ELECTRON MICROPROBE ANALYSES OF LITHIC FRAGMENTS AND THEIR MINERALS FROM LUNA 20 FINES

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Special Publication Number 12, UNM INSTITUTE OF METEORITICS (1973)

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INTRODUCTION

Here we present bulk analyses of lithic fragments from Luna 20 fines as well as analyses of their constituent minerals, obtained by electron microprobe techniques. All of the bulk analyses and most of the mineral analyses have not been previously published. The interpretation of these data and the conclusions drawn are presented in Prinz et al. (1973) and Brett et al. (1973).

The lithic fragments are classified using the terminology of Prinz et al. (1973). The terminology is given below and abbreviations (in parentheses) are used in the tables strictly for the purpose of saving space.

Anorthositic-noritic-troctolitic suite (ANT)
- Anorthosite (A)
- Noritic and troctolitic anorthosite (NATA)
- Anorthositic norite and troctolite (ANAT)
- (Spinel) troctolite (SPT)

High-Alumina Basalt Suite (HAB)
Mare Basalt (MB)

The bulk analyses (determined with the broad beam electron microprobe technique, Prinz et al., 1971) of lithic fragments are given in weight percentages and are arranged according to the rock classification (Tables 1 through 6). Within each rock group the analyses are arranged in order of increasing FeO content. Thin section and lithic fragment numbers are given at the top of each column of analysis and correspond to the numbers recorded on photo mosaics on file in the Institute of Meteoritics. CIPW molecular norms are given for each analysis.

Electron microprobe mineral analyses (given in oxide weight percentages), structural formulae and molecular end member values are presented for plagioclase, olivine, pyroxene and K-feldspar. The minerals are selected mostly from lithic fragments that were also analyzed for bulk composition. Some of the mineral analyses are partial analyses and, hence, the structural formulae are not given. Some of the pyroxene analyses have somewhat low totals. This is primarily due to conductivity problems encountered, in individual thin sections of very small lithic fragments during electron microprobe analysis. Repeated analysis and repolishing and carbon coating did not improve the analyses significantly. Although the oxide percentages are slightly low, it probably has little effect on the major element proportions and hence the molecular end member values are considered representative.

Within each mineral group the analyses are presented according to the section number and lithic fragment number. Within each lithic fragment the mineral analyses are arranged as follows: Plagioclase in order of increasing CaO; olivine and pyroxene in order of increasing FeO; and K-feldspar in order of increasing K_2O. The mineral grains are identified at the top of each column of analysis by grain number and lithic fragment number. These numbers are recorded on photo mosaics on file in the Institute of Meteoritics.

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Prinz M., Dowty E., Keil K. and Bunch T. E. (1973) Mineralogy, petrology and chemistry of lithic fragments from Luna 20 fines: origin of the cumulate ANT suite and its relationship to high-alumina and mare basalts. Geochim. Cosmochim. Acta 37, 979-1006.

The following notation is used in all tables

n.d. Not determined

* Less than 0.01 weight percent

LITHIC FRAGMENTS

ANT SUITE ROCKS

ANORTHOSITE

TABLE 1: BULK ANALYSES OF ANORTHOSITE

Section	18	17	11	18	18	18	17
Fragment	25	48	17	64	95	162a	100
SiO_2	43.5	44.8	45.3	43.8	47.4	43.3	43.1
TiO_2	*	.06	.06	.04	.13	.08	.08
Al_2O_3	34.4	34.1	33.4	33.0	32.4	31.9	33.3
Cr_2O_3	.03	.02	.02	*	.05	.04	.01
FeO	.49	1.07	1.12	1.35	1.36	1.77	2.79
MnO	.01	.03	.02	.03	.03	.02	.03
MgO	1.13	.81	1.02	2.66	.92	2.52	2.60
CaO	18.7	18.9	18.8	17.7	18.4	17.8	18.1
Na_2O	.21	.43	.36	.59	.30	.40	.25
K_2O	*	.05	.03	.02	*	.02	.03
P_2O_5	.03	.04	.04	.01	.03	.04	.05
ZrO_2	.01	n.d.	n.d.	*	.01	*	n.d.
Total	98.51	100.31	100.17	99.11	101.03	97.89	100.25
CIPW Molecular Norms							
q	.18	.17	1.17	--	4.38	-	--
c	.15	--	--	.01	--	--	.08
z	.01	--	--	--	.01	--	--
or	--	.29	.18	.12	--	.12	.18
ab	1.91	3.85	3.23	4.50	2.68	3.65	1.86
an	93.74	90.67	89.34	87.88	86.60	86.67	89.01
ne	--	--	--	--	--	--	.22
di wo	--	1.00	1.42	--	1.59	1.15	--
di en	--	.58	8.89	--	.90	.84	--
di fs	--	.42	.53	--	.69	.32	--
hy en	3.16	1.64	1.92	1.06	1.62	1.58	--
hy fs	.76	1.18	1.14	.30	1.24	.60	--
ol fo	--	--	--	4.72	--	3.49	5.35
ol fa	--	--	--	1.34	--	1.33	3.07
cm	.03	.02	.02	--	.05	.04	.01
il	--	.08	.08	.06	.18	.11	.11
ap	.06	.08	.08	.02	.06	.09	.11

TABLE 2: BULK ANALYSES OF NORITIC AND TROCTOLITIC ANORTHOSITE

Section	19	8	21	19	18	20	10	18	18	18
Fragment	63	28	17	22	185	30	4	210	22	47
SiO_2	44.9	44.9	43.8	44.8	44.0	46.1	44.9	44.1	45.4	43.7
TiO_2	.19	.20	.19	.19	.03	.32	13.0	.12	.08	.35
Al_2O_3	31.0	31.4	29.8	28.2	28.3	31.1	30.3	27.7	31.4	31.0
Cr_2O_3	.10	.05	.06	.14	.02	.1	.06	.08	.04	.04
FeO	2.00	2.41	2.78	2.80	2.86	2.94	2.94	3.0	3.2	3.2
MnO	.10	.05	.04	.10	.03	.03	.08	.02	.03	.06
MgO	3.4	3.2	3.5	6.6	9.1	3.1	3.2	6.3	3.4	2.94
CaO	17.6	17.8	16.8	16.1	15.0	17.7	17.5	16.1	17.5	17.3
Na_2O	.32	.50	.57	.33	.60	.47	.35	.53	.40	.57
K_2O	.07	.09	.03	.04	.04	.04	.14	.05	*	.03
P_2O_5	.03	.07	.06	.06	.02	.02	.06	.02	.02	.08
ZrO_2	n.d.	n.d.	.01	n.d.	*	n.d.	n.d.	*	*	*
Total	99.79	100.67	97.64	99.36	100.00	101.87	99.66	98.02	101.47	99.27
CIPW Molecular Norms										
q	--	--	--	--	--	--	--	--	--	--
c	--	--	--	--	.05	--	--	--	--	--
z	--	--	.01	--	--	--	--	--	--	--
or	.41	.52	.18	.23	.23	.23	.83	.30	--	.18
ab	2.87	4.44	5.22	2.95	5.26	4.14	3.15	4.79	3.53	5.14
an	82.79	82.30	80.24	74.97	72.48	81.07	80.91	73.62	82.50	82.41
ne	--	--	--	--	--	--	--	--	--	--
di wo	1.66	1.84	1.74	1.64	--	1.97	2.29	2.69	1.10	1.34
di en	1.27	1.32	1.23	1.33	--	1.33	1.52	2.14	.72	.86
di fs	.39	.52	.52	.30	--	.64	.77	.55	.37	.48
hy en	6.24	2.30	3.43	8.43	.90	6.03	5.00	3.58	4.99	.88
hy fs	1.89	.91	1.44	1.91	.16	2.90	2.52	.92	2.59	.49
ol fo	1.57	3.84	3.90	6.27	17.70	.77	1.75	8.85	2.63	4.81
ol fa	.48	1.52	1.64	1.42	3.12	.37	.88	2.27	1.36	2.69
cm	.11	.05	.07	.15	.02	.05	.06	.09	.04	.04
il	.26	.28	.27	.26	.04	.44	.18	.17	.11	.49
ap	.06	.14	.13	.12	.04	.04	.12	.04	.04	.17

NORITIC AND TROCTOLITIC ANORTHOSITE

TABLE 2: CONTINUED

Section	18	18	12	21	9	12	20	17	17	18
Fragment	27	37	39	15	7	61	21	1	84	214
SiO_2	43.7	45.8	43.7	43.8	44.8	45.8	45.1	45.6	45.3	42.3
TiO_2	.11	.33	.38	.79	.15	.29	.25	.51	.28	1.56
Al_2O_3	31.5	29.3	30.0	29.7	30.0	27.7	28.5	29.6	28.4	29.1
Cr_2O_3	.06	.09	.05	.04	.08	.10	.11	.11	.08	.06
FeO	3.3	3.6	3.7	3.7	3.9	4.1	4.3	4.4	4.5	4.9
MnO	.03	.05	.05	.06	.08	.06	.06	.06	.05	.04
MgO	2.87	4.7	2.92	5.3	4.1	4.6	4.4	4.0	4.5	4.1
CaO	18.3	16.6	17.0	16.4	17.1	16.2	16.4	16.7	16.5	16.1
Na_2O	.26	.48	.41	.63	.33	.45	.50	.45	.36	.64
K_2O	*	.06	*	.25	.11	.03	.09	.05	.04	.32
P_2O_5	.03	.04	.04	.23	.07	.03	.05	.01	.06	.40
ZrO_2	*	.03	*	.02	n.d.	*	n.d.	n.d.	n.d.	.02
Total	100.16	101.08	98.25	100.92	100.72	99.36	99.76	101.49	100.47	99.54
CIPW Molecular Norms										
q	--	--	--	--	--	--	--	--	--	--
c	--	--	--	--	--	--	--	--	--	--
z	--	.03	--	.02	--	--	--	--	--	.02
or	--	.35	--	1.45	.64	.18	.53	.29	.24	1.90
ab	2.33	4.25	3.75	4.99	2.94	4.06	4.49	3.98	3.23	4.91
an	84.66	76.52	81.60	76.21	79.37	73.91	75.35	77.54	75.74	76.08
ne	--	--	--	--	--	--	--	--	--	.52
di wo	2.31	1.76	1.65	.93	1.71	2.59	2.31	1.64	2.27	.67
di en	1.42	1.26	1.00	.71	1.12	1.83	1.52	1.06	1.48	.45
di fs	.89	.50	.65	.23	.58	.18	.79	.59	.79	.22
hy en	.46	7.58	4.21	--	4.41	19.44	6.04	6.70	8.08	--
hy fs	.29	3.00	2.74	--	2.30	4.90	3.15	3.71	4.29	--
ol fo	4.52	2.96	2.25	10.26	4.26	.38	3.45	2.35	2.14	8.20
ol fa	2.83	1.17	1.47	3.29	2.22	.18	1.80	1.30	1.14	3.94
cm	.06	.10	.06	.04	.09	.11	.12	.12	.09	.07
il	.15	.45	.54	1.08	.21	.41	.35	.70	.39	2.19
ap	.06	.08	.08	.47	.14	.06	.10	.02	.12	.84

TABLE 3: BULK ANALYSES OF ANORTHOSITIC NORITE AND TROCTOLITE

Section	18	19	18	10	9	12	11	18	1	8	4	7	21
Fragment	171	80	208	8	13	35	45	128	1	10	5	5	16
SiO_2	45.4	45.9	41.6	46.1	44.8	44.8	45.1	44.4	48.4	43.6	44.1	45.1	44.6
TiO_2	.24	.19	*	.12	.12	.11	.16	.20	.29	.13	.19	.11	.18
Al_2O_3	27.1	27.0	27.6	28.7	25.1	27.4	27.9	26.7	26.0	27.6	26.5	26.9	26.5
Cr_2O_3	.12	.07	.02	.12	.07	.09	.08	.08	.06	.10	.08	.08	.11
FeO	1.83	2.30	2.80	2.90	3.4	3.4	3.6	3.7	3.7	3.7	3.7	3.8	3.9
MnO	.02	.08	.04	.08	.06	.04	.07	.02	.07	.09	.04	.07	.05
MgO	5.5	8.8	11.4	8.0	11.7	7.8	8.9	7.9	5.2	8.5	8.2	8.1	7.8
CaO	17.8	14.6	15.3	15.2	14.7	15.6	15.6	15.1	15.0	15.4	15.3	15.4	15.2
Na_2O	.52	.32	.19	.34	.36	.47	.44	.26	.78	.30	.31	.33	.58
K_2O	.08	.03	*	.11	.06	.03	.05	.03	.67	.12	.01	.77	.07
P_2O_5	.05	.03	.03	.06	.05	.04	.04	.06	.07	.04	.03	.06	.08
ZrO_2	*	n.d.	*	n.d.	n.d.	*	n.d.	*	n.d.	n.d.	n.d.	n.d.	.01
Total	98.66	99.32	98.98	101.73	100.42	99.78	101.04	98.45	100.24	99.58	98.46	100.02	99.08
CIPW Molecular Norms													
q	--	--	+	--	--	--	--	--	--	--	--	--	--
c	--	--		.56	--	--	--	--	--	--	--	--	--
z	--	--		--	--	--	--	--	--	--	--	--	.01
or	.47	.17		.63	.34	.18	.29	.18	3.43	.70	.06	.41	.41
ab	4.67	2.84		2.95	3.13	4.16	3.85	2.34	6.96	2.66	2.69	2.92	5.18
an	71.66	71.26		72.54	64.65	71.61	72.12	71.77	65.04	72.66	70.97	70.71	69.15
ne	--	--		--	--	--	--	--	--	--	--	--	--
di wo	6.66	.03		--	2.28	1.80	1.21	1.16	3.37	.99	1.90	1.69	2.14
di en	5.74	.02		--	1.97	1.45	.97	.93	2.45	.80	1.53	1.34	1.68
di fs	.92	--		--	.31	.34	.24	.23	.92	.19	.37	.35	.45
hy en	3.52	16.90		12.44	5.09	5.71	5.64	10.53	11.81	2.73	7.50	8.54	5.26
hy fs	.57	2.35		2.46	.81	1.35	1.38	2.62	4.44	.65	1.84	2.21	1.41
ol fo	4.49	5.30		6.69	18.17	10.56	11.17	7.79	--	14.71	10.21	9.12	10.85
ol fa	.72	.73		1.32	2.89	2.51	2.73	1.94	--	3.52	2.50	2.36	2.92
cm	.13	.07		.13	.07	.10	.08	.09	.06	.11	.09	.08	.12
il	.34	.26		.16	.16	.15	.22	.28	.40	.18	.26	.15	.25
ap	.10	.06		.12	.10	.08	.08	.13	.14	.08	.06	.12	.17

+ Insufficient SiO_2 for olivine

ANORTHOSITIC NORITE AND TROCTOLITE

TABLE 3: CONTINUED

Section	7	2	18	7	1	7	18	4	18	19	4	11	18
Fragment	15	3	178	12	3	36	98	2	51	91	4	9	197
SiO_2	47.9	45.6	41.1	45.5	42.9	44.6	47.4	44.4	45.5	45.6	45.4	45.9	45.4
TiO_2	.26	.35	.35	.20	.14	.15	.50	.21	.25	.25	.22	.60	.23
Al_2O_3	24.0	26.8	27.2	26.9	26.9	25.0	21.7	27.5	26.3	23.5	27.1	26.0	24.6
Cr_2O_3	.14	.16	.14	.10	.05	.10	.20	.07	.12	.14	.08	.13	.09
FeO	4.1	4.2	4.2	4.3	4.5	4.6	4.6	4.6	4.7	4.8	4.8	4.9	5.0
MnO	.10	.08	.06	.09	.07	.09	.09	.05	.06	.14	.08	.08	.07
MgO	8.5	7.1	8.5	6.7	8.2	11.2	9.3	5.4	7.6	12.0	5.5	6.3	8.1
CaO	14.5	15.0	17.8	15.4	15.1	14.3	16.6	16.5	15.8	12.4	16.2	15.4	14.2
Na_2O	.38	.48	.05	.48	.32	.37	.45	.16	.17	.45	.14	.49	.49
K_2O	.07	.14	.01	.15	.11	.13	.07	*	*	.14	*	.13	.13
P_2O_5	.05	.09	.05	.08	.07	.09	.03	.04	.03	.05	.02	.06	.11
ZrO_2	n.d.	n.d.	*	n.d.	n.d.	n.d.	*	n.d.	*	n.d.	n.d.	n.d.	*
Total	100.00	100.00	99.46	99.90	98.36	100.63	100.94	98.85	100.53	99.47	99.49	100.00	98.42
CIPW Molecular Norms													
q	.27	--	--	--	--	--	--	--	--	--	--	--	--
c	--	--	--	--	--	--	--	--	--	.20	--	--	--
z	--	--	--	--	--	--	--	--	--	--	--	--	--
or	.41	.82	--	.88	.65	.74	.41	--	--	.81	--	.76	.77
ab	3.78	4.27	--	4.28	2.88	3.23	3.96	1.45	1.51	3.97	1.26	4.38	4.42
an	62.95	69.92	--	70.30	71.78	64.30	55.92	75.03	70.11	60.07	73.60	68.16	64.92
ne	--	--	--	--	--	--	--	--	--	--	--	--	--
di wo	3.18	1.29	--	2.01	1.12	1.62	9.87	2.93	2.83	--	2.77	3.04	2.08
di en	2.52	.98	--	1.49	.86	1.32	7.90	2.91	2.13	--	1.88	2.19	1.56
di fs	.65	.30	--	.52	.26	.30	1.98	.92	.70	--	.89	.85	.52
hy en	20.70	10.71	--	8.64	2.28	5.22	8.95	8.01	10.92	15.31	11.93	10.67	12.39
hy fs	5.33	3.29	--	3.01	.69	1.18	2.24	3.69	3.61	3.33	5.65	4.16	4.14
ol fo	--	5.79	--	6.17	14.65	17.62	6.25	3.77	5.74	12.90	1.07	3.36	6.40
ol fa	--	1.78	--	2.15	4.43	3.98	1.56	1.73	1.90	2.81	.51	1.13	2.14
cm	.15	.17	--	.11	.06	.11	.22	.08	.13	.15	.09	.14	.10
il	.36	.48	--	.28	.20	.20	.68	.29	.34	.34	.31	.83	.32
ap	.10	.19	--	.17	.15	.18	.06	.08	.06	.10	.04	.12	.23

TABLE 3: CONTINUED

Section	18	14	14	21	9	18	20	12	19	8	17	4	18
Fragment	48	8	7	6	20	209	27	47	56	2	87	6	2
SiO_2	47.6	44.6	44.6	43.9	46.8	45.2	44.8	44.9	43.6	46.6	45.7	45.6	48.0
TiO_2	.43	.56	.33	.17	.31	.37	1.83	.14	.37	.18	.46	.35	.40
Al_2O_3	23.0	24.0	25.5	23.4	25.6	24.4	23.9	22.7	25.1	22.4	22.9	24.3	22.3
Cr_2O_3	.17	.12	.07	.10	.09	.13	.18	.07	.14	.17	.11	.11	.18
FeO	5.1	5.1	5.2	5.2	5.2	5.3	5.4	5.6	5.6	5.9	6.0	6.0	6.1
MnO	.08	.09	.07	.06	.09	.05	.06	.06	.11	.12	.08	.08	.10
MgO	7.9	9.2	6.6	11.1	6.7	7.5	6.7	12.9	9.5	11.1	10.7	8.5	9.6
CaO	15.2	14.3	15.4	13.8	15.6	14.4	14.9	14.1	13.5	13.0	13.7	14.7	14.2
Na_2O	.59	.30	.24	.37	.37	.59	.44	.36	.35	.35	.49	.25	.48
K_2O	.18	*	.01	.03	.12	.11	.15	.01	.07	.10	.14	*	.09
P_2O_5	.22	*	.02	.02	.05	.18	.03	.03	.03	.05	.07	.04	.14
ZrO_2	.09	n.d.	n.d.	.01	n.d.	.04	n.d.	*	n.d.	n.d.	.00	n.d.	.04
Total	100.59	98.27	98.06	98.16	100.93	98.19	98.39	100.87	98.37	99.97	100.35	99.93	101.63
CIPW Molecular Norms													
q	--	--	--	--	--	--	--	--	--	--	--	--	--
c	--	--	--	--	--	--	-	--	--	--	--	--	--
z	.08	--	--	.01	--	.04	--	--	--	--	--	--	.04
or	1.05	--	.06	.18	.70	.56	.00	.06	.41	.58	.81	--	.52
ab	5.24	2.71	2.19	3.32	3.28	4.54	4.02	3.13	3.15	3.09	4.32	2.23	4.21
an	58.95	64.53	69.64	61.99	67.03	64.79	63.94	58.34	66.86	58.38	58.78	64.82	57.05
ne	--	--	--	--	--	--	--	--	--	--	--	--	--
di wo	5.69	2.73	3.16	2.48	3.64	2.53	4.44	3.66	.02	1.93	2.99	2.97	4.33
di en	4.26	2.13	2.23	1.98	2.57	1.84	3.39	2.95	.02	1.49	2.31	2.16	5.24
di fs	1.43	.60	.94	.51	1.07	.68	1.06	.71	.01	.44	.68	.81	1.09
hy en	14.21	12.06	10.81	7.95	12.46	12.32	12.78	5.04	8.91	17.80	10.26	12.94	17.44
hy fs	4.76	3.41	4.54	1.80	5.19	4.58	3.99	1.21	2.80	10.55	3.02	4.88	5.87
ol fo	2.32	8.51	4.11	16.16	2.43	5.09	2.09	19.84	13.01	8.16	12.31	6.17	3.89
ol fa	.78	2.40	1.73	4.14	1.01	1.89	.62	4.75	4.08	2.38	3.62	2.33	1.31
cm	.18	.13	.08	.11	.10	.14	.20	.07	.15	.18	.12	.12	.19
il	.59	.78	.47	.24	.43	.52	2.59	.19	.52	.25	.63	.48	.54
ap	.45	--	.04	.04	.10	.38	.06	.06	.06	.10	.14	.08	.28

