.6580	0.9871	7.3656
FeO	0.84	71.80	0.0117	0.0117	0.1308
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.13	40.30	0.0033	0.0033	0.0366
CaO	18.03	56.10	0.3214	0.3214	3.5974
Na2O	1.21	31.00	0.0390	0.0195	0.4368
K2O	0.03	47.00	0.0006	0.0003	0.0064
P2O5					
Total	99.35			2.8589	20.0562
					Cation Excess
No. of Oxygens	32				
F	11.193				

End Member Calculation		
X_{an}	3.5974	89.0
X_{ab}	0.4368	10.8
X_{or}	0.0064	0.2
	4.0406	100.0

Analysis No.	375				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.32	60.10	0.7541	1.5082	8.4503
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	33.67	51.00	0.6602	0.9903	7.3983
FeO	0.84	71.80	0.0117	0.0117	0.1310
MnO	0.02	70.94	0.0003	0.0003	0.0033
MgO	0.11	40.30	0.0026	0.0026	0.0294
CaO	18.15	56.10	0.3235	0.3235	3.6255
Na2O	1.13	31.00	0.0366	0.0183	0.4103
K2O	0.02	47.00	0.0005	0.0003	0.0059
P2O5					
Total	99.28			2.8556	20.0564
					Cation Excess
No. of Oxygens	32				
F	11.206				

End Member Calculation		
X_{an}	3.6255	89.7
X_{ab}	0.4103	10.2

X_{or}	0.0059	0.1
	4.0417	100.0

Analysis No.	376				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.54	60.10	0.7577	1.5155	8.4952
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.39	51.00	0.6547	0.9821	7.3401
FeO	0.90	71.80	0.0125	0.0125	0.1403
MnO	0.01	70.94	0.0001	0.0001	0.0016
MgO	0.12	40.30	0.0030	0.0030	0.0338
CaO	17.94	56.10	0.3198	0.3198	3.5852
Na2O	1.30	31.00	0.0420	0.0210	0.4708
K2O	0.03	47.00	0.0006	0.0003	0.0063
P2O5					
Total	99.23			2.8543	20.0733
					Cation Excess
No. of Oxygens	32				
F	11.211				

End Member Calculation		
X_{an}	3.5852	88.3
X_{ab}	0.4708	11.6
X_{or}	0.0063	0.2
	4.0623	100.0

Analysis No.	377				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.95	60.10	0.7646	1.5291	8.5532
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.20	51.00	0.6510	0.9765	7.2826
FeO	0.93	71.80	0.0130	0.0130	0.1455
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.12	40.30	0.0029	0.0029	0.0328
CaO	17.79	56.10	0.3171	0.3171	3.5476
Na2O	1.33	31.00	0.0430	0.0215	0.4811
K2O	0.03	47.00	0.0006	0.0003	0.0068
P2O5					
Total	99.35			2.8604	20.0495
No. of Oxygens	32				
F	11.187				

End Member Calculation		
X_{an}	3.5476	87.9
X_{ab}	0.4811	11.9
X_{or}	0.0068	0.2
	4.0354	100.0

Analysis No.	378				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.24	60.10	0.7527	1.5055	8.4931
TiO2	0.01	79.87	0.0001	0.0003	0.0017
Al2O3	33.11	51.00	0.6492	0.9738	7.3250
FeO	0.95	71.80	0.0133	0.0133	0.1499
MnO	0.02	70.94	0.0003	0.0003	0.0031
MgO	0.11	40.30	0.0026	0.0026	0.0297
CaO	18.02	56.10	0.3212	0.3212	3.6242
Na2O	1.17	31.00	0.0377	0.0188	0.4251
K2O	0.03	47.00	0.0006	0.0003	0.0070
P2O5					
Total	98.66			2.8362	20.0587
					Cation Excess
No. of Oxygens	32				
F	11.283				

End Member Calculation		
X_{an}	3.6242	89.3
X_{ab}	0.4251	10.5
X_{or}	0.0070	0.2
	4.0562	100.0

Analysis No.	380				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.89	60.10	0.8468	1.6935	9.3522
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	29.55	51.00	0.5794	0.8691	6.3995
FeO	1.53	71.80	0.0213	0.0213	0.2354
MnO	0.01	70.94	0.0001	0.0001	0.0012
MgO	0.23	40.30	0.0058	0.0058	0.0638
CaO	14.06	56.10	0.2506	0.2506	2.7681
Na2O	3.46	31.00	0.1116	0.0558	1.2327
K2O	0.10	47.00	0.0021	0.0011	0.0234
P2O5					
Total	99.83			2.8973	20.0761
					Cation Excess
No. of Oxygens	32				
F	11.045				

End Member Calculation		
X_{an}	2.7681	68.8

X_{ab}	1.2327	30.6
X_{or}	0.0234	0.6
	4.0242	100.0

Analysis No. 383

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.09	60.10	0.8334	1.6669	9.2445
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	29.84	51.00	0.5851	0.8776	6.4898
FeO	1.40	71.80	0.0195	0.0195	0.2163
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.22	40.30	0.0055	0.0055	0.0612
CaO	14.79	56.10	0.2636	0.2636	2.9242
Na2O	3.14	31.00	0.1013	0.0506	1.1235
K2O	0.11	47.00	0.0023	0.0012	0.0256
P2O5					
Total	99.59			2.8850	20.0852
					Cation Excess
No. of Oxygens	32				
F	11.092				

End Member Calculation

X_{an}	2.9242	71.8
X_{ab}	1.1235	27.6
X_{or}	0.0256	0.6
	4.0733	100.0

Analysis No. 384

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.37	60.10	0.7549	1.5098	8.4603
TiO2	0.02	79.87	0.0003	0.0006	0.0033
Al2O3	33.54	51.00	0.6576	0.9865	7.3703
FeO	0.85	71.80	0.0119	0.0119	0.1332
MnO	0.03	70.94	0.0004	0.0004	0.0043
MgO	0.13	40.30	0.0032	0.0032	0.0362
CaO	18.12	56.10	0.3230	0.3230	3.6198
Na2O	1.22	31.00	0.0393	0.0197	0.4405
K2O	0.03	47.00	0.0006	0.0003	0.0072
P2O5					
Total	99.31			2.8553	20.0750
					Cation Excess
No. of Oxygens	32				
F	11.207				

End Member Calculation

X_{an}	3.6198	89.0
X_{ab}	0.4405	10.8
X_{or}	0.0072	0.2
	4.0674	100.0

Analysis No. 385

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.01	60.10	0.7988	1.5977	8.8989
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.48	51.00	0.6173	0.9259	6.8761
FeO	1.03	71.80	0.0143	0.0143	0.1594
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.18	40.30	0.0045	0.0045	0.0501
CaO	16.48	56.10	0.2938	0.2938	3.2724
Na2O	2.22	31.00	0.0716	0.0358	0.7978
K2O	0.06	47.00	0.0013	0.0007	0.0146
P2O5					
Total	99.46			2.8726	20.0693
					Cation Excess
No. of Oxygens	32				
F	11.140				

End Member Calculation

X_{an}	3.2724	80.1
X_{ab}	0.7978	19.5
X_{or}	0.0146	0.4
	4.0848	100.0

Analysis No. 386

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.65	60.10	0.8095	1.6190	9.0126
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	31.02	51.00	0.6082	0.9124	6.7720
FeO	1.06	71.80	0.0148	0.0148	0.1650
MnO	0.02	70.94	0.0003	0.0003	0.0035
MgO	0.21	40.30	0.0052	0.0052	0.0579
CaO	15.75	56.10	0.2807	0.2807	3.1258
Na2O	2.51	31.00	0.0810	0.0405	0.9015
K2O	0.08	47.00	0.0017	0.0009	0.0190
P2O5					
Total	99.32			2.8741	20.0594
					Cation Excess
No. of Oxygens	32				
F	11.134				

End Member Calculation

X_{an}	3.1258	77.3
X_{ab}	0.9015	22.3
X_{or}	0.0190	0.5
	4.0463	100.0

Analysis No.	387				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.75	60.10	0.8111	1.6223	9.0072
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.10	51.00	0.6098	0.9147	6.7715
FeO	1.16	71.80	0.0161	0.0161	0.1788
MnO	0.02	70.94	0.0002	0.0002	0.0026
MgO	0.21	40.30	0.0051	0.0051	0.0572
CaO	15.90	56.10	0.2834	0.2834	3.1472
Na2O	2.42	31.00	0.0781	0.0390	0.8669
K2O	0.08	47.00	0.0016	0.0008	0.0183
P2O5					
Total	99.63			2.8818	20.0496
No. of Oxygens	32				
F	11.104				

End Member Calculation		
X_{an}	3.1472	78.0
X_{ab}	0.8669	21.5
X_{or}	0.0183	0.5
	4.0324	100.0

Analysis No.	388				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.10	60.10	0.8336	1.6672	9.2253
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.09	51.00	0.5900	0.8850	6.5293
FeO	1.32	71.80	0.0184	0.0184	0.2035
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.23	40.30	0.0057	0.0057	0.0627
CaO	14.87	56.10	0.2651	0.2651	2.9334
Na2O	3.04	31.00	0.0981	0.0490	1.0852
K2O	0.11	47.00	0.0024	0.0012	0.0267
P2O5					
Total	99.76			2.8916	20.0660
					Cation Excess
No. of Oxygens	32				
F	11.067				

End Member Calculation		
X_{an}	2.9334	72.5
X_{ab}	1.0852	26.8
X_{or}	0.0267	0.7
	4.0453	100.0

Analysis No.	389				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.51	60.10	0.7739	1.5478	8.6578
TiO2	0.02	79.87	0.0002	0.0005	0.0028
Al2O3	32.56	51.00	0.6384	0.9576	7.1425
FeO	1.04	71.80	0.0145	0.0145	0.1621
MnO	0.02	70.94	0.0002	0.0002	0.0027
MgO	0.16	40.30	0.0040	0.0040	0.0451
CaO	17.25	56.10	0.3075	0.3075	3.4400
Na2O	1.72	31.00	0.0555	0.0277	0.6207
K2O	0.04	47.00	0.0009	0.0005	0.0102
P2O5					
Total	99.32			2.8603	20.0837
					Cation Excess
No. of Oxygens	32				
F	11.188				

End Member Calculation		
X_{an}	3.4400	84.5
X_{ab}	0.6207	15.2
X_{or}	0.0102	0.2
	4.0709	100.0

Analysis No.	390				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.62	60.10	0.7591	1.5181	8.5106
TiO2	0.07	79.87	0.0008	0.0017	0.0094
Al2O3	33.21	51.00	0.6512	0.9768	7.3010
FeO	0.92	71.80	0.0129	0.0129	0.1443
MnO	0.01	70.94	0.0002	0.0002	0.0023
MgO	0.13	40.30	0.0031	0.0031	0.0351
CaO	17.88	56.10	0.3187	0.3187	3.5734
Na2O	1.37	31.00	0.0442	0.0221	0.4955
K2O	0.05	47.00	0.0010	0.0005	0.0110
P2O5					
Total	99.26			2.8541	20.0827
					Cation Excess
No. of Oxygens	32				
F	11.212				

End Member Calculation

X_{an}	3.5734	87.6
X_{ab}	0.4955	12.1
X_{or}	0.0110	0.3
	4.0799	100.0

Analysis No. 391

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.19	60.10	0.7686	1.5371	8.6236
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.58	51.00	0.6388	0.9582	7.1680
FeO	1.00	71.80	0.0139	0.0139	0.1560
MnO	0.01	70.94	0.0002	0.0002	0.0022
MgO	0.12	40.30	0.0031	0.0031	0.0344
CaO	17.58	56.10	0.3134	0.3134	3.5162
Na2O	1.59	31.00	0.0513	0.0256	0.5755
K2O	0.04	47.00	0.0008	0.0004	0.0084
P2O5					
Total	99.11			2.8519	20.0843
					Cation Excess
No. of Oxygens	32				
F	11.221				

End Member Calculation

X_{an}	3.5162	85.8
X_{ab}	0.5755	14.0
X_{or}	0.0084	0.2
	4.1001	100.0

Analysis No. 392

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.47	60.10	0.8065	1.6130	8.9623
TiO2	0.02	79.87	0.0002	0.0004	0.0022
Al2O3	31.33	51.00	0.6143	0.9215	6.8267
FeO	1.15	71.80	0.0160	0.0160	0.1774
MnO	0.03	70.94	0.0004	0.0004	0.0045
MgO	0.18	40.30	0.0044	0.0044	0.0490
CaO	15.94	56.10	0.2841	0.2841	3.1575
Na2O	2.42	31.00	0.0781	0.0390	0.8675
K2O	0.07	47.00	0.0016	0.0008	0.0173
P2O5					
Total	99.60			2.8796	20.0645
					Cation Excess
No. of Oxygens	32				
F	11.113				

End Member Calculation

X_{an}	3.1575	78.1
X_{ab}	0.8675	21.5
X_{or}	0.0173	0.4
	4.0423	100.0

Analysis No. 393

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.09	60.10	0.8334	1.6669	9.2264
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	30.29	51.00	0.5939	0.8909	6.5748
FeO	1.21	71.80	0.0169	0.0169	0.1870
MnO	0.01	70.94	0.0001	0.0001	0.0015
MgO	0.21	40.30	0.0052	0.0052	0.0581
CaO	14.80	56.10	0.2638	0.2638	2.9205
Na2O	2.83	31.00	0.0913	0.0456	1.0106
K2O	0.09	47.00	0.0019	0.0009	0.0207
P2O5					
Total	99.54			2.8906	20.0007
No. of Oxygens	32				
F	11.070				

End Member Calculation

X_{an}	2.9205	73.9
X_{ab}	1.0106	25.6
X_{or}	0.0207	0.5
	3.9518	100.0

Analysis No. 397

	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.41	60.10	0.8055	1.6110	8.9658
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.15	51.00	0.6108	0.9162	6.7985
FeO	1.27	71.80	0.0177	0.0177	0.1975
MnO	0.01	70.94	0.0001	0.0001	0.0011
MgO	0.20	40.30	0.0049	0.0049	0.0548
CaO	15.93	56.10	0.2840	0.2840	3.1607
Na2O	2.49	31.00	0.0803	0.0402	0.8941
K2O	0.08	47.00	0.0017	0.0009	0.0191
P2O5					
Total	99.54			2.8749	20.0915
					Cation Excess
No. of Oxygens	32				
F	11.131				

End Member Calculation		
X_{an}	3.1607	77.6
X_{ab}	0.8941	21.9
X_{or}	0.0191	0.5
	4.0738	100.0

Analysis No.	398				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.75	60.10	0.7612	1.5225	8.5340
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.19	51.00	0.6508	0.9762	7.2958
FeO	1.06	71.80	0.0148	0.0148	0.1655
MnO	0.02	70.94	0.0002	0.0002	0.0028
MgO	0.13	40.30	0.0032	0.0032	0.0359
CaO	17.67	56.10	0.3150	0.3150	3.5311
Na2O	1.37	31.00	0.0442	0.0221	0.4954
K2O	0.05	47.00	0.0010	0.0005	0.0108
P2O5					
Total	99.23			2.8544	20.0712
					Cation Excess
No. of Oxygens	32				
F	11.211				

End Member Calculation		
X_{an}	3.5311	87.5
X_{ab}	0.4954	12.3
X_{or}	0.0108	0.3
	4.0373	100.0

Analysis No.	399				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.78	60.10	0.7617	1.5235	8.5314
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.39	51.00	0.6547	0.9821	7.3327
FeO	0.89	71.80	0.0124	0.0124	0.1384
MnO	0.02	70.94	0.0002	0.0002	0.0025
MgO	0.15	40.30	0.0037	0.0037	0.0415
CaO	17.57	56.10	0.3132	0.3132	3.5077
Na2O	1.35	31.00	0.0435	0.0218	0.4877
K2O	0.04	47.00	0.0008	0.0004	0.0085
P2O5					
Total	99.18			2.8572	20.0504
					Cation Excess
No. of Oxygens	32				
F	11.200				

End Member Calculation		
X_{an}	3.5077	87.6
X_{ab}	0.4877	12.2
X_{or}	0.0085	0.2
	4.0040	100.0

Analysis No.	400				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.51	60.10	0.7739	1.5478	8.6664
TiO2	0.04	79.87	0.0005	0.0010	0.0055
Al2O3	32.49	51.00	0.6371	0.9556	7.1342
FeO	1.09	71.80	0.0152	0.0152	0.1702
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.14	40.30	0.0035	0.0035	0.0397
CaO	17.24	56.10	0.3073	0.3073	3.4414
Na2O	1.65	31.00	0.0532	0.0266	0.5961
K2O	0.05	47.00	0.0010	0.0005	0.0111
P2O5					
Total	99.21			2.8575	20.0645
					Cation Excess
No. of Oxygens	32				
F	11.199				

End Member Calculation		
X_{an}	3.4414	85.0
X_{ab}	0.5961	14.7
X_{or}	0.0111	0.3
	4.0486	100.0

Analysis No.	401				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.41	60.10	0.7556	1.5111	8.4759
TiO2	0.02	79.87	0.0002	0.0005	0.0028
Al2O3	33.33	51.00	0.6535	0.9803	7.3311
FeO	1.06	71.80	0.0148	0.0148	0.1656
MnO	0.00	70.94	0.0000	0.0000	0.0002
MgO	0.13	40.30	0.0031	0.0031	0.0349
CaO	18.09	56.10	0.3225	0.3225	3.6173
Na2O	1.23	31.00	0.0397	0.0199	0.4455
K2O	0.04	47.00	0.0010	0.0005	0.0107
P2O5					
Total	99.31			2.8526	20.0839
					Cation Excess
No. of Oxygens	32				
F	11.218				

End Member Calculation		
X_{an}	3.6173	88.8
X_{ab}	0.4455	10.9
X_{or}	0.0107	0.3
	4.0735	100.0

Analysis No.	402				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.04	60.10	0.7993	1.5987	8.9171
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.38	51.00	0.6153	0.9229	6.8640
FeO	1.15	71.80	0.0160	0.0160	0.1789
MnO	0.01	70.94	0.0002	0.0002	0.0020
MgO	0.16	40.30	0.0040	0.0040	0.0443
CaO	16.36	56.10	0.2916	0.2916	3.2532
Na2O	2.13	31.00	0.0687	0.0344	0.7665
K2O	0.07	47.00	0.0014	0.0007	0.0160
P2O5					
Total	99.30			2.8685	20.0421
No. of Oxygens	32				
F	11.156				

End Member Calculation		
X_{an}	3.2532	80.6
X_{ab}	0.7665	19.0
X_{or}	0.0160	0.4
	4.0357	100.0

Analysis No.	406				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.39	60.10	0.8384	1.6769	9.2564
TiO2	0.04	79.87	0.0004	0.0009	0.0049
Al2O3	30.02	51.00	0.5886	0.8829	6.4985
FeO	1.51	71.80	0.0210	0.0210	0.2322
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.24	40.30	0.0061	0.0061	0.0669
CaO	14.68	56.10	0.2617	0.2617	2.8889
Na2O	2.96	31.00	0.0955	0.0477	1.0542
K2O	0.12	47.00	0.0026	0.0013	0.0289
P2O5					
Total	99.96			2.8985	20.0309
No. of Oxygens	32				
F	11.040				

End Member Calculation		
X_{an}	2.8889	72.7
X_{ab}	1.0542	26.5
X_{or}	0.0289	0.7
	3.9720	100.0