TABLE 3: CONTINUED

Section	18	20	2	17	8	8	19	4	11	20	20	18	17
Fragment	182	6	8	19	12	8	40	3	46	8	29	147	63
SiO_2	45.2	46.1	47.1	45.3	46.4	47.3	44.8	44.3	44.8	44.4	46.6	45.5	51.4
TiO_2	.53	.58	.26	.69	.66	.27	1.15	.75	.54	.44	.86	.66	.44
Al_2O_3	22.6	24.0	23.4	22.5	21.5	22.2	24.7	24.2	24.4	23.9	22.3	21.4	21.3
Cr_2O_3	.29	.10	.16	.15	.21	.14	.15	.13	.10	.14	.15	.16	.15
FeO	6.1	6.1	6.2	6.4	6.4	6.5	6.5	6.5	6.5	6.5	6.5	6.6	6.7
MnO	.09	.06	.13	.07	.12	.14	.13	.11	.11	.10	.09	.08	.08
MgO	8.3	8.5	9.0	10.0	10.3	10.9	9.1	7.3	8.4	8.4	10.4	9.4	8.4
CaO	14.2	13.8	13.1	13.7	13.0	13.5	13.0	14.3	14.2	14.7	13.4	13.2	12.3
Na_2O	.40	.50	.50	.47	.59	.49	.59	.21	.53	.41	.52	.53	.92
K_2O	.22	.12	.20	.22	.21	.13	.15	.02	.17	.08	.15	.11	.23
P_2O_5	.14	.14	.13	.24	.19	.14	.02	.05	.09	.05	.18	.14	.08
ZrO_2	.03	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	*	n.d.	.02	n.d.
Total	98.10	100.00	100.18	99.74	99.49	101.71	100.27	97.77	99.84	99.12	101.15	97.80	102.00
CIPW Molecular Norms													
q	--	--	--	--	--	--	--	--	--	--	--	--	2.52
c	--	--	--	--	--	--	.14	--	--	--	--	--	--
z	.03	--	--	--	--	--	--	--	--	--	--	.02	--
or	1.32	.70	1.17	1.29	1.23	.74	.89	.12	1.00	.47	.67	.66	1.33
ab	3.64	4.46	4.44	4.18	4.46	4.27	4.44	1.93	4.73	3.69	4.57	4.93	8.07
an	60.11	62.46	60.41	58.18	55.53	56.29	63.06	66.65	63.33	63.29	56.85	56.54	52.12
ne	--	--	--	--	--	--	--	--	--	--	--	--	--
di wo	4.18	1.85	1.23	3.98	2.96	3.13	--	2.28	2.44	3.79	2.82	3.60	2.81
di en	3.04	1.35	.90	2.32	2.25	2.36	--	1.56	1.74	2.69	2.16	2.65	1.97
di fs	1.14	.50	.34	.75	.71	.77	--	.72	.71	1.10	.67	.95	.83
hy en	12.49	14.46	18.21	11.13	16.94	14.35	12.09	13.72	7.21	6.69	14.99	15.31	20.69
hy fs	4.71	5.34	6.84	3.61	5.38	4.87	4.13	6.28	2.93	2.74	4.65	5.49	8.73
ol fo	5.79	5.62	4.11	10.45	6.82	8.91	9.53	3.79	10.58	10.39	8.20	6.28	--
ol fa	2.18	2.07	1.54	3.39	2.17	2.91	3.31	1.73	4.29	4.26	2.54	2.25	--
cm	.32	.11	.17	.16	.23	.15	.16	.15	.11	.15	.16	.18	.16
il	.75	.80	.36	.95	.91	.36	1.60	1.97	.75	.61	1.17	.93	.60
ap	.30	.29	.27	.50	.40	.28	.04	.11	.19	.10	.37	.30	.16

TABLE 3: CONTINUED

Section	19	20	19	18	21	20	18	20	11	11	18	3	20
Fragment	27	32	12	96	10	1	106	33	67	91	193	1	44
SiO_2	46.0	45.7	43.5	44.0	46.5	46.2	44.3	44.8	46.2	45.4	41.6	45.2	45.1
TiO_2	1.34	.30	.33	.48	.52	.82	.15	.31	.74	.55	1.49	.76	.57
Al_2O_3	23.2	25.0	24.0	25.8	21.8	24.6	23.9	22.2	22.5	21.4	23.4	21.8	21.4
Cr_2O_3	.22	.10	.14	.11	.21	.06	.08	.11	.13	.19	.59	.19	.16
FeO	6.8	6.8	6.9	6.9	7.2	7.5	7.8	8.2	8.3	8.3	8.3	8.4	10.0
MnO	.20	.10	.18	.09	.11	.09	.07	.11	.02	.13	.08	.13	.09
MgO	8.2	8.4	10.4	4.9	10.1	5.0	10.1	10.4	8.6	9.8	8.0	9.3	10.0
CaO	12.9	15.0	13.1	16.0	13.3	15.0	13.3	13.3	14.1	12.9	13.4	14.8	12.6
Na_2O	.45	.28	.48	.27	.48	.59	.49	.57	.50	.36	.45	.49	.49
K_2O	.14	.08	.15	.07	.13	.08	.10	.18	.20	.12	.20	.16	.17
P_2O_5	.16	.08	.15	.04	.13	.15	.21	.45	.13	.07	.25	*	.12
ZrO_2	n.d.	n.d.	n.d.	.03	.02	n.d.	.02	n.d.	n.d.	n.d.	.11	n.d.	n.d.
Total	99.61	101.84	99.33	98.69	100.50	100.00	100.43	100.63	101.42	99.22	97.87	101.23	100.70
CIPW Molecular Norms													
q	--	--	--	--	--	--	--	--	--	--	--	--	--
c	--	--	--	--	--	--	--	--	--	--	--	--	--
z	--	--	--	.03	.02	--	.02	--	--	--	.10	--	--
or	.83	.46	.88	.42	.76	.48	.58	1.05	1.16	.71	1.21	.93	.99
ab	4.05	2.46	4.27	2.47	4.25	4.53	3.54	5.04	4.42	3.24	4.14	4.33	4.36
an	61.09	65.19	62.40	70.41	56.23	65.30	62.19	56.66	57.71	56.65	62.73	55.97	55.19
ne	--	--	--	--	--	--	--	--	--	--	--	--	--
di wo	.83	2.80	.44	4.13	3.23	3.55	.59	2.18	4.15	2.85	1.47	6.54	2.39
di en	.60	1.94	.32	2.37	2.35	2.01	.41	1.52	2.77	1.97	1.00	4.45	1.56
di fs	.23	.85	.12	1.76	.88	1.54	.17	.56	1.37	.88	.47	2.09	.83
hy en	19.75	9.06	5.51	5.83	14.90	11.93	7.88	7.84	10.32	14.32	4.51	4.07	9.96
hy fs	7.70	3.98	2.00	4.34	5.59	9.14	3.37	3.37	5.11	6.44	2.14	1.91	5.31
ol fo	1.77	8.73	16.98	4.20	7.70	--	14.38	14.17	7.72	8.15	12.83	12.57	11.87
ol fa	.69	3.84	6.16	3.13	2.89	--	6.15	6.10	3.82	3.66	6.09	5.88	6.33
cm	.24	.11	.15	.12	.23	.07	.09	.12	.14	.21	.66	.21	.17
il	1.87	.41	.45	.68	.71	1.15	.21	.43	1.02	.77	2.13	1.04	.79
ap	.33	.16	.31	.08	.27	.32	.43	.93	.27	.15	.54	--	.25

TABLE 4: BULK ANALYSES OF (SPINEL) TROCTOLITES

Section	7	10	7	7	18	18	17	9	9	15	18	7
Fragment	18	1	10	42	60	111	35	19	16	9	71	33
SiO_2	45.1	44.4	43.0	43.8	44.0	43.6	43.3	44.8	43.0	44.8	44.0	45.0
TiO_2	.09	.17	.15	.15	.21	.12	.12	.17	.15	.16	.15	.19
Al_2O_3	28.5	23.9	24.7	27.1	23.0	21.8	24.4	22.5	22.7	22.9	24.5	23.5
Cr_2O_3	.05	.12	.22	.08	.11	.15	.09	.12	.16	.07	.12	.09
FeO	2.20	3.9	4.1	4.1	4.1	4.1	4.1	4.3	4.4	4.5	4.6	4.7
MnO	.05	.08	.07	.07	.06	.06	.05	.07	.07	.07	.07	.09
MgO	7.2	13.1	13.5	9.8	15.1	14.9	14.1	14.7	15.6	14.0	11.9	13.5
CaO	16.9	13.8	13.7	14.3	13.1	13.2	13.3	13.4	13.0	12.5	14.1	13.6
Na_2O	.36	.40	.38	.50	.35	.37	.30	.37	.56	.26	.41	.37
K_2O	.05	.11	.08	.11	*	*	.03	.08	.08	*	*	.09
P_2O_5	.05	.04	.07	.0(	.06	.06	.05	.05	.07	*	.04	.04
ZrO_2	n.d.	n.d.	n.d.	n.d.	.01	*	n.d.	n.d.	n.d.	n.d.	.01	n.d.
Total	100.55	100.02	99.97	100.10	100.10	98.36	98.84	100.57	100.79	99.26	99.90	101.17
CIPW Molecular Norms												
c	--	--	--	.33	--	--	--	--	--	--	--	--
z	--	--	--	--	.01	--	--	--	--	--	.01	--
or	.29	.63	.46	.63	--	--	.17	.45	.45	--	--	.51
ab	3.16	3.48	2.94	4.38	3.03	3.26	2.61	3.19	2.37	2.28	3.59	3.19
an	74.41	61.18	63.36	68.93	58.95	56.72	63.04	57.41	57.00	59.91	63.45	59.72
ne	--	--	.22	--	--	--	--	--	1.48	--	--	1.92
di wo	2.93	1.93	.79	--	1.31	2.85	.19	2.42	1.66	.27	1.82	1.92
di en	2.51	1.70	.68	--	1.14	2.48	.17	2.09	1.61	.23	1.50	1.61
di fs	.42	.27	.11	--	.17	.37	.03	.33	.25	.04	.32	.31
hy en	3.99	4.34	--	3.04	4.77	4.25	2.95	5.47	--	13.24	3.79	6.03
hy fs	.67	.70	--	.69	.69	.64	.47	.87	--	2.33	.80	1.16
ol fo	9.70	21.76	26.54	17.54	25.68	25.21	25.70	23.55	21.88	18.21	20.07	21.06
ol fa	1.62	3.52	4.34	3.99	3.74	3.78	4.12	3.74	4.58	3.21	4.24	4.01
cm	.05	.13	.23	.08	.12	.16	.10	.13	.17	.07	.13	.09
il	.12	.23	.20	.24	.28	.16	.16	.23	.20	.22	.20	.25
ap	.10	.08	.14	.12	.12	.12	.10	.12	.14	--	.08	.09

TABLE 4: CONTINUED

Section	19	7	9	8	17	18	18	17	7	20	17
Fragment	15	4	18	22	91	12	112	2	35	31	10
SiO_2	42.3	43.2	44.4	42.7	44.1	44.5	43.5	43.7	43.1	44.5	44.1
TiO_2	.16	.23	.23	.12	.17	.18	.14	.30	.18	.19	.22
Al_2O_3	23.9	22.7	21.5	22.4	19.6	22.3	21.3	22.5	20.5	22.0	23.2
Cr_2O_3	.08	.18	.13	.11	.15	.18	.30	.12	.13	.05	.15
FeO	4.7	4.8	4.9	4.9	5.0	5.0	5.1	5.1	5.1	5.2	5.2
MnO	.11	.11	.08	.08	.05	.06	.07	.04	.09	.08	.07
MgO	14.7	14.7	15.4	15.7	20.3	16.4	16.5	16.1	19.3	16.3	13.4
CaO	12.8	12.9	12.6	13.4	11.9	12.6	12.4	12.3	11.7	13.0	13.2
Na_2O	.44	.50	.40	.45	.54	.27	.35	.45	.37	.39	.36
K_2O	.03	.08	.11	.10	.07	*	*	.04	.09	.05	.04
P_2O_5	.01	.04	.07	.04	.02	.01	.04	.07	.06	*	.04
ZrO_2	n.d.	n.d.	n.d.	n.d.	n.d.	*	*	n.d.	n.d.	n.d.	n.d.
Total	99.23	99.44	99.82	100.00	101.90	101.30	99.47	100.72	100.62	101.76	99.98

CIPW Molecular Norms

	c	--	--	--	--	-	--	--	--	--	--	--
	z	--	--	--	--	--	--	--	--	--	--	--
	or	.17	.46	.63	.23	.38	--	--	.22	.50	.28	.23
	ab	2.40	4.36	3.47	.68	2.29	2.31	3.04	3.85	2.34	3.31	3.14
	an	61.34	57.75	54.72	56.59	47.42	55.02	54.69	56.92	51.16	55.04	59.89
	ne	.86	--	--	1.92	--	--	--	--	.48	--	--
di	wo	.11	1.66	2.13	2.85	3.00	1.35	1.82	.39	1.38	2.40	1.42
di	en	.09	1.41	1.81	2.43	2.65	1.16	1.53	.33	1.20	.36	1.17
di	fs	.01	.25	.31	.42	.35	.19	.26	.06	.17	2.08	.24
hy	en	--	.09	6.10	--	--	6.67	3.45	2.86	--	1.77	5.94
hy	fs	--	.02	1.05	--	--	1.11	.50	.48	--	.31	1.24
ol	fo	29.48	28.42	24.91	29.45	37.19	24.46	29.28	22.27	35.94	29.08	21.64
ol	fa	5.21	5.01	4.28	5.07	4.96	4.42	4.98	4.94	5.34	5.09	4.53
	cm	.09	.19	.14	.12	.15	.04	.03	.12	.14	.05	.16
	il	.22	.31	.31	.16	.22	.24	.19	.40	.24	.25	.30
	ap	.02	.08	.14	.08	.04	.04	.38	.14	.12	--	.08

TABLE 4: CONTINUED

Section	18	2	12	18	8	18	18	9	18	20	17
Fragment	65	6	88	72	23	102	140	15	211	16	111
SiO_2	44.4	41.9	44.1	43.4	44.7	43.4	41.9	45.1	42.6	43.2	42.2
TiO_2	.17	.13	.16	.18	.19	.18	.15	.24	.17	.09	.13
Al_2O_3	21.2	22.8	22.6	20.2	21.8	24.1	21.3	19.4	20.2	25.3	21.5
Cr_2O_3	.08	.12	.10	.14	.12	.11	.10	.12	.13	.05	.12
FeO	5.2	5.5	5.5	5.5	5.7	5.7	5.7	5.8	5.9	6.4	6.8
MnO	.06	.08	.07	.06	.10	.06	.04	.10	.06	.07	.09
MgO	16.2	13.7	15.2	17.9	14.8	12.3	18.5	16.7	19.0	10.3	16.2
CaO	13.3	13.6	13.2	11.7	13.4	13.9	12.0	12.4	11.9	14.0	11.8
Na_2O	.35	.46	.31	.30	.40	.25	.27	.39	.33	.55	.33
K_2O	.01	.11	.01	*	.11	*	.02	.11	.01	.16	.04
P_2O_5	.03	.55	.05	.02	.04	.02	.02	.07	.05	.14	.05
ZrO_2	.03	n.d.	*	*	n.d.	.01	*	n.d.	*	n.d.	n.d.
Total	101.03	98.45	101.30	99.40	101.36	100.03	100.00	103.43	100.35	100.76	99.26
CIPW Molecular Norms											
c	--	--	--	--	--	--	++	--	--	--	--
z	.02	--	--	--	--	.01		--	--	--	--
or	.06	.02	.06	--	.62	--		.62	.06	.93	.23
ab	3.00	.74	2.66	2.60	3.44	2.19		3.37	1.21	4.17	2.88
an	53.71	58.90	57.56	51.89	54.90	63.14		48.91	51.07	64.73	55.52
ne	--	2.00	--	--	--	--		--	.97	.40	--
di wo	3.64	2.88	1.87	1.59	3.38	1.63		3.92	1.94	.95	.04
di en	3.09	2.36	1.56	1.36	2.79	1.30		3.30	1.66	.71	.36
di fs	.54	.52	.06	.23	.62	.33		.62	.28	.25	.08
hy- en	2.20	--	3.14	4.64	2.76	3.39		7.00	--	--	.65
hy- fs	.39	--	.62	.78	.58	.86		1.32	--	--	.15
ol fo	28.05	26.15	26.53	31.25	25.15	21.34		25.52	36.21	20.35	31.86
ol fa	4.92	5.79	5.27	5.22	5.31	5.40		4.83	6.15	7.06	7.41
cm	.08	.13	.10	.15	.13	.12		.11	.14	.05	.13
il	.23	.18	.21	.24	.25	.24		.32	.23	.12	.18
ap	.06	.10	.10	.04	.08	.04		.14	.10	.29	.10

++ insufficient SiO_2 for nepheline

HIGH-ALUMINA BASALT SUITE ROCKS

TABLE 5: BULK ANALYSES OF HIGH-ALUMINA BASALT SUITE ROCKS

Section	8	12	17	18	10	17	11	18	11	20	18	11
Fragment	14	82	98	138	6	40	36	110	58	25	107	35
SiO_2	48.2	46.9	48.2	46.4	46.1	47.0	47.7	48.3	45.1	45.7	44.9	46.4
TiO_2	.41	.44	.35	.86	.86	.89	.64	.35	.38	.74	.87	.69
Al_2O_3	18.6	20.8	20.5	19.7	19.7	20.5	20.6	19.3	20.1	21.2	20.2	18.8
Cr_2O_3	.23	.15	.18	.18	.24	.19	.25	.19	.21	.15	.17	.32
FeO	6.9	7.1	7.1	7.3	7.3	7.4	7.6	8.0	8.1	8.3	8.6	8.6
MnO	.14	.09	.10	.10	.13	.12	.13	.11	.13	.07	.11	.13
MgO	10.1	11.8	12.0	9.4	11.3	10.8	11.7	11.9	10.3	10.4	9.9	11.3
CaO	12.8	12.3	12.7	13.1	12.1	12.9	12.8	12.4	13.6	12.6	12.9	12.3
Na_2O	.46	.40	.46	.40	.42	.45	.48	.35	.23	.47	.40	.42
K_2O	.18	.12	.13	.15	.23	.17	.12	.10	.02	.17	.15	.11
P_2O_5	.06	.10	.07	.21	.17	.23	.10	.12	.02	.20	.17	.14
ZrO_2	n.d.	.01	n.d.	.02	n.d.	n.d.	n.d.	*	n.d.	n.d.	.06	n.d.
Total	98.08	100.21	101.79	97.82	98.55	100.75	101.12	101.12	98.19	100.00	98.43	99.21
CIPW Molecular Norms												
q	.24	--	--	--	--	--	--	--	--	--	--	--
c	--	--	--	--	--	--	--	--	--	--	--	--
z	--	.01	--	.02	--	--	--	--	--	--	.05	--
or	1.08	.70	.74	.90	1.36	.99	.70	.59	.12	1.00	.90	.65
ab	4.19	3.54	4.00	3.67	3.79	3.98	4.23	3.08	2.09	4.19	3.64	3.78
an	48.86	53.78	51.86	52.59	51.62	52.72	52.75	49.83	54.53	54.90	53.63	49.24
ne	--	--	--	--	--	--	--	--	--	--	--	--
di wo	6.06	2.26	3.51	4.94	3.02	3.47	3.59	3.89	5.53	2.37	4.05	4.42
di en	4.44	1.72	2.66	3.55	2.28	2.58	2.62	2.85	3.86	1.68	2.81	3.16
di fs	1.62	.70	.85	1.39	.74	.88	.97	1.04	1.64	.69	1.25	1.25
hy en	23.83	19.48	19.61	20.59	19.60	18.53	19.59	22.97	13.52	14.54	13.58	18.61
hy fs	8.69	6.23	6.24	8.04	6.37	6.42	7.23	8.35	5.74	5.99	6.04	7.39
ol fo	--	8.16	7.38	1.76	7.08	6.12	5.17	4.77	8.57	9.23	8.49	7.13
ol fa	--	2.61	2.34	.69	2.30	2.11	1.98	1.73	3.64	3.80	3.78	2.83
cm	.26	.16	.19	.20	.26	.21	.27	.20	.23	.16	.19	.28
il	.58	.60	.47	1.22	1.20	1.22	.88	.48	.54	1.52	1.23	.96
ap	.13	.21	.11	.45	.36	.47	.21	.25	.04	.42	.36	.29