Analysis No.	409				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	44.99	60.10	0.7486	1.4972	8.4211
TiO2	0.03	79.87	0.0004	0.0008	0.0044
Al2O3	33.70	51.00	0.6608	0.9912	7.4334
FeO	0.90	71.80	0.0125	0.0125	0.1408
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.11	40.30	0.0027	0.0027	0.0302
CaO	18.07	56.10	0.3221	0.3221	3.6234
Na2O	1.11	31.00	0.0358	0.0179	0.4022
K2O	0.03	47.00	0.0006	0.0003	0.0066
P2O5					
Total	98.93			2.8446	20.0622
					Cation Excess
No. of Oxygens	32				
F	11.249				

End Member Calculation		
X_{an}	3.6234	89.9
X_{ab}	0.4022	10.0
X_{or}	0.0066	0.2
	4.0323	100.0

Analysis No.	410				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.63	60.10	0.7592	1.5185	8.5261
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.08	51.00	0.6486	0.9729	7.2840
FeO	0.90	71.80	0.0126	0.0126	0.1414
MnO	0.02	70.94	0.0003	0.0003	0.0033
MgO	0.16	40.30	0.0040	0.0040	0.0448
CaO	17.89	56.10	0.3189	0.3189	3.5811
Na2O	1.36	31.00	0.0439	0.0219	0.4927
K2O	0.04	47.00	0.0008	0.0004	0.0095
P2O5					
Total	99.09			2.8495	20.0830
					Cation Excess
No. of Oxygens	32				

F	11.230

End Member Calculation		
X_{an}	3.5811	87.7
X_{ab}	0.4927	12.1
X_{or}	0.0095	0.2
	4.0833	100.0

Analysis No.	411				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.44	60.10	0.7727	1.5454	8.6568
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.65	51.00	0.6402	0.9603	7.1722
FeO	1.03	71.80	0.0144	0.0144	0.1614
MnO	0.01	70.94	0.0001	0.0001	0.0011
MgO	0.15	40.30	0.0037	0.0037	0.0418
CaO	17.18	56.10	0.3062	0.3062	3.4308
Na2O	1.59	31.00	0.0513	0.0256	0.5746
K2O	0.05	47.00	0.0010	0.0005	0.0117
P2O5					
Total	99.10			2.8564	20.0503
					Cation Excess
No. of Oxygens	32				
F	11.203				

End Member Calculation		
X_{an}	3.4308	85.4
X_{ab}	0.5746	14.3
X_{or}	0.0117	0.3
	4.0171	100.0

Analysis No.	412				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	47.25	60.10	0.7862	1.5724	8.7528
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	32.26	51.00	0.6325	0.9488	7.0423
FeO	1.10	71.80	0.0153	0.0153	0.1703
MnO	0.01	70.94	0.0001	0.0001	0.0009
MgO	0.18	40.30	0.0044	0.0044	0.0486
CaO	16.97	56.10	0.3025	0.3025	3.3678
Na2O	1.88	31.00	0.0606	0.0303	0.6752
K2O	0.05	47.00	0.0010	0.0005	0.0113
P2O5					
Total	99.69			2.8743	20.0692
					Cation Excess
No. of Oxygens	32				
F	11.133				

End Member Calculation		
X_{an}	3.3678	83.1
X_{ab}	0.6752	16.7
X_{or}	0.0113	0.3
	4.0542	100.0

Analysis No.	413				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.28	60.10	0.7534	1.5068	8.4506
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	33.53	51.00	0.6575	0.9862	7.3743
FeO	1.05	71.80	0.0146	0.0146	0.1643
MnO	0.01	70.94	0.0002	0.0002	0.0020
MgO	0.12	40.30	0.0030	0.0030	0.0338
CaO	18.12	56.10	0.3230	0.3230	3.6229
Na2O	1.16	31.00	0.0375	0.0187	0.4201
K2O	0.03	47.00	0.0006	0.0003	0.0063
P2O5					
Total	99.31			2.8529	20.0748
					Cation Excess
No. of Oxygens	32				
F	11.217				

End Member Calculation		
X_{an}	3.6229	89.5
X_{ab}	0.4201	10.4
X_{or}	0.0063	0.2
	4.0492	100.0

Analysis No.	414				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	46.14	60.10	0.7677	1.5354	8.5851
TiO2	0.03	79.87	0.0004	0.0008	0.0044
Al2O3	32.88	51.00	0.6447	0.9671	7.2095
FeO	1.03	71.80	0.0143	0.0143	0.1600
MnO	0.03	70.94	0.0005	0.0005	0.0053
MgO	0.15	40.30	0.0036	0.0036	0.0405
CaO	17.72	56.10	0.3159	0.3159	3.5322
Na2O	1.47	31.00	0.0474	0.0237	0.5303
K2O	0.03	47.00	0.0007	0.0003	0.0075
P2O5					
Total	99.48			2.8616	20.0747
					Cation Excess

No. of Oxygens	32
F	11.183

End Member Calculation		
X_{an}	3.5322	86.8
X_{ab}	0.5303	13.0
X_{or}	0.0075	0.2
	4.0700	100.0

Analysis No.	416				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.53	60.10	0.7576	1.5151	8.4654
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	33.56	51.00	0.6580	0.9871	7.3532
FeO	0.95	71.80	0.0132	0.0132	0.1479
MnO	0.02	70.94	0.0002	0.0002	0.0028
MgO	0.13	40.30	0.0032	0.0032	0.0353
CaO	18.28	56.10	0.3258	0.3258	3.6411
Na2O	1.16	31.00	0.0375	0.0188	0.4191
K2O	0.02	47.00	0.0005	0.0003	0.0056
P2O5					
Total	99.65			2.8637	20.0704
					Cation Excess
No. of Oxygens	32				
F	11.174				

End Member Calculation		
X_{an}	3.6411	89.6
X_{ab}	0.4191	10.3
X_{or}	0.0056	0.1
	4.0659	100.0

Analysis No.	417				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	45.26	60.10	0.7531	1.5062	8.4581
TiO2	0.02	79.87	0.0003	0.0006	0.0033
Al2O3	33.38	51.00	0.6545	0.9818	7.3510
FeO	1.03	71.80	0.0143	0.0143	0.1608
MnO	0.03	70.94	0.0004	0.0004	0.0041
MgO	0.14	40.30	0.0034	0.0034	0.0387
CaO	18.00	56.10	0.3209	0.3209	3.6036
Na2O	1.32	31.00	0.0425	0.0213	0.4774
K2O	0.04	47.00	0.0008	0.0004	0.0092
P2O5					
Total	99.21			2.8492	20.1063
					Cation Excess
No. of Oxygens	32				
F	11.231				

End Member Calculation		
X_{an}	3.6036	88.1
X_{ab}	0.4774	11.7
X_{or}	0.0092	0.2
	4.0902	100.0

Analysis No.	418				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.03	60.10	0.8324	1.6649	9.2252
TiO2	0.00	79.87	0.0001	0.0001	0.0006
Al2O3	30.05	51.00	0.5892	0.8838	6.5297
FeO	1.26	71.80	0.0175	0.0175	0.1938
MnO	0.02	70.94	0.0003	0.0003	0.0034
MgO	0.22	40.30	0.0054	0.0054	0.0599
CaO	14.85	56.10	0.2647	0.2647	2.9335
Na2O	3.09	31.00	0.0997	0.0498	1.1046
K2O	0.09	47.00	0.0020	0.0010	0.0220
P2O5					
Total	99.61			2.8876	20.0727
					Cation Excess
No. of Oxygens	32				
F	11.082				

End Member Calculation		
X_{an}	2.9335	72.3
X_{ab}	1.1046	27.2
X_{or}	0.0220	0.5
	4.0601	100.0

Analysis No.	230				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.85	60.10	0.8128	1.6256	9.0784
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	30.87	51.00	0.6053	0.9079	6.7606
FeO	0.23	71.80	0.0032	0.0032	0.0354
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.30	40.30	0.0075	0.0075	0.0835
CaO	15.69	56.10	0.2797	0.2797	3.1238
Na2O	2.51	31.00	0.0810	0.0405	0.9043
K2O	0.06	47.00	0.0013	0.0007	0.0147
P2O5					
Total	98.51			2.8650	20.0008
No. of Oxygens	32				
F	11.169				

End Member Calculation		
X_{an}	3.1238	77.3
X_{ab}	0.9043	22.4
X_{or}	0.0147	0.4
	4.0428	100.0

Analysis No.	262				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.61	60.10	0.8421	1.6842	9.3095
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	29.70	51.00	0.5824	0.8735	6.4380
FeO	1.06	71.80	0.0148	0.0148	0.1638
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.32	40.30	0.0080	0.0080	0.0881
CaO	15.02	56.10	0.2677	0.2677	2.9599
Na2O	2.79	31.00	0.0900	0.0450	0.9950
K2O	0.13	47.00	0.0027	0.0013	0.0294
P2O5					
Total	99.63			2.8946	19.9837
No. of Oxygens	32				
F	11.055				

End Member Calculation		
X_{an}	2.9599	74.3
X_{ab}	0.9950	25.0
X_{or}	0.0294	0.7
	3.9842	100.0

Analysis No.	263				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.21	60.10	0.8022	1.6043	8.9426
TiO2	0.01	79.87	0.0001	0.0002	0.0011
Al2O3	31.31	51.00	0.6139	0.9209	6.8441
FeO	0.86	71.80	0.0119	0.0119	0.1330
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.27	40.30	0.0066	0.0066	0.0733
CaO	16.20	56.10	0.2888	0.2888	3.2193
Na2O	2.30	31.00	0.0742	0.0371	0.8271
K2O	0.06	47.00	0.0013	0.0007	0.0145
P2O5					
Total	99.21			2.8704	20.0550
					Cation Excess
No. of Oxygens	32				
F	11.148				

End Member Calculation		
X_{an}	3.2193	79.3
X_{ab}	0.8271	20.4
X_{or}	0.0145	0.4
	4.0609	100.0

Analysis No.	264				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	48.55	60.10	0.8078	1.6156	8.9335
TiO2	0.00	79.87	0.0000	0.0000	0.0000
Al2O3	31.64	51.00	0.6204	0.9306	6.8608
FeO	0.86	71.80	0.0120	0.0120	0.1322
MnO	0.00	70.94	0.0000	0.0000	0.0000
MgO	0.26	40.30	0.0064	0.0064	0.0706
CaO	16.33	56.10	0.2911	0.2911	3.2191
Na2O	2.32	31.00	0.0748	0.0374	0.8276
K2O	0.05	47.00	0.0011	0.0005	0.0120
P2O5					
Total	100.01			2.8936	20.0559
					Cation Excess
No. of Oxygens	32				
F	11.059				

End Member Calculation		
X_{an}	3.2191	79.3
X_{ab}	0.8276	20.4
X_{or}	0.0120	0.3
	4.0588	100.0

Analysis No.	311				
	Molecular %	EW	Molecular prop	Atomic Prop	On 32 O
SiO2	50.43	60.10	0.8391	1.6782	9.3824
TiO2	0.24	79.87	0.0030	0.0060	0.0335
Al2O3	26.01	51.00	0.5100	0.7650	5.7026
Fe2O3	0.00	79.85	0.0000	0.0000	0.0000
FeO	5.53	71.80	0.0770	0.0770	0.8612
MnO	0.08	70.94	0.0011	0.0011	0.0128
MgO	2.47	40.30	0.0613	0.0613	0.6853
CaO	13.42	56.10	0.2392	0.2392	2.6748
Na2O	2.03	31.00	0.0655	0.0327	0.7322
K2O	0.12	47.00	0.0025	0.0013	0.0280
P2O5					
Total	100.33			2.8619	20.1129
					Cation Excess
No. of Oxygens	32				
F	11.182				

End Member Calculation		
X_{an}	2.6748	77.9
X_{ab}	0.7322	21.3
X_{or}	0.0280	0.8
	3.4350	100.0