TABLE 5: CONTINUED

Section	9	10	17	9	18	20	20	7	12	12	18
Fragment	1	18	104	5	66	10a	10b	2	59	31	196
SiO_2	45.3	48.4	46.9	45.4	46.2	46.8	45.9	49.9	43.7	48.8	45.2
TiO_2	.80	.97	.98	.72	1.07	1.06	1.05	.41	.38	.31	.41
Al_2O_3	19.3	15.7	19.2	21.3	17.8	18.4	18.4	17.5	19.7	19.0	17.2
Cr_2O_3	.20	.25	.22	.15	.25	.23	.24	.27	.24	.25	.19
FeO	8.7	8.8	9.0	9.2	9.4	9.6	9.6	10.3	10.5	11.1	12.5
MnO	.16	.15	.14	.15	.14	.12	.13	.17	.10	.16	.16
MgO	10.6	14.9	11.2	11.3	11.3	11.7	11.3	10.5	13.1	8.8	13.5
CaO	12.3	9.3	12.4	12.5	12.4	12.3	12.5	11.1	11.9	12.6	11.2
Na_2O	.44	.43	.50	.40	.45	.43	.52	.37	.39	.38	.34
K_2O	.24	.17	.09	.20	.11	.16	.12	.23	.11	.03	.06
P_2O_5	.13	.03	.20	.13	.15	.16	.19	.12	.08	.02	.06
ZrO_2	n.d.	n.d.	n.d.	n.d.	.07	n.d.	.03	n.d.	.01	.02	.02
Total	98.27	99.10	100.83	101.45	99.34	100.96	99.98	100.67	100.21	101.47	100.84

CIPW Molecular Norms

	q	--	--	--	--	--	--	--	1.42	--	--	--
	c	--	--	--	--	--	--	--	--	--	--	--
	z	--	--	--	--	.06	--	.03	--	.01	.02	.02
	or	1.44	1.00	.52	1.16	.65	.33	.71	1.35	.64	.18	.35
	ab	4.00	3.84	4.43	3.51	4.06	3.81	4.66	3.31	3.45	3.40	3.01
	an	50.68	40.20	49.28	54.54	46.46	47.23	47.43	45.55	50.97	49.84	44.64
	ne	--	--	--	--	--	--	--	--	--	--	--
di	wo	4.13	2.20	4.02	2.12	5.75	4.80	5.28	3.42	2.69	4.91	3.92
di	en	2.90	1.69	2.86	1.48	4.05	3.39	3.69	2.26	1.88	2.90	2.60
di	fs	1.22	.51	1.17	.64	1.70	1.41	1.59	1.17	.82	2.01	1.32
hy	en	15.04	32.80	18.28	11.27	17.21	17.45	14.28	26.63	6.27	21.24	12.27
hy	fs	6.35	9.83	7.47	4.83	7.23	7.25	6.15	13.77	2.72	14.72	6.22
ol	fo	8.79	4.81	7.05	13.32	7.56	8.28	9.85	--	20.63	.04	16.42
ol	fa	3.71	1.44	2.88	5.71	3.17	3.44	4.24	--	8.97	.02	8.33
	cm	.22	.27	.24	.16	.28	.25	.25	.30	.26	.27	.21
	il	1.24	1.35	1.35	.98	1.51	1.46	1.46	.57	.52	.43	.56
	ap	.28	.06	.45	.26	.32	.33	.43	.25	.16	.04	.12

MARE BASALTS

TABLE 6: BULK ANALYSES OF MARE BASALTS

Section	8	7	20	17	18	7	11	19
Fragment	7	44	44	57	195	8	34	93
SiO_2	49.0	48.7	48.6	46.6	44.3	46.3	46.8	40.1
TiO_2	1.61	.29	.55	2.73	2.68	1.00	1.41	12.3
Al_2O_3	12.9	12.4	11.0	10.1	11.4	9.3	12.0	10.2
Cr_2O_3	.30	.34	.30	.39	.26	.41	.10	.11
FeO	16.7	17.6	19.4	19.6	20.8	21.6	22.1	23.3
MnO	.33	.36	.31	.32	.26	.35	.33	.40
MgO	6.2	7.3	7.3	9.5	8.8	9.7	2.85	5.9
CaO	13.2	14.0	13.9	11.3	10.9	10.7	13.0	8.1
Na_2O	.71	.19	.10	.34	.32	.23	.33	.91
K_2O	.33	.14	.90	.15	.10	.17	.11	.26
P_2O_5	.10	.04	.05	.09	.10	.08	.08	.13
ZrO_2	n.d.	n.d.	.12	n.d.	.08	n.d.	n.d.	n.d.
Total	101.38	101.70	101.72	101.12	100.00	100.34	99.11	101.71
CIPW Molecular Norms								
q	.65	--	--	--	--	--	2.05	1.02
c	--	--	--	--	--	--	--	--
z	--	--	.11	--	.08	--	--	--
or	2.00	.85	.55	.91	.62	1.04	.70	1.64
ab	6.54	1.75	.92	3.15	3.00	2.15	3.20	8.74
an	31.86	33.41	30.17	26.39	30.73	24.80	33.46	24.58
ne	--	--	--	--	--	--	--	--
di wo	13.87	15.02	16.20	12.32	10.06	11.94	14.28	6.99
di en	5.77	6.40	6.57	6.10	4.61	5.41	2.77	3.18
di fs	8.10	8.63	.55	6.22	5.45	6.53	11.52	3.81
hy en	11.79	13.50	13.60	17.02	12.84	16.15	5.74	14.23
hy fs	16.56	18.21	19.95	17.38	15.17	19.50	23.85	17.05
ol fo	--	.57	.43	2.94	5.97	4.70	--	--
ol fa	--	.77	.63	3.00	7.05	5.68	--	--
cm	.34	.38	.34	.44	.30	.47	.12	.13
il	2.30	.41	.79	3.92	3.99	1.45	2.12	18.30
ap	.21	.08	.11	.19	.22	.17	.18	.23

TABLE 7: PARTIAL ANALYSES OF PLAGIOCLASE FELDSPAR

Section 1

Frag. No.	1	1	1	1	3	3	3	3
Grain No.	3	4	2	1	4	1	2	3
TiO_2	.04	.01	.01	.02	.02	.01	.04	.01
Cr_2O_3	*	*	*	*	*	*	*	*
FeO	.33	.14	.17	.18	.13	.14	.18	.11
MgO	.02	.08	.33	.11	.10	.12	.08	.04
CaO	14.4	18.8	19.2	19.5	18.9	19.0	19.1	19.1
Na_2O	2.03	.35	.31	.38	.28	.31	.35	.40
K_2O	.48	.03	.04	.03	.03	.02	.06	.05
Molecular End Members								
An	77.2	96.6	96.9	96.4	97.2	97.0	96.4	96.1
Ab	19.7	3.3	2.8	3.4	2.6	2.9	3.2	3.6
Or	3.1	.2	.2	.2	.2	.1	.4	.3
Group	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT

TABLE 7: CONTINUED

Section 2

Frag. No.	3	3	3	3	3	6	6	6	6	6	8	8	8	8	8
Grain No.	4	1	2	3	5	3	2	1	4	5	5	1	3	4	2
TiO_2	.05	.02	.05	.01	.05	*	.03	.04	.01	.01	*	.01	.01	.03	.02
Cr_2O_3	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
FeO	.14	.21	.26	.17	.16	.20	.20	.18	.24	.22	.34	.22	.30	.33	.24
MgO	.02	.08	.06	.07	.03	.20	.11	.08	.05	.04	.06	.08	.05	.07	.06
CaO	18.0	18.2	18.4	18.5	18.5	18.5	18.9	18.9	19.0	19.1	18.6	18.7	18.7	18.9	19.3
Na_2O	.51	.58	.60	.50	.51	.39	.32	.30	.33	.33	.48	.54	.55	.57	.36
K_2O	.12	.12	.12	.10	.12	.05	.06	.05	.06	.06	.14	.13	.17	.24	.10
Molecular End Members															
An	94.4	93.9	93.7	94.8	94.6	96.0	96.7	96.1	96.6	96.6	94.7	94.3	94.0	93.5	96.2
Ab	4.8	5.4	5.5	4.6	4.7	3.7	3.0	3.4	3.0	3.0	4.4	4.9	5.0	5.1	3.2
Or	.7	.7	.7	.6	.7	.3	.4	.3	.4	.4	.8	.8	1.0	1.4	.6
Group	ANAT	ANAT	ANAT	ANAT	ANAT	SPT	SPT	SPT	SPT	SPT	ANAT	ANAT	ANAT	ANAT	ANAT

TABLE 7: CONTINUED

Section 7

Frag. No.	2	2	4	4	4	4	4	5	5	5	10	10	10	12	12
Grain No.	1	2	4	1	2	5	3	2	1	3	2	1	3	1	2
TiO_2	.02	*	.03	.03	.01	.02	.01	.04	.03	*	.01	*	.03	.01	.03
Cr_2O_3	*	*	*	*	*	*	*	*	*	*	.01	*	*	*	*
FeO	.25	.26	.15	.16	.12	.29	.14	.25	.30	.25	.28	.15	.25	23	.29
MgO	.15	.09	.02	.06	.06	.04	.05	.51	.42	.45	.22	.06	.09	15	.09
CaO	18.8	18.9	18.4	18.5	18.5	18.7	19.0	18.3	18.5	18.5	18.2	18.5	18.6	18.2	18.8
Na_2O	.26	.24	.44	.50	.36	.34	.33	.26	.29	.26	.45	.26	.35	.54	.36
K_2O	.03	.01	.03	.07	.06	.06	.06	.01	*	.02	.04	.01	.04	.13	.10
Molecular End Members															
An	97.4	97.7	95.7	94.9	95.2	96.5	96.6	97.4	97.2	97.4	95.5	97.5	96.5	94.1	96.1
Ab	2.4	2.2	4.1	4.6	3.4	3.2	3.0	2.5	2.8	2.5	4.3	2.5	3.3	5.1	3.3
Or	.2	.1	.2	.4	.4	.4	.4	.1	.0	.1	.2	.1	.2	.8	.6
Group	HAB	HAB	SPT	SPT	SPT	SPT	SPT	ANAT	ANAT	ANAT	SPT	SPT	SPT	ANAT	ANAT

TABLE 7: CONTINUED

Section 7 Continued

Frag. No.	15	15	15	15	15	18	18	18	18	18	33	33	33	33
Grain No.	1	4	2	5	3	3	4	2	1	5	3	4	2	1
TiO_2	*	*	*	*	*	.03	*	*	*	.01	.02	.03	*	.01
Cr_2O_3	*	.02	*	*	*	*	*	*	*	*	*	*	*	*
FeO	.16	.40	.17	.25	.13	.32	.21	.20	.14	.32	.23	.26	.28	.21
MgO	.09	.06	.05	.06	.05	.29	.04	.22	.18	.29	.20	.19	.12	.08
CaO	18.6	18.6	18.7	18.8	18.9	18.5	18.9	19.0	19.2	19.2	19.0	19.2	19.4	19.4
Na_2O	.39	.47	.36	.33	.43	.40	.50	.37	.20	.42	.38	.40	.37	.39
K_2O	.03	.04	.03	.02	.04	.04	.03	.01	.02	.04	.04	.01	.02	.07
Molecular End Members														
An	96.2	95.4	96.5	96.8	95.8	96.0	95.3	96.5	98.0	96.0	96.3	96.3	96.5	96.1
Ab	3.6	4.4	3.4	3.1	3.9	3.8	4.6	3.4	1.8	3.8	3.5	3.6	3.3	3.5
Or	.2	.2	.2	.1	.2	.2	.2	.1	.1	.2	.2	.1	.1	.4
Group	ANAT	ANAT	ANAT	ANAT	ANAT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT

TABLE 7: CONTINUED

Section 7 Continued

Frag. No.	35	35	35	35	35	36	36	36	36	36
Grain No.	3	4	1	2	5	5	2	4	3	1
TiO_2	.02	*	*	.04	*	.03	.02	.02	.02	.03
Cr_2O_3	*	*	.02	*	*	.01	*	.02	*	*
FeO	.32	.21	.10	.25	.27	.18	.16	.25	.19	.19
MgO	.14	.16	.06	.19	.17	.07	.11	.12	.11	.10
CaO	18.5	19.2	19.4	19.6	19.7	18.7	18.9	19.0	19.1	19.2
Na_2O	.45	.31	.37	.34	.34	.50	.52	.56	.45	.44
K_2O	.08	.03	.04	.03	.03	.07	.10	.12	.10	.08
Molecular End Members										
An	95.3	97.0	94.6	96.8	96.8	95.0	94.7	94.3	95.3	95.6
Ab	4.2	2.8	3.3	3.0	3.0	4.6	4.7	5.0	4.1	4.0
Or	.5	.2	.2	.2	.2	.4	.6	.7	.6	.5
Group	SPT	SPT	SPT	SPT	SPT	ANAT	ANAT	ANAT	ANAT	ANAT

TABLE 7: CONTINUED

Section 7 Continued

Frag. No.	41	41	41	41	41	42	42	42	42	42	44	44	44
Grain No.	4	1	5	3	2	1	3	4	5	2	2	3	1
TiO_2	.02	.01	.01	.01	*	*	.01	*	*	*	*	*	.02
Cr_2O_3	*	*	*	*	*	*	*	*	*	*	*	.01	*
FeO	.37	.30	.35	.34	.43	.20	.27	.18	.26	.25	1.07	.86	1.08
MgO	.22	.05	.12	.06	.09	.13	.45	.34	.36	.31	.08	.11	.08
CaO	18.6	19.2	19.2	19.3	19.4	17.8	19.0	19.0	19.3	19.4	19.1	19.1	19.4
Na_2O	.68	.36	.41	.36	.28	.87	.36	.38	.39	.35	.36	.29	.44
K_2O	.19	.10	.10	.07	.08	.12	.02	.05	.05	.04	.06	.03	.03
Molecular End Members													
An	92.7	96.1	95.7	96.3	97.0	91.2	96.4	96.2	96.2	96.6	96.4	97.1	95.9
Ab	6.1	3.3	3.7	3.3	2.5	8.1	3.5	3.5	3.5	3.2	3.3	2.7	3.9
Or	1.1	.6	.6	.4	.5	.7	.1	.3	.3	.2	.4	.2	.2
Group					SPT	SPT	SPT	SPT	SPT	SPT	MB	MB	MB

TABLE 7: CONTINUED

Section 8

Frag. No.	2	2	2	2	2	7	7	7	7	7	8	8	8	8
Grain No.	5	4	3	1	2	2	5	1	3	4	1	4	3	2
TiO_2	*	*	.01	.01	.01	.04	.04	.05	.02	.03	.02	.03	.03	*
Cr_2O_3	*	*	.01	*	.02	*	*	.01	*	*	*	*	*	*
FeO	.31	.28	.25	.31	.24	1.20	.76	.87	.95	.63	.21	.28	.32	.21
MgO	.13	.07	.19	.18	.12	.17	.09	.13	.09	.09	.10	.09	.11	.06
CaO	19.3	19.4	19.4	19.8	19.9	16.3	16.5	16.6	16.7	18.4	19.0	19.1	19.2	19.5
Na_2O	.40	.37	.61	.34	.29	1.61	1.52	1.21	1.34	.57	.54	.53	.40	.31
K_2O	.02	.04	.04	.02	.01	.27	.23	.38	.30	.08	.11	.13	.13	.07
Molecular End Members														
An	96.3	96.4	94.4	96.9	97.4	83.4	84.5	86.3	85.7	94.2	94.5	94.5	95.6	96.8
Ab	3.6	3.3	5.4	3.0	2.6	14.9	14.1	11.4	12.4	5.3	4.9	4.7	3.6	2.8
Or	.1	.2	.2	.1	.1	1.6	1.4	2.4	1.8	.5	.7	.8	.8	.4
Group	ANAT	ANAT	ANAT	ANAT	ANAT	MB	MB	MB	MB	MB	ANAT	ANAT	ANAT	ANAT

TABLE 7: CONTINUED

Section 8 Continued

Frag. No.	10	10	10	10	11	11	11	11	12	12	12	12	12
Grain No.	3	2	1	4	1	3	4	2	4	1	2	5	3
TiO_2	.02	*	.01	.01	*	.02	.01	*	.01	.03	.02	.02	.03
Cr_2O_3	*	*	.01	.01	*	.01	*	*	*	*	.01	.01	*
FeO	.66	.92	.37	.35	.63	1.18	.79	.74	.59	.22	.34	.38	.33
MgO	1.75	.72	.60	.61	.26	.25	.27	.27	.37	.17	.26	.20	.09
CaO	18.7	18.9	19.2	19.2	18.5	18.5	18.5	18.8	18.0	18.6	18.8	18.8	19.2
Na_2O	.26	.19	.24	.21	.43	.56	.50	.39	.78	.51	.48	.61	.33
K_2O	.04	.04	.03	.03	.01	.02	.03	.03	.05	.13	.03	.11	.09
Molecular End Members													
An	97.3	98.0	97.6	97.9	95.9	94.7	95.2	95.2	92.4	94.5	95.4	93.8	96.5
Ab	2.4	1.8	2.2	1.9	4.0	5.2	4.7	3.6	7.2	4.7	4.4	5.5	3.0
Or	.2	.2	.2	.2	.1	.1	.2	.2	.4	.8	.2	.7	.5
Group	ANAT	ANAT	ANAT	ANAT					ANAT	ANAT	ANAT	ANAT	ANAT

TABLE 7: CONTINUED

Section 8 Continued

Frag. No.	14	14	14	14	14	22	22	22	22	23	23	23	23	23
Grain No.	4	1	3	2	5	1	4	2	3	4	3	2	1	5
TiO_2	.01	.02	.02	.03	.01	*	.02	*	.01	.02	*	.01	*	.02
Cr_2O_3	.01	*	.01	.01	*	*	*	*	*	*	*	*	.01	.01
FeO	.49	.34	.32	.32	.38	.13	.16	.12	.26	.58	.28	.21	.25	.26
MgO	.18	.18	.13	.20	.22	.06	.08	.02	.11	.13	.16	.12	.15	.12
CaO	18.2	18.5	18.5	18.9	18.9	18.6	19.2	19.4	19.4	19.2	19.5	19.8	19.9	20.1
Na_2O	.70	.54	.63	.53	.51	.35	.33	.31	.33	.42	.55	.46	.30	20.1
K_2O	.23	.13	.20	.14	.15	.04	.06	.02	.03	.06	.06	.04	.03	.02
Molecular End Members														
An	92.2	94.2	93.1	94.4	94.5	96.5	96.6	97.1	96.8	95.8	94.8	95.7	96.9	97.2
Ab	6.4	5.0	5.7	4.8	4.6	3.3	3.0	2.8	3.0	3.8	4.8	4.0	2.9	2.7
Or	1.4	.8	1.2	.8	.9	.2	.4	.1	.2	.4	.3	.2	.2	.1
Group	HAB	HAB	HAB	HAB	HAB	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT

TABLE 7: CONTINUED

Section 8 Continued

Section 9

Frag. No.	28	28	28	28	28	1	1	1	1	10	10	10	10
Grain No.	4	1	2	5	3	1	2	4	3	4	2	1	3
TiO_2	.01	.03	.02	.01	.02	.03	.04	.01	.05	.07	.09	.05	.06
Cr_2O_3	*	*	*	.01	.01	.01	.05	.01	.01	.02	.01	.01	.01
FeO	.17	.20	.20	.18	.15	.24	.27	.33	.25	.40	.51	.47	.42
MgO	.02	.11	.09	.08	.05	.31	.27	.04	.14	.25	.15	.25	.29
CaO	19.1	19.6	19.7	19.7	20.2	18.6	18.8	19.4	19.5	16.4	16.5	16.6	16.7
Na_2O	.70	.40	.43	.54	.28	.52	.50	.43	.29	1.39	1.50	1.26	1.34
K_2O	.09	.04	.06	.04	.04	.05	.05	.05	.03	.07	.09	.09	.08
Molecular End Members													
An	93.2	96.2	95.9	95.1	97.3	94.9	95.1	95.9	97.2	86.3	85.4	87.4	86.9
Ab	6.2	3.6	3.8	4.7	2.4	4.8	4.6	3.8	2.6	13.2	14.0	12.0	12.6
Or	.5	.2	.3	.2	.2	.3	.3	.3	.2	.4	.6	.6	.5
Group	NATA	NATA	NATA	NATA	NATA	HAB	HAB	HAB	HAB	HAB	HAB	HAB	HAB

TABLE 7: CONTINUED

Section 10

Frag. No.	1	1	1	1	1	4	4	4	4	4
Grain No.	5	1	3	2	4	1	5	3	2	4
TiO_2	.02	.01	.01	.01	.01	.01	.02	*	*	.01
Cr_2O_3	*	.01	*	*	*	*	*	*	*	*
FeO	.17	.17	.20	.15	.21	.22	.19	.15	.16	.13
MgO	.25	.13	.22	.09	.09	.03	.02	.05	.02	.06
CaO	19.2	19.5	19.7	19.8	19.8	19.5	19.9	20.0	20.1	20.2
Na_2O	.46	.32	.41	.25	.36	.44	.22	.28	.12	.27
K_2O	.05	.04	.05	.05	.05	.04	.05	.05	.05	.05
Molecular End Members										
An	95.6	96.9	96.1	97.5	96.5	95.8	97.6	97.2	98.8	97.2
Ab	4.1	2.9	3.6	2.2	3.2	3.9	2.0	2.5	1.1	2.4
Or	.3	.2	.3	.3	.3	.3	.4	.3	.1	.4
Group	SPT	SPT	SPT	SPT	SPT	NATA	NATA	NATA	NATA	NATA

TABLE 7: CONTINUED

Section 10 Continued

Frag. No.	6	6	6	6	6	3	8	3	8	18	18	18	18	18
Grain No.	5	1	2	4	3	3	3	1	2	5	4	3	1	2
TiO_2	.02	.01	.02	.03	*	*	.01	.01	*	.01	.02	.02	*	.03
Cr_2O_3	*	*	*	*	*	.01	*	*	.01	*	.01	*	*	*
FeO	.34	.23	.28	.30	.19	.16	.15	.11	.16	.20	.20	.23	.26	.34
MgO	.15	.29	.18	.22	.07	.13	.12	.10	.11	.07	.08	.03	.08	.06
CaO	18.8	19.2	19.2	19.3	19.4	19.5	19.6	19.7	20.0	18.6	18.8	19.0	19.0	19.4
Na_2O	.53	.52	.60	.50	.39	.37	.24	.30	.26	.52	.66	.52	.53	.29
K_2O	.07	.05	.02	.07	.05	.05	.05	.02	.04	.10	.17	.11	.13	.09
Molecular End Members														
An	94.8	95.0	94.4	95.1	96.3	96.4	97.5	97.2	97.5	94.6	93.1	94.7	94.5	96.8
Ab	4.8	4.7	5.3	4.5	3.5	3.3	2.2	2.7	2.3	4.8	5.9	4.7	4.8	2.6
Or	.4	.3	.2	.4	.2	.3	.3	.1	.2	.6	1.0	.7	.8	.5
Group	HAB	HAB	HAB	HAB	HAB	ANAT	ANAT	ANAT	ANAT	SPT	SPT	SPT	SPT	SPT

TABLE 7: CONTINUED

Section 17

Frag. No.	19	19	19	19	19	63	63	63	84	84	84	84	91	91	91
Grain No.	5	3	1	4	2	3	1	2	3	2	1	4	3	2	1
TiO_2	.04	.05	.06	.02	.02	.05	.02	.04	*	.03	.02	.04	.21	.08	.06
Cr_2O_3	.01	.01	*	.01	.02	.02	.01	.02	.01	.01	*	.02	.01	.01	.02
FeO	.32	.22	.17	.28	.12	.36	.27	.38	.15	.22	.18	.24	1.15	.89	.77
MgO	.14	.13	.07	.11	.12	.27	.20	.28	.13	.14	.17	.25	1.63	2.20	2.54
CaO	18.7	18.8	19.0	19.0	19.7	16.5	18.1	18.1	19.2	19.4	19.7	19.7	17.7	17.9	18.3
Na_2O	.56	.50	.55	.42	.24	1.59	.97	.94	.31	.32	.21	.23	.63	.71	.61
K_2O	.14	.12	.09	.11	.09	.25	.18	.18	.03	.02	.03	.03	.05	.10	.06
Molecular End Members															
An	94.1	94.7	94.5	95.5	97.3	83.9	90.2	90.4	97.0	97.0	97.9	97.8	93.7	92.7	94.0
Ab	5.1	4.6	5.0	3.8	2.1	14.6	8.7	8.5	2.8	2.9	1.9	2.1	6.0	6.7	5.7
Or	.8	.7	.5	.7	.5	1.5	1.1	1.1	.2	.1	.2	.2	.3	.6	.4
Group	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	NATA	NATA	NATA	NATA	SPT	SPT	SPT

TABLE 7: CONTINUED

Section 18

Frag. No.	2	2	2	2	97	110	110	110	111	111	111	25	25	25	25
Grain No.	1	4	2	3	1	2	3	1	3	1	2	4	1	2	3
TiO_2	.04	.03	.06	.01	.10	.04	.04	.05	.03	.03	.02	.07	.09	.02	.06
Cr_2O_3	.01	.02	.02	*	.01	*	.01	.01	.02	.02	.01	*	*	.02	.02
FeO	.21	.26	.21	.22	1.02	.32	.20	.26	.19	.12	.11	.44	.34	.27	.31
MgO	.10	.16	.07	.01	.54	.13	.06	.10	.12	.09	.05	.19	.12	.02	.09
CaO	18.9	19.3	19.4	19.8	15.3	18.3	18.8	19.0	19.3	19.4	20.1	18.4	18.5	19.0	19.6
Na_2O	.61	.35	.39	.45	1.77	.65	.57	.60	.46	.41	.21	.67	.67	.54	.28
K_2O	.11	.11	.13	.05	.16	.21	.16	.14	.06	.06	.01	.26	.22	.15	.08
Molecular End Members															
An	93.9	96.2	95.8	95.8	81.8	92.8	93.9	93.8	95.5	96.0	98.1	92.4	92.6	94.3	97.0
Ab	5.5	3.2	3.5	3.9	17.1	6.0	5.2	5.4	4.1	3.7	1.9	6.1	6.1	4.8	2.5
Or	.7	.7	.8	.3	1.0	1.3	.8	1.0	.4	.4	.1	1.6	1.3	.9	.5
Group	ANAT	ANAT	ANAT	ANAT	HAB	HAB	HAB	HAB	SPT	SPT	SPT	HAB	HAB	HAB	HAB

OLIVINE

TABLE 8: OLIVINE ANALYSES

Section	1							Section 2				
Frag. No.	1	1	1	1	3	3	3	3	3	3	3	3
Grain No.	3	2	1	4	3	1	2	1	4	3	5	2
SiO_2	41.2	40.2	37.2	37.1	39.8	39.2	38.6	37.4	38.3	37.7	37.7	38.1
TiO_2	.01	.09	.05	.04	.02	.03	.03	.13	.10	.11	.07	.17
Al_2O_3	*	.01	.15	.17	*	*	.02	.06	.03	.01	.15	.10
Cr_2O_3	.06	.07	.06	.07	.05	.05	.05	.08	.06	.08	.07	.09
FeO	8.6	15.7	29.0	32.5	17.7	18.0	21.6	23.4	24.0	24.2	24.4	23.8
MgO	50.1	44.3	33.5	31.0	43.4	43.4	40.1	37.4	37.1	37.6	37.6	37.8
CaO	.28	.22	.21	.25	.10	.11	.19	.28	.21	.18	.21	.29
Total	100.25	100.59	100.17	101.13	101.07	100.79	100.59	98.75	99.80	99.88	100.20	100.35
Number of Ions on the Basis of 4 (O)												
Si	1.001	1.005	.997	1.001	1.000	.990	.994	.992	1.005	.991	.989	.994
Ti	--	.001	.005	.005	--	--	.001	.002	.001	.002	.005	.003
Cr	.001	.001	.001	.002	.001	.001	.001	.002	.001	.002	.002	.002
Ti	.001	.002	.001	.001	.001	.001	.001	.003	.002	.002	.001	.003
Mg	1.814	1.650	1.338	1.246	1.624	1.634	1.539	1.478	1.451	1.473	1.470	1.470
Fe	.175	.328	.650	.733	.372	.380	.465	.519	.527	.532	.535	.519
Ca	.007	.006	.006	.007	.003	.003	.005	.008	.006	.005	.006	.008
Z	1.001	1.005	.997	1.001	1.000	.990	.994	.992	1.005	.991	.989	.994
X	1.999	1.988	2.001	1.994	2.001	2.019	2.012	2.012	1.988	2.016	2.019	2.005
Sum	3.000	2.993	2.998	2.995	3.001	3.009	3.006	3.004	2.993	3.007	3.008	2.999
Molecular End Members												
Fo	91.2	83.4	67.3	63.0	81.4	81.1	76.8	74.0	73.	73.5	73.3	73.9
Fa	8.8	16.6	32.7	37.0	18.6	18.9	23.2	26.0	26.6	26.5	26.7	26.1
Group	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT

TABLE 8: CONTINUED

Section 2 Continued										Section 7				
Frag. No.	6	6	6	6	6	8	8	8	8	2	2	4	4	4
Grain No.	4	5	2	1	3	2	1	3	4	2	1	3	2	1
SiO_2	39.3	39.4	39.3	39.6	39.1	37.3	37.3	39.?	37.4	39.8	39.9	40.0	39.6	39.8
TiO_2	.04	.10	.24	21	.15	.06	.09	.06	.06	n.d.	n.d.	.05	.04	.03
Al_2O_3	*	*	.03	.01	.03	.02	.04	.04	.01	n.d.	n.d.	*	*	*
Cr_2O_3	.03	.01	.04	.05	.05	.08	.10	.08	.10	n.d.	n.d.	.04	.01	.07
FeO	18.6	19.0	19.1	19.4	29.2	24.6	25.7	25.9	25.9	15.1	16.1	15.5	15.6	15.6
MgO	41.4	41.2	41.2	40.9	39.8	34.5	35.2	35.4	35.3	44.1	43.3	43.4	43.6	43.9
CaO	.15	.18	.15	.12	.12	.18	.17	.18	.21	.36	.45	.19	.17	.15
Total	99.52	99.89	100.06	99.69	99.45	96.74	98.69	99.66	98.98	99.36	99.75	99.18	99.02	99.55
Number of Ions on the Basis of 4 (O)														
Si	1.005	1.008	1.013	1.006	1.005	1.007	1.007	1.004	1.002	1.010	1.015	1.001	1.008	1.001
Al	--	--	--	--	--	--	--	.001	.001	.001	.001	.001	.001	.001
Cr	--	--	.001	.001	.001	.001	.001	.001	.001	.001	.002	.002	.002	.002
Ti	--	--	.001	.001	.001	.001	.002	.005	.004	.003	.001	.002	.001	.001
Mg	1.660	1.631	1.638	1.651	1.653	1.581	1.570	1.568	1.566	1.532	1.399	1.408	1.399	1.407
Fe	.319	.340	.328	.331	.330	.399	.406	.408	.417	.436	.560	.577	.574	.580
Ca	.010	.012	.005	.005	.040	.004	.005	.004	.003	.003	.005	.005	.005	.006
Z	1.005	1.008	1.013	1.006	1.005	1.007	1.007	1.004	1.002	1.010	1.015	1.001	1.008	1.001
X	1.989	1.983	1.973	1.989	1.989	1.986	1.984	1.987	1.992	1.976	1.958	1.995	1.982	1.997
Sum	2.994	2.991	2.986	2.995	2.994	2.993	2.991	2.991	2.994	2.986	2.983	2.996	2.990	2.998
Molecular End Members														
Fo	83.9	82.7	83.3	83.3	83.4	79.9	79.4	79.4	79.0	77.8	71.4	70.9	70.9	70.8
Fa	16.1	17.3	16.7	16.7	16.6	20.1	20.6	20.6	21.0	22.2	28.6	29.1	29.1	29.2
Group	HAB	HAB	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	ANAT	ANAT	ANAT	ANAT

TABLE 8: CONTINUED

Section 7 Continued

Frag. No.	8	8	8	10	10	10	12	12	12	15	15	15
Grain No.	3	2	1	2	3	1	3	2	1	2	3	1
SiO_2	37.0	36.8	36.7	39.9	39.9	39.8	38.1	37.6	37.5	38.5	38.2	38.5
TiO_2	.07	.07	.06	.10	.11	.25	.04	.06	.14	.06	.05	.05
Al_2O_3	.19	.15	.12	*	.04	*	.12	.06	.11	.03	.02	.04
Cr_2O_3	.22	.17	.15	.03	.03	.07	.02	.04	.05	.02	.04	.01
FeO	28.4	31.2	32.6	14.5	14.6	14.7	25.5	25.6	25.6	23.0	23.3	23.4
MgO	33.1	31.6	30.2	44.5	44.6	44.3	36.2	35.7	35.6	38.0	38.3	38.1
CaO	.60	.28	.34	.16	.22	.19	.24	.28	.29	.12	.13	.09
Total	99.58	100.27	100.07	99.19	99.50	99.31	100.22	99.34	99.29	99.73	100.04	100.19
Number of Ions on the Basis of 4 (O)												
Si	.997	.997	1.003	1.006	1.004	1.004	1.002	1.000	.998	1.006	.997	1.003
Al	.006	.005	.004	--	.001	--	.004	.002	.004	.001	.001	.001
Cr	.005	.004	.003	.001	.001	.001	.001	.001	.001	.001	.001	.001
Ti	.001	.001	.001	.002	.002	.005	.001	.001	.003	.001	.001	.001
Mg	1.329	1.276	1.226	1.673	1.672	1.665	1.423	1.415	1.413	1.479	1.490	1.479
Fe	.640	.707	.745	.306	.307	.310	.561	.570	.570	.502	.509	.510
Ca	.017	.008	.010	.004	.006	.005	.007	.008	.008	.003	.004	.003
Z	.997	.997	1.003	1.006	1.004	1.004	1.002	1.000	.998	1.006	.997	1.003
X	1.998	2.001	1.989	1.986	1.989	1.986	1.994	1.997	1.999	1.987	2.006	1.995
Sum	2.995	2.998	2.992	2.992	2.493	2.990	2.996	2.997	2.997	2.993	3.003	2.998
Molecular End Members												
Fo	67.5	64.4	62.2	84.5	84.5	84.3	71.7	71.3	71.3	74.7	74.6	74.4
Fa	32.5	35.6	37.8	15.5	15.5	15.7	28.3	28.7	28.7	25.3	25.4	25.6
Group	MB	MB	MB	SPT	SPT	SPT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT

TABLE 8: CONTINUED

Section 7 Continued

Frag. No.	18	18	18	18	33	33	33	35	35	35	36	36	36
Grain No.	2	1	4	3	3	2	1	2	3	1	1	3	2
SiO_2	40.6	40.1	39.9	39.7	39.3	39.2	39.2	39.9	39.8	39.9	39.2	39.1	38.9
TiO_2	.07	.05	.10	.10	.28	.03	.04	.12	.01	.20	.03	.03	.01
Al_2O_3	*	*	.03	.04	.11	*	.02	.01	*	.01	*	*	.02
Cr_2O_3	.03	.01	.03	.04	.05	.02	.05	.05	.04	.08	.05	.04	.03
FeO	11.7	13.3	13.3	15.1	16.3	16.4	16.4	14.9	14.3	14.6	17.9	18.0	18.3
MgO	46.6	45.4	45.8	44.2	43.2	43.4	43.4	44.9	44.7	44.4	41.6	41.5	41.4
CaO	.16	.20	.21	.21	.20	.19	.12	.17	.14	.13	.15	.20	.15
Total	99.16	99.06	99.37	99.39	99.44	99.24	99.23	99.15	98.99	99.32	98.93	98.87	98.81
Number of Ions on the Basis of 4 (O)													
Si	1.010	1.007	1.000	1.003	.998	.998	.998	1.005	1.005	1.006	1.008	1.006	1.004
Al	--	--	.001	.001	.003	--	.001	.001	--	.001	--	--	.001
Cr	.001	.001	.001	.001	.001	.001	.001	.001	.001	.002	.001	.001	.001
Ti	.001	.001	.002	.002	.005	.001	.001	.002	.001	.004	.001	.001	.001
Mg	1.728	1.699	1.710	1.664	1.635	1.647	1.647	1.685	1.682	1.668	1.593	1.592	1.592
Fe	.244	.279	.279	.319	.346	.349	.349	.295	.302	.308	.345	.388	.395
Ca	.004	.005	.006	.006	.005	.005	.003	.005	.004	.004	.004	.006	.004
Z	1.010	1.007	1.000	1.003	.998	.998	.998	1.005	1.005	1.006	1.008	1.006	1.004
X	1.978	1.985	1.999	1.993	1.995	2.003	2.002	1.989	1.990	1.987	1.944	1.988	1.994
Sum	2.988	2.992	2.999	2.996	2.993	3.001	3.000	2.994	2.995	2.993	2.952	2.994	2.998
Molecular End Members													
Fo	87.7	85.9	86.0	83.9	82.5	82.5	82.5	85.1	84.8	84.4	80.6	80.4	80.1
Fa	12.3	14.1	14.0	16.1	17.5	17.5	17.5	14.9	15.2	15.6	19.4	19.6	19.9
Group	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	ANAT	ANAT	ANAT

TABLE 8: CONTINUED

Section	7 Continued			Section 8								
Frag. No.	41	41	41	2	2	2	8	8	8	13	13	16
Grain No.	3	2	1	1	2	3	1	3	2	2	1	1
SiO_2	37.2	36.8	37.0	38.2	38.0	38.2	38.1	38.0	38.1	41.7	37.7	38.2
TiO_2	.03	.06	.07	.14	.10	.09	.21	.12	.04	.02	.15	.04
Al_2O_3	.08	.10	.10	.05	.08	.06	.16	.08	.09	.15	.13	.05
Cr_2O_3	.04	.05	.04	.04	.06	.10	.11	.05	.08	.13	.08	.02
FeO	28.3	28.5	28.7	22.2	22.5	22.9	23.7	24.5	24.9	5.8	25.7	23.6
MgO	33.5	33.4	33.0	38.4	38.2	38.0	37.0	36.5	36.5	51.4	35.7	37.7
CaO	.17	.16	.21	.29	.37	.36	.28	.25	.20	.39	.19	.25
Total	99.32	99.07	99.12	99.32	99.31	99.71	99.56	99.50	99.89	99.59	99.65	99.86
Number of Ions on the Basis of 4 (O)												
Si	1.003	.997	1.002	1.000	.997	.999	1.001	1.003	1.003	1.007	1.000	1.000
Al	.003	.003	.003	.002	.003	.002	.005	.003	.003	.004	.004	.002
Cr	.001	.001	.001	.001	.001	.002	.002	.001	.001	.003	.002	.001
Ti	.001	.001	.001	.003	.002	.002	.004	.002	.001	.001	.003	.001
Mg	1.346	1.348	1.332	1.498	1.493	1.481	1.449	1.436	1.432	1.849	1.411	1.471
Fe	.638	.646	.650	.486	.494	.501	.521	5.410	.548	.117	.570	.517
Ca	.005	.005	.006	.001	.010	.010	.008	.007	.006	.010	.005	.007
Z	1.003	.997	1.002	1.000	.997	.999	1.001	1.003	1.003	1.007	1.000	1.000
X	1.994	2.004	1.993	1.991	2.003	1.998	1.989	1.990	1.991	1.984	1.995	2.006
Sum	2.997	3.001	2.995	2.991	3.000	2.997	2.990	2.993	2.994	2.991	2.995	3.006
Molecular End Members												
Fo	67.8	67.6	67.2	75.5	75.2	74.7	73.6	72.6	72.3	94.0	71.2	74.0
Fa	32.2	32.4	32.8	24.5	24.8	25.3	26.4	27.4	27.7	6.0	28.8	26.0
Group	SPT	SPT	SPT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT

TABLE 8: CONTINUED

Section 8 Continued

Frag. No.	12	12	12	12	14	14	14	22	23	23	23	28
Grain No.	4	3	2	1	1	3	2	1	1	2	3	1
SiO_2	38.2	38.2	37.1	37.1	37.8	37.4	37.9	39.3	37.9	37.8	37.8	37.1
TiO_2	.06	.10	.17	.10	.06	.15	.04	.15	.22	.26	.14	.06
Al_2O_3	.08	.04	.09	.12	.17	.09	.06	.19	.06	.11	.13	.13
Cr_2O_3	.19	.20	.12	.07	.11	.16	.09	.01	.05	.09	.04	.04
FeO	21.7	22.3	28.6	28.9	25.3	25.4	25.6	14.7	21.7	22.9	22.9	28.1
MgO	37.8	37.7	33.1	32.4	35.6	35.5	35.4	44.5	38.7	37.5	37.7	33.4
CaO	.38	.40	.48	.47	.21	.19	.20	.23	.32	.25	.20	.31
Total	99.41	98.94	99.66	99.16	99.25	98.83	99.22	99.08	98.95	98.91	98.96	99.14
Number of Ions on the Basis of 4 (O)												
Si	1.007	1.005	.999	1.005	1.004	.999	1.008	.995	.994	1.009	.997	1.002
Al	.003	.001	.003	.004	.005	.003	.002	.006	.002	.003	.004	.004
Cr	.004	.004	.003	.002	.002	.003	.002	.001	.001	.002	.001	.001
Ti	.001	.002	.003	.002	.001	.003	.001	.003	.004	.005	.004	.001
Mg	1.485	1.477	1.329	1.309	1.410	1.413	1.403	1.697	1.513	1.4[illegible]	1.48[illegible]	1.344
Fe	.478	.490	.644	.655	.562	.568	.569	.311	.476	.499	.505	.634
Ca	.011	.011	.014	.014	.006	.005	.006	.006	.009	.007	.006	.009
Z	1.007	1.005	.999	1.005	1.004	.999	1.008	.995	.994	1.009	.997	1.002
X	1.982	1.984	1.996	1.986	1.986	1.995	1.983	2.005	2.005	1.973	2.001	1.993
Sum	2.989	2.989	2.995	2.991	2.990	2.994	2.991	3.001	2.999	2.982	2.998	2.995
Molecular End Members												
Fo	75.6	75.1	67.4	66.6	71.5	71.4	71.1	84.4	76.1	74.5	74.6	67.9
Fa	24.4	24.9	32.6	33.4	28.5	28.6	28.9	15.6	23.9	25.5	25.4	32.1
Group	ANAT	ANAT	ANAT	ANAT	HAB	HAB	HAB	SPT	SPT	SPT	SPT	NAIA

TABLE 8: CONTINUED

Section 9

Frag. No.	1	1	1	1	5	5	5	5	7	7	7	7
Grain No.	2	4	3	1	1	2	3	4	3	4	2	1
SiO_2	37.2	37.5	37.2	37.0	37.3	37.0	36.8	36.9	37.3	37.2	36.7	36.8
TiO_2	.11	.11	.07	.11	.21	.17	.10	.11	.04	.15	.06	.05
Al_2O_3	*	*	.04	*	*	*	*	.01	.06	.06	.11	.05
Cr_2O_3	.14	.11	.09	.12	.07	.05	.04	.05	.19	.22	.20	.23
FeO	26.5	27.5	28.3	29.3	27.8	28.5	28.5	28.5	28.3	28.7	28.7	29.4
MgO	34.8	33.5	33.1	32.5	33.9	33.1	33.2	33.3	33.7	32.9	32.6	32.2
CaO	.33	.36	.39	.37	.11	.17	.22	.16	.61	.59	.61	.54
Total	99.08	99.08	99.19	99.40	99.39	98.99	98.86	99.03	100.20	99.82	98.98	99.27
Number of Ions on the Basis of 4 (O)												
Si	.998	1.009	1.005	1.002	1.002	1.002	.999	1.000	.998	1.001	.998	1.000
Al	--	--	.001	--	--	--	--	.001	.002	.002	.004	.002
Cr	.003	.002	.002	.003	.002	.001	.001	.001	.004	.005	.004	.005
Ti	.002	.002	.001	.002	.004	.004	.002	.002	.001	.001	.001	.001
Mg	1.391	1.344	1.332	1.312	1.357	1.336	1.343	1.344	1.344	1.319	1.321	1.304
Fe	.595	.619	.639	.664	.625	.646	.647	.646	.633	.64	.652	.668
Ca	.010	.010	.011	.011	.003	.005	.006	.005	.018	.017	.018	.016
Z	.998	1.009	1.005	1.002	1.002	1.002	.999	1.000	.998	1.001	.998	1.000
X	2.001	1.977	1.986	1.992	1.991	1.992	1.999	1.999	2.002	1.992	2.000	1.996
Sum	2.999	2.986	2.991	2.994	2.993	2.994	2.998	2.999	3.000	2.993	2.998	2.996
Molecular End Members												
Fo	72.8	68.5	67.6	66.4	68.5	67.4	67.5	67.6	68.9	67.1	66.9	66.1
Fa	27.2	31.5	32.4	33.6	31.5	32.6	32.5	32.4	32.0	32.9	33.1	33.9
Group	HAB	HAB	HAB	HAB	HAB	HAB	HAB	HAB	NATA	NATA	NATA	NATA

TABLE 8: CONTINUED

Section 9 Continued

Frag. No.	13	13	13	13	13	15	15	15	15	16	16	16
Grain No.	5	1	4	2	3	1	2	3	4	2	3	1
SiO_2	41.0	40.2	39.9	39.6	38.6	39.8	39.6	39.3	39.2	39.9	40.0	39.2
TiO_2	.07	.03	.01	.09	.12	.09	.11	.03	.16	.03	.07	.02
Al_2O_3	.34	*	*	*	*	.05	*	*	*	*	.06	*
Cr_2O_3	.01	.05	*	.05	.03	.15	.05	.03	.04	.08	.04	*
FeO	9.2	10.6	12.2	14.9	15.7	13.2	16.0	16.8	17.9	10.3	13.8	15.1
MgO	49.7	48.2	47.7	44.9	44.1	46.4	44.1	43.4	42.5	48.9	45.1	44.7
CaO	.26	.16	.19	.17	.23	.21	.21	.17	.15	.15	.20	.18
Total	100.58	99.24	100.00	99.71	98.78	99.90	100.03	99.71	99.98	99.41	99.25	99.17
Number of Ions on the Basis of 4 (O)												
Si	.995	.996	.989	.997	.987	.992	.998	.998	.998	.987	1.005	.993
Al	.010	--	--	--	--	.002	--	--	--	--	.002	--
Cr	.001	.001	--	.001	.001	.003	.001	.001	.001	.002	.001	--
Ti	.001	.001	.001	.002	.002	.002	.002	.001	.003	.001	.001	.001
Mg	1.798	1.781	1.763	1.684	1.680	1.724	1.656	1.642	1.612	1.803	1.689	1.688
Fe	.187	.220	.253	.314	.336	.275	.337	.357	.381	.213	.290	.320
Ca	.007	.004	.005	.005	.006	.006	.005	.004	.005	.005	.005	.004
Z	.995	.996	.989	.997	.987	.992	.998	.998	.998	.987	1.005	.993
X	2.004	2.007	2.022	2.006	2.025	2.012	2.001	2.005	2.002	2.024	1.998	2.013
Sum	2.999	3.003	3.011	3.003	3.012	3.004	2.999	3.003	3.000	3.011	2.993	3.006
Molecular End Members												
Fo	90.6	89.0	87.5	84.3	83.4	86.2	83.1	82.2	8.1	89.4	85.3	84.1
Fa	9.4	11.0	12.5	15.7	16.6	13.8	16.9	17.8	19.1	10.6	14.7	15.9
Group	ANAT	ANAT	ANAT	ANAT	ANAT	SPT	SPT	SPT	SPT	SPT	SPT	SPT

TABLE 8: CONTINUED

Section 9 Continued

Frag. No.	18	18	18	19	19	19	19	19	20	20	20
Grain No.	2	3	1	1	4	2	5	3	2	1	3
SiO_2	39.2	38.9	38.8	39.9	39.7	40.0	39.8	39.1	39.6	39.5	38.4
TiO_2	.16	.01	.19	.07	.08	.04	.14	.14	.02	*	.04
Al_2O_3	*	*	*	*	*	*	*	*	*	*	*
Cr_2O_3	.11	.03	.12	.09	.01	*	.02	.01	.16	.15	.09
FeO	16.8	16.9	17.1	12.0	13.8	13.9	14.8	15.0	15.2	16.7	21.0
MgO	43.5	43.9	43.4	47.3	45.3	46.2	45.0	45.5	43.8	42.6	39.6
CaO	.15	.13	.12	.18	.20	.16	.18	.21	.41	.46	.39
Total	99.92	99.87	99.73	99.54	99.09	100.30	99.94	99.95	99.19	99.41	99.52
Number of Ions on the Basis of 4 (O)											
Si	.994	.988	.988	.993	1.000	.996	.998	.984	1.004	1.006	.998
Al	--	--	--	--	--	--	--	--	--	--	--
Cr	.002	.001	.002	.002	.001	--	.001	.001	.003	.003	.002
Ti	.003	.001	.004	.001	.002	.001	.003	.003	.001	--	.001
Mg	1.643	1.661	1.647	1.754	1.701	1.714	1.682	1.706	1.654	1.616	1.533
Fe	.356	.359	.364	.250	.291	.289	.311	.316	.322	.356	.456
Ca	.004	.004	.003	.005	.005	.004	.005	.006	.011	.013	.011
Z	.994	.988	.988	.993	1.000	.996	.998	.984	1.004	1.006	.998
X	2.008	2.026	2.026	2.012	2.000	2.008	2.002	2.032	1.991	1.988	2.003
Sum	3.002	3.014	3.008	3.005	3.000	3.004	3.000	3.016	2.995	2.994	3.001
Molecular End Members											
Fo	82.2	82.2	81.9	87.5	85.4	85.6	84.4	84.4	83.7	82.0	77.1
Fa	17.8	17.8	18.1	12.5	14.6	14.4	15.6	15.6	16.3	18.0	22.9
Group	SPT	SPT	SPT	SPT	SPT	SPT	SPT	SPT	ANAT	ANAT	ANAT

TABLE 8: CONTINUED

Section 10								Section 12					
Frag. No.	1	1	1	6	6	6	6	47	47	39	59	59	59
Grain No.	1	2	3	4	2	3	1	3	1	1	1	3	2
SiO_2	39.5	39.2	39.5	38.6	38.1	37.8	37.0	39.3	39.3	35.6	37.5	37.5	37.3
TiO_2	.02	.19	.25	.09	.09	.10	.14	.10	.09	.07	.09	.08	.09
Al_2O_3	*	*	*	.06	*	*	*	*	.57	.03	*	*	*
Cr_2O_3	.01	.03	.04	.23	.14	.10	.07	.02	.02	.04	.06	.07	.07
FeO	14.5	14.6	14.6	22.6	24.4	26.9	29.8	17.5	18.3	39.4	27.6	27.6	27.9
MgO	45.0	44.9	44.7	37.9	36.8	34.9	32.3	41.9	41.2	24.6	34.0	33.9	33.8
CaO	.14	.15	.19	.34	.38	.38	.37	.28	.25	.42	.24	.18	.23
Total	99.17	99.07	99.28	99.82	99.91	99.68	99.68	99.10	99.73	99.96	99.49	99.33	99.39
Number of Ions on the Basis of 4 (O)													
Si	.998	.992	.997	1.006	1.002	1.005	1.002	1.007	1.003	1.008	1.005	1.007	1.003
Al	--	--	--	.002	--	--	--	--	.017	.001	--	--	--
Cr	.001	.001	.001	.005	.003	.002	.002	.001	.001	.001	.001	.002	.002
Ti	.001	.004	.005	.002	.002	.002	.003	.002	.002	.002	.002	.002	.002
Mg	1.694	1.694	1.682	1.472	1.442	1.384	1.303	1.690	1.567	1.038	1.358	1.356	1.354
Fe	.306	.309	.308	.493	.536	.587	.675	.375	.391	.933	.619	.620	.627
Ca	.004	.004	.005	.010	.011	.011	.011	.008	.007	.007	.007	.005	.007
Z	.998	.992	.997	1.006	1.002	1.006	1.002	1.007	1.003	1.008	1.005	1.007	1.003
X	2.006	2.012	2.001	1.984	1.994	1.986	1.994	1.986	1.985	1.982	1.987	1.985	1.992
Sum	3.004	3.004	2.998	2.990	2.996	2.992	2.996	2.993	2.988	2.990	2.992	2.992	2.995
Molecular End Members													
Fo	84.7	84.6	84.5	74.9	72.9	70.2	65.9	81.0	80.1	52.7	68.7	68.6	68.3
Fa	15.3	15.4	15.5	25.1	27.1	29.8	34.1	19.0	19.9	47.3	31.3	31.3	31.7
Group	SPT	SPT	SPT	HAB	HAB	HAB	HAB	HATA	ANAT	ANAT	HAB	HAB	HAB

TABLE 8: CONTINUED

Section 12 Continued										Section 17		
Frag. No.	61	61	61	82	82	82	86	86	86	2	2	2
Grain No.	1	3	2	3	1	2	2	1	3	1	2	3
SiO_2	37.2	37.0	36.9	38.0	37.4	38.0	40.0	39.5	39.6	39.5	40.1	39.8
TiO_2	.05	.05	.13	.07	.05	.09	.08	.05	.06	.24	.05	.05
Al_2O_3	*	*	.01	*	*	*	*	*	*	*	*	*
Cr_2O_3	.10	.12	.11	.14	.06	.06	.02	.02	.01	.07	.02	.03
FeO	28.4	29.3	30.7	24.9	26.3	26.4	16.7	16.9	17.0	15.4	15.4	15.4
MgO	33.0	32.7	31.5	35.8	35.0	34.7	42.8	42.8	42.5	43.6	43.9	44.1
CaO	.36	.37	.39	.31	.22	.29	.18	.14	.17	.14	.12	.14
Total	99.11	99.54	99.83	99.22	99.03	99.54	99.78	99.41	99.34	98.95	99.59	99.52
Number of Ions on the Basis of 4 (O)												
Si	1.006	1.001	1.002	1.008	1.003	1.008	1.012	1.005	1.009	1.004	1.011	1.005
Al	--	--	.001	--	--	--	--	--	--	--	--	--
Cr	.002	.003	.002	.003	.001	.001	.001	.001	.001	.001	.001	.001
Ti	.001	.001	.003	.001	.001	.001	.002	.001	.001	.005	.001	.001
Mg	1.330	1.318	1.279	1.415	1.383	1.391	1.614	1.623	1.613	1.651	1.649	1.659
Fe	.642	.663	.697	.552	.579	.587	.353	.360	.362	.327	.325	.325
Ca	.010	.011	.011	.009	.007	.008	.005	.004	.005	.004	.003	.004
Z	1.006	1.001	1.002	1.008	1.003	1.008	1.012	1.005	1.009	1.004	1.011	1.005
X	1.985	1.996	1.993	1.980	1.971	1.998	1.975	1.989	1.982	1.988	1.979	1.990
Sum	2.991	2.997	2.995	2.988	2.974	2.996	2.987	2.994	2.991	2.992	2.990	2.995
Molecular End Members												
Fo	67.4	66.5	64.7	71.9	70.3	70.1	82.0	81.9	81.7	83.5	83.6	83.6
Fa	32.6	33.5	35.3	28.1	29.7	29.9	18.0	18.1	18.3	16.5	16.4	16.4
Group	NATA	NATA	NATA	HAB	HAB	HAB	HAB	HAB	HAB	SPT	SPT	SPT

TABLE 8: CONTINUED

Section 17 Continued

Frag. No.	10	10	10	19	19	19	19	35	35	35
Grain No.	1	2	3	1	4	2	3	1	3	2
SiO_2	39.5	39.5	39.4	37.9	37.9	37.6	37.6	39.8	39.5	39.9
TiO_2	.06	.04	.21	.04	.07	.03	.06	.03	.17	.07
Al_2O_3	*	*	*	*	*	*	*	*	*	*
Cr_2O_3	.03	.06	.13	.03	.03	.04	.04	*	.02	.01
FeO	15.7	15.7	15.9	22.5	25.3	25.4	25.7	14.2	14.6	14.8
MgO	43.6	43.6	43.6	38.5	36.2	36.2	35.6	44.8	45.4	44.6
CaO	.20	.20	.23	.24	.18	.26	.24	.14	.13	.17
Total	99.09	99.10	99.47	99.21	99.68	99.53	99.24	98.97	99.82	99.55
Number of Ions on the Basis of 4 (O)										
Si	1.004	1.004	.999	.995	1.002	.998	1.002	1.005	.992	1.004
Al	--	--	--	--	--	--	--	--	--	--
Cr	.001	.001	.003	.001	.001	.001	.001	--	.001	.001
Ti	.001	.001	.004	.001	.001	.001	.001	.001	.003	.001
Mg	1.651	1.651	1.647	1.507	1.427	1.431	1.414	1.686	1.699	1.673
Fe	.334	.334	.337	.494	.560	.564	.573	.300	.307	.312
Ca	.005	.005	.006	.007	.005	.007	.007	.004	.004	.005
Z	1.004	1.004	.999	.995	1.002	.998	1.002	1.005	.992	1.004
X	1.992	1.992	1.997	2.010	1.994	2.004	1.996	1.991	2.014	1.992
Sum	2.996	2.996	2.996	3.005	2.996	3.002	2.998	2.996	3.006	2.996
Molecular End Members										
Fo	83.2	83.2	83.0	75.3	71.8	71.8	71.2	84.9	84.7	84.3
Fa	16.8	16.8	17.0	24.7	28.2	28.2	28.8	15.1	15.3	15.7
Group	SPT	SPT	SPT	ANAT	ANAT	ANAT	ANAT	SPT	SPT	SPT

TABLE 8: CONTINUED

Section 17 Continued

Frag. No.	40	40	40	40	48	52	52	52	52	63	63
Grain No.	2	1	3	4	1	3	4	2	1	2	1
SiO_2	38.5	38.9	37.2	36.7	34.8	32.3	31.9	32.0	31.5	37.3	37.2
TiO_2	.10	.12	.10	.17	.08	.07	.08	.07	.08	.04	.05
Al_2O_3	*	.34	*	.51	.42	.21	.23	.20	.24	.01	*
Cr_2O_3	.22	.16	.09	.08	.04	.10	.09	.08	.05	.03	.01
FeO	21.8	22.6	28.3	29.3	46.0	56.8	57.0	58.5	59.1	28.2	28.6
MgO	38.1	36.2	33.4	32.2	18.2	8.9	9.3	7.8	7.2	33.9	33.4
CaO	.43	.82	.48	.43	.41	.57	.62	.61	.64	.14	.08
Total	99.15	99.14	99.57	99.39	99.95	98.95	99.22	99.26	98.81	99.62	99.34
Number of Ions on the Basis of 4 (O)											
Si	1.007	1.020	1.001	.995	1.019	1.021	1.008	1.018	1.013	1.002	1.004
Al	--	.011	--	.016	.015	.008	.009	.008	.009	.001	--
Cr	.005	.003	.002	.002	.001	.003	.002	.002	.001	.001	.001
Ti	.002	.002	.002	.004	.002	.002	.002	.002	.002	.001	.001
Mg	1.486	1.415	1.340	1.300	.795	.419	.438	.370	.345	1.357	1.343
Fe	.477	.496	.637	.664	1.127	1.501	1.506	1.556	1.589	.633	.645
Ca	.012	.023	.014	.013	.013	.019	.021	.022	.022	.004	.002
Z	1.007	1.020	1.001	.995	1.019	1.021	1.008	1.018	1.013	1.002	1.004
X	1.982	1.950	1.995	1.999	1.953	1.952	1.978	1.959	1.968	1.997	1.992
Sum	2.989	2.970	2.996	2.994	2.972	2.973	2.986	2.977	2.981	2.999	2.996
Molecular End Members											
Fo	75.7	74.1	67.8	66.2	41.4	21.8	22.5	19.2	17.8	68.2	67.5
Fa	24.3	25.9	32.2	33.8	58.6	78.2	77.5	80.8	82.2	31.8	32.5
Group	HAB	HAB	HAB	HAB	A					ANAT	ANAT