Sample	SiO2	TiO2	Al2O3	FeO*	MnO	MgO	CaO	Na2O	K2O	Total	Analysis No.	An	Ab	Or	Classification
7-1_2_plag core	46.04	0.03	33.67	0.68	0.00	0.14	17.27	1.47	0.02	99.32	16	87	13	0	Bytownite
7-1_2_plag rim	46.18	0.05	33.59	0.74	0.03	0.13	17.44	1.51	0.03	99.70	17	86	14	0	Bytownite
7-1_2_plag core 2	47.11	0.07	32.78	0.70	0.02	0.16	16.95	1.93	0.03	99.76	18	83	17	0	Bytownite
7-1_4 plag core	46.86	0.02	33.56	0.66	0.00	0.15	17.53	1.70	0.02	100.50	27	85	15	0	Bytownite
7-1_4 plag rim	46.78	0.06	33.48	0.71	0.00	0.15	17.39	1.80	0.02	100.39	28	84	16	0	Bytownite
7-1_5 plag core	49.27	0.05	31.92	0.70	0.01	0.20	15.74	2.78	0.05	100.73	29	76	24	0	Bytownite
7-1_5 plag middle	48.16	0.00	32.81	0.79	0.00	0.21	16.40	2.22	0.02	100.61	30	80	20	0	Bytownite
7-1_5 plag rim	46.57	0.04	33.83	0.70	0.00	0.13	17.69	1.54	0.02	100.51	31	86	14	0	Bytownite
7-1_5 plag middle2	47.09	0.00	33.20	0.70	0.00	0.17	17.53	1.78	0.03	100.49	32	84	15	0	Bytownite
7-1_11 plag lightcore	46.62	0.02	33.46	0.73	0.00	0.16	17.51	1.63	0.04	100.16	37	85	14	0	Bytownite
7-1_11 plag light2	46.56	0.00	33.73	0.75	0.00	0.14	17.63	1.44	0.04	100.29	38	87	13	0	Bytownite
7-1_11 plag light3	46.69	0.03	33.35	0.69	0.04	0.13	17.36	1.67	0.02	99.99	39	85	15	0	Bytownite
7-1_11 plag lightrim	47.86	0.01	32.79	0.83	0.02	0.18	16.51	2.26	0.04	100.51	40	80	20	0	Bytownite
7-1_11 plag dark core	49.33	0.07	31.66	0.72	0.00	0.20	15.44	2.76	0.05	100.23	41	75	24	0	Bytownite
7-1_11 plag dark2	49.56	0.00	31.83	0.72	0.02	0.19	15.71	2.71	0.06	100.80	42	76	24	0	Bytownite
7-1_11 plag dark rim	49.20	0.02	31.79	0.77	0.01	0.19	15.33	2.74	0.05	100.10	43	75	24	0	Bytownite
7-1_7 plag lightcore	44.31	0.00	35.06	0.70	0.04	0.06	19.05	0.86	0.02	100.12	56	92	8	0	Anorthite
7-1_7 plag light2	46.87	0.00	32.94	0.65	0.00	0.15	16.76	1.99	0.04	99.40	57	82	18	0	Bytownite
2-1_13 plag lightcore	50.03	0.00	30.69	0.72	0.03	0.04	14.22	3.36	0.10	99.19	65	70	30	1	Labradorite
2-1_13 plag darkcore	50.43	0.01	30.52	0.86	0.05	0.04	13.86	3.55	0.13	99.45	66	68	31	1	Labradorite
2-1_13 plag darkrim	52.93	0.08	28.39	0.84	0.00	0.03	11.61	4.79	0.20	98.88	67	57	42	1	Labradorite
2-1_13 plag2 lightcore	45.79	0.01	33.29	0.62	0.03	0.04	17.28	1.75	0.04	98.85	70	84	15	0	Bytownite
2-1_13 plag2 light2	49.53	0.01	30.78	0.59	0.03	0.06	14.07	3.36	0.06	98.48	71	70	30	0	Labradorite
2-1_13 plag2 darkcore	50.98	0.02	29.79	0.62	0.02	0.06	13.14	3.90	0.11	98.64	72	65	35	1	Labradorite
2-1_13 plag2 darkrim	52.52	0.04	28.88	0.62	0.02	0.03	11.99	4.45	0.16	98.71	73	59	40	1	Labradorite
2-1_13 plag3 lightcore	47.81	0.00	31.71	0.79	0.01	0.03	15.51	2.61	0.09	98.56	80	76	23	1	Bytownite
2-1_13 plag3 lightrim	51.25	0.02	29.36	0.67	0.02	0.02	12.79	4.10	0.18	98.42	81	63	36	1	Labradorite
2-1_12 plag light core	48.38	0.03	31.88	0.62	0.02	0.04	15.32	2.73	0.02	99.05	89	76	24	0	Bytownite
2-1_12 plag dark core	53.35	0.02	28.70	0.65	0.00	0.05	11.65	4.83	0.14	99.40	90	57	43	1	Labradorite
2-1_12 plag light2	48.33	0.04	32.00	0.64	0.04	0.06	15.46	2.62	0.04	99.23	93	76	23	0	Bytownite
2-1_12 plag dark rim	53.71	0.00	28.26	0.60	0.02	0.05	11.27	4.91	0.15	98.97	94	55	44	1	Labradorite
2-1_12 plag light3	49.73	0.02	31.04	0.57	0.00	0.06	14.35	3.44	0.07	99.27	95	69	30	0	Labradorite
2-1_12 plag dark core	53.26	0.00	28.64	0.61	0.04	0.06	11.59	4.93	0.15	99.27	96	56	43	1	Labradorite
2-1_11 plag core	52.26	0.00	28.69	1.09	0.01	0.04	12.03	3.89	0.20	98.21	107	62	36	1	Labradorite
2-1_11 plag light rim	52.54	0.02	28.86	1.04	0.04	0.04	12.28	3.53	0.21	98.55	109	65	34	1	Labradorite
2-1_10 plag light core	49.77	0.06	31.32	0.70	0.04	0.05	14.93	2.91	0.09	99.86	112	74	26	1	Bytownite
2-1_10 plag dark core	53.73	0.01	28.97	0.55	0.02	0.07	11.88	3.95	0.12	99.30	113	62	37	1	Labradorite
2-1_10 plag light2	50.37	0.02	31.17	0.68	0.00	0.08	14.32	3.14	0.07	99.85	114	71	28	0	Bytownite
2-1_10 plag dark rim	54.25	0.00	28.69	0.64	0.00	0.04	11.15	4.01	0.19	98.98	115	60	39	1	Labradorite
2-1_10 plag dark2	53.64	0.03	28.75	0.63	0.00	0.06	11.78	4.00	0.10	98.99	116	62	38	1	Labradorite
2-1_1 plag light core	50.83	0.00	30.41	0.99	0.03	0.06	13.95	3.39	0.09	99.76	326	69	30	1	Labradorite
2-1_1 plag rim	54.24	0.02	28.64	0.86	0.00	0.04	11.57	4.12	0.19	99.67	327	60	39	1	Labradorite
2-1_1 plag2 core	51.86	0.00	29.73	0.77	0.01	0.05	12.60	3.85	0.13	99.00	329	64	35	1	Labradorite
2-1_1 plag2 rim	54.56	0.00	28.38	0.71	0.02	0.03	10.44	4.23	0.21	98.58	330	57	42	1	Labradorite
2-1_2 plag light core	48.97	0.05	31.28	0.55	0.01	0.06	15.13	2.99	0.04	99.09	332	74	26	0	Bytownite
2-1_2 plag dark2	49.04	0.01	31.19	0.65	0.00	0.04	15.35	2.92	0.04	99.25	333	74	26	0	Bytownite
2-1_2 plag light2	50.32	0.02	31.32	0.60	0.02	0.05	14.42	2.55	0.05	99.35	334	75	24	0	Bytownite
2-1_2 plag light3	49.10	0.02	31.08	0.60	0.00	0.05	15.05	2.79	0.05	98.75	335	75	25	0	Bytownite
2-1_2 plag dark rim	52.43	0.02	29.09	0.52	0.02	0.03	12.37	4.01	0.13	98.62	336	63	37	1	Labradorite
2-1_3 plag light core	50.50	0.03	30.07	0.66	0.02	0.08	13.66	3.52	0.05	98.58	343	68	32	0	Labradorite
2-1_3 plag dark2	53.36	0.02	28.18	0.64	0.00	0.05	11.49	4.19	0.13	98.07	344	60	39	1	Labradorite
2-1_3 plag rim	53.07	0.00	28.77	0.68	0.00	0.04	11.96	4.18	0.16	98.87	345	61	38	1	Labradorite
2-1_5 plag light core	50.59	0.00	30.38	0.57	0.02	0.05	14.13	3.29	0.07	99.11	353	70	30	0	Bytownite
2-1_5 plag dark2	53.70	0.01	28.80	0.56	0.02	0.08	11.98	4.13	0.08	99.37	354	61	38	0	Labradorite
2-1_5 plag light2	53.60	0.01	28.71	0.61	0.00	0.06	11.95	3.90	0.11	98.95	355	62	37	1	Labradorite
2-1_5 plag light3	53.62	0.00	28.60	0.59	0.06	0.05	11.59	4.16	0.18	98.85	356	60	39	1	Labradorite
2-1_5 plag rim	53.26	0.00	29.16	0.66	0.02	0.02	12.05	4.26	0.19	99.61	357	60	39	1	Labradorite
2-1_6 plag light core	50.93	0.03	30.37	0.56	0.00	0.05	14.30	3.50	0.07	99.81	358	69	31	0	Labradorite
2-1_6 plag dark2	52.49	0.02	29.35	0.51	0.02	0.06	12.67	4.03	0.09	99.25	359	63	36	1	Labradorite
2-1_6 plag rim	54.22	0.02	28.37	0.61	0.01	0.05	11.49	4.42	0.20	99.40	360	58	41	1	Labradorite
2-1_6 plag darkrim	53.83	0.07	28.58	0.50	0.00	0.03	11.53	4.42	0.24	99.21	361	58	40	1	Labradorite
2-1_7 plag dark core	53.56	0.05	28.88	0.71	0.00	0.07	12.15	4.16	0.09	99.67	365	61	38	1	Labradorite
2-1_7 plag light2	53.16	0.06	29.78	0.64	0.02	0.07	13.10	3.82	0.07	100.71	366	65	34	0	Labradorite
2-1_7 plag light3	53.00	0.03	29.29	0.56	0.00	0.08	12.31	4.03	0.10	99.40	367	62	37	1	Labradorite
2-1_7 plag dark2	54.51	0.04	28.72	0.58	0.00	0.07	11.74	3.99	0.07	99.72	368	62	38	0	Labradorite
2-1_7 plag dark rim	54.04	0.03	28.77	0.63	0.01	0.04	11.73	4.15	0.13	99.53	369	60	39	1	Labradorite
2-1_9 plag light core	52.04	0.06	29.68	0.60	0.00	0.07	13.06	3.98	0.13	99.63	374	64	35	1	Labradorite
2-1_9 plag dark rim	53.22	0.00	28.71	0.56	0.00	0.04	12.27	4.12	0.17	99.09	375	62	37	1	Labradorite
5-1_3 plag light core	50.51	0.06	30.20	0.80	0.02	0.09	14.06	3.36	0.08	99.18	237	69	30	0	Labradorite
5-1_3 plag dark2	49.52	0.03	31.06	0.81	0.02	0.08	14.74	3.09	0.06	99.41	239	72	27	0	Bytownite
5-1_3 plag rim	52.92	0.00	28.84	0.79	0.00	0.08	12.22	3.80	0.10	98.75	240	64	36	1	Labradorite
5-1_4 plag light core	45.08	0.08	34.18	0.64	0.00	0.04	18.40	1.14	0.00	99.55	250	90	10	0	Bytownite
5-1_4 plag light2	45.34	0.03	34.04	0.55	0.01	0.06	18.07	1.24	0.03	99.37	251	89	11	0	Bytownite
5-1_4 plag dark2	49.64	0.00	31.23	0.75	0.02	0.06	14.98	2.94	0.07	99.68	252	74	26	0	Bytownite
5-1_4 plag dark rim	50.61	0.00	30.49	0.83	0.01	0.09	14.11	3.09	0.06	99.29	253	71	28	0	Bytownite
5-1_4 plag2 core	44.59	0.01	34.50	0.63	0.01	0.04	18.50	1.10	0.02	99.39	255	90	10	0	Anorthite
5-1_4 plag2 dark2	49.86	0.05	31.15	0.80	0.01	0.09	14.55	2.79	0.05	99.34	256	74	26	0	Bytownite
5-1_4 plag2 rim	50.36	0.10	30.55	0.95	0.01	0.09	14.31	3.10	0.07	99.53	257	72	28	0	Bytownite
5-1_6 plag light core	48.89	0.03	31.14	0.82	0.03	0.08	15.04	3.00	0.04	99.07	270	73	26	0	Bytownite
5-1_6 plag dark2	51.80	0.03	29.25	0.79	0.01	0.07	12.90	3.64	0.10	98.59	271	66	34	1	Labradorite
5-1_6 plag light2	48.91	0.06	31.19	0.76	0.00	0.06	14.97	2.85	0.04	98.84	272	74	26	0	Bytownite
5-1_8 plag rim	48.91	0.00	31.13	0.94	0.02	0.07	14.86	2.85	0.05	98.82	284	74	26	0	Bytownite
5-1_8 plag core	47.41	0.02	31.81	0.95	0.01	0.06	16.21	2.19	0.04	98.69	285	80	20	0	Bytownite
46-1_7 plag core	45.85	0.02	33.54	0.81	0.01	0.15	17.95	1.36	0.02	99.72	123	88	12	0	Bytownite
46-1_7 plag middle	45.44	0.00	33.61	0.86	0.00	0.17	17.91	1.33	0.02	99.34	124	88	12	0	Bytownite
46-1_7 plag dark2	45.80	0.02	33.64	0.84	0.00	0.14	17.89	1.48	0.02	99.84	125	87	13	0	Bytownite
46-1_7 plag dark3	46.11	0.07	33.15	0.84	0.01	0.17	17.66	1.51	0.03	99.55	126	86	13	0	Bytownite
46-1_7 plag light	46.29	0.01	33.25	0.82	0.00	0.15	17.61	1.60	0.04	99.77	127	86	14	0	Bytownite
46-1_7 plag rim	48.04	0.02	31.75	1.06	0.01	0.20	16.13	2.31	0.05	99.57	128	79	21	0	Bytownite
46-1_4 plag core	45.57	0.01	33.52	0.73	0.00	0.14	18.01	1.30	0.04	99.33	146	88	12	0	Bytownite
46-1_4 plag middle2	45.56	0.03	33.60	0.75	0.00	0.15	17.95	1.38	0.04	99.47	147	88	12	0	Bytownite
46-1_4 plag middle3	47.03	0.00	32.55	0.95	0.02	0.19	17.09	1.79	0.05	99.67	148	84	16	0	Bytownite
46-1_4 plag rim	45.13	0.06	33.62	0.95	0.00	0.12	18.07	1.19	0.03	99.18	149	89	11	0	Bytownite
46-1_4 plag lightpatch	45.54	0.06	33.96	0.90	0.02	0.14	18.44	1.08	0.03	100.16	150	90	10	0	Anorthite
41-1_1_plag core_a	46.38	0.08	33.11	0.90	0.01	0.07	17.09	1.68	0.02	99.33	39	85	15	0	Bytownite
41-1_1_plag core_b	47.60	0.02	32.37	1.01	0.00	0.09	16.59	2.04	0.05	99.77	40	82	18	0	Bytownite
41-1_1_plag rim_c	48.46	0.05	31.79	0.96	0.00	0.09	15.84	2.44	0.07	99.70	41	78	22	0	Bytownite
41-1_3 plag core_a	47.23	0.02	32.64	0.70	0.00	0.07	16.92	1.94	0.03	99.55	71	83	17	0	Bytownite
41-1_3 plag core_b	46.69	0.00	32.71	0.76	0.02	0.08	16.95	1.97	0.04	99.22	72	82	17	0	Bytownite
41-1_3 plag core_d	49.56	0.02	31.25	0.91	0.03	0.12	15.30	2.74	0.09	100.01	73	75	24	1	Bytownite
41-1_3 plag core_e	46.26	0.00	32.99	0.86	0.03	0.07	17.44	1.59	0.02	99.27	74	86	14	0	Bytownite
41-1_3 plag rim_e	45.87	0.00	33.18	0.80	0.00	0.08	17.12	1.40	0.04	98.49	75	87	13	0	Bytownite
41-1_5 plag core_a	46.41	0.03	33.11	0.69	0.00	0.06	17.40	1.60	0.02	99.33	100	86	14	0	Bytownite
41-1_5 plag core_b	46.99	0.00	32.47	0.72	0.05	0.06	16.63	1.99	0.04	98.95	101	82	18	0	Bytownite
41-1_5 plag core_c	45.92	0.00	32.96	0.39	0.01	0.05	17.34	1.65	0.03	98.34	102	85	15	0	Bytownite
41-1_5 plag rim_d	46.41	0.04	32.54	0.42	0.00	0.09	17.16	1.60	0.02	98.28	103	85	14	0	Bytownite
41-1_7 plag core_a	47.46	0.02	31.96	0.79	0.02	0.06	16.35	2.18	0.03	98.87	118	80	19	0	Bytownite
41-1_7 plag core_b	46.07	0.00	32.98	0.72	0.00	0.05	17.32	1.67	0.04	98.85	119	85	15	0	Bytownite
41-1_7 plag core_c	46.50	0.02	32.85	0.73	0.00	0.07	17.02	1.80	0.03	99.02	120	84	16	0	Bytownite
41-1_7 plag core_d	49.24	0.02	30.82	0.82	0.00	0.10	15.12	2.83	0.08	99.03	121	74	25	0	Bytownite
41-1_7 plag rim_e	46.97	0.03	32.17	0.97	0.02	0.11	16.73	1.96	0.06	99.02	122	82	17	0	Bytownite
8-2_1 plag core_a	46.37	0.00	32.76	0.80	0.00	0.11	17.38	1.68	0.02	99.12	172	85	15	0	Bytownite
8-2_1 plag core_b	45.05	0.00	33.71	0.71	0.02	0.11	18.28	1.22	0.02	99.12	173	89	11	0	Bytownite
8-2_1 plag core_c	45.66	0.00	33.37	0.75	0.03	0.11	17.78	1.42	0.01	99.13	174	87	13	0	Bytownite
8-2_1 plag core_d	49.33	0.00	30.73	0.88	0.00	0.20	15.20	2.84	0.04	99.23	175	75	25	0	Bytownite
8-2_3 plag core_b	44.75	0.00	33.30	0.60	0.03	0.11	18.08	1.12	0.02	98.00	183	90	10	0	Bytownite