TABLE 8: CONTINUED

Section 17 Continued

Frag. No.	91	91	91	91	98	98	98	100	100	100	104	104	104
Grain No.	3	2	4	1	1	2	3	1	2	3	3	1	2
SiO_2	42.0	41.6	41.2	41.3	38.5	38.3	38.3	37.3	37.2	37.1	37.5	37.8	38.2
TiO_2	*	*	*	*	.11	.09	.08	.10	.08	.06	.13	.14	.09
Al_2O_3	*	.02	.04	*	.04	*	*	.07	.17	.15	.07	.04	.17
Cr_2O_3	.05	.06	.04	.08	.08	.06	.08	.08	.09	.10	.03	.03	*
FeO	5.1	5.5	6.0	6.2	22.6	24.6	24.7	29.3	29.3	29.3	26.2	27.3	27.5
MgO	52.3	52.1	51.4	51.1	37.5	36.0	36.3	32.4	32.2	32.0	35.5	34.0	32.6
CaO	.33	.33	.37	.31	.18	.23	.26	.34	.26	.28	.18	.23	.56
Total	99.78	99.61	99.05	98.99	99.01	99.28	99.72	99.59	99.30	98.99	99.61	99.54	99.12
Number of Ions on the Basis of 4 (O)													
Si	1.008	1.003	1.002	1.005	1.011	1.012	1.009	1.007	1.008	1.008	.998	1.010	1.025
Al	--	.001	.001	--	.001	--	--	.002	.005	.005	.002	.001	.005
Cr	.001	.001	.001	.002	.002	.001	.002	.002	.002	.002	.001	.001	--
Ti	--	--	--	--	.002	.002	.002	.002	.002	.001	.003	.003	.002
Mg	1.871	1.872	1.862	1.853	1.468	1.419	1.425	1.304	1.300	1.296	1.407	1.354	1.304
Fe	.102	.111	.122	.126	.496	.544	.544	.662	.664	.666	.583	.610	.617
Ca	.009	.009	.010	.008	.005	.007	.007	.010	.008	.008	.005	.007	.016
Z	1.008	1.003	1.002	1.005	1.011	1.012	1.009	1.007	1.008	1.008	.998	1.010	1.025
X	1.983	1.994	1.996	1.989	1.974	1.973	1.980	1.982	1.982	1.978	2.001	1.976	1.944
Sum	2.991	2.997	2.998	2.994	2.985	2.985	2.989	2.989	2.990	2.986	2.999	2.986	2.969
Molecular End Members													
Fo	94.8	94.4	93.9	93.6	74.7	72.3	72.4	66.3	66.2	66.1	70.7	68.9	67.9
Fa	5.2	5.6	6.1	6.4	25.3	27.7	27.6	33.7	33.8	33.9	29.3	31.1	32.1
Group	SPT	SPT	SPT	SPT	HAB	HAB	HAB	A	A	A	HAB	HAB	HAB

TABLE 8: CONTINUED

Section 17 Continued						Section 18					
Frag. No.	108	108	111	111	111	2	2	2	12	12	12
Grain No.	2	1	1	2	3	2	1	3	2	1	3
SiO_2	36.3	35.7	39.4	39.6	39.6	37.5	36.9	36.8	40.0	39.5	39.5
TiO_2	.06	.06	*	.19	.10	.17	.19	.15	.09	.04	.22
Al_2O_3	.10	.12	*	*	*	.15	.16	.20	.08	.02	.04
Cr_2O_3	.05	.06	.02	.07	.03	.08	.11	.14	.03	.03	.07
FeO	35.0	37.8	18.8	18.9	19.0	27.6	28.3	28.4	15.3	15.9	16.1
MgO	27.3	25.2	40.9	40.8	40.6	34.0	33.6	33.5	44.1	44.1	43.9
CaO	.37	.38	.15	.14	.14	.42	.31	.25	.23	.21	.18
Total	99.18	99.32	99.27	99.70	99.47	99.92	99.57	99.44	99.83	99.80	100.01
Number of Ions on the Basis of 4 (O)											
Si	1.013	1.010	1.013	1.013	1.016	1.001	.993	.993	1.006	.998	.996
Al	.003	.004	--	--	--	.005	.005	.006	.002	.001	.001
Cr	.001	.001	.001	.001	.001	.002	.002	.003	.001	.001	.001
Ti	.001	.001	--	.004	.002	.003	.004	.003	.002	.001	.004
Mg	1.136	1.063	1.566	1.566	1.522	1.353	1.348	1.347	1.653	1.660	1.650
Fe	.817	.895	.404	.404	.408	.616	.637	.641	.322	.336	.340
Ca	.011	.012	.004	.004	.004	.012	.009	.007	.006	.006	.005
Z	1.013	1.010	1.013	1.013	1.016	1.001	.993	.993	1.006	.998	.996
X	1.969	1.976	1.975	1.969	1.967	1.991	2.005	2.007	1.986	2.005	2.001
Sum	2.982	2.986	2.988	2.982	2.983	2.992	2.998	3.000	2.992	3.003	2.997
Molecular End Members											
Fo	58.2	54.3	79.5	79.4	79.2	68.7	67.9	67.8	83.7	83.2	82.9
Fa	41.8	45.7	20.5	20.6	20.8	31.3	32.1	32.2	16.3	16.8	17.1
Group			SPT	SPT	SPT	ANAT	ANAT	ANAT	SPT	SPT	SPT

TABLE 8: CONTINUED

Section 18 Continued

Frag. No.	25	25	25	27	37	48	48	48	64	64	64
Grain No.	2	1	3	1	1	3	1	2	3	2	1
SiO_2	40.1	39.9	40.5	37.5	37.7	36.5	36.9	36.9	39.9	39.8	39.0
TiO_2	.02	.03	.01	.06	.07	.09	.14	.08	.04	.04	.06
Al_2O_3	.20	.07	.08	.11	.11	.12	.12	.11	.12	.04	.07
Cr_2O_3	*	.03	.02	.22	.08	.14	.13	.11	.02	.03	.02
FeO	13.1	13.6	13.7	26.1	26.7	27.4	27.8	28.7	18.6	18.9	19.1
MgO	45.3	45.3	45.7	34.5	34.3	34.2	33.6	33.4	40.6	40.7	41.1
CaO	.29	.13	.17	.51	.29	.36	.31	.31	.27	.21	.22
Total	99.01	99.06	100.18	99.00	99.25	98.81	99.00	99.61	99.55	99.72	99.57
Number of Ions on the Basis of 4 (O)											
Si	1.007	1.004	1.007	1.004	1.008	.988	.997	.995	1.020	1.018	1.002
Al	.006	.002	.002	.004	.004	.004	.004	.004	.004	.001	.002
Cr	--	.001	.001	.005	.002	.003	.003	.002	.001	.001	.001
Ti	.001	.001	.001	.001	.001	.002	.003	.002	.001	.001	.001
Mg	1.695	1.698	1.693	1.377	1.367	1.380	1.353	1.342	1.547	1.551	1.574
Fe	.275	.286	.285	.585	.597	.620	.628	.647	.398	.404	.410
Ca	.008	.004	.005	.015	.008	.010	.009	.009	.007	.006	.006
Z	1.007	1.004	1.007	1.004	1.008	.988	.997	.995	1.020	1.018	1.002
X	1.935	1.992	1.987	1.987	1.979	2.019	2.000	2.006	1.958	1.964	1.994
Sum	2.992	2.996	2.994	2.991	2.987	3.007	2.997	3.001	2.978	2.982	2.996
Molecular End Members											
Fo	86.0	85.6	85.6	70.2	69.6	69.0	68.3	67.5	79.6	79.3	79.3
Fa	14.0	14.4	14.4	29.8	30.4	31.0	31.7	32.5	20.4	20.7	20.7
Group	A	A	A	NATA	NATA	ANAT	ANAT	ANAT	A	A	A

TABLE 8: CONTINUED

Section 18 Continued

Frag. No.	66	66	66	71	71	71	72	72	72	95	98	98
Grain No.	1	3	2	1	2	3	1	2	3	1	1	2
SiO_2	39.8	39.0	37.8	39.4	39.8	39.3	40.0	39.9	39.8	36.4	37.7	37.[illegible]
TiO_2	.05	.10	.14	.11	.15	.13	.06	.22	.09	.13	.08	.10
Al_2O_3	*	.08	.18	.11	.10	*	.17	.07	.07	.22	.05	.06
Cr_2O_3	.08	.17	.21	.06	.05	.07	.09	.12	.06	.13	.10	.09
FeO	15.5	19.1	25.6	17.3	17.3	17.4	15.4	15.4	15.5	32.0	24.2	24.2
MgO	43.9	40.8	35.5	42.6	42.6	42.1	43.9	43.9	43.8	30.0	36.8	37.0
CaO	.14	.40	.34	.20	.21	.21	.18	.20	.23	.40	.20	.29
Total	99.47	99.65	99.77	99.78	100.21	99.21	99.80	99.81	99.55	98.28	99.13	99.64
Number of Ions on the Basis of 4 (O)												
Si	1.006	1.002	1.001	1.001	1.006	1.005	1.006	1.004	1.005	1.001	.999	.998
Al	--	.002	.006	.003	.003	--	.005	.002	.002	.007	.002	.002
Cr	.002	.004	.004	.001	.001	.001	.002	.002	.001	.003	.002	.002
Ti	.001	.002	.003	.002	.003	.003	.001	.040	.002	.003	.002	.002
Mg	1.653	1.562	1.401	1.613	1.605	1.605	1.646	1.647	1.648	1.230	1.453	1.453
Fe	.328	.410	.567	.368	.366	.372	.324	.324	.327	.736	.536	.533
Ca	.004	.011	.010	.005	.006	.006	.005	.005	.006	.012	.006	.008
Z	1.006	1.002	1.001	1.001	1.006	1.005	1.006	1.004	1.005	1.001	.999	.998
X	1.988	1.991	1.991	1.992	1.984	1.987	1.983	1.988	1.986	1.991	2.001	2.000
Sum	2.994	2.993	2.992	2.993	2.990	2.992	2 989	2.988	2.991	2.992	3.000	2.998
Molecular End Members												
Fo	83.5	79.2	71.2	81.4	81.4	81.2	83.6	83.6	83.4	62.6	73.0	73.2
Fa	16.5	20.8	28.8	18.6	18.6	18.8	16.4	16.4	16.6	37.4	27.0	26.8
Group	HAB	HAB	HAB	SPT	SPT	SPT	SPT	SPT	SPT	NATA	HAB	HAB

TABLE 8: CONTINUED

Section 18 Continued

Frag. No.	102	102	102	106	106	106	107	110	110	110	111	111	111
Grain No.	3	2	1	1	2	3	1	1	3	2	2	3	1
SiO_2	39.8	39.6	39.4	37.4	37.0	37.1	36.4	37.3	37.1	37.0	40.0	39.7	39.4
TiO_2	.24	.12	.29	.10	.07	.08	.39	.10	.15	.15	.09	.13	.23
Al_2O_3	.04	.08	.10	.12	.16	.10	.82	.09	.14	.15	.08	.04	.08
Cr_2O_3	.11	.07	.15	.09	.09	.10	.16	.10	.09	.56	.08	.06	.07
FeO	15.7	15.8	15.9	27.1	27.6	27.7	28.9	25.3	25.5	26.6	11.9	13.4	14.7
MgO	43.8	43.6	43.4	34.9	33.9	34.3	32.2	35.9	35.3	34.9	46.7	45.5	44.8
CaO	.15	.18	.18	.26	.32	.24	.38	.33	.27	.23	.29	.19	.17
Total	99.84	99.45	99.42	99.97	99.14	99.62	99.25	99.12	99.55	99.59	99.14	99.02	99.45
Number of Ions on the Basis of 4 (O)													
Si	1.003	1.003	.999	.996	.997	.995	.987	.994	.990	.989	.999	.999	.994
Al	.001	.002	.003	.004	.005	.003	.026	.003	.004	.005	.002	.001	.002
Cr	.002	.001	.003	.002	.002	.002	.003	.002	.002	.012	.002	.001	.001
Ti	.005	.002	.006	.002	.001	.002	.008	.002	.003	.003	.002	.003	.004
Mg	1.645	1.645	1.640	1.385	1.361	1.371	1.301	1.426	1.404	1.390	1.737	1.706	1.684
Fe	.331	.335	.337	.604	.622	.621	.655	.564	.592	.595	.248	.282	.310
Ca	.004	.005	.005	.007	.009	.007	.011	.009	.008	.007	.008	.005	.005
Z	1.003	1.003	.999	.996	.997	.995	.987	.994	.990	.989	.999	.999	.994
X	1.988	1.990	1.994	2.004	2.000	2.006	2.004	2.006	2.013	2.012	1.999	1.998	2.006
Sum	2.991	2.993	2.993	3.000	2.997	3.001	2.991	3.000	3.003	3.001	2.998	2.997	3.000
Molecular End Members													
Fo	83.3	83.1	83.0	69.7	68.6	68.8	66.5	71.7	70.5	70.0	87.5	85.8	84.5
Fa	16.7	16.9	17.0	30.3	31.4	31.2	33.5	28.3	29.5	30.0	12.5	14.2	15.5
Group	SPT	SPT	SPT	ANAT	ANAT	ANAT	HAB	HAB	HAB	HAB	SPT	SPT	SPT

TABLE 8: CONTINUED

Section 18 Continued

Frag. No.	112	112	112	138	138	140	140	140	147	147	147
Grain No.	3	2	1	3	2	1	2	3	3	1	2
SiO_2	40.0	39.3	39.4	35.1	32.2	39.9	40.0	39.3	37.2	37.1	36.6
TiO_2	.17	.06	.06	.14	.10	.38	.33	.23	.10	.11	.10
Al_2O_3	*	.03	.03	.18	.27	*	.01	*	*	.04	*
Cr_2O_3	.07	.05	.05	.14	.14	.22	.21	.17	.08	.08	.06
FeO	15.4	15.5	15.6	32.7	33.4	14.8	14.9	15.3	28.2	29.7	30.5
MgO	44.0	44.0	43.9	29.4	30.1	43.9	44.2	44.3	33.2	32.7	31.8
CaO	.18	.14	.18	.41	.48	.21	.33	.25	.57	.47	.46
Total	99.82	99.08	99.22	99.07	99.59	99.41	99.98	99.55	99.35	100.29	99.52
Number of Ions on the Basis of 4 (O)											
Si	1.006	.998	1.000	.999	.973	1.006	1.003	.994	1.003	.999	.997
Al	--	.001	.001	.006	.009	--	.001	--	--	.001	--
Cr	.001	.001	.001	.003	.003	.004	.004	.003	.002	.002	.001
Ti	.003	.001	.001	.003	.002	.007	.006	.004	.002	.002	.002
Mg	1.650	1.666	1.660	1.213	1.244	1.650	1.653	1.669	1.334	1.312	1.291
Fe	.324	.329	.331	.757	.774	.312	.313	.324	.636	.669	.695
Ca	.005	.004	.005	.012	.014	.006	.009	.007	.017	.014	.013
Z	1.006	.998	1.000	.999	.973	1.006	1.003	.994	1.003	.999	.997
X	1.983	2.002	1.999	1.994	2.046	1.979	1.986	2.007	1.991	2.000	2.002
Sum	2.989	3.000	2.999	2.993	3.019	2.985	2.989	3.001	2.994	2.999	2.999
Molecular End Members											
Fo	83.6	83.5	83.4	61.6	61.6	84.1	84.1	83.8	67.6	66.2	65.0
Fa	16.4	16.5	16.6	38.4	38.4	15.9	15.9	16.2	32.4	33.8	35.0
Group	SPT	SPT	SPT	HAB	HAB	SPT	SPT	SPT	ANAT	ANAT	ANAT

TABLE 8: CONTINUED

Section 18 Continued

Frag. No.	171	171	171	182	182	182	185	185	185	193	193	193
Grain No.	2	1	3	3	1	2	2	3	1	3	2	1
SiO_2	39.1	38.8	39.1	37.2	37.4	37.1	39.1	39.2	39.4	37.2	37.4	37.3
TiO_2	.06	.05	.04	.11	.08	.08	.04	.04	.05	.14	.10	.09
Al_2O_3	*	*	*	.05	.01	*	*	*	*	.05	*	.01
Cr_2O_3	.03	.03	.03	.10	.12	.12	.02	.02	.03	.10	.10	.07
FeO	19.7	19.9	20.2	26.5	27.5	27.8	16.5	16.6	16.7	26.7	26.9	27.0
MgO	40.9	40.6	40.4	34.8	34.5	34.2	43.0	42.5	42.7	34.4	34.0	33.9
CaO	.16	.15	.21	.33	.28	.23	.15	.15	.11	.33	.31	.43
Total	99.95	99.53	99.98	99.09	99.89	99.53	98.81	98.51	98.99	98.92	98.81	98.80
Number of Ions on the Basis of 4 (O)												
Si	1.003	1.001	1.005	.998	.999	.997	1.001	1.006	1.006	1.000	1.007	1.005
Al	--	--	--	.002	.001	--	--	--	--	.002	--	.001
Cr	.001	.001	.001	.002	.002	.003	.001	.001	.001	.002	.002	.001
Ti	.001	.001	.001	.002	.001	.002	.001	.001	.001	.003	.002	.002
Mg	1.564	1.561	1.548	1.391	1.373	1.369	1.649	1.626	1.625	1.378	1.364	1.362
Fe	.423	.429	.434	.594	.614	.625	.353	.356	.357	.600	.606	.609
Ca	.004	.004	.006	.010	.008	.007	.004	.004	.003	.010	.009	.024
Z	1.003	1.001	1.005	.998	.999	.997	1.001	1.006	1.006	1.000	1.007	1.005
X	1.993	1.996	1.990	2.001	1.993	2.006	1.999	1.988	1.987	1.995	1.983	1.999
Sum	2.996	2.997	2.995	2.999	2.998	3.003	3.000	2.994	2.993	2.995	2.990	3.004
Molecular End Members												
Fo	78.7	78.4	78.1	70.1	69.1	68.7	82.3	82.0	82.0	69.7	69.3	69.1
Fa	21.3	21.6	21.9	29.9	30.9	31.3	17.7	18.0	18.0	30.3	30.7	30.9
Group	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	NATA	NATA	NATA	ANAT	ANAT	ANAT

TABLE 8: CONTINUED

Section 18 Continued

Frag. No.	196	196	196	197	197	208	208	208	209	209	209	211	211
Grain No.	3	2	1	2	3	3	1	2	2	1	3	3	1
SiO_2	36.7	36.7	36.8	37.7	38.1	40.8	40.6	40.7	37.8	38.1	37.6	40.7	40.5
TiO_2	.27	.06	.07	.09	.07	*	.02	.01	.09	.15	.14	.02	.03
Al_2O_3	.07	.02	*	.08	*	*	*	*	.04	*	.03	*	*
Cr_2O_3	.12	.10	.09	.09	.09	*	*	.03	.09	.09	.12	.12	.09
FeO	30.7	31.1	31.2	24.8	24.3	12.5	13.0	13.3	25.8	26.3	26.3	13.3	14.1
MgO	30.5	30.7	30.4	36.0	36.0	46.2	45.9	45.7	35.1	34.7	34.4	45.0	44.6
CaO	.40	.32	.32	.23	.27	.12	.10	.12	.32	.32	.33	.35	.40
Total	98.76	99.00	98.88	98.99	98.83	99.62	99.62	99.56	99.24	99.66	98.89	99.49	99.72
Number of Ions on the Basis of 4 (O)													
Si	1.008	1.007	1.011	1.003	1.011	1.013	1.011	1.014	1.007	1.012	1.008	1.017	1.014
Al	.002	.001	--	.003	--	--	--	--	.001	--	.001	--	--
Cr	.003	.002	.002	.002	.002	--	--	.001	.002	.002	.003	.002	.002
Ti	.006	.001	.001	.002	.001	--	.001	.001	.002	.003	.003	.001	.001
Mg	1.249	1.256	1.245	1.427	1.424	1.710	1.704	1.697	1.394	1.374	1.375	1.675	1.663
Fe	.705	.714	.717	.552	.540	.260	.271	.271	.575	.584	.590	.279	.295
Ca	.012	.009	.009	.007	.008	.003	.003	.003	.009	.009	.009	.009	.011
Z	1.008	1.007	1.011	1.003	1.011	1.013	1.011	1.014	1.007	1.012	1.008	1.017	1.014
X	1.977	1.983	1.974	1.993	1.975	1.973	1.979	1.973	1.983	1.972	1.981	1.966	1.972
Sum	2.985	2.990	2.985	2.996	2.986	2.986	2.990	2.987	2.990	2.984	2.989	2.983	2.986
Molecular End Members													
Fo	63.9	63.8	63.5	72.1	72.5	86.8	85.3	86.2	70.8	70.2	70.0	85.9	84.9
Fa	36.1	36.2	36.5	27.9	27.5	13.2	13.7	13.8	29.2	29.8	30.0	14.2	15.1
Group	HAB	HAB	HAB	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	SPT	SPT

TABLE 8: CONTINUED

Section 18 Continued				Section 20							
Frag. No.	214	214	214	1	4	4	4	4	6	6	6
Grain No.	3	1	2	1	3	2	1	4	1	3	2
SiO_2	37.7	37.7	37.9	36.9	38.1	37.5	37.2	37.2	39.9	40.0	39.0
TiO_2	.18	.12	.09	.05	.03	.12	.12	.13	.00	.03	.05
Al_2O_3	.01	.04	.02	.19	*	*	*	*	.08	.16	*
Cr_2O_3	.11	.09	.07	.02	.17	.12	.09	.11	.18	.19	.12
FeO	27.3	27.5	27.6	29.2	23.4	27.1	28.4	29.7	12.9	13.0	19.5
MgO	33.8	33.7	33.6	32.6	37.1	33.7	33.4	32.3	45.7	45.2	40.3
CaO	.32	.33	.32	.22	.32	.37	.40	.40	.38	.43	.26
Total	99.42	99.48	99.60	99.18	99.12	98.91	99.61	99.83	99.20	99.01	99.23
Number of Ions on the Basis of 4 (O)											
Si	1.010	1.010	1.014	1.001	1.005	1.009	1.001	1.005	1.009	1.005	1.007
Al	.001	.001	.001	.006	--	--	--	--	.002	.005	--
Cr	.002	.002	.002	.001	.004	.003	.002	.002	.004	.004	.003
Ti	.004	.002	.002	.001	.001	.002	.002	.003	.001	.001	.001
Mg	1.349	1.345	1.339	1.318	1.458	1.352	1.340	1.309	1.708	1.692	1.551
Fe	.611	.616	.617	.662	.516	.610	.639	.671	.271	.273	.421
Ca	.009	.010	.009	.006	.009	.011	.012	.012	.010	.012	.007
Z	1.010	1.010	1.014	1.001	1.005	1.009	1.001	1.005	1.009	1.005	1.007
X	1.976	1.976	1.970	1.994	1.988	1.978	1.993	1.988	1.996	1.987	1.983
Sum	2.986	2.986	2.984	2.995	2.993	2.987	2.996	2.993	2.996	2.992	2.990
Molecular End Members											
Fo	68.8	68.6	68.5	66.6	73.9	68.9	67.7	66.9	86.3	86.1	78.6
Fa	31.2	31.4	31.5	33.4	26.1	31.1	32.3	34.0	13.7	13.9	21.4
Group	NATA	NATA	NATA	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT

TABLE 8: CONTINUED

Section 20 Continued

Frag. No.	8	8	8	8	10	10	10	16	16	16	21
Grain No.	1	4	3	2	1	4	3	1	2	3	1
SiO_2	40.3	39.9	39.3	38.8	38.0	36.9	36.9	38.0	38.2	38.2	39.7
TiO_2	.17	.06	.03	.02	.06	.17	.12	.03	.04	.05	.03
Al_2O_3	*	*	*	.18	*	.04	.02	*	*	*	*
Cr_2O_3	.06	.04	.02	.26	.12	.14	.10	.03	.04	.07	.03
FeO	13.2	15.6	19.8	[illegible]	23.2	28.2	29.7	23.7	23.8	23.8	14.7
MgO	45.0	43.8	40.1	39.5	37.5	33.1	32.4	37.3	37.3	37.4	44.3
CaO	.20	.21	.23	.64	.35	.33	.29	.22	.20	.17	.19
Total	98.93	99.61	99.48	99.50	99.23	98.88	99.53	99.28	99.58	99.69	98.95
Number of Ions on the Basis of 4 (O)											
Si	1.012	1.007	1.013	1.004	1.001	1.009	1.009	1.002	1.004	1.002	1.005
Al	--	--	--	.006	--	.001	.001	--	--	--	--
Cr	.001	.001	.001	.005	.002	.003	.002	.001	.001	.002	.001
Ti	.003	.001	.001	.001	.001	.004	.002	.001	.001	.001	.001
Mg	1.685	1.648	1.540	1.523	1.472	1.337	1.309	1.466	1.461	1.463	1.671
Fe	.277	.329	.427	.435	.511	.639	.673	.523	.523	.523	.311
Ca	.005	.006	.006	.018	.010	.010	.008	.006	.006	.005	.005
Z	1.012	1.007	1.013	1.004	1.001	1.009	1.009	1.002	1.004	1.002	1.005
Y	1.971	1.985	1.975	1.988	1.996	1.994	1.995	1.997	1.992	1.994	1.989
Sum	2.983	2.992	2.988	2.992	2.997	2.994	2.995	2.999	2.996	2.996	2.994
Molecular End Members											
Fo	85.9	83.3	78.3	77.8	74.2	67.7	66.0	73.7	73.6	73.7	84.3
Fa	14.1	16.7	21.7	22.2	25.8	32.3	34.0	26.3	26.4	26.3	15.7
Group	ANAT	ANAT	ANAT	ANAT	HAB	HAB	HAB	SPT	SPT	SPT	NATA

TABLE 8: CONTINUED

Section 20 Continued

Frag. No.	25	25	25	27	27	27	29	29	29	31	31	31	33	33	33
Grain No.	1	3	2	2	1	3	2	1	3	3	2	1	1	3	2
SiO_2	37.4	37.6	37.3	38.0	37.1	37.5	38.0	37.8	37.1	39.7	39.6	39.2	37.1	37.0	37.0
TiO_2	.08	.07	.11	.10	.13	.08	.08	.20	.09	.35	.14	.07	.07	.13	.12
Al_2O_3	.05	.01	*	.02	.03	.01	*	*	*	*	*	*	*	*	.03
Cr_2O_3	.06	.06	.08	.09	.12	.09	.10	.07	.09	.04	.03	.01	.10	.12	.11
FeO	26.5	26.9	27.1	27.3	27.5	27.6	23.8	24.0	24.6	15.5	15.7	16.1	27.4	27.4	27.5
MgO	34.6	34.4	34.3	33.4	33.9	33.9	37.4	37.1	36.7	43.8	43.7	44.0	34.2	34.2	34.2
CaO	.27	.28	.27	.33	.26	.33	.24	.29	.30	.22	.20	.22	.20	.23	.25
Total	98.96	99.32	99.16	99.24	99.04	99.51	99.62	99.46	98.88	99.61	99.37	99.60	99.07	99.08	99.21
Number of Ions on the Basis of 4 (O)															
Si	1.003	1.006	1.002	1.018	1.000	1.005	.999	.997	.989	1.002	1.003	.994	.999	.997	.996
Al	.002	.001	--	.001	.001	.001	--	--	--	--	--	--	--	--	.001
Cr	.001	.001	.002	.002	.003	.002	.002	.002	.002	.001	.001	.001	.002	.003	.002
Ti	.002	.001	.002	.002	.003	.002	.002	.004	.002	.007	.003	.001	.002	.003	.002
Mg	1.383	1.372	1.373	1.334	1.362	1.355	1.466	1.458	1.458	1.648	1.650	1.662	1.373	13.730	1.372
Fe	.595	.602	.609	.612	.620	.619	.523	.529	.549	.327	.333	.341	.617	.614	.619
Ca	.008	.008	.008	.100	.008	.100	.007	.008	.009	.006	.005	.006	.006	.007	.007
Z	1.003	1.006	1.002	1.018	1.000	1.005	.999	.997	.989	1.002	1.003	.994	.999	.997	.996
X	1.991	1.985	1.993	1.959	1.997	1.989	2.002	2.001	2.020	1.989	1.992	2.011	2.000	2.000	2.003
Sum	2.994	2.991	2.995	2.977	2.997	2.994	3.001	2.998	3.009	2.991	2.995	3.005	2.999	2.997	2.999
Molecular End Members															
Fo	69.9	69.5	69.3	68.6	68.7	68.6	73.7	73.4	72.7	83.4	83.2	83.0	69.0	69.0	68.9
Fa	30.1	30.5	30.7	31.4	31.3	31.4	26.3	26.6	27.3	16.6	16.8	17.0	31.0	31.0	31.1
Group	HAB	HAB	HAB	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	SPT	SPT	SPT	ANAT	ANAT	ANAT

PYROXENE

TABLE 9: PYROXENE ANALYSES

Section 7

Frag. No.	2	2	2	4	4	4	10	15	15	15	15
Grain No.	3	1	2	4	6	5	19	14	13	11	12
SiO_2	53.1	53.0	52.5	53.1	53.5	53.6	53.9	51.2	51.0	53.1	53.2
TiO_2	.43	.34	.43	.83	.71	.67	.43	.82	.80	.51	.57
Al_2O_3	.81	.99	.87	1.05	1.16	1.21	1.12	1.29	1.24	.66	.85
Cr_2O_3	.45	.63	.51	.40	.41	.44	.41	.28	.29	.17	.24
FeO	13.9	14.0	15.1	8.7	9.6	9.7	10.5	4.8	5.3	13.0	13.2
MgO	26.0	25.7	24.7	25.9	27.4	27.0	27.9	15.9	16.6	26.2	26.2
CaO	1.97	1.90	2.02	5.7	3.8	3.8	2.11	21.5	21.0	1.33	1.62
Total	96.66	96.56	96.13	95.74	96.69	96.50	96.37	95.80	96.27	95.67	95.88
Number of Ions on the Basis of			6 (O)								
Si	1.98	1.98	1.98	1.97	1.97	1.97	1.98	1.96	1.95	1.98	1.99
Ti	.02	.01	.02	.03	.03	.03	.02	.03	.03	.02	.02
Al	.03	.03	.03	.03	.04	.04	.03	.04	.04	.02	.03
Cr	.01	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01
Fe	.43	.44	.48	.27	.30	.30	.32	.15	.17	.41	.41
Mg	1.44	1.43	1.39	1.43	1.50	1.48	1.53	.91	.94	1.50	1.46
Ca	.08	.08	.08	.23	.15	.15	.08	.88	.86	.05	.07
Sum	4.00	3.99	3.99	3.97	4.00	3.98	3.97	3.98	4.00	3.99	3.99
Molecular End Members											
En	73.8	73.3	71.3	74.1	76.9	76.7	79.3	46.9	47.7	76.5	76.3
Wo	4.1	4.1	4.1	11.9	7.7	7.8	4.1	45.4	43.7	2.6	3.6
Fs	22.1	22.6	24.6	14.0	15.4	15.5	16.6	7.7	8.6	20.9	21.1
Group	HAB	HAB	HAB	SPT	SPT	SPT	SPT	ANAT	ANAT	ANAT	ANAT

TABLE 9: CONTINUED

Section 7 Continued						Section 8						
Frag. No.	35	35	41	41	41	2	2	2	8	8	8	8
Grain No.	16	17	20	22	19	2	1	3	3	2	1	4
SiO_2	52.6	52.2	51.5	52.9	52.7	55.0	53.9	54.1	53.6	53.3	53.2	53.1
TiO_2	.89	.91	1.11	.74	.62	.60	.69	.69	.74	.58	.75	.79
Al_2O_3	1.58	2.57	1.58	1.08	.83	.92	1.23	1.35	1.73	1.76	1.71	1.55
Cr_2O_3	.30	.43	.41	.36	.24	.22	.34	.34	.64	.66	.68	.55
FeO	6.2	7.2	8.7	15.6	16.0	12.3	12.8	13.5	13.5	13.8	14.0	14.4
MgO	20.7	23.9	16.1	24.9	24.4	25.8	25.0	26.6	24.7	24.4	24.8	24.0
CaO	14.5	9.5	17.6	1.82	1.81	4.2	3.9	1.80	3.6	3.5	2.69	3.7
Total	96.77	96.74	97.00	97.40	96.60	99.13	97.87	98.38	98.56	98.08	97.83	98.13
Number of Ions on the Basis of 6 (O)												
Si	1.96	1.93	1.96	1.97	1.98	1.99	1.98	1.97	1.97	1.97	1.96	1.96
Ti	.03	.03	.04	.03	.02	.02	.03	.03	.03	.02	.03	.03
Al	.05	.08	.05	.03	.03	.03	.04	.04	.05	.05	.05	.05
Cr	.01	.01	.01	.01	.01	.01	.01	.01	.02	.02	.02	.02
Fe	.19	.22	.28	.49	.50	.37	.39	.41	.41	.43	.43	.45
Mg	1.15	1.32	.91	1.38	1.37	1.39	1.37	1.45	1.35	1.34	1.37	1.32
Ca	.58	.38	.72	.07	.07	.17	.15	.07	.14	.14	.11	.15
Sum	3.97	3.97	3.97	3.98	3.98	3.98	3.97	3.98	3.97	3.97	3.97	3.98
Molecular End Members												
En	59.9	68.7	47.6	71.1	70.6	72.0	71.7	75.1	71.0	70.2	71.7	68.8
Wo	30.2	19.8	37.7	3.6	3.6	8.8	7.9	3.6	7.4	7.3	5.8	7.8
Fs	9.9	11.5	14.7	25.3	25.8	19.2	20.4	21.2	21.6	22.5	22.5	23.4
Group	SPT	SPT	SPT	SPT	SPT	ANAT	ANAT	ANAT	ANT	ANAT	ANAT	ANAT

TABLE 9: CONTINUED

Section 8 Continued

Frag. No.	12	12	12	12	12	14	14	14	14	14	14
Grain No.	1	5	3	2	4	5	6	3	2	1	4
SiO_2	52.9	52.9	51.8	53.0	52.6	51.1	50.4	51.6	53.0	53.3	53.1
TiO_2	.85	.81	1.34	.98	1.04	1.84	2.31	1.27	.85	.81	.84
Al_2O_3	2.37	2.39	2.07	1.83	1.66	2.58	2.72	1.90	1.49	1.17	1.49
Cr_2O_3	.66	.75	.45	.44	.46	.65	.65	.54	.57	.44	.55
FeO	12.3	12.6	13.2	13.6	14.3	8.3	8.6	9.9	13.1	13.5	13.7
MgO	23.9	24.3	20.5	24.1	22.9	15.9	16.0	18.0	22.3	22.1	22.7
CaO	5.2	4.4	8.2	4.3	5.1	17.9	17.5	14.2	6.9	6.5	5.P
Total	98.18	98.22	97.57	98.32	98.06	98.29	98.25	97.49	98.28	97.90	98.21
Number of Ions on the Basis of 6 (O)											
Si	1.95	1.95	1.95	1.95	1.95	1.92	1.90	1.95	1.96	1.98	1.97
Ti	.03	.03	.05	.04	.04	.07	.09	.05	.03	.03	.03
Al	.07	.07	.07	.06	.05	.08	.09	.06	.05	.04	.05
Cr	.02	.02	.01	.01	.01	.02	.02	.02	.02	.01	.02
Fe	.38	.39	.42	.42	.45	.26	.27	.31	.41	.42	.43
Mg	1.31	1.33	1.14	1.33	1.27	.89	.89	1.01	1.23	1.22	1.25
Ca	.21	.18	.33	.17	.20	.72	.71	.57	.28	.26	.23
Sum	3.97	3.97	3.97	3.98	3.97	3.96	3.97	3.97	3.98	3.96	3.98
Molecular End Members											
En	69.0	70.0	60.3	69.3	66.2	47.6	47.6	53.4	64.1	64.2	65.5
Wo	11.0	9.5	17.5	8.8	10.4	38.5	38.0	30.2	14.6	13.7	12.0
Fs	20.0	20.5	22.2	21.9	23.4	13.9	14.4	16.4	21.3	22.1	22.5
Group	ANAT	ANAT	ANAT	ANAT	ANAT	HAB	HAB	HAB	HAB	HAB	HAB

TABLE 9: CONTINUED

Section 17

Frag. No.	1	1	1	19	19	40	40	40	40	40
Grain No.	1	2	3	4	5	10	6	9	8	7
SiO_2	53.4	54.3	54.3	53.7	53.2	52.3	53.7	51.3	52.6	52.7
TiO_2	.45	.53	.50	.82	.53	1.21	.98	.77	.82	1.55
Al_2O_3	.71	1.03	.69	1.33	1.44	1.88	2.79	1.83	1.88	2.41
Cr_2O_3	.24	.28	.25	.49	.51	.39	.44	.51	.53	.38
FeO	16.2	16.2	16.6	14.2	15.0	13.1	13.5	13.5	14.5	14.9
MgO	23.0	23.5	24.4	25.6	24.6	20.4	23.0	19.1	21.9	21.9
CaO	2.85	2.93	2.67	2.95	3.2	7.9	5.6	9.0	4.6	5.7
Total	96.85	98.77	99.41	99.09	98.43	97.18	100.02	96.09	96.91	99.61
Number of Ions on the Basis of 6 (O)										
Si	2.00	1.99	1.98	1.95	1.95	1.96	1.94	1.95	1.97	1.93
Ti	.01	.02	.01	.03	.02	.04	.03	.03	.03	.05
Al	.03	.04	.03	.05	.05	.07	.10	.07	.07	.09
Cr	.01	.01	.01	.01	.01	.01	.01	.01	.02	.01
Fe	.51	.50	.51	.43	.46	.41	.41	.43	.45	.46
Mg	1.29	1.29	1.32	1.39	1.35	1.14	1.23	1.09	1.22	1.19
Ca	.11	.11	.11	.11	.13	.32	.22	.37	.19	.23
Sum	3.96	3.96	3.97	3.97	3.97	3.95	3.94	3.95	3.95	3.96
Molecular End Members										
En	67.5	67.9	68.0	72.0	69.6	61.0	66.1	57.7	65.6	63.3
Wo	5.6	5.8	5.7	5.7	6.7	17.1	11.8	19.6	10.2	12.2
Fs	26.7	26.3	26.3	22.3	23.7	21.9	22.0	22.7	24.2	24.5
Group	NATA	NATA	NATA	ANAT	ANAT	HAB	HAB	HAB	HAB	HAB