8-2_3 plag rim_c	49.34	0.00	30.14	0.89	0.03	0.16	14.65	2.95	0.03	98.19	184	73	27	0	Bytownite
8-2_4 plag core_b	47.08	0.02	31.82	0.84	0.00	0.10	16.40	2.16	0.02	98.43	193	81	19	0	Bytownite
8-2_6 plag core_a	44.87	0.05	34.27	0.66	0.02	0.08	18.48	1.03	0.00	99.46	199	91	9	0	Anorthite
8-2_6 plag core_b	45.24	0.00	33.78	0.69	0.00	0.10	18.19	1.16	0.01	99.16	200	90	10	0	Bytownite
8-2_6 plag rim_c	45.49	0.02	33.84	0.70	0.03	0.10	18.07	1.15	0.02	99.41	201	90	10	0	Bytownite
8-2_6 plag rim_d	49.00	0.00	31.24	0.98	0.01	0.16	15.80	2.76	0.02	99.98	202	76	24	0	Bytownite
8-2_7 plag core_a	44.91	0.00	34.06	0.72	0.00	0.09	18.60	1.10	0.00	99.47	205	90	10	0	Anorthite
8-2_7 plag core_b	44.94	0.01	33.69	0.61	0.00	0.11	18.40	1.10	0.01	98.88	206	90	10	0	Anorthite
8-2_7 plag core_c	44.63	0.00	34.27	0.65	0.00	0.07	18.64	0.90	0.02	99.18	207	92	8	0	Anorthite
8-2_7 plag core_d	45.85	0.05	33.42	0.76	0.00	0.12	17.84	1.43	0.01	99.49	208	87	13	0	Bytownite
8-2_7 plag rim_e	45.94	0.00	33.21	0.76	0.00	0.13	17.79	1.50	0.02	99.34	209	87	13	0	Bytownite
8-2_9 plag core_a	45.59	0.01	33.26	0.76	0.01	0.13	17.91	1.44	0.02	99.13	215	87	13	0	Bytownite
8-2_9 plag core_b	44.98	0.01	33.89	0.67	0.01	0.09	18.37	1.12	0.01	99.15	216	90	10	0	Anorthite
8-2_9 plag core_c	45.52	0.00	33.06	0.70	0.01	0.11	17.90	1.37	0.02	98.70	217	88	12	0	Bytownite
8-2_9 plag rim_d	50.72	0.03	29.81	1.08	0.00	0.19	14.19	3.51	0.04	99.57	218	69	31	0	Labradorite
45-1_1 plag core_a	46.83	0.00	32.63	1.02	0.01	0.13	17.25	1.74	0.01	99.63	282	84	15	0	Bytownite
45-1_1 plag core_b	46.41	0.00	32.91	0.92	0.01	0.15	17.41	1.57	0.00	99.37	283	86	14	0	Bytownite
45-1_1 plag core_c	45.49	0.04	33.52	0.92	0.00	0.13	18.01	1.24	0.01	99.36	284	89	11	0	Bytownite
45-1_1 plag rim_d	45.14	0.06	33.67	1.04	0.02	0.12	18.22	1.24	0.02	99.52	285	89	11	0	Bytownite
45-1_2 plag core_a	46.43	0.03	32.86	1.01	0.03	0.14	17.57	1.63	0.02	99.72	306	86	14	0	Bytownite
45-1_2 plag core_b	44.63	0.06	34.24	0.84	0.00	0.08	18.89	0.86	0.01	99.61	307	92	8	0	Anorthite
45-1_2 plag core_c	45.84	0.00	33.02	0.94	0.00	0.12	17.83	1.45	0.02	99.22	308	87	13	0	Bytownite
45-1_2 plag rim_d	44.74	0.04	34.05	1.03	0.00	0.08	18.68	0.97	0.02	99.60	309	91	9	0	Anorthite
45-1_4 plag core_a	46.72	0.00	32.34	0.97	0.00	0.17	17.12	1.79	0.03	99.15	318	84	16	0	Bytownite
45-1_4 plag core_b	44.96	0.04	33.28	0.89	0.03	0.12	17.61	1.25	0.02	98.20	319	89	11	0	Bytownite
45-1_4 plag core_c	45.88	0.00	32.99	0.96	0.02	0.14	17.94	1.47	0.00	99.40	320	87	13	0	Bytownite
45-1_4 plag core_d	45.82	0.05	33.00	1.06	0.00	0.16	17.61	1.47	0.01	99.18	321	87	13	0	Bytownite
45-1_4 plag rim_e	48.57	0.03	31.18	1.23	0.01	0.19	15.84	2.49	0.04	99.58	322	78	22	0	Bytownite
45-1_5 plag core_a	45.46	0.00	33.19	0.91	0.00	0.14	18.01	1.31	0.02	99.04	334	88	12	0	Bytownite
45-1_5 plag core_b	45.19	0.01	33.40	0.93	0.00	0.14	18.22	1.17	0.02	99.06	335	90	10	0	Bytownite
45-1_5 plag core_c	46.36	0.00	32.80	0.97	0.01	0.15	17.40	1.52	0.02	99.24	336	86	14	0	Bytownite
45-1_5 plag core_d	45.76	0.00	33.16	0.98	0.00	0.14	18.02	1.36	0.01	99.43	337	88	12	0	Bytownite
45-1_5 plag rim_e	46.64	0.00	32.44	1.02	0.00	0.15	16.76	1.64	0.01	98.67	338	85	15	0	Bytownite
45-1_6 plag core_a	43.59	0.00	34.88	0.60	0.03	0.05	19.39	0.56	0.01	99.11	340	95	5	0	Anorthite
45-1_6 plag core_b	46.22	0.02	32.79	1.01	0.00	0.11	17.62	1.59	0.01	99.38	341	86	14	0	Bytownite
45-1_6 plag core_c	45.92	0.00	33.03	0.92	0.03	0.12	17.80	1.47	0.01	99.29	342	87	13	0	Bytownite
45-1_6 plag core_d	45.39	0.07	33.42	1.07	0.02	0.12	18.22	1.15	0.02	99.47	343	90	10	0	Bytownite
45-1_6 plag rim_e	48.29	0.03	31.33	1.16	0.02	0.21	15.80	2.49	0.03	99.36	344	78	22	0	Bytownite
47-1_1 plag core_a	45.52	0.03	33.40	0.93	0.00	0.12	18.09	1.23	0.02	99.34	350	89	11	0	Bytownite
47-1_1 plag core_b	45.15	0.01	33.58	0.94	0.00	0.12	18.30	1.11	0.03	99.23	351	90	10	0	Anorthite
47-1_1 plag core_c	46.65	0.01	32.70	1.06	0.01	0.18	17.30	1.79	0.05	99.76	352	84	16	0	Bytownite
47-1_1 plag core_d	45.10	0.01	33.77	0.99	0.01	0.11	18.59	1.07	0.03	99.67	353	90	9	0	Anorthite
47-1_1 plag rim_e	47.86	0.02	31.77	1.12	0.01	0.20	16.39	2.29	0.05	99.70	354	80	20	0	Bytownite
47-1_2 plag mp core_a	45.73	0.00	33.16	1.16	0.00	0.14	17.95	1.33	0.03	99.50	369	88	12	0	Bytownite
47-1_2 plag mp core_b	48.17	0.02	31.25	1.18	0.02	0.19	16.11	2.31	0.08	99.33	370	79	21	0	Bytownite
47-1_2 plag mp rim_c	48.91	0.00	30.71	1.19	0.02	0.21	15.31	2.52	0.09	98.96	371	77	23	1	Bytownite
47-1_2 plag2 mp	50.25	0.02	29.92	1.43	0.00	0.23	14.55	3.12	0.10	99.61	373	72	28	1	Bytownite
47-1_3 plag core_a	45.54	0.01	33.56	0.84	0.00	0.13	18.03	1.21	0.03	99.35	374	89	11	0	Bytownite
47-1_3 plag core_b	45.32	0.02	33.67	0.84	0.02	0.11	18.15	1.13	0.02	99.28	375	90	10	0	Bytownite
47-1_3 plag core_c	45.54	0.00	33.39	0.90	0.01	0.12	17.94	1.30	0.03	99.23	376	88	12	0	Bytownite
47-1_3 plag core_d	45.95	0.00	33.20	0.93	0.00	0.12	17.79	1.33	0.03	99.35	377	88	12	0	Bytownite
47-1_3 plag rim_e	45.24	0.01	33.11	0.95	0.02	0.11	18.02	1.17	0.03	98.66	378	89	10	0	Bytownite
47-1_3a plag core_a	45.37	0.02	33.54	0.85	0.03	0.13	18.12	1.22	0.03	99.31	384	89	11	0	Bytownite
47-1_3a plag core_b	48.01	0.00	31.48	1.03	0.00	0.18	16.48	2.22	0.06	99.46	385	80	20	0	Bytownite
47-1_3a plag core_c	48.65	0.02	31.02	1.06	0.02	0.21	15.75	2.51	0.08	99.32	386	77	22	0	Bytownite
47-1_3a plag core_d	48.75	0.00	31.10	1.16	0.02	0.21	15.90	2.42	0.08	99.63	387	78	21	0	Bytownite
47-1_3a plag rim_e	50.10	0.00	30.09	1.32	0.00	0.23	14.87	3.04	0.11	99.76	388	73	27	1	Bytownite
47-1_3a plag2 core_a	46.51	0.02	32.56	1.04	0.02	0.16	17.25	1.72	0.04	99.32	389	85	15	0	Bytownite
47-1_3a plag2 core_b	45.62	0.07	33.21	0.92	0.01	0.13	17.88	1.37	0.05	99.26	390	88	12	0	Bytownite
47-1_3a plag2 core_c	46.19	0.00	32.58	1.00	0.01	0.12	17.58	1.59	0.04	99.11	391	86	14	0	Bytownite
47-1_3a plag2 core_d	48.47	0.02	31.33	1.15	0.03	0.18	15.94	2.42	0.07	99.60	392	78	21	0	Bytownite
47-1_3a plag2 rim_e	50.09	0.01	30.29	1.21	0.01	0.21	14.80	2.83	0.09	99.54	393	74	26	1	Bytownite
47-1_4 plag core_a	45.75	0.00	33.19	1.06	0.02	0.13	17.67	1.37	0.05	99.23	398	87	12	0	Bytownite
47-1_4 plag core_b	45.78	0.00	33.39	0.89	0.02	0.15	17.57	1.35	0.04	99.18	399	88	12	0	Bytownite
47-1_4 plag core_c	46.51	0.04	32.49	1.09	0.00	0.14	17.24	1.65	0.05	99.21	400	85	15	0	Bytownite
47-1_4 plag core_d	45.41	0.02	33.33	1.06	0.00	0.13	18.09	1.23	0.04	99.31	401	89	11	0	Bytownite
47-1_4 plag rim_e	48.04	0.00	31.38	1.15	0.01	0.16	16.36	2.13	0.07	99.30	402	81	19	0	Bytownite
47-1_6 plag core_a	44.99	0.03	33.70	0.90	0.00	0.11	18.07	1.11	0.03	98.93	409	90	10	0	Bytownite
47-1_6 plag core_b	45.63	0.00	33.08	0.90	0.02	0.16	17.89	1.36	0.04	99.09	410	88	12	0	Bytownite
47-1_6 plag core_c	46.44	0.00	32.65	1.03	0.01	0.15	17.18	1.59	0.05	99.10	411	85	14	0	Bytownite
47-1_6 plag rim_d	47.25	0.00	32.26	1.10	0.01	0.18	16.97	1.88	0.05	99.69	412	83	17	0	Bytownite
47-1_plag core_a	45.53	0.00	33.56	0.95	0.02	0.13	18.28	1.16	0.02	99.65	416	90	10	0	Bytownite
47-1_plag core_b	45.26	0.02	33.38	1.03	0.03	0.14	18.00	1.32	0.04	99.21	417	88	12	0	Bytownite
47-1_plag rim_c	50.03	0.00	30.05	1.26	0.02	0.22	14.85	3.09	0.09	99.61	418	72	27	1	Bytownite
46-1_4 plag core_a	45.43	0.00	33.66	0.18	0.01	0.17	18.00	1.24	0.02	98.72	482	89	11	0	Bytownite
46-1_4 plag core_b	45.73	0.00	33.28	0.25	0.01	0.15	17.85	1.39	0.04	98.70	483	87	12	0	Bytownite
46-1_4 plag core_c	46.09	0.00	32.77	0.16	0.00	0.14	17.70	1.44	0.03	98.33	484	87	13	0	Bytownite
46-1_4 plag core_d	45.23	0.01	33.78	0.14	0.03	0.12	18.00	1.10	0.02	98.43	485	90	10	0	Bytownite
46-1_4 plag rim_e	48.27	0.04	31.28	0.35	0.01	0.19	16.03	2.31	0.08	98.55	486	79	21	0	Bytownite
46-1_4 plag2 core_a	44.84	0.00	34.21	0.18	0.01	0.09	18.65	0.92	0.01	98.91	487	92	8	0	Anorthite
46-1_4 plag2 core_b	45.78	0.00	33.17	0.16	0.03	0.15	17.70	1.32	0.02	98.33	488	88	12	0	Bytownite
46-1_4 plag2 core_c	45.28	0.00	34.03	0.21	0.01	0.12	18.59	0.96	0.02	99.21	489	91	9	0	Anorthite
46-1_4 plag2 core_d	46.48	0.00	32.77	0.15	0.01	0.16	17.25	1.56	0.04	98.43	490	86	14	0	Bytownite
46-1_4 plag2 core_e	45.43	0.00	33.53	0.17	0.00	0.16	18.04	1.17	0.02	98.51	491	89	10	0	Bytownite
46-1_4 plag2 rim_f	48.50	0.03	31.13	0.24	0.00	0.17	15.61	2.50	0.06	98.24	492	77	22	0	Bytownite
46-1_4 plag3 core_a	44.93	0.00	33.68	0.17	0.00	0.13	18.37	1.05	0.02	98.35	502	91	9	0	Anorthite
46-1_4 plag3 core_b	45.96	0.03	33.37	0.13	0.00	0.15	17.90	1.37	0.02	98.93	503	88	12	0	Bytownite
46-1_4 plag3 core_c	47.18	0.00	32.44	0.18	0.01	0.17	17.00	1.79	0.03	98.80	504	84	16	0	Bytownite
46-1_4 plag3 core_d	45.58	0.05	33.49	0.16	0.01	0.12	18.04	1.20	0.02	98.68	505	89	11	0	Bytownite
46-1_4 plag3 rim_e	48.49	0.02	31.57	0.21	0.02	0.17	15.94	2.31	0.09	98.82	506	79	21	1	Bytownite
46-1_7 plag core_a	45.83	0.00	33.21	0.19	0.01	0.15	17.81	1.36	0.02	98.59	513	88	12	0	Bytownite
46-1_7 plag core_b	45.47	0.01	33.33	0.18	0.00	0.15	18.10	1.32	0.03	98.58	514	88	12	0	Bytownite
46-1_7 plag core_c	45.96	0.03	33.58	0.19	0.02	0.14	18.11	1.35	0.03	99.40	515	88	12	0	Bytownite
46-1_7 plag core_d	45.71	0.00	33.02	0.20	0.02	0.15	17.67	1.35	0.05	98.17	516	88	12	0	Bytownite
46-1_7 plag core_e	45.94	0.00	33.20	0.24	0.01	0.15	17.68	1.43	0.02	98.67	517	87	13	0	Bytownite
7-1_11 plag core_a	46.70	0.02	33.22	0.10	0.00	0.16	17.45	1.73	0.02	99.40	518	85	15	0	Bytownite
7-1_11 plag core_b	47.61	0.00	32.33	0.10	0.00	0.19	16.91	2.08	0.04	99.26	519	82	18	0	Bytownite
7-1_11 plag core_c	46.96	0.00	32.65	0.18	0.02	0.16	17.14	1.88	0.04	99.02	520	83	17	0	Bytownite
7-1_11 plag core_d	46.34	0.02	33.34	0.17	0.00	0.15	17.67	1.72	0.02	99.44	521	85	15	0	Bytownite
7-1_11 plag core_e	47.35	0.00	32.18	0.18	0.01	0.17	16.72	2.31	0.04	98.96	522	80	20	0	Bytownite
7-1_11 plag rim_f	46.96	0.00	32.98	0.19	0.00	0.15	17.42	1.77	0.03	99.51	523	84	16	0	Bytownite
7-1_5 plag core_a	47.10	0.00	32.87	0.12	0.01	0.16	17.35	1.88	0.02	99.50	524	84	16	0	Bytownite
7-1_5 plag core_b	49.05	0.04	31.79	0.07	0.00	0.20	15.98	2.59	0.03	99.75	525	77	23	0	Bytownite
7-1_5 plag core_c	49.65	0.00	31.26	0.18	0.03	0.23	15.31	2.94	0.06	99.65	526	74	26	0	Bytownite
7-1_5 plag core_d	46.16	0.00	33.09	0.13	0.00	0.13	17.74	1.66	0.04	98.95	527	85	14	0	Bytownite
7-1_5 plag core_e	47.35	0.05	32.96	0.13	0.01	0.16	17.26	1.93	0.02	99.87	528	83	17	0	Bytownite
7-1_5 plag rim_f	49.60	0.02	31.30	0.18	0.00	0.19	15.54	2.97	0.05	99.85	529	74	26	0	Bytownite
7-1_2 plag core_a	46.26	0.03	32.87	0.19	0.02	0.16	17.54	1.55	0.03	98.64	530	86	14	0	Bytownite
7-1_2 plag core_b	47.55	0.00	31.79	0.11	0.03	0.17	16.18	2.29	0.05	98.18	531	79	20	0	Bytownite
7-1_2 plag core_c	46.57	0.00	32.81	0.12	0.00	0.16	17.15	1.70	0.02	98.53	532	85	15	0	Bytownite
7-1_2 plag core_d	46.86	0.00	32.35	0.10	0.00	0.16	16.74	1.83	0.03	98.07	533	83	16	0	Bytownite
7-1_2 plag rim_e	46.92	0.00	32.28	0.18	0.03	0.15	16.81	1.89	0.03	98.29	534	83	17	0	Bytownite

Anorthite
Bytownite

Sample	SiO2	TiO2	Al2O3	FeO*	MnO	MgO	CaO	Na2O	K2O	Total	Analysis No.	An	Ab	Or	Classification
2-1_7 gm plag	50.97	0.04	30.76	0.73	0.02	0.04	14.18	3.41	0.14	100.28	370	69	30	1	Labradorite
5-1_1 gm plag1	54.53	0.13	27.70	1.31	0.01	0.18	11.38	4.45	0.17	99.87	221	58	41	1	Labradorite
5-1_1 gm plag2	51.55	0.00	30.32	0.93	0.01	0.13	13.31	3.50	0.08	99.83	224	67	32	0	Labradorite
5-1_1 gm plag3	52.75	0.11	28.93	1.04	0.01	0.16	12.72	4.07	0.12	99.91	227	63	36	1	Labradorite
48-2_3 gm plag	50.43	0.24	26.01	5.53	0.08	2.47	13.42	2.03	0.12	100.33	311	78	21	1	Bytownite
46-1_4 gm plag	47.87	0.07	30.64	2.87	0.04	0.69	15.83	1.77	0.08	99.86	152	83	17	0	Bytownite
43-1_2 gm plag	49.00	0.00	32.02	0.82	0.00	0.24	16.08	2.37	0.06	100.58	190	79	21	0	Bytownite
43-1_4 gm plag	48.70	0.00	32.58	0.83	0.00	0.27	16.51	2.16	0.07	101.13	201	81	19	0	Bytownite
43-1_5 gm plag	50.70	0.01	30.86	0.86	0.03	0.23	14.84	2.81	0.09	100.44	206	74	25	1	Bytownite
41-1_1_gm plag_core_a	50.39	0.00	30.40	1.17	0.01	0.16	14.41	3.11	0.08	99.72	44	72	28	0	Bytownite
41-1_1_gm plag_core_b	50.21	0.02	30.53	1.09	0.02	0.16	14.88	3.10	0.06	100.08	45	72	27	0	Bytownite
41-1_1_gm plag_core_c	50.67	0.00	30.19	1.11	0.01	0.17	14.59	3.12	0.07	99.94	46	72	28	0	Bytownite
41-1_2gm plag_core	47.91	0.06	31.65	1.07	0.01	0.15	16.00	2.34	0.07	99.26	66	79	21	0	Bytownite
41-1_2gm plag_rim	48.57	0.00	31.54	1.06	0.01	0.13	15.95	2.28	0.07	99.61	67	79	20	0	Bytownite
41-1_4 gm plag_core	49.87	0.00	30.19	1.20	0.00	0.22	14.79	2.94	0.07	99.29	84	73	26	0	Bytownite
41-1_4 gm plag_core b	50.19	0.02	30.17	1.17	0.01	0.16	14.58	3.15	0.08	99.53	85	72	28	0	Bytownite
41-1_4 gm plag_rim	52.33	0.00	28.55	1.42	0.06	0.16	13.47	3.46	0.17	99.62	86	68	31	1	Labradorite
41-1_6 gm plag_core	48.78	0.02	30.52	1.10	0.00	0.15	15.37	2.74	0.07	98.75	113	75	24	0	Bytownite
41-1_6 gm plag_rim	48.28	0.00	31.32	1.06	0.00	0.16	15.80	2.38	0.07	99.07	114	78	21	0	Bytownite
41-1_8 gm plag	48.08	0.02	31.10	0.93	0.00	0.13	15.71	2.46	0.06	98.49	130	78	22	0	Bytownite
41-1_8 gm plag2	50.35	0.01	29.46	0.98	0.00	0.14	14.24	3.13	0.08	98.39	131	71	28	1	Bytownite
41-1_8 gm plag3	47.98	0.00	30.83	1.32	0.05	0.23	15.99	1.95	0.13	98.48	132	81	18	1	Bytownite
8-2_1 gm plag	50.23	0.00	29.63	1.10	0.01	0.19	14.05	3.62	0.05	98.88	177	68	32	0	Labradorite
8-2_2 gm plag	45.74	0.00	32.73	0.70	0.00	0.12	17.12	1.41	0.02	97.84	179	87	13	0	Bytownite
8-2_3 gm plag	48.77	0.03	30.23	0.91	0.02	0.17	14.90	2.91	0.04	97.98	186	74	26	0	Bytownite
8-2_5 gm plag	49.87	0.00	29.42	1.11	0.00	0.21	14.14	3.21	0.03	97.99	197	71	29	0	Bytownite
8-2_8 gm plag	51.80	0.05	28.97	1.14	0.01	0.16	13.26	4.08	0.06	99.53	210	64	36	0	Labradorite
8-2_9 gm plag	47.72	0.00	31.91	0.81	0.00	0.16	16.36	2.37	0.01	99.35	214	79	21	0	Bytownite
48-1_6 gm plag	48.85	0.00	30.87	0.23	0.00	0.30	15.69	2.51	0.06	98.51	230	77	22	0	Bytownite
48-1_2 gm plag	50.61	0.00	29.70	1.06	0.00	0.32	15.02	2.79	0.13	99.63	262	74	25	1	Bytownite
48-1_2 gm plag2	48.21	0.01	31.31	0.86	0.00	0.27	16.20	2.30	0.06	99.21	263	79	20	0	Bytownite
48-1_2 gm plag3	48.55	0.00	31.64	0.86	0.00	0.26	16.33	2.32	0.05	100.01	264	79	20	0	Bytownite
45-1_3 gm plag	48.94	0.00	30.80	1.34	0.02	0.20	15.52	2.73	0.04	99.59	316	76	24	0	Bytownite
45-1_3 gm plag2	48.81	0.01	30.90	1.31	0.00	0.17	15.66	2.72	0.04	99.62	317	76	24	0	Bytownite
47-1_1 gm plag	48.23	0.02	31.50	1.32	0.00	0.21	16.29	2.31	0.08	99.96	359	79	20	0	Bytownite
47-1_3 gm plag	50.89	0.00	29.55	1.53	0.01	0.23	14.06	3.46	0.10	99.83	380	69	31	1	Labradorite
47-1_3a gm plag	50.09	0.00	29.84	1.40	0.00	0.22	14.79	3.14	0.11	99.59	383	72	28	1	Bytownite
47-1_4 gm plag	48.41	0.00	31.15	1.27	0.01	0.20	15.93	2.49	0.08	99.54	397	78	22	0	Bytownite
47-1_5a gm plag	50.39	0.04	30.02	1.51	0.00	0.24	14.68	2.96	0.12	99.96	406	73	27	1	Bytownite
47-1_6 gm plag	45.28	0.00	33.53	1.05	0.01	0.12	18.12	1.16	0.03	99.31	413	89	10	0	Bytownite
47-1_6 gm plag2	46.14	0.03	32.88	1.03	0.03	0.15	17.72	1.47	0.03	99.48	414	87	13	0	Bytownite

Analysis No. 61

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.16	60.10	0.0026	0.003	0.005	0.006	0.012	0.006	0.012	Si
TiO2	10.39	79.87	0.1301	0.130	0.260	0.294	0.587	0.294	0.587	Ti
Al2O3	1.91	101.96	0.0187	0.037	0.056	0.085	0.127	0.085	0.127	Al
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.316	1.975	Fe^{3+}
FeO	80.99	71.85	1.1272	1.127	1.127	2.544	2.544	1.228	1.228	Fe^{2+}
MnO	0.54	70.94	0.0077	0.008	0.008	0.017	0.017	0.017	0.017	Mn
MgO	0.97	40.30	0.0241	0.024	0.024	0.054	0.054	0.054	0.054	Mg
Total	94.96			1.329	1.481	3.000	3.342	3.000	4.000	
desired								3.000	4.000	
calc charge				2.961	-2.961	6.684	-6.684	8.000	-8.000	

	Normalized Analysis
SiO2	0.16
TiO2	10.39
Al2O3	1.91
Cr2O3	0.00
Fe2O3	46.91
FeO	39.08
MnO	0.54
MgO	0.97
Total	99.97
Check!	42.21
FeO*	81.30

Analysis No. 62

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.13	60.10	0.0022	0.002	0.004	0.005	0.010	0.005	0.010	Si
TiO2	10.44	79.87	0.1307	0.131	0.261	0.295	0.590	0.295	0.590	Ti
Al2O3	1.96	101.96	0.0192	0.038	0.058	0.087	0.130	0.087	0.130	Al
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.481	2.221	Fe^{3+}
FeO	78.32	71.85	1.0900	1.090	1.090	2.460	2.460	0.979	0.979	Fe^{2+}
MnO	0.45	70.94	0.0064	0.006	0.006	0.014	0.014	0.014	0.014	Mn
MgO	0.98	40.30	0.0243	0.024	0.024	0.055	0.055	0.055	0.055	Mg
Total	92.28			1.292	1.444	2.916	3.260	2.916	4.000	
desired								3.000	4.000	
calc charge				2.888	-2.888	6.519	-6.519	8.000	-8.000	

	Normalized Analysis
SiO2	0.13
TiO2	10.44
Al2O3	1.96
Cr2O3	0.00
Fe2O3	52.78
FeO	31.17
MnO	0.45
MgO	0.98
Total	97.91

Analysis No. 63

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.21	60.10	0.0035	0.004	0.007	0.008	0.016	0.008	0.016	Si
TiO2	8.89	79.87	0.1113	0.111	0.223	0.251	0.502	0.251	0.502	Ti
Al2O3	2.32	101.96	0.0228	0.046	0.068	0.103	0.154	0.103	0.154	Al
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.393	2.090	Fe^{3+}
FeO	81.47	71.85	1.1339	1.134	1.134	2.559	2.559	1.166	1.166	Fe^{2+}
MnO	0.50	70.94	0.0071	0.007	0.007	0.016	0.016	0.016	0.016	Mn
MgO	0.99	40.30	0.0247	0.025	0.025	0.056	0.056	0.056	0.056	Mg
Total	94.39			1.326	1.464	2.993	3.303	2.993	4.000	
desired								3.000	4.000	
calc charge				2.927	-2.927	6.607	-6.607	8.000	-8.000	

	Normalized Analysis
SiO2	0.21
TiO2	8.89
Al2O3	2.32
Cr2O3	0.00
Fe2O3	49.65
FeO	37.12
MnO	0.50
MgO	0.99
Total	99.69

Analysis No. 64

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.18	60.10	0.0030	0.003	0.006	0.007	0.014	0.007	0.014	Si
TiO2	8.43	79.87	0.1055	0.106	0.211	0.238	0.476	0.238	0.476	Ti
Al2O3	2.18	101.96	0.0214	0.043	0.064	0.097	0.145	0.097	0.145	Al
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.513	2.269	Fe^{3+}
FeO	80.83	71.85	1.1250	1.125	1.125	2.539	2.539	1.026	1.026	Fe^{2+}
MnO	0.45	70.94	0.0063	0.006	0.006	0.014	0.014	0.014	0.014	Mn
MgO	0.99	40.30	0.0246	0.025	0.025	0.056	0.056	0.056	0.056	Mg
Total	93.06			1.307	1.437	2.950	3.244	2.950	4.000	
desired								3.000	4.000	
calc charge				2.874	-2.874	6.487	-6.487	8.000	-8.000	

	Normalized Analysis
SiO2	0.18
TiO2	8.43
Al2O3	2.18
Cr2O3	0.00
Fe2O3	53.91
FeO	32.67
MnO	0.45
MgO	0.99
Total	98.81

Analysis No. 119

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.16	60.10	0.0027	0.003	0.005	0.006	0.012	0.006	0.012	Si
TiO2	10.30	79.87	0.1290	0.129	0.258	0.291	0.582	0.291	0.582	Ti
Al2O3	2.43	101.96	0.0238	0.048	0.071	0.108	0.161	0.108	0.161	Al
Cr2O3	0.01	159.69	0.0001	0.000	0.000	0.000	0.001	0.000	0.001	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.254	1.881	Fe^{3+}
FeO	80.98	71.85	1.1271	1.127	1.127	2.544	2.544	1.290	1.290	Fe^{2+}
MnO	0.56	70.94	0.0079	0.008	0.008	0.018	0.018	0.018	0.018	Mn
MgO	0.98	40.30	0.0243	0.024	0.024	0.055	0.055	0.055	0.055	Mg
Total	95.43			1.339	1.494	3.022	3.373	3.022	4.000	
desired								3.000	4.000	
calc charge				2.989	-2.989	6.746	-6.746	8.000	-8.000	

	Normalized Analysis
SiO2	0.16
TiO2	10.30
Al2O3	2.43
Cr2O3	0.01
Fe2O3	44.70
FeO	41.05
MnO	0.56
MgO	0.98
Total	100.20

Analysis No. 120

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.13	60.10	0.0022	0.002	0.004	0.005	0.010	0.005	0.010	Si
TiO2	10.29	79.87	0.1288	0.129	0.258	0.291	0.582	0.291	0.582	Ti
Al2O3	2.33	101.96	0.0229	0.046	0.069	0.103	0.155	0.103	0.155	Al
Cr2O3	0.01	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.221	1.831	Fe^{3+}
FeO	81.83	71.85	1.1389	1.139	1.139	2.571	2.571	1.350	1.350	Fe^{2+}
MnO	0.55	70.94	0.0078	0.008	0.008	0.018	0.018	0.018	0.018	Mn
MgO	0.98	40.30	0.0244	0.024	0.024	0.055	0.055	0.055	0.055	Mg
Total	96.12			1.348	1.502	3.042	3.390	3.042	4.000	
desired								3.000	4.000	
calc charge				3.004	-3.004	6.779	-6.779	8.000	-8.000	

	Normalized Analysis
SiO2	0.13
TiO2	10.29
Al2O3	2.33
Cr2O3	0.01
Fe2O3	43.50
FeO	42.97
MnO	0.55
MgO	0.98
Total	100.77

Analysis No. 319

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen		Normalized Analysis
SiO2	0.32	60.10	0.0054	0.005	0.011	0.012	0.024	0.012	0.024	Si	SiO2 0.32
TiO2	11.26	79.87	0.1409	0.141	0.282	0.318	0.636	0.318	0.636	Ti	TiO2 11.26
Al2O3	2.09	101.96	0.0205	0.041	0.062	0.093	0.139	0.093	0.139	Al	Al2O3 2.09
Cr2O3	0.05	159.69	0.0003	0.001	0.001	0.001	0.002	0.001	0.002	Cr	Cr2O3 0.05
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.292	1.938	Fe^{3+}	Fe2O3 46.03
FeO	79.40	71.85	1.1051	1.105	1.105	2.494	2.494	1.203	1.203	Fe^{2+}	FeO 38.28
MnO	0.79	70.94	0.0111	0.011	0.011	0.025	0.025	0.025	0.025	Mn	MnO 0.79
MgO	0.60	40.30	0.0148	0.015	0.015	0.033	0.033	0.033	0.033	Mg	MgO 0.60
											Total 99.42
Total	94.51			1.319	1.486	2.977	3.354	2.977	4.000		
desired								3.000	4.000		
calc charge				2.972	-2.972	6.708	-6.708	8.000	-8.000		

Analysis No. 320

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen		Normalized Analysis
SiO2	0.29	60.10	0.0049	0.005	0.010	0.011	0.022	0.011	0.022	Si	SiO2 0.29
TiO2	11.39	79.87	0.1426	0.143	0.285	0.322	0.644	0.322	0.644	Ti	TiO2 11.39
Al2O3	2.20	101.96	0.0215	0.043	0.065	0.097	0.146	0.097	0.146	Al	Al2O3 2.20
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr	Cr2O3 0.00
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.295	1.943	Fe^{3+}	Fe2O3 46.17
FeO	78.93	71.85	1.0985	1.099	1.099	2.479	2.479	1.184	1.184	Fe^{2+}	FeO 37.69
MnO	0.81	70.94	0.0115	0.011	0.011	0.026	0.026	0.026	0.026	Mn	MnO 0.81
MgO	0.63	40.30	0.0157	0.016	0.016	0.035	0.035	0.035	0.035	Mg	MgO 0.63
											Total 99.18
Total	94.25			1.316	1.485	2.971	3.352	2.971	4.000		
desired								3.000	4.000		
calc charge				2.971	-2.971	6.705	-6.705	8.000	-8.000		

Analysis No. 346

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen		Normalized Analysis
SiO2	1.19	60.10	0.0197	0.020	0.039	0.045	0.089	0.045	0.089	Si	SiO2 1.19
TiO2	12.10	79.87	0.1515	0.151	0.303	0.342	0.684	0.342	0.684	Ti	TiO2 12.10
Al2O3	2.65	101.96	0.0260	0.052	0.078	0.117	0.176	0.117	0.176	Al	Al2O3 2.65
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr	Cr2O3 0.00
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.345	2.018	Fe^{3+}	Fe2O3 47.93
FeO	75.23	71.85	1.0470	1.047	1.047	2.363	2.363	1.018	1.018	Fe^{2+}	FeO 32.41
MnO	0.45	70.94	0.0063	0.006	0.006	0.014	0.014	0.014	0.014	Mn	MnO 0.45
MgO	0.03	40.30	0.0007	0.001	0.001	0.002	0.002	0.002	0.002	Mg	MgO 0.03
											Total 96.75
Total	91.63			1.277	1.474	2.882	3.327	2.882	4.000		
desired								3.000	4.000		
calc charge				2.949	-2.949	6.655	-6.655	8.000	-8.000		

Analysis No. 347

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen		Normalized Analysis
SiO2	1.81	60.10	0.0300	0.030	0.060	0.068	0.136	0.068	0.136	Si	SiO2 1.81
TiO2	11.05	79.87	0.1384	0.138	0.277	0.312	0.625	0.312	0.625	Ti	TiO2 11.05
Al2O3	2.50	101.96	0.0246	0.049	0.074	0.111	0.166	0.111	0.166	Al	Al2O3 2.50
Cr2O3	0.02	159.69	0.0001	0.000	0.000	0.001	0.001	0.001	0.001	Cr	Cr2O3 0.02
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.467	2.201	Fe^{3+}	Fe2O3 52.29
FeO	73.91	71.85	1.0287	1.029	1.029	2.322	2.322	0.855	0.855	Fe^{2+}	FeO 27.20
MnO	0.54	70.94	0.0076	0.008	0.008	0.017	0.017	0.017	0.017	Mn	MnO 0.54
MgO	0.01	40.30	0.0001	0.000	0.000	0.000	0.000	0.000	0.000	Mg	MgO 0.01
											Total 95.41
Total	89.83			1.254	1.447	2.831	3.266	2.831	4.000		
desired								3.000	4.000		
calc charge				2.894	-2.894	6.533	-6.533	8.000	-8.000		

Analysis No. 371

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen		Normalized Analysis
SiO2	0.21	60.10	0.0035	0.003	0.007	0.008	0.016	0.008	0.016	Si	SiO2 0.21
TiO2	9.99	79.87	0.1251	0.125	0.250	0.282	0.565	0.282	0.565	Ti	TiO2 9.99
Al2O3	2.45	101.96	0.0241	0.048	0.072	0.109	0.163	0.109	0.163	Al	Al2O3 2.45
Cr2O3	0.01	159.69	0.0001	0.000	0.000	0.000	0.001	0.000	0.001	Cr	Cr2O3 0.01
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.177	1.765	Fe^{3+}	Fe2O3 41.93
FeO	82.38	71.85	1.1465	1.147	1.147	2.588	2.588	1.411	1.411	Fe^{2+}	FeO 44.92
MnO	0.55	70.94	0.0078	0.008	0.008	0.018	0.018	0.018	0.018	Mn	MnO 0.55
MgO	1.11	40.30	0.0276	0.028	0.028	0.062	0.062	0.062	0.062	Mg	MgO 1.11
											Total 101.19
Total	96.72			1.359	1.512	3.067	3.412	3.067	4.000		
desired								3.000	4.000		
calc charge				3.023	-3.023	6.823	-6.823	8.000	-8.000		

Analysis No. 97

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen		Normalized Analysis
SiO2	0.45	60.10	0.0075	0.008	0.015	0.017	0.034	0.017	0.034	Si	SiO2 0.45
TiO2	13.89	79.87	0.1739	0.174	0.348	0.393	0.785	0.393	0.785	Ti	TiO2 13.89
Al2O3	1.15	101.96	0.0113	0.023	0.034	0.051	0.077	0.051	0.077	Al	Al2O3 1.15
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr	Cr2O3 0.00
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.419	2.129	Fe^{3+}	Fe2O3 50.57
FeO	74.81	71.85	1.0412	1.041	1.041	2.350	2.350	0.931	0.931	Fe^{2+}	FeO 29.64
MnO	1.39	70.94	0.0196	0.020	0.020	0.044	0.044	0.044	0.044	Mn	MnO 1.39
MgO	0.01	40.30	0.0002	0.000	0.000	0.001	0.001	0.001	0.001	Mg	MgO 0.01
											Total 97.10
Total	91.71			1.265	1.458	2.855	3.290	2.855	4.000		
desired								3.000	4.000		
calc charge				2.916	-2.916	6.581	-6.581	8.000	-8.000		

Analysis No. 122

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	1.08	60.10	0.0180	0.018	0.036	0.041	0.081	0.041	0.081	Si
TiO2	11.38	79.87	0.1425	0.142	0.285	0.322	0.643	0.322	0.643	Ti
Al2O3	0.57	101.96	0.0056	0.011	0.017	0.025	0.038	0.025	0.038	Al
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	2.037	3.056	Fe^{3+}
FeO	69.54	71.85	0.9678	0.968	0.968	2.184	2.184	0.147	0.147	Fe^{2+}
MnO	0.99	70.94	0.0139	0.014	0.014	0.031	0.031	0.031	0.031	Mn
MgO	0.06	40.30	0.0014	0.001	0.001	0.003	0.003	0.003	0.003	Mg
Total	83.62			1.155	1.321	2.607	2.981	2.607	4.000	
desired								3.000	4.000	
calc charge				2.642	-2.642	5.963	-5.963	8.000	-8.000	

	Normalized Analysis
SiO2	1.08
TiO2	11.38
Al2O3	0.57
Cr2O3	0.00
Fe2O3	72.59
FeO	4.69
MnO	0.99
MgO	0.06
Total	91.37

Analysis No. 337

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	6.28	60.10	0.1045	0.104	0.209	0.236	0.472	0.236	0.472	Si
TiO2	12.56	79.87	0.1572	0.157	0.314	0.355	0.710	0.355	0.710	Ti
Al2O3	1.46	101.96	0.0143	0.029	0.043	0.065	0.097	0.065	0.097	Al
Cr2O3	0.03	159.69	0.0002	0.000	0.001	0.001	0.001	0.001	0.001	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.955	1.433	Fe^{3+}
FeO	70.05	71.85	0.9749	0.975	0.975	2.200	2.200	1.245	1.245	Fe^{2+}
MnO	0.88	70.94	0.0124	0.012	0.012	0.028	0.028	0.028	0.028	Mn
MgO	0.25	40.30	0.0063	0.006	0.006	0.014	0.014	0.014	0.014	Mg
Total	91.51			1.284	1.561	2.899	3.522	2.899	4.000	
desired								3.000	4.000	
calc charge				3.121	-3.121	7.045	-7.045	8.000	-8.000	

	Normalized Analysis
SiO2	6.28
TiO2	12.56
Al2O3	1.46
Cr2O3	0.03
Fe2O3	34.04
FeO	39.64
MnO	0.88
MgO	0.25
Total	95.15

Analysis No. 376

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.20	60.10	0.0033	0.003	0.007	0.007	0.015	0.007	0.015	Si
TiO2	9.81	79.87	0.1228	0.123	0.246	0.277	0.554	0.277	0.554	Ti
Al2O3	2.08	101.96	0.0204	0.041	0.061	0.092	0.138	0.092	0.138	Al
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.185	1.777	Fe^{3+}
FeO	83.71	71.85	1.1651	1.165	1.165	2.630	2.630	1.445	1.445	Fe^{2+}
MnO	0.54	70.94	0.0076	0.008	0.008	0.017	0.017	0.017	0.017	Mn
MgO	0.95	40.30	0.0235	0.024	0.024	0.053	0.053	0.053	0.053	Mg
Total	97.29			1.363	1.510	3.077	3.408	3.077	4.000	
desired								3.000	4.000	
calc charge				3.019	-3.019	6.815	-6.815	8.000	-8.000	

	Normalized Analysis
SiO2	0.20
TiO2	9.81
Al2O3	2.08
Cr2O3	0.00
Fe2O3	42.23
FeO	45.99
MnO	0.54
MgO	0.95
Total	101.80

Analysis No. 105

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.06	60.10	0.0010	0.001	0.002	0.002	0.005	0.002	0.005	Si
TiO2	0.68	79.87	0.0086	0.009	0.017	0.019	0.039	0.019	0.039	Ti
Al2O3	11.70	101.96	0.1148	0.230	0.344	0.518	0.777	0.518	0.777	Al
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.994	1.491	Fe^{3+}
FeO	76.55	71.85	1.0654	1.065	1.065	2.405	2.405	1.411	1.411	Fe^{2+}
MnO	0.69	70.94	0.0097	0.010	0.010	0.022	0.022	0.022	0.022	Mn
MgO	4.58	40.30	0.1136	0.114	0.114	0.257	0.257	0.257	0.257	Mg
Total	94.26			1.428	1.552	3.223	3.503	3.223	4.000	
desired								3.000	4.000	
calc charge				3.104	-3.104	7.006	-7.006	8.000	-8.000	

	Normalized Analysis
SiO2	0.06
TiO2	0.68
Al2O3	11.70
Cr2O3	0.00
Fe2O3	35.42
FeO	44.91
MnO	0.69
MgO	4.58
Total	98.04

Analysis No. 323

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.24	60.10	0.0039	0.004	0.008	0.009	0.018	0.009	0.018	Si
TiO2	7.76	79.87	0.0971	0.097	0.194	0.219	0.438	0.219	0.438	Ti
Al2O3	3.18	101.96	0.0312	0.062	0.094	0.141	0.211	0.141	0.211	Al
Cr2O3	0.00	159.69	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.326	1.989	Fe^{3+}
FeO	81.19	71.85	1.1300	1.130	1.130	2.550	2.550	1.224	1.224	Fe^{2+}
MnO	0.49	70.94	0.0069	0.007	0.007	0.016	0.016	0.016	0.016	Mn
MgO	1.85	40.30	0.0458	0.046	0.046	0.103	0.103	0.103	0.103	Mg
Total	94.70			1.346	1.478	3.038	3.337	3.038	4.000	
desired								3.000	4.000	
calc charge				2.957	-2.957	6.674	-6.674	8.000	-8.000	

	Normalized Analysis
SiO2	0.24
TiO2	7.76
Al2O3	3.18
Cr2O3	0.00
Fe2O3	47.26
FeO	38.97
MnO	0.49
MgO	1.85
Total	99.75

Analysis No. 338

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	4.43	60.10	0.0737	0.074	0.147	0.166	0.333	0.166	0.333	Si
TiO2	9.65	79.87	0.1209	0.121	0.242	0.273	0.546	0.273	0.546	Ti
Al2O3	3.27	101.96	0.0321	0.064	0.096	0.145	0.217	0.145	0.217	Al
Cr2O3	0.01	159.69	0.0001	0.000	0.000	0.000	0.001	0.000	0.001	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.047	1.571	Fe^{3+}
FeO	74.43	71.85	1.0359	1.036	1.036	2.338	2.338	1.291	1.291	Fe^{2+}
MnO	0.48	70.94	0.0068	0.007	0.007	0.015	0.015	0.015	0.015	Mn
MgO	0.47	40.30	0.0118	0.012	0.012	0.027	0.027	0.027	0.027	Mg
Total	92.76			1.313	1.540	2.964	3.476	2.964	4.000	
desired								3.000	4.000	
calc charge				3.080	-3.080	6.953	-6.953	8.000	-8.000	

	Normalized Analysis
SiO2	4.43
TiO2	9.65
Al2O3	3.27
Cr2O3	0.01
Fe2O3	37.32
FeO	41.09
MnO	0.48
MgO	0.47
Total	96.74

Analysis No. 246

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.08	60.10	0.0013	0.001	0.003	0.003	0.006	0.003	0.006	Si
TiO2	6.27	79.87	0.0785	0.079	0.157	0.171	0.342	0.171	0.342	Ti
Al2O3	3.47	101.96	0.0340	0.068	0.102	0.148	0.222	0.148	0.222	Al
Cr2O3	0.05	159.69	0.0003	0.001	0.001	0.001	0.002	0.001	0.002	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.503	2.255	Fe^{3+}
FeO	83.69	71.85	1.1648	1.165	1.165	2.534	2.534	1.030	1.030	Fe^{2+}
MnO	0.34	70.94	0.0048	0.005	0.005	0.010	0.010	0.010	0.010	Mn
MgO	2.46	40.30	0.0610	0.061	0.061	0.133	0.133	0.133	0.133	Mg
Total	96.36			1.379	1.493	3.000	3.248	3.000	4.000	
desired								3.000	4.000	
calc charge				2.986	-2.986	6.497	-6.497	8.000	-8.000	

	Normalized Analysis
SiO2	0.08
TiO2	6.27
Al2O3	3.47
Cr2O3	0.05
Fe2O3	55.59
FeO	34.03
MnO	0.34
MgO	2.46
Total	102.29

Analysis No. 262

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.09	60.10	0.0014	0.001	0.003	0.003	0.006	0.003	0.006	Si
TiO2	7.68	79.87	0.0962	0.096	0.192	0.209	0.418	0.209	0.418	Ti
Al2O3	3.08	101.96	0.0302	0.060	0.091	0.131	0.197	0.131	0.197	Al
Cr2O3	0.03	159.69	0.0002	0.000	0.000	0.001	0.001	0.001	0.001	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.420	2.130	Fe^{3+}
FeO	83.41	71.85	1.1609	1.161	1.161	2.525	2.525	1.105	1.105	Fe^{2+}
MnO	0.38	70.94	0.0054	0.005	0.005	0.012	0.012	0.012	0.012	Mn
MgO	2.41	40.30	0.0598	0.060	0.060	0.130	0.130	0.130	0.130	Mg
Total	97.07			1.384	1.512	3.012	3.290	3.012	4.000	
desired								3.000	4.000	
calc charge				3.025	-3.025	6.580	-6.580	8.000	-8.000	

	Normalized Analysis
SiO2	0.09
TiO2	7.68
Al2O3	3.08
Cr2O3	0.03
Fe2O3	52.51
FeO	36.50
MnO	0.38
MgO	2.41
Total	102.68

Analysis No. 263

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.11	60.10	0.0018	0.002	0.004	0.004	0.008	0.004	0.008	Si
TiO2	7.51	79.87	0.0940	0.094	0.188	0.205	0.409	0.205	0.409	Ti
Al2O3	3.15	101.96	0.0309	0.062	0.093	0.134	0.202	0.134	0.202	Al
Cr2O3	0.07	159.69	0.0004	0.001	0.001	0.002	0.003	0.002	0.003	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.457	2.186	Fe^{3+}
FeO	82.73	71.85	1.1514	1.151	1.151	2.505	2.505	1.048	1.048	Fe^{2+}
MnO	0.41	70.94	0.0057	0.006	0.006	0.012	0.012	0.012	0.012	Mn
MgO	2.46	40.30	0.0610	0.061	0.061	0.133	0.133	0.133	0.133	Mg
Total	96.43			1.377	1.504	2.995	3.271	2.995	4.000	
desired								3.000	4.000	
calc charge				3.008	-3.008	6.543	-6.543	8.000	-8.000	

	Normalized Analysis
SiO2	0.11
TiO2	7.51
Al2O3	3.15
Cr2O3	0.07
Fe2O3	53.87
FeO	34.61
MnO	0.41
MgO	2.46
Total	102.19

Analysis No. 266

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.03	60.10	0.0005	0.000	0.001	0.001	0.002	0.001	0.002	Si
TiO2	0.25	79.87	0.0031	0.003	0.006	0.007	0.014	0.007	0.014	Ti
Al2O3	10.07	101.96	0.0988	0.198	0.296	0.430	0.645	0.430	0.645	Al
Cr2O3	52.49	159.69	0.3287	0.657	0.986	1.430	2.145	1.430	2.145	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Fe^{3+}
FeO	28.60	71.85	0.3981	0.398	0.398	0.866	0.866	0.866	0.866	Fe^{2+}
MnO	0.44	70.94	0.0062	0.006	0.006	0.014	0.014	0.014	0.014	Mn
MgO	8.56	40.30	0.2124	0.212	0.212	0.462	0.462	0.462	0.462	Mg
Total	100.44			1.475	1.906	3.209	4.147	3.209	4.147	
desired								3.000	4.000	
calc charge				3.813	-3.813	8.294	-8.294	8.294	-8.294	

	Normalized Analysis
SiO2	0.03
TiO2	0.25
Al2O3	10.07
Cr2O3	52.49
Fe2O3	0.00
FeO	28.60
MnO	0.44
MgO	8.56
Total	100.44

Analysis No. 276

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.09	60.10	0.0015	0.001	0.003	0.003	0.006	0.003	0.006	Si
TiO2	6.27	79.87	0.0785	0.079	0.157	0.171	0.342	0.171	0.342	Ti
Al2O3	3.57	101.96	0.0350	0.070	0.105	0.152	0.229	0.152	0.229	Al
Cr2O3	0.04	159.69	0.0002	0.000	0.001	0.001	0.001	0.001	0.001	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.557	2.336	Fe^{3+}
FeO	82.21	71.85	1.1442	1.144	1.144	2.489	2.489	0.932	0.932	Fe^{2+}
MnO	0.31	70.94	0.0043	0.004	0.004	0.009	0.009	0.009	0.009	Mn
MgO	2.69	40.30	0.0667	0.067	0.067	0.145	0.145	0.145	0.145	Mg
Total	95.17			1.366	1.481	2.971	3.221	2.971	4.000	
desired								3.000	4.000	
calc charge				2.962	-2.962	6.443	-6.443	8.000	-8.000	

	Normalized Analysis
SiO2	0.09
TiO2	6.27
Al2O3	3.57
Cr2O3	0.04
Fe2O3	57.58
FeO	30.78
MnO	0.31
MgO	2.69
Total	101.31

Analysis No. 277

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.09	60.10	0.0014	0.001	0.003	0.003	0.006	0.003	0.006	Si
TiO2	5.71	79.87	0.0715	0.071	0.143	0.156	0.311	0.156	0.311	Ti
Al2O3	3.71	101.96	0.0364	0.073	0.109	0.158	0.237	0.158	0.237	Al
Cr2O3	0.08	159.69	0.0005	0.001	0.002	0.002	0.003	0.002	0.003	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.561	2.341	Fe^{3+}
FeO	82.74	71.85	1.1516	1.152	1.152	2.505	2.505	0.945	0.945	Fe^{2+}

	Normalized Analysis
SiO2	0.09
TiO2	5.71
Al2O3	3.71
Cr2O3	0.08
Fe2O3	57.70
FeO	31.20

MnO	0.33	70.94	0.0047	0.005	0.005	0.010	0.010	0.010	0.010	Mn	MnO	0.33
MgO	2.71	40.30	0.0672	0.067	0.067	0.146	0.146	0.146	0.146	Mg	MgO	2.71
											Total	101.53
Total	95.37			1.370	1.480	2.981	3.220	2.981	4.000			
desired								3.000	4.000			
calc charge				2.960	-2.960	6.439	-6.439	8.000	-8.000			

Analysis No. 228

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen			Normalized Analysis
SiO2	0.07	60.10	0.0011	0.001	0.002	0.002	0.005	0.002	0.005	Si	SiO2	0.07
TiO2	0.15	79.87	0.0019	0.002	0.004	0.004	0.008	0.004	0.008	Ti	TiO2	0.15
Al2O3	9.89	101.96	0.0970	0.194	0.291	0.422	0.633	0.422	0.633	Al	Al2O3	9.89
Cr2O3	54.65	159.69	0.3422	0.684	1.027	1.489	2.233	1.489	2.233	Cr	Cr2O3	54.65
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.000	0.000	Fe^{3+}	Fe2O3	0.00
FeO	25.37	71.85	0.3531	0.353	0.353	0.768	0.768	0.768	0.768	Fe^{2+}	FeO	25.37
MnO	0.36	70.94	0.0050	0.005	0.005	0.011	0.011	0.011	0.011	Mn	MnO	0.36
MgO	10.52	40.30	0.2610	0.261	0.261	0.568	0.568	0.568	0.568	Mg	MgO	10.52
											Total	101.01
Total	101.01			1.501	1.943	3.264	4.226	3.264	4.226			
desired								3.000	4.000			
calc charge				3.886	-3.886	8.453	-8.453	8.453	-8.453			

Analysis No. 232

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen			Normalized Analysis
SiO2	0.12	60.10	0.0020	0.002	0.004	0.004	0.009	0.004	0.009	Si	SiO2	0.12
TiO2	7.02	79.87	0.0879	0.088	0.176	0.191	0.382	0.191	0.382	Ti	TiO2	7.02
Al2O3	3.13	101.96	0.0307	0.061	0.092	0.134	0.200	0.134	0.200	Al	Al2O3	3.13
Cr2O3	0.71	159.69	0.0045	0.009	0.013	0.019	0.029	0.019	0.029	Cr	Cr2O3	0.71
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.435	2.152	Fe^{3+}	Fe2O3	53.06
FeO	81.79	71.85	1.1383	1.138	1.138	2.476	2.476	1.041	1.041	Fe^{2+}	FeO	34.40
MnO	0.42	70.94	0.0060	0.006	0.006	0.013	0.013	0.013	0.013	Mn	MnO	0.42
MgO	3.20	40.30	0.0794	0.079	0.079	0.173	0.173	0.173	0.173	Mg	MgO	3.20
											Total	102.06
Total	96.40			1.384	1.509	3.011	3.283	3.011	4.000			
desired								3.000	4.000			
calc charge				3.018	-3.018	6.565	-6.565	8.000	-8.000			

Analysis No. 52

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.10	60.10	0.0016	0.002	0.003	0.003	0.007	0.003	0.007	Si
TiO2	3.44	79.87	0.0431	0.043	0.086	0.095	0.189	0.095	0.189	Ti
Al2O3	4.82	101.96	0.0473	0.095	0.142	0.208	0.312	0.208	0.312	Al
Cr2O3	0.26	159.69	0.0016	0.003	0.005	0.007	0.011	0.007	0.011	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.589	2.383	Fe^{3+}
FeO	83.02	71.85	1.1555	1.155	1.155	2.539	2.539	0.950	0.950	Fe^{2+}
MnO	0.30	70.94	0.0042	0.004	0.004	0.009	0.009	0.009	0.009	Mn
MgO	2.55	40.30	0.0633	0.063	0.063	0.139	0.139	0.139	0.139	Mg
Total	94.48			1.365	1.459	3.000	3.206	3.000	4.000	
desired								3.000	4.000	
calc charge				2.918	-2.918	6.411	-6.411	8.000	-8.000	

	Normalized Analysis
SiO2	0.10
TiO2	3.44
Al2O3	4.82
Cr2O3	0.26
Fe2O3	58.17
FeO	31.06
MnO	0.30
MgO	2.55
Total	100.69

Analysis No. 60

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.10	60.10	0.0016	0.002	0.003	0.004	0.007	0.004	0.007	Si
TiO2	3.31	79.87	0.0414	0.041	0.083	0.091	0.182	0.091	0.182	Ti
Al2O3	3.20	101.96	0.0314	0.063	0.094	0.138	0.207	0.138	0.207	Al
Cr2O3	0.25	159.69	0.0015	0.003	0.005	0.007	0.010	0.007	0.010	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.739	2.609	Fe^{3+}
FeO	82.69	71.85	1.1509	1.151	1.151	2.529	2.529	0.790	0.790	Fe^{2+}
MnO	0.29	70.94	0.0041	0.004	0.004	0.009	0.009	0.009	0.009	Mn
MgO	3.42	40.30	0.0849	0.085	0.085	0.186	0.186	0.186	0.186	Mg
Total	93.25			1.349	1.425	2.963	3.130	2.963	4.000	
desired								3.000	4.000	
calc charge				2.849	-2.849	6.261	-6.261	8.000	-8.000	

	Normalized Analysis
SiO2	0.10
TiO2	3.31
Al2O3	3.20
Cr2O3	0.25
Fe2O3	63.66
FeO	25.82
MnO	0.29
MgO	3.42
Total	100.05

Analysis No. 97

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.11	60.10	0.0018	0.002	0.004	0.004	0.008	0.004	0.008	Si
TiO2	1.67	79.87	0.0209	0.021	0.042	0.046	0.092	0.046	0.092	Ti
Al2O3	4.04	101.96	0.0396	0.079	0.119	0.174	0.261	0.174	0.261	Al
Cr2O3	0.30	159.69	0.0019	0.004	0.006	0.008	0.012	0.008	0.012	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.966	2.949	Fe^{3+}
FeO	82.20	71.85	1.1441	1.144	1.144	2.514	2.514	0.548	0.548	Fe^{2+}
MnO	0.29	70.94	0.0041	0.004	0.004	0.009	0.009	0.009	0.009	Mn
MgO	2.21	40.30	0.0548	0.055	0.055	0.120	0.120	0.120	0.120	Mg
Total	90.82			1.309	1.373	2.876	3.017	2.876	4.000	
desired								3.000	4.000	
calc charge				2.746	-2.746	6.034	-6.034	8.000	-8.000	

	Normalized Analysis
SiO2	0.11
TiO2	1.67
Al2O3	4.04
Cr2O3	0.30
Fe2O3	71.98
FeO	17.90
MnO	0.29
MgO	2.21
Total	98.51

Analysis No.	186										
	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen		
SiO2	0.09	60.10	0.0014	0.001	0.003	0.003	0.006	0.003	0.006	Si	
TiO2	0.12	79.87	0.0015	0.001	0.003	0.003	0.006	0.003	0.006	Ti	
Al2O3	9.25	101.96	0.0907	0.181	0.272	0.368	0.552	0.368	0.552	Al	
Cr2O3	53.88	159.69	0.3374	0.675	1.012	1.369	2.054	1.369	2.054	Cr	
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.251	0.376	Fe^{3+}	
FeO	26.37	71.85	0.3670	0.367	0.367	0.745	0.745	0.494	0.494	Fe^{2+}	
MnO	0.32	70.94	0.0045	0.005	0.005	0.009	0.009	0.009	0.009	Mn	
MgO	9.99	40.30	0.2479	0.248	0.248	0.503	0.503	0.503	0.503	Mg	
Total	100.01			1.479	1.910	3.000	3.875	3.000	4.000		
desired								3.000	4.000		
calc charge				3.819	-3.819	7.749	-7.749	8.000	-8.000		

	Normalized Analysis
SiO2	0.09
TiO2	0.12
Al2O3	9.25
Cr2O3	53.88
Fe2O3	9.95
FeO	17.48
MnO	0.32
MgO	9.99
Total	101.07

Analysis No. 141

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.02	60.10	0.0004	0.000	0.001	0.001	0.001	0.001	0.001	Si
TiO2	0.13	79.87	0.0016	0.002	0.003	0.003	0.007	0.003	0.007	Ti
Al2O3	6.79	101.96	0.0666	0.133	0.200	0.281	0.422	0.281	0.422	Al
Cr2O3	50.06	159.69	0.3135	0.627	0.940	1.324	1.987	1.324	1.987	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.386	0.579	Fe^{3+}
FeO	34.20	71.85	0.4760	0.476	0.476	1.005	1.005	0.620	0.620	Fe^{2+}
MnO	0.38	70.94	0.0054	0.005	0.005	0.011	0.011	0.011	0.011	Mn
MgO	7.12	40.30	0.1767	0.177	0.177	0.373	0.373	0.373	0.373	Mg
Total	98.71			1.420	1.802	3.000	3.807	3.000	4.000	
desired								3.000	4.000	
calc charge				3.605	-3.605	7.614	-7.614	8.000	-8.000	

	Normalized Analysis
SiO2	0.02
TiO2	0.13
Al2O3	6.79
Cr2O3	50.06
Fe2O3	14.70
FeO	21.07
MnO	0.38
MgO	7.12
Total	100.27

Analysis No. 146

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.16	60.10	0.0027	0.003	0.005	0.006	0.011	0.006	0.011	Si
TiO2	2.00	79.87	0.0250	0.025	0.050	0.053	0.106	0.053	0.106	Ti
Al2O3	5.94	101.96	0.0583	0.117	0.175	0.246	0.369	0.246	0.369	Al
Cr2O3	0.12	159.69	0.0008	0.002	0.002	0.003	0.005	0.003	0.005	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	2.021	3.031	Fe^{3+}
FeO	79.04	71.85	1.1001	1.100	1.100	2.324	2.324	0.303	0.303	Fe^{2+}
MnO	0.28	70.94	0.0040	0.004	0.004	0.008	0.008	0.008	0.008	Mn
MgO	3.17	40.30	0.0787	0.079	0.079	0.166	0.166	0.166	0.166	Mg
Total	90.72			1.329	1.415	2.806	2.990	2.806	4.000	
desired								3.000	4.000	
calc charge				2.831	-2.831	5.979	-5.979	8.000	-8.000	

	Normalized Analysis
SiO2	0.16
TiO2	2.00
Al2O3	5.94
Cr2O3	0.12
Fe2O3	76.95
FeO	10.31
MnO	0.28
MgO	3.17
Total	98.93

Analysis No. 150

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.05	60.10	0.0009	0.001	0.002	0.002	0.004	0.002	0.004	Si
TiO2	0.03	79.87	0.0004	0.000	0.001	0.001	0.002	0.001	0.002	Ti
Al2O3	8.05	101.96	0.0790	0.158	0.237	0.334	0.500	0.334	0.500	Al
Cr2O3	52.32	159.69	0.3276	0.655	0.983	1.384	2.076	1.384	2.076	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.150	0.225	Fe^{3+}
FeO	27.90	71.85	0.3883	0.388	0.388	0.820	0.820	0.670	0.670	Fe^{2+}
MnO	0.30	70.94	0.0042	0.004	0.004	0.009	0.009	0.009	0.009	Mn
MgO	9.80	40.30	0.2432	0.243	0.243	0.514	0.514	0.514	0.514	Mg
Total	98.45			1.450	1.858	3.063	3.925	3.063	4.000	
desired								3.000	4.000	
calc charge				3.716	-3.716	7.850	-7.850	8.000	-8.000	

	Normalized Analysis
SiO2	0.05
TiO2	0.03
Al2O3	8.05
Cr2O3	52.32
Fe2O3	5.72
FeO	22.79
MnO	0.30
MgO	9.80
Total	99.06

Analysis No. 159

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.06	60.10	0.0010	0.001	0.002	0.002	0.004	0.002	0.004	Si
TiO2	0.03	79.87	0.0004	0.000	0.001	0.001	0.002	0.001	0.002	Ti
Al2O3	7.92	101.96	0.0777	0.155	0.233	0.328	0.492	0.328	0.492	Al
Cr2O3	55.15	159.69	0.3454	0.691	1.036	1.459	2.189	1.459	2.189	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.121	0.181	Fe^{3+}
FeO	25.84	71.85	0.3596	0.360	0.360	0.760	0.760	0.639	0.639	Fe^{2+}
MnO	0.38	70.94	0.0054	0.005	0.005	0.011	0.011	0.011	0.011	Mn
MgO	9.19	40.30	0.2280	0.228	0.228	0.482	0.482	0.482	0.482	Mg
Total	98.57			1.441	1.865	3.043	3.940	3.043	4.000	
desired								3.000	4.000	
calc charge				3.730	-3.730	7.879	-7.879	8.000	-8.000	

	Normalized Analysis
SiO2	0.06
TiO2	0.03
Al2O3	7.92
Cr2O3	55.15
Fe2O3	4.61
FeO	21.73
MnO	0.38
MgO	9.19
Total	99.07

Analysis No.	333											
	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen			Normalized Analysis
SiO2	0.10	60.10	0.0017	0.002	0.003	0.004	0.008	0.004	0.008	Si	SiO2	0.10
TiO2	0.47	79.87	0.0059	0.006	0.012	0.013	0.025	0.013	0.025	Ti	TiO2	0.47
Al2O3	6.15	101.96	0.0603	0.121	0.181	0.260	0.390	0.260	0.390	Al	Al2O3	6.15
Cr2O3	1.31	159.69	0.0082	0.016	0.025	0.035	0.053	0.035	0.053	Cr	Cr2O3	1.31
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.672	2.508	Fe^{3+}	Fe2O3	62.40
FeO	81.79	71.85	1.1383	1.138	1.138	2.453	2.453	0.781	0.781	Fe^{2+}	FeO	26.05
MnO	0.25	70.94	0.0035	0.003	0.003	0.008	0.008	0.008	0.008	Mn	MnO	0.25
MgO	4.26	40.30	0.1057	0.106	0.106	0.228	0.228	0.228	0.228	Mg	MgO	4.26
											Total	100.99
Total	94.33			1.392	1.468	3.000	3.164	3.000	4.000			
desired								3.000	4.000			
calc charge				2.937	-2.937	6.328	-6.328	8.000	-8.000			

Analysis No.	339											
	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen			Normalized Analysis
SiO2	0.11	60.10	0.0018	0.002	0.004	0.004	0.008	0.004	0.008	Si	SiO2	0.11
TiO2	0.48	79.87	0.0060	0.006	0.012	0.013	0.026	0.013	0.026	Ti	TiO2	0.48
Al2O3	6.16	101.96	0.0604	0.121	0.181	0.260	0.391	0.260	0.391	Al	Al2O3	6.16
Cr2O3	1.12	159.69	0.0070	0.014	0.021	0.030	0.045	0.030	0.045	Cr	Cr2O3	1.12
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.726	2.589	Fe^{3+}	Fe2O3	64.42
FeO	81.09	71.85	1.1286	1.129	1.129	2.432	2.432	0.706	0.706	Fe^{2+}	FeO	23.55
MnO	0.23	70.94	0.0032	0.003	0.003	0.007	0.007	0.007	0.007	Mn	MnO	0.23
MgO	4.28	40.30	0.1062	0.106	0.106	0.229	0.229	0.229	0.229	Mg	MgO	4.28
											Total	100.34
Total	93.46			1.381	1.456	2.975	3.137	2.975	4.000			
desired								3.000	4.000			
calc charge				2.912	-2.912	6.274	-6.274	8.000	-8.000			

Analysis No.	145											
	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen			Normalized Analysis
SiO2	0.16	60.10	0.0026	0.003	0.005	0.006	0.011	0.006	0.011	Si	SiO2	0.16
TiO2	3.32	79.87	0.0416	0.042	0.083	0.090	0.180	0.090	0.180	Ti	TiO2	3.32
Al2O3	4.87	101.96	0.0478	0.096	0.143	0.207	0.311	0.207	0.311	Al	Al2O3	4.87
Cr2O3	0.26	159.69	0.0016	0.003	0.005	0.007	0.010	0.007	0.010	Cr	Cr2O3	0.26
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.594	2.391	Fe^{3+}	Fe2O3	59.05
FeO	82.80	71.85	1.1524	1.152	1.152	2.502	2.502	0.908	0.908	Fe^{2+}	FeO	30.05
MnO	0.28	70.94	0.0040	0.004	0.004	0.009	0.009	0.009	0.009	Mn	MnO	0.28
MgO	3.33	40.30	0.0826	0.083	0.083	0.179	0.179	0.179	0.179	Mg	MgO	3.33
											Total	101.32
Total	95.02			1.382	1.476	3.000	3.203	3.000	4.000			
desired								3.000	4.000			
calc charge				2.951	-2.951	6.406	-6.406	8.000	-8.000			

Analysis No.	167											
	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen			Normalized Analysis
SiO2	0.13	60.10	0.0022	0.002	0.004	0.005	0.009	0.005	0.009	Si	SiO2	0.13
TiO2	3.83	79.87	0.0480	0.048	0.096	0.104	0.208	0.104	0.208	Ti	TiO2	3.83
Al2O3	4.75	101.96	0.0466	0.093	0.140	0.202	0.303	0.202	0.303	Al	Al2O3	4.75
Cr2O3	0.06	159.69	0.0004	0.001	0.001	0.002	0.003	0.002	0.003	Cr	Cr2O3	0.06
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.525	2.287	Fe^{3+}	Fe2O3	56.50
FeO	83.32	71.85	1.1596	1.160	1.160	2.517	2.517	0.993	0.993	Fe^{2+}	FeO	32.85
MnO	0.26	70.94	0.0037	0.004	0.004	0.008	0.008	0.008	0.008	Mn	MnO	0.26
MgO	3.50	40.30	0.0868	0.087	0.087	0.189	0.189	0.189	0.189	Mg	MgO	3.50
											Total	101.89
Total	95.86			1.394	1.491	3.027	3.238	3.027	4.000			
desired								3.000	4.000			
calc charge				2.983	-2.983	6.475	-6.475	8.000	-8.000			

Analysis No.	172											
	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen			Normalized Analysis
SiO2	0.10	60.10	0.0016	0.002	0.003	0.004	0.007	0.004	0.007	Si	SiO2	0.10
TiO2	3.89	79.87	0.0487	0.049	0.097	0.106	0.211	0.106	0.211	Ti	TiO2	3.89
Al2O3	4.64	101.96	0.0455	0.091	0.137	0.198	0.296	0.198	0.296	Al	Al2O3	4.64
Cr2O3	0.01	159.69	0.0001	0.000	0.000	0.000	0.001	0.000	0.001	Cr	Cr2O3	0.01
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	1.559	2.339	Fe^{3+}	Fe2O3	57.78
FeO	83.28	71.85	1.1591	1.159	1.159	2.516	2.516	0.957	0.957	Fe^{2+}	FeO	31.67
MnO	0.25	70.94	0.0035	0.004	0.004	0.008	0.008	0.008	0.008	Mn	MnO	0.25
MgO	3.36	40.30	0.0834	0.083	0.083	0.181	0.181	0.181	0.181	Mg	MgO	3.36
											Total	101.70
Total	95.53			1.387	1.483	3.012	3.220	3.012	4.000			
desired								3.000	4.000			
calc charge				2.967	-2.967	6.441	-6.441	8.000	-8.000			

Analysis No.	254										
	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen		
SiO2	0.06	60.10	0.0011	0.001	0.002	0.002	0.004	0.002	0.004	Si	
TiO2	0.14	79.87	0.0018	0.002	0.004	0.004	0.007	0.004	0.007	Ti	
Al2O3	11.51	101.96	0.1129	0.226	0.339	0.455	0.682	0.455	0.682	Al	
Cr2O3	46.39	159.69	0.2905	0.581	0.871	1.170	1.755	1.170	1.755	Cr	
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.364	0.546	Fe^{3+}	
FeO	29.80	71.85	0.4148	0.415	0.415	0.835	0.835	0.471	0.471	Fe^{2+}	
MnO	0.32	70.94	0.0045	0.004	0.004	0.009	0.009	0.009	0.009	Mn	
MgO	10.52	40.30	0.2610	0.261	0.261	0.526	0.526	0.526	0.526	Mg	
Total	98.74			1.490	1.896	3.000	3.818	3.000	4.000		
desired								3.000	4.000		
calc charge				3.792	-3.792	7.636	-7.636	8.000	-8.000		

	Normalized Analysis
SiO2	0.06
TiO2	0.14
Al2O3	11.51
Cr2O3	46.39
Fe2O3	14.54
FeO	16.81
MnO	0.32
MgO	10.52
Total	100.29

Analysis No. 299

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.03	60.10	0.0006	0.001	0.001	0.001	0.002	0.001	0.002	Si
TiO2	0.10	79.87	0.0013	0.001	0.003	0.002	0.005	0.002	0.005	Ti
Al2O3	6.36	101.96	0.0624	0.125	0.187	0.245	0.368	0.245	0.368	Al
Cr2O3	62.74	159.69	0.3929	0.786	1.179	1.546	2.319	1.546	2.319	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.201	0.302	Fe^{3+}
FeO	17.93	71.85	0.2495	0.250	0.250	0.491	0.491	0.290	0.290	Fe^{2+}
MnO	0.27	70.94	0.0038	0.004	0.004	0.008	0.008	0.008	0.008	Mn
MgO	14.46	40.30	0.3588	0.359	0.359	0.706	0.706	0.706	0.706	Mg
Total	101.90			1.525	1.982	3.000	3.899	3.000	4.000	
desired								3.000	4.000	
calc charge				3.963	-3.963	7.799	-7.799	8.000	-8.000	

	Normalized Analysis
SiO2	0.03
TiO2	0.10
Al2O3	6.36
Cr2O3	62.74
Fe2O3	8.22
FeO	10.59
MnO	0.27
MgO	14.46
Total	102.77

Analysis No. 300

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.05	60.10	0.0009	0.001	0.002	0.002	0.004	0.002	0.004	Si
TiO2	0.16	79.87	0.0021	0.002	0.004	0.004	0.008	0.004	0.008	Ti
Al2O3	6.78	101.96	0.0665	0.133	0.199	0.262	0.393	0.262	0.393	Al
Cr2O3	61.97	159.69	0.3881	0.776	1.164	1.527	2.291	1.527	2.291	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.249	0.374	Fe^{3+}
FeO	18.59	71.85	0.2587	0.259	0.259	0.509	0.509	0.260	0.260	Fe^{2+}
MnO	0.27	70.94	0.0038	0.004	0.004	0.007	0.007	0.007	0.007	Mn
MgO	13.59	40.30	0.3372	0.337	0.337	0.664	0.664	0.664	0.664	Mg
Total	101.42			1.512	1.969	2.975	3.875	2.975	4.000	
desired								3.000	4.000	
calc charge				3.939	-3.939	7.751	-7.751	8.000	-8.000	

	Normalized Analysis
SiO2	0.05
TiO2	0.16
Al2O3	6.78
Cr2O3	61.97
Fe2O3	10.20
FeO	9.48
MnO	0.27
MgO	13.59
Total	102.50

Analysis No. 313

	Wt %	MW	Moles	mole cations	mole oxygen	norm Cations	norm oxygen	atom units	norm oxygen	
SiO2	0.04	60.10	0.0006	0.001	0.001	0.001	0.002	0.001	0.002	Si
TiO2	0.19	79.87	0.0024	0.002	0.005	0.005	0.009	0.005	0.009	Ti
Al2O3	6.16	101.96	0.0604	0.121	0.181	0.238	0.357	0.238	0.357	Al
Cr2O3	62.32	159.69	0.3903	0.781	1.171	1.536	2.304	1.536	2.304	Cr
Fe2O3	0.00	160.87	0.0000	0.000	0.000	0.000	0.000	0.263	0.394	Fe^{3+}
FeO	18.65	71.85	0.2596	0.260	0.260	0.511	0.511	0.248	0.248	Fe^{2+}
MnO	0.28	70.94	0.0040	0.004	0.004	0.008	0.008	0.008	0.008	Mn
MgO	13.88	40.30	0.3444	0.344	0.344	0.678	0.678	0.678	0.678	Mg
Total	101.52			1.512	1.966	2.976	3.869	2.976	4.000	
desired								3.000	4.000	
calc charge				3.932	-3.932	7.737	-7.737	8.000	-8.000	

	Normalized Analysis
SiO2	0.04
TiO2	0.19
Al2O3	6.16
Cr2O3	62.32
Fe2O3	10.74
FeO	9.06
MnO	0.28
MgO	13.88
Total	102.67

Sample	Analysis No.	Si	Ti	Al	Cr	Fe3+	Fe2+	Mn	Mg	Classification	SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	Total	Cr #
2-1_13 spinel core	61	0.006	0.294	0.085	0.000	1.316	1.228	0.017	0.054	magnetite	0.16	10.39	1.91	0.00	46.91	39.08	0.54	0.97	99.97	0.00
2-1_13 spinel rim	62	0.005	0.295	0.087	0.000	1.481	0.979	0.014	0.055	magnetite	0.13	10.44	1.96	0.00	52.78	31.17	0.45	0.98	97.91	0.00
2-1_13 spinel2 core	63	0.008	0.251	0.103	0.000	1.393	1.166	0.016	0.056	magnetite	0.21	8.89	2.32	0.00	49.65	37.12	0.50	0.99	99.69	0.00
2-1_13 spinel2 rim	64	0.007	0.238	0.097	0.000	1.513	1.026	0.014	0.056	magnetite	0.18	8.43	2.18	0.00	53.91	32.67	0.45	0.99	98.81	0.00
2-1_10 spinel core	119	0.006	0.291	0.108	0.000	1.254	1.290	0.018	0.055	magnetite	0.16	10.30	2.43	0.01	44.70	41.05	0.56	0.98	100.20	0.01
2-1_10 spinel rim	120	0.005	0.291	0.103	0.000	1.221	1.350	0.018	0.055	magnetite	0.13	10.29	2.33	0.01	43.50	42.97	0.55	0.98	100.77	0.00
5-1_4 spinel core	246	0.003	0.171	0.148	0.001	1.503	1.030	0.010	0.133	Al-titanomagnetite	0.08	6.27	3.47	0.05	55.59	34.03	0.34	2.46	102.29	0.01
5-1_4a spinel core	262	0.003	0.209	0.131	0.001	1.420	1.105	0.012	0.130	Al-titanomagnetite	0.09	7.68	3.08	0.03	52.51	36.50	0.38	2.41	102.68	0.01
5-1_4a spinel rim	263	0.004	0.205	0.134	0.002	1.457	1.048	0.012	0.133	Al-titanomagnetite	0.11	7.51	3.15	0.07	53.87	34.61	0.41	2.46	102.19	0.02
5-1_5 spinel	266	0.001	0.007	0.430	1.430	0.000	0.866	0.014	0.462	chromite	0.03	0.25	10.07	52.49	0.00	28.60	0.44	8.56	100.44	0.84
5-1_7 spinel core	276	0.003	0.171	0.152	0.001	1.557	0.932	0.009	0.145	Al-titanomagnetite	0.09	6.27	3.57	0.04	57.58	30.78	0.31	2.69	101.31	0.01
5-1_7 spinel rim	277	0.003	0.156	0.158	0.002	1.561	0.945	0.010	0.146	Al-titanomagnetite	0.09	5.71	3.71	0.08	57.70	31.20	0.33	2.71	101.53	0.02
2-1_1 spinel core	319	0.012	0.318	0.093	0.001	1.292	1.203	0.025	0.033	magnetite	0.32	11.26	2.09	0.05	46.03	38.28	0.79	0.60	99.42	0.02
2-1_1 spinel rim	320	0.011	0.322	0.097	0.000	1.295	1.184	0.026	0.035	magnetite	0.29	11.39	2.20	0.00	46.17	37.69	0.81	0.63	99.18	0.00
2-1_3 spinel core	346	0.045	0.342	0.117	0.000	1.345	1.018	0.014	0.002	magnetite	1.19	12.10	2.65	0.00	47.93	32.41	0.45	0.03	96.75	0.00
2-1_3 spinel core2	347	0.068	0.312	0.111	0.001	1.467	0.855	0.017	0.000	magnetite	1.81	11.05	2.50	0.02	52.29	27.20	0.54	0.01	95.41	0.01
2-1_8 spinel	371	0.008	0.282	0.109	0.000	1.177	1.411	0.018	0.062	magnetite	0.21	9.99	2.45	0.01	41.93	44.92	0.55	1.11	101.19	0.01
5-1_2 chromite	228	0.002	0.004	0.422	1.489	0.000	0.768	0.011	0.568	chromite	0.07	0.15	9.89	54.65	0.00	25.37	0.36	10.52	101.01	0.85
48-2_1 chromite core	299	0.001	0.002	0.245	1.546	0.201	0.290	0.008	0.706	picrochromite	0.03	0.10	6.36	62.74	8.22	10.59	0.27	14.46	102.77	0.91
48-2_1 chromite rim	300	0.002	0.004	0.262	1.527	0.249	0.260	0.007	0.664	picrochromite	0.05	0.16	6.78	61.97	10.20	9.48	0.27	13.59	102.50	0.90
48-2_4 chromite	313	0.001	0.005	0.238	1.536	0.263	0.248	0.008	0.678	picrochromite	0.04	0.19	6.16	62.32	10.74	9.06	0.28	13.88	102.67	0.91

Sample	Analysis No.	Si	Ti	Al	Cr	Fe3+	Fe2+	Mn	Mg	Classification	SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	Total	Cr#
2-1_12 spinel gm	97	0.017	0.393	0.051	0.000	1.419	0.931	0.044	0.001	magnetite	0.45	13.89	1.15	0.00	50.57	29.64	1.39	0.01	97.10	0.00
2-1_10 spinel gm	122	0.041	0.322	0.025	0.000	2.037	0.147	0.031	0.003	magnetite	1.08	11.38	0.57	0.00	72.59	4.69	0.99	0.06	91.37	0.00
46-1_5 gm spinel	145	0.006	0.090	0.207	0.007	1.594	0.908	0.009	0.179	Al-titanomagnetite	0.16	3.32	4.87	0.26	59.05	30.05	0.28	3.33	101.32	0.05
46-1_2 gm spinel rim	167	0.005	0.104	0.202	0.002	1.525	0.993	0.008	0.189	Al-titanomagnetite	0.13	3.83	4.75	0.06	56.50	32.85	0.26	3.50	101.89	0.01
46-1_1 gm spinel	172	0.004	0.106	0.198	0.000	1.559	0.957	0.008	0.181	Al-titanomagnetite	0.10	3.89	4.64	0.01	57.78	31.67	0.25	3.36	101.70	0.00
2-1_2 gm spinel	337	0.236	0.355	0.065	0.001	0.955	1.245	0.028	0.014	magnetite	6.28	12.56	1.46	0.03	34.04	39.64	0.88	0.25	95.15	0.02
2-1_9 gm spinel	376	0.007	0.277	0.092	0.000	1.185	1.445	0.017	0.053	magnetite	0.20	9.81	2.08	0.00	42.23	45.99	0.54	0.95	101.80	0.00

Sample	Analysis No.	Si	Ti	Al	Cr	Fe3+	Fe2+	Mn	Mg	Classification	SiO2	TiO2	Al2O3	Cr2O3	Fe2O3	FeO	MnO	MgO	Total	Cr#
2-1_11 opx2 spinel incl core	105	0.002	0.019	0.518	0.000	0.994	1.411	0.022	0.257	Al-titanomagnetite	0.06	0.68	11.70	0.00	35.42	44.91	0.69	4.58	98.04	0.00
43-1_2 olivine spinel incl	186	0.003	0.003	0.368	1.369	0.251	0.494	0.009	0.503	chromite	0.09	0.12	9.25	53.88	9.95	17.48	0.32	9.99	101.07	85.35
5-1_3 cpx spinel incl	232	0.004	0.191	0.134	0.019	1.435	1.041	0.013	0.173	Al-titanomagnetite	0.12	7.02	3.13	0.71	53.06	34.40	0.42	3.20	102.06	18.55
2-1_1 cpx spinel incl	323	0.009	0.219	0.141	0.000	1.326	1.224	0.016	0.103	Al-titanomagnetite	0.24	7.76	3.18	0.00	47.26	38.97	0.49	1.85	99.75	0.14
2-1_3 cpx spinel incl	338	0.166	0.273	0.145	0.000	1.047	1.291	0.015	0.027	Al-titanomagnetite	4.43	9.65	3.27	0.01	37.32	41.09	0.48	0.47	96.74	0.42
41-1_1_opx ill incl	52	0.003	0.095	0.208	0.007	1.589	0.950	0.009	0.139	Al-titanomagnetite	0.10	3.44	4.82	0.26	58.17	31.06	0.30	2.55	100.69	5.04
41-1_2cpx_spinel incl	60	0.004	0.091	0.138	0.007	1.739	0.790	0.009	0.186	Al-titanomagnetite	0.10	3.31	3.20	0.25	63.66	25.82	0.29	3.42	100.05	7.17
41-1_4 opx ilmenite incl	97	0.004	0.046	0.174	0.008	1.966	0.548	0.009	0.120	Al-titanomagnetite	0.11	1.67	4.04	0.30	71.98	17.90	0.29	2.21	98.51	6.97
43-4_1 cpx chromite incl	141	0.001	0.003	0.281	1.324	0.386	0.620	0.011	0.373	chromite	0.02	0.13	6.79	50.06	14.70	21.07	0.38	7.12	100.27	88.06
43-4_2 cpx ill incl	146	0.006	0.053	0.246	0.003	2.021	0.303	0.008	0.166	Al-titanomagnetite	0.16	2.00	5.94	0.12	76.95	10.31	0.28	3.17	98.93	2.04
43-4_3 olivine chrome incl	150	0.002	0.001	0.334	1.384	0.150	0.670	0.009	0.514	chromite	0.05	0.03	8.05	52.32	5.72	22.79	0.30	9.80	99.06	86.67
43-4_5 olivine2 chromite incl	159	0.002	0.001	0.328	1.459	0.121	0.639	0.011	0.482	chromite	0.06	0.03	7.92	55.15	4.61	21.73	0.38	9.19	99.07	87.44
48-1_2 olivine chromite incl	254	0.002	0.004	0.455	1.170	0.364	0.471	0.009	0.526	chromite	0.06	0.14	11.51	46.39	14.54	16.81	0.32	10.52	100.29	80.12
45-1_5 olivine ill incl	333	0.004	0.013	0.260	0.035	1.672	0.781	0.008	0.228	Al-titanomagnetite	0.10	0.47	6.15	1.31	62.40	26.05	0.25	4.26	100.99	17.53
45-1_5 plag ill incl	339	0.004	0.013	0.260	0.030	1.726	0.706	0.007	0.229	Al-titanomagnetite	0.11	0.48	6.16	1.12	64.42	23.55	0.23	4.28	100.34	15.39

Appendix D

Partition coefficients

Calculated and observed daughter compositions

Table 21 Partition Coefficients

Partition coefficients for basaltic and basaltic andesitic rocks used in fractional crystallization models. Data are a compilation from (Arth, 1976; Fujimaki et al., 1984; Irving and Frey, 1978; Schock, 1979)

Basaltic and Basaltic Andesitic Magmas						
	Plag[1]	Cpx[1]	Ol[1]	Opx[2]	Mt[3]	Il*
Rb	0.071	0.031	0.010	0.022	0	0.01
Ba	0.230	0.026	0.010	0.013	0	0.01
Sr	1.830	0.060	0.014	0.040	0	0.01
V	0	1.350	0.000	0.600	26	30
Cr	0	34	0.7	10	153	32
Ni	0	3.50	15	5	29	10
Zr	0.048	0.10	0.012	0.180	0.1	0.4
Sc	0	3.0	0.170	1.200	2	2
Cu	0	0	0	0	0	2
La	0.190	0.056	0.007	0.003	1.5	0.001
Ce	0.111	0.092	0.006	0.020	1.3	0.001
Nd	0.090	0.230	0.006	0.030	1.0	0.001
Sm	0.072	0.445	0.007	0.050	1.1	0.001
Eu	0.443	0.474	0.007	0.050	0.6	0.001
Gd	0.071	0.556	0.010	0.090	0.0	0.001
Dy	0.063	0.582	0.013	0.150	0.0	0.001
Er	0.057	0.583	0.026	0.230	0.0	0.001
Yb	0.056	0.542	0.049	0.340	0.9	0.001
Y	0.030	0.900	0.010	0.180	0.2	0.001

[1]REE data from Fujimaki et al. (1984)

[2]REE data from Arth (1976)

[3]REE data from Schock (1979)

*IGPET

Table 22 Calculated and Observed Daughter Compositions

Calculated (Calc) and observed (Obs) daughter trace element compositions, the partition coefficients (D) are derived from fractional crystallization models calculated in IGPET modelling software. (A) Gemini-Oscostar volcanic field results. (B) Volsmar volcanic field results.

(A)	D	Parent (Obs) CD-01-1	Daughter (Calc) CD-03-2	Daughter (Obs) CD-03-2	Difference
Rb	0.04	2.78	5.87	6.99	-1.12
Ba	0.09	43.92	89.21	85.1	4.12
Sr	0.98	443.44	450.40	475.7	-25.25
V	3.6	381.73	50.40	205.6	-155.20
Cr	3.97	47.20	4.67	10.5	-5.86
Ni	2.79	41.10	10.20	8.0	2.22
Zr	0.09	21.42	43.51	42.7	0.80
Sc	1.02	38.91	38.31	32.3	5.98
Cu	0.34	168.43	281.59	13.46	268.13
La	0.13	2.48	4.88	4.30	0.58
Ce	0.13	5.90	11.62	10.11	1.51
Nd	0.12	5.74	11.39	7.09	4.30
Sm	0.12	1.65	3.27	2.15	1.12
Eu	0.11	0.70	1.40	0.91	0.49
Gd	0.11	2.16	4.32	2.39	1.93
Dy	0.11	2.39	4.78	2.55	2.23
Er	0.1	1.53	3.08	1.69	1.39
Yb	0.1	1.55	3.12	1.76	1.36
Y	0.1	13.29	26.79	15.3	11.52

Table 22 continued

	D	Parent (Obs) CD-05-1	Daughter (Calc) CD-04-1	Daughter (Obs) CD-04-1	Difference
Rb	0.04	10.75	15.18	11.27	3.91
Ba	0.07	105.63	147.57	155.90	-8.33
Sr	0.73	352.83	388.80	329.27	59.53
V	3.13	208.22	96.81	180.29	-83.48
Cr	6.18	214.15	33.26	10.22	23.04
Ni	2.5	53.54	31.22	7.48	23.74
Zr	0.13	46.20	63.17	63.23	-0.06
Sc	1.72	31.05	23.97	27.32	-3.35
Cu	0.26	60.33	78.72	28.41	50.31
La	0.12	5.44	7.46	5.64	1.82
Ce	0.14	13.19	17.97	13.08	4.89
Nd	0.15	9.91	13.45	9.97	3.48
Sm	0.16	2.73	3.69	2.50	1.19
Eu	0.17	0.85	1.15	1.06	0.09
Gd	0.18	2.97	3.99	2.82	1.17
Dy	0.18	3.07	4.12	3.61	0.51
Er	0.18	1.85	2.48	2.38	0.10
Yb	0.18	2.07	2.78	2.61	0.17
Y	0.18	17.91	24.05	19.88	4.17
	D	**Parent (Obs) CD-03-2**	**Daughter (Calc) CD-02-1**	**Daughter (Obs) CD-02-1**	**Difference**
Rb	0.05	6.99	11.81	14.02	-2.21
Ba	0.1	85.1	139.80	149.13	-9.33
Sr	1.1	475.7	450.12	349.48	100.64
V	3.82	205.6	43.39	104.76	-61.37
Cr	4.03	10.5	1.98	11.55	-9.57
Ni	1.68	8.0	5.48	6.30	-0.82
Zr	0.09	42.7	70.56	64.13	6.43
Sc	1.03	32.3	31.80	22.01	9.79
Cu	0.36	13.46	19.16	14.17	4.99
La	0.14	4.30	6.91	7.41	-0.50
Ce	0.14	10.11	16.25	17.31	-1.06
Nd	0.13	7.09	11.46	12.79	-1.33
Sm	0.12	2.15	3.49	3.43	0.06
Eu	0.12	0.91	1.48	0.96	0.52
Gd	0.12	2.39	3.88	3.97	-0.09
Dy	0.11	2.55	4.17	4.23	-0.06
Er	0.1	1.69	2.78	2.81	-0.03
Yb	0.1	1.76	2.89	2.95	-0.06
Y	0.1	15.3	25.09	24.43	0.66

Table 22 continued

	D	Parent (Obs) CD-03-2	Daughter (Calc) CD-02-5	Daughter (Obs) CD-02-5	Difference
Rb	0.04	6.99	8.70	11.70	-3.00
Ba	0.08	85.1	104.96	118.51	-13.55
Sr	0.81	475.7	496.72	425.12	71.60
V	5.13	205.6	80.13	133.82	-53.69
Cr	5.72	10.5	3.59	11.69	-8.10
Ni	2.36	8.0	5.85	5.51	0.34
Zr	0.12	42.7	52.21	54.91	-2.70
Sc	1.48	32.3	28.98	23.81	5.17
Cu	0.48	13.46	15.16	28.34	-13.18
La	0.12	4.30	5.26	6.65	-1.39
Ce	0.13	10.11	12.33	15.22	-2.89
Nd	0.13	7.09	8.65	11.71	-3.06
Sm	0.13	2.15	2.62	3.48	-0.86
Eu	0.13	0.91	1.11	0.90	0.21
Gd	0.14	2.39	2.91	3.68	-0.77
Dy	0.13	2.55	3.11	3.67	-0.56
Er	0.13	1.69	2.06	2.42	-0.36
Yb	0.13	1.76	2.15	2.72	-0.57
Y	0.13	15.3	18.62	21.03	-2.41
	D	**Parent (Obs) CD-08-6**	**Daughter (Calc) CD-08-1**	**Daughter (Obs) CD-08-1**	**Difference**
Rb	0.06	2.87	3.28	4.43	-1.15
Ba	0.11	40.78	46.26	63.97	-17.71
Sr	1.23	353.24	341.92	302.95	38.97
V	0.3	318.96	352.19	450.93	-98.74
Cr	2.78	27.87	21.66	14.26	7.40
Ni	1.84	35.46	31.48	16.25	15.23
Zr	0.07	35.01	39.94	56.25	-16.31
Sc	0.83	40.41	41.39	42.99	-1.60
Cu	0	140.24	161.57	116.88	44.69
La	0.16	2.33	2.62	4.65	-2.03
Ce	0.16	6.51	7.33	11.40	-4.07
Nd	0.15	5.87	6.62	9.99	-3.37
Sm	0.14	2.02	2.28	2.87	-0.59
Eu	0.14	0.70	0.79	1.26	-0.47
Gd	0.14	2.25	2.54	3.93	-1.39
Dy	0.13	2.57	2.91	4.43	-1.52
Er	0.12	1.44	1.63	3.00	-1.37
Yb	0.12	1.80	2.04	2.93	-0.89
Y	0.12	14.13	16.00	25.02	-9.02

Table 22 continued

	D	Parent (Obs) CD-04-2	Daughter (Calc) CD-03-2	Daughter (Obs) CD-03-2	Difference
Rb	0.06	0.24	1.77	6.99	-5.22
Ba	0.13	11.99	76.40	85.09	-8.69
Sr	1.41	439.95	183.81	475.65	-291.84
V	1.89	245.78	36.96	205.60	-168.64
Cr	1.9	22.62	3.33	10.53	-7.20
Ni	1.35	22.73	10.79	7.98	2.81
Zr	0.05	7.68	58.02	42.71	15.31
Sc	0.48	29.59	89.51	32.33	57.18
Cu	0.18	30.14	172.66	13.46	159.20
La	0.17	0.56	3.28	4.30	-1.02
Ce	0.15	1.58	9.65	10.11	-0.46
Nd	0.13	1.74	11.09	7.09	4.00
Sm	0.11	0.61	4.06	2.15	1.91
Eu	0.1	0.30	2.04	0.91	1.13
Gd	0.1	0.67	4.55	2.39	2.16
Dy	0.09	1.02	7.08	2.55	4.53
Er	0.07	0.54	3.91	1.69	2.22
Yb	0.06	0.66	4.88	1.76	3.12
Y	0.07	5.04	36.49	15.27	21.22
(B)	**D**	**Parent (Obs) CD-48-1**	**Daughter (Calc) CD-44-1**	**Daughter (Obs) CD-44-1**	**Difference**
Rb	0.02	2.52	4.33	4.28	0.05
Ba	0.02	38.79	66.60	53.15	13.45
Sr	0.07	252.69	422.08	460.31	-38.23
V	2.05	235.63	132.03	377.52	-245.49
Cr	7.75	1698.30	41.01	40.85	0.16
Ni	7.06	223.16	7.88	39.96	-32.08
Zr	0.16	15.24	24.22	19.92	4.30
Sc	2.16	51.56	27.19	48.77	-21.58
Cu	0.13	49.83	80.52	120.12	-39.60
La	0.06	2.21	3.71	4.15	-0.44
Ce	0.09	4.79	7.91	8.82	-0.91
Nd	0.12	3.89	6.32	6.85	-0.53
Sm	0.14	1.28	2.06	1.70	0.36
Eu	0.16	0.41	0.65	0.63	0.02
Gd	0.17	1.45	2.29	2.07	0.22
Dy	0.18	1.44	2.26	1.98	0.28
Er	0.19	1.02	1.59	1.20	0.39
Yb	0.20	1.07	1.66	1.02	0.64
Y	0.19	8.10	12.66	10.58	2.08

Table 22 continued

	D	Parent (Obs) CD-48-1	Daughter (Calc) CD-45-1	Daughter (Obs) CD-45-1	Difference
Rb	0.02	2.52	4.88	3.46	1.42
Ba	0.02	38.79	75.04	47.67	27.37
Sr	0.07	252.69	472.66	453.60	19.06
V	2.56	235.63	82.42	365.16	-282.74
Cr	7.81	1698.30	17.32	50.46	-33.14
Ni	6.77	223.16	4.58	22.29	-17.71
Zr	0.17	15.24	26.65	14.95	11.70
Sc	2.18	51.56	23.29	44.38	-21.09
Cu	0.18	49.83	86.55	105.63	-19.08
La	0.06	2.21	4.16	3.03	1.13
Ce	0.09	4.79	8.84	6.76	2.08
Nd	0.12	3.89	7.04	6.20	0.84
Sm	0.15	1.28	2.27	1.76	0.51
Eu	0.16	0.41	0.72	0.62	0.10
Gd	0.17	1.45	2.54	1.87	0.67
Dy	0.19	1.44	2.48	1.93	0.55
Er	0.2	1.02	1.75	1.09	0.66
Yb	0.21	1.07	1.82	1.27	0.55
Y	0.2	8.10	13.88	10.14	3.74
	D	**Parent (Obs) CD-43-1**	**Daughter (Calc) CD-46-1**	**Daughter (Obs) CD-46-1**	**Difference**
Rb	0.02	5.81	8.96	5.97	2.99
Ba	0.02	57.54	88.70	74.55	14.15
Sr	0.06	254.89	386.04	515.01	-128.97
V	0.95	274.91	281.05	377.78	-96.73
Cr	9.9	757.78	14.88	87.20	-72.32
Ni	5.28	158.52	23.95	24.98	-1.03
Zr	0.13	27.09	39.78	21.25	18.53
Sc	2.6	46.64	23.01	45.36	-22.35
Cu	0	89.40	139.04	112.13	26.91
La	0.05	4.68	7.12	4.60	2.52
Ce	0.07	9.43	14.22	9.94	4.28
Nd	0.1	6.91	10.28	7.19	3.09
Sm	0.12	1.52	2.24	1.77	0.47
Eu	0.13	0.54	0.79	0.74	0.05
Gd	0.14	1.96	2.87	1.93	0.94
Dy	0.15	1.64	2.39	1.67	0.72
Er	0.16	1.13	1.64	1.27	0.37
Yb	0.18	1.17	1.68	0.92	0.76
Y	0.16	9.57	13.87	10.39	3.48

Table 22 continued

	D	Parent (Obs) CD-45-2	Daughter (Calc) CD-42-3	Daughter (Obs) CD-42-3	Difference
Rb	0.04	3.44	3.76	6.27	-2.51
Ba	0.07	55.71	60.69	87.98	-27.29
Sr	0.76	474.39	484.99	553.14	-68.15
V	2.88	379.83	319.43	355.73	-36.30
Cr	5.2	37.44	25.43	44.52	-19.09
Ni	3.31	19.43	15.71	31.91	-16.20
Zr	0.12	15.37	16.67	25.86	-9.19
Sc	1.44	44.23	42.47	38.30	4.17
Cu	0.24	147.11	157.78	232.22	-74.44
La	0.12	3.24	3.51	4.67	-1.16
Ce	0.13	6.84	7.41	10.31	-2.90
Nd	0.13	6.01	6.51	8.27	-1.76
Sm	0.14	1.68	1.82	2.15	-0.33
Eu	0.15	0.57	0.62	0.70	-0.08
Gd	0.15	1.95	2.11	2.21	-0.10
Dy	0.15	1.90	2.05	2.18	-0.13
Er	0.15	1.26	1.36	1.44	-0.08
Yb	0.15	1.46	1.58	1.40	0.18
Y	0.15	10.73	11.60	12.20	-0.60
	D	**Parent (Obs) CD-46-3**	**Daughter (Calc) CD-42-4a**	**Daughter (Obs) CD-42-4a**	**Difference**
Rb	0.04	4.26	5.56	2.71	2.85
Ba	0.07	56.87	73.59	38.83	34.76
Sr	0.75	461.69	494.80	347.99	146.81
V	3.46	360.47	182.33	368.50	-186.17
Cr	5.55	117.60	33.34	35.36	-2.02
Ni	2.98	32.88	19.00	19.37	-0.37
Zr	0.12	22.60	28.84	32.87	-4.03
Sc	1.51	44.67	38.78	38.22	0.56
Cu	0.3	77.66	94.28	117.66	-23.38
La	0.12	3.30	4.21	2.67	1.54
Ce	0.13	7.50	9.54	6.84	2.70
Nd	0.14	5.67	7.20	6.16	1.04
Sm	0.14	1.05	1.33	1.95	-0.62
Eu	0.15	0.50	0.63	0.85	-0.22
Gd	0.15	1.55	1.96	2.58	-0.62
Dy	0.15	1.51	1.91	2.94	-1.03
Er	0.15	0.86	1.09	1.66	-0.57
Yb	0.15	1.00	1.27	2.05	-0.78
Y	0.15	7.86	9.95	15.98	-6.03

Table 22 continued

	D	Parent (Obs) CD-46-3	Daughter (Calc) CD-42-4b	Daughter (Obs) CD-42-4b	Difference
Rb	0.03	4.26	5.24	6.20	-0.96
Ba	0.05	56.87	69.64	82.61	-12.97
Sr	0.45	461.69	519.13	505.99	13.14
V	3.92	360.47	193.42	365.59	-172.17
Cr	6.89	117.60	33.50	50.76	-17.26
Ni	4.09	32.88	17.02	25.38	-8.36
Zr	0.15	22.60	27.09	23.27	3.82
Sc	1.89	44.67	36.95	39.73	-2.78
Cu	0.33	77.66	89.58	142.87	-53.29
La	0.1	3.30	4.00	4.28	-0.28
Ce	0.12	7.50	9.05	10.11	-1.06
Nd	0.13	5.67	6.83	7.98	-1.15
Sm	0.15	1.05	1.26	1.92	-0.66
Eu	0.16	0.50	0.60	0.75	-0.15
Gd	0.17	1.55	1.85	2.11	-0.26
Dy	0.18	1.51	1.80	1.98	-0.18
Er	0.18	0.86	1.02	1.27	-0.25
Yb	0.19	1.00	1.19	1.33	-0.14
Y	0.18	7.86	9.36	10.80	-1.44