TABLE 9: CONTINUED

Section 17 Continued

Frag. No.	48	48	48	48	48	52	52	52	63	63	63	63	63
Grain No.	4	1	5	2	3	8	7	6	9	11	12	13	10
SiO_2	51.4	51.0	51.8	51.0	51.1	50.8	48.2	48.1	52.6	51.2	53.8	53.1	50.9
TiO_2	.36	.75	.49	.54	1.23	.43	.93	.37	.40	.81	.71	.93	.85
Al_2O_3	1.90	2.09	1.48	1.63	1.75	1.67	1.16	.87	2.62	2.97	1.60	1.88	1.07
Cr_2O_3	.16	.28	.22	.22	.31	.72	.11	.14	1.14	1.15	.50	.45	.24
FeO	13.4	13.5	22.7	23.3	24.0	18.8	27.6	31.2	13.6	14.4	14.6	14.7	23.4
MgO	13.3	13.3	16.4	16.4	16.7	18.0	6.0	7.7	23.6	15.7	23.2	23.2	15.6
CaO	17.8	17.2	6.1	5.4	4.7	5.9	13.5	8.7	5.5	12.1	4.9	4.1	5.7
Total	98.32	98.12	99.16	98.44	99.83	96.31	97.52	97.06	97.45	98.33	99.36	98.35	97.77
Number of Ions on the Basis of 6 (O)													
Si	1.96	1.95	1.97	1.96	1.95	1.96	1.97	1.98	1.94	1.93	1.96	1.95	1.98
Ti	.01	.02	.01	.02	.04	.01	.03	.01	.01	.03	.02	.03	.03
Al	.07	.08	.06	.06	.07	.07	.05	.04	.10	.11	.06	.07	.04
Cr	.01	.01	.01	.01	.01	.02	.01	.01	.03	.03	.01	.01	.01
Fe	.43	.43	.72	.75	.76	.61	.95	1.08	.42	.45	.45	.45	.76
Mg	.75	.76	.93	.94	.95	1.04	.37	.47	1.30	.88	1.26	1.27	.91
Ca	.73	.70	.25	.22	.19	.24	.59	.38	.14	.49	.19	.16	.24
Sum	3.96	3.95	3.95	3.96	3.97	3.95	3.96	3.97	3.94	3.92	3.95	3.94	3.97
Molecular End Members													
En	39.3	40.2	48.9	49.2	50.0	55.0	19.4	24.3	69.9	48.4	66.3	67.6	47.6
Wo	38.2	37.0	13.2	11.5	10.0	12.7	30.9	19.7	7.5	26.9	10.0	8.5	12.6
Fs	22.5	22.8	37.9	39.3	40.0	32.3	49.7	56.0	22.6	24.7	23.7	23.9	39.8
Group	A	A	A	A	A	HB	HB	HB	ANAT	ANAT	ANAT	ANAT	ANAT

TABLE 9: CONTINUED

Section 17 Continued					Section 18						
Frag. No.	98	98	98	98	2	19	19	22	22	22	22
Grain No.	15	16	17	14	1	2	1	4	2	1	3
SiO_2	52.1	53.8	53.1	53.9	53.3	52.4	52.2	54.0	53.0	52.4	52.6
TiO_2	.88	.71	.93	.71	.53	.71	.77	.73	.71	.41	.43
Al_2O_3	1.69	1.60	1.88	1.04	.89	1.12	1.14	1.63	1.62	.81	.86
Cr_2O_3	.53	.50	.45	.35	.38	.42	.43	.34	.30	.21	.20
FeO	14.6	14.6	14.7	14.7	12.2	16.2	16.5	8.7	8.8	20.8	20.8
MgO	23.4	23.2	23.2	23.4	28.2	22.9	22.7	14.4	14.3	21.6	21.7
CaO	3.7	4.9	4.1	4.1	2.14	3.9	4.0	21.1	20.7	1.80	1.80
Total	96.20	99.36	98.35	98.20	97.64	97.65	97.74	100.95	99.43	98.08	98.41
Number of Ions on the Basis of 6 (O)											
Si	1.95	1.96	1.95	1.99	1.95	1.96	1.96	1.98	1.97	1.98	1.98
Ti	.03	.02	.03	.02	.01	.02	.02	.02	.02	.01	.01
Al	.06	.06	.07	.04	.04	.05	.05	.07	.07	.04	.04
Cr	.02	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01
Fe	.46	.45	.45	.45	.37	.51	.52	.27	.27	.66	.66
Mg	1.31	1.26	1.27	1.29	1.54	1.28	1.27	.79	.79	1.22	1.22
Ca	.15	.19	.16	.16	.08	.16	.16	.83	.83	.08	.07
Sum	3.98	3.95	3.94	3.96	4.00	3.99	3.99	3.97	3.96	4.00	3.99
Molecular End Members											
En	68.2	66.2	67.6	67.9	77.1	65.8	[illegible]	41.8	41.9	62.4	62.6
Wo	7.8	10.0	8.5	8.4	4.2	8.1	8.3	44.0	43.6	3.8	3.8
Fs	24.0	23.7	23.9	23.7	18.7	26.1	26.6	14.2	14.5	33.7	33.7
Group	HAB	HAB	HAB	HAB	ANAT			NATA	NATA	NATA	NATA

TABLE 9: CONTINUED

Section 18 Continued

Frag. No.	37	37	37	48	48	48	49	49	55	55	63
Grain No.	3	1	2	3	1	2	2	1	1	2	3
SiO_2	53.5	53.6	53.1	51.9	53.8	53.3	50.4	48.8	50.5	51.7	54.5
TiO_2	.46	.54	.92	1.31	.46	.95	.83	1.31	.48	.65	.67
Al_2O_3	1.21	.89	2.48	2.31	.72	1.42	1.36	2.31	1.41	.93	1.11
Cr_2O_3	.49	.38	.67	.65	.36	.52	.30	.65	.51	.26	.40
FeO	8.0	15.3	15.5	10.3	15.7	15.7	26.7	33.1	20.9	21.5	9.7
MgO	17.8	22.8	22.2	17.0	25.3	24.7	8.5	3.7	18.5	17.4	30.3
CaO	17.4	5.0	5.5	15.1	2.45	2.48	11.9	13.9	4.2	4.7	1.84
Total	98.86	98.51	100.37	98.57	98.79	99.27	99.99	102.87	96.57	97.18	98.53
Number of Ions on the Basis of 6 (O)											
Si	1.98	1.98	1.93	1.94	1.97	1.96	1.98	1.93	1.96	2.00	1.95
Ti	.01	.02	.03	.04	.01	.03	.02	.04	.01	.02	.02
Al	.05	.04	.11	.10	.03	.06	.06	.11	.06	.04	.05
Cr	.01	.01	.02	.02	.01	.02	.01	.02	.02	.01	.01
Fe	.25	.47	.47	.32	.48	.48	.89	1.10	.68	.69	.29
Mg	.98	1.26	1.21	.95	1.38	1.35	.50	.22	1.07	1.00	1.62
Ca	.69	.20	.21	.60	.10	.10	.50	.55	.18	.20	.07
Sum	3.97	3.98	3.98	3.97	3.98	4.00	3.96	3.97	3.98	3.96	4.01
Molecular End Members											
En	51.2	65.2	63.7	50.5	70.5	70.0	26.5	11.7	55.6	52.9	81.7
Wo	35.9	10.3	11.3	32.3	4.9	5.1	26.7	26.9	9.2	10.4	3.6
Fs	12.9	24.5	25.0	17.2	24.6	25.0	46.8	58.7	35.2	36.7	14.7
Group	NATA	NATA	NATA	ANAT	ANAT	ANAT					

TABLE 9: CONTINUED

Section 18 Continued

Frag. No.	98.	98	98	98	102	106	106	110	138	138	138	138	147
Grain No.	1	3	4	2	1	1	2	3	5	1	4	6	3
SiO_2	52.7	53.6	53.2	53.8	53.4	53.2	53.0	52.1	53.5	53.1	52.8	52.5	51.7
TiO_2	1.77	.99	.80	.60	1.09	.68	.68	.75	.45	.45	.49	.41	1.14
Al_2O_3	2.47	1.81	.82	.62	1.92	1.20	1.29	1.02	1.31	1.19	1.35	1.20	1.86
Cr_2O_3	.59	.47	.28	.31	.51	.53	.45	.37	.62	.62	.59	.66	.42
FeO	7.8	8.2	15.0	15.1	10.0	14.4	14.4	15.6	13.4	13.7	14.3	14.7	14.2
MgO	16.7	17.8	23.9	25.0	29.9	25.9	26.5	22.6	26.7	23.6	24.9	22.9	22.1
CaO	17.6	16.7	3.8	3.1	2.09	2.29	1.65	3.9	2.26	4.5	2.78	4.4	6.0
Total	99.63	99.57	97.83	98.61	98.91	98.20	97.98	96.42	98.24	97.20	97.21	96.86	97.62
Number of Ions on the Basis of 6 (O)													
Si	1.94	1.96	1.97	1.98	1.91	1.96	1.95	1.97	1.96	1.98	1.96	1.97	1.93
Ti	.05	.03	.02	.02	.03	.02	.02	.02	.01	.01	.01	.01	.03
Al	.11	.08	.04	.03	.08	.05	.06	.05	.06	.05	.06	.05	.08
Cr	.02	.01	.01	.01	.01	.02	.01	.01	.02	.02	.02	.02	.01
Fe	.24	.25	.47	.46	.30	.44	.44	.49	.41	.43	.44	.46	.44
Mg	.91	.97	1.32	1.37	1.60	1.42	1.45	1.27	1.45	1.31	1.38	1.28	1.23
Ca	.69	.66	.15	.13	.08	.09	.07	.16	.09	.18	.11	.18	.24
Sum	3.96	3.96	3.98	4.00	4.01	4.00	4.00	3.97	4.00	3.98	3.98	3.97	3.96
Molecular End Members													
En	49.5	51.7	68.2	69.9	80.8	72.7	74.1	66.1	74.5	68.3	71.3	66.6	64.3
Wo	37.5	34.9	7.9	6.4	4.1	4.6	3.3	8.4	4.5	9.4	5.7	9.4	12.6
Fs	13.0	13.4	24.0	23.7	15.2	22.7	22.6	25.6	21.0	22.2	23.0	24.0	23.2
Group	HAB	HAB	HAB	HAB	SPT	ANAT	ANAT	HAB	HAB	HAB	HAB	HAB	ANAT

TABLE 10: PARTIAL ANALYSES OF PYROXENE

Section 1										Section 9		
Frag. No.	3	3	3	3	5	5	5	5	5	7	7	20
Grain No.	6 *	8 **	7	5	13	9	10	11	12	2	1	3
Cr_2O_3	n.d.	1.32	.27	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	.83	.18	n.d.
FeO	16.0	17.2	23.7	32.0	10.0	15.6	16.1	16.9	17.8	14.4	25.8	15.8
MgO	11.0	21.0	17.3	12.4	15.8	25.0	25.1	24.3	13.8	19.7	25.2	24.3
CaO	17.6	4.7	3.9	2.65	17.7	1.93	1.67	1.81	12.2	7.9	2.82	2.31
Molecular End Members												
En	33.7	51.6	51.8	38.4	46.3	71.1	71.9	69.3	42.4	58.9	60.4	69.8
Wo	38.8	10.0	8.4	5.9	37.3	3.9	3.4	3.7	26.9	17.0	4.9	4.8
Fs	27.5	28.3	39.8	55.7	16.4	24.9	25.6	27.0	30.7	24.1	34.7	25.5
Group	ANAT	ANAT	ANAT	ANAT						NATA	NATA	ANAT

* TiO_2 .10 Al_2O_3 .72 ** TiO_2 .76 Al_2O_3 .81

TABLE 10: CONTINUED

Section 10												
Frag. No.	4	4	4	4	4	4	4	4	8	8	8	
Grain No.	1	5	2	7	6	3	8	4	11	10	9	
TiO_2	.71	1.70	.99	1.40	.29	.43	.65	1.05	.23	.22	.25	
Al_2O_3	1.72	2.16	1.74	1.99	1.02	.96	.82	1.44	1.71	1.71	1.24	
Cr_2O_3	.67	.50	.52	.48	.53	.40	.28	.35	.69	.69	.50	
FeO	12.6	13.9	14.5	17.6	17.7	18.3	18.7	18.9	10.4	10.4	11.4	
MgO	17.2	16.9	17.5	18.8	21.1	21.4	20.5	20.9	28.9	28.9	27.8	
CaO	13.3	11.5	11.2	6.2	4.1	3.8	4.4	4.4	2.42	2.41	3.1	
Molecular End Members												
En	50.8	51.3	51.9	56.7	62.0	62.2	60.9	59.2	79.2	78.9	76.3	
Wo	28.3	25.1	23.9	13.5	8.8	7.9	9.3	9.4	4.8	4.7	6.1	
Fs	20.9	23.7	24.1	29.8	29.2	29.8	30.7	31.4	16.0	16.4	17.5	
Group	NATA	NATA	NATA	NATA	NATA	NATA	NATA	NATA	ANAT	ANAT	ANAT	

TABLE 10: CONTINUED

Section 10 Continued					Section 12					
Frag. No.	18	18	18	18	39	39	39	61	61	61
Grain No.	15	12	14	13	7	6	5	2	4	5
TiO_2	n.d.	.55	.74	.87	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Al_2O_3	n.d.	1.00	1.11	.97	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Cr_2O_3	n.d.	.40	.43	.35	.14	.20	.19	.63	.57	.54
FeO	12.4	15.5	15.9	16.0	22.8	23.0	23.2	14.5	14.8	15.1
MgO	25.5	24.5	24.4	24.6	18.4	18.1	18.5	22.5	20.5	19.7
CaO	2.06	2.51	2.35	2.04	2.66	2.90	2.20	4.9	6.4	7.0
Molecular End Members										
En	75.1	70.0	69.7	70.2	55.6	54.7	55.9	65.9	61.4	59.3
Wo	4.4	5.1	4.8	4.2	5.8	6.3	4.8	10.3	13.8	15.2
Fs	20.5	24.8	25.5	25.6	38.6	39.0	39.3	23.8	24.9	25.5
Group	HAB	HAB	HAB	HAB	NATA	NATA	NATA	NATA	NATA	NATA

TABLE 10: CONTINUED

Section 17							Section 18			
Frag. No.	1	1	1	1	48	48	48	84	22	22	22
Grain No.	6	4	7	5	7	6	8	1	7	5	6
Cr_2O_3	.27	.27	.27	.28	.10	.18	.19	.18	.31	.26	.29
FeO	15.8	16.1	16.5	16.7	15.7	22.7	22.8	22.1	9.3	9.4	9.5
MgO	24.0	23.3	23.2	23.1	13.2	15.1	14.8	13.9	14.6	14.9	14.3
CaO	2.43	2.76	2.50	2.60	15.6	6.1	5.5	8.2	19.9	18.8	19.5
Molecular End Members											
En	69.3	67.9	67.7	67.3	39.7	46.9	46.9	41.5	42.8	44.2	42.5
Wo	5.0	5.8	5.2	5.4	33.8	13.6	12.5	18.8	41.9	40.1	41.7
Fs	25.6	26.3	27.0	27.3	26.5	39.5	40.6	39.6	15.3	15.7	15.8
Group	NATA	NATA	NATA	NATA	A	A	A	NATA	NATA	NATA	NATA

TABLE 10: CONTINUED

Section 18 Continued

Frag. No.	37	37	37	37	37	47	47	64	64	64	95	95	95
Grain No.	4	7	5	6	8	1	2	1B	1C	1A	1	3	2
Cr_2O_3	.62	.65	.34	.39	.40	.51	.66	.79	.77	.70	.89	.74	.72
FeO	9.4	9.5	15.3	15.8	16.1	7.9	11.1	5.0	5.9	5.2	14.1	15.7	15.9
MgO	16.8	17.0	21.1	22.9	22.7	12.5	15.0	16.8	16.1	17.0	16.9	15.0	14.7
CaO	16.2	15.7	4.0	4.5	4.7	12.6	16.2	20.1	20.2	20.1	11.3	12.7	12.5
Molecular End Members													
En	49.8	50.6	64.8	65.4	64.7	48.1	45.6	49.3	48.1	49.5	51.3	45.5	45.0
Wo	34.5	33.6	8.8	9.2	9.6	34.8	35.4	42.4	43.6	42.0	24.7	27.7	27.6
Fs	15.6	15.9	26.4	25.3	25.7	17.1	18.9	8.2	8.4	8.5	24.0	26.7	27.4
Group	NATA	NATA	NATA	NATA	NATA	NATA	NATA	A	A	A	A	A	A

TABLE 10: CONTINUED

Section 18 Continued

Frag. No.	147	147	162A	162A	162A	171	171	171	182	182	182	182
Grain No.	1	4	4	3	2	1	2	3	1	2	3	4
Cr_2O_3	n.d.	n.d.	.15	.14	.25	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
FeO	13.3	18.7	7.6	9.1	9.8	11.7	11.9	11.9	10.1	13.5	14.1	14.2
MnO	.21	.21	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	.21	.21	.22	.17
MgO	20.1	27.3	10.4	10.5	8.6	27.3	27.8	28.6	16.7	19.4	20.8	23.8
CaO	6.4	3.4	12.8	11.9	12.6	2.26	2.23	1.85	15.1	9.5	7.7	3.0
Molecular End Members												
En	62.5	67.8	43.6	43.5	37.1	76.9	77.1	78.1	50.3	57.4	60.7	70.1
Wo	14.3	6.1	38.6	35.4	39.2	4.6	4.4	3.6	32.7	20.2	16.2	6.5
Fs	23.2	26.1	17.8	21.1	23.7	18.5	18.5	18.2	17.1	22.4	23.1	23.5
Group	A	A	A	A	A	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT

TABLE 10: CONTINUED

Section 18 Continued

Frag. No.	193	193	193	193	195	196	196	196	196	197	197	197	197
Grain No.	3	2	4	1	1	4	2	1	3	3	2	4	1
TiO_2	n.d.	.68	.57	.66	.57	n.d.	.72	n.d.	.74	n.d.	n.d.	n.d.	n.d.
Al_2O_3	n.d.	1.11	.90	.88	1.46	n.d.	1.94	n.d.	1.10	n.d.	n.d.	n.d.	n.d.
Cr_2O_3	n.d.	.40	.48	.36	.59	n.d.	.35	n.d.	.33	n.d.	n.d.	n.d.	n.d.
FeO	16.0	16.1	16.6	16.7	14.1	14.3	16.3	17.7	19.0	14.2	14.3	14.3	14.5
MgO	22.8	22.9	23.6	22.9	17.0	18.3	20.2	20.8	20.4	23.3	23.0	23.5	23.4
CaO	3.3	3.5	3.3	3.4	12.9	9.6	5.5	12.2	4.1	4.1	4.5	3.7	3.9
Molecular End Members													
En	66.7	66.7	68.2	66.7	50.4	55.0	60.6	61.7	60.0	68.0	67.1	68.8	68.1
Wo	7.0	7.4	6.9	7.2	27.5	20.9	12.9	8.9	8.6	8.7	9.5	7.8	8.2
Fs	26.3	25.8	25.0	26.1	22.1	24.1	27.4	29.4	31.3	23.3	23.4	23.5	23.7
Group	ANAT	ANAT	ANAT	ANAT	MB	HAB	HAB	HAB	HAB	ANAT	ANAT	ANAT	ANAT

TABLE 10: CONTINUED

Section 18 Continued

Frag. No.	209	209	209	209	210	214	214	214	214
Grain No.	3	2	4	1	1	2	1	3	4
Cr_2O_3	n.d.	n.d.	n.d.	n.d.	.52	n.d.	n.d.	.66	.60
FeO	13.8	14.2	14.4	14.5	13.9	8.6	8.9	8.9	9.7
MgO	20.6	24.3	23.3	22.6	27.0	16.3	16.6	15.9	17.4
CaO	5.8	3.2	4.2	3.0	1.52	16.9	16.7	17.4	15.8
Molecular End Members									
En	63.4	70.3	67.7	68.4	75.3	49.0	49.5	47.6	50.9
Wo	12.8	6.7	8.8	6.7	3.0	36.5	35.7	37.4	33.2
Fs	23.8	23.0	23.5	24.9	21.7	14.5	14.8	15.0	15.9
Group	ANAT	ANAT	ANAT	ANAT	NATA	NATA	NATA	NATA	NATA

TABLE 10: CONTINUED

Section 20 Continued

Frag. No.	30	30	30	30	30	30	30	30	30	30
Grain No.	3	7	9	1	10	5	4	2	6	8
Cr_2O_3	n.d.	.46	.43	n.d.	.37	.32	n.d.	n.d.	.31	.29
FeO	7.8	9.1	9.1	9.8	13.9	15.2	16.0	16.8	16.9	17.0
MgO	14.4	15.6	16.0	16.4	20.5	21.3	21.6	22.9	22.9	22.9
CaO	18.5	17.3	17.4	15.0	8.2	6.3	4.3	2.95	3.6	3.6
Molecular End Members										
En	44.9	47.1	47.6	50.2	60.0	62.9	64.2	66.5	64.6	65.4
Wo	41.5	37.5	33.2	33.0	19.2	13.2	9.1	6.1	7.6	7.4
Fs	13.6	15.4	15.2	16.8	22.8	24.8	26.7	27.4	27.8	27.2
Group	NATA	NATA	NATA	NATA	NATA	NATA	NATA	NATA	NATA	NATA

TABLE 10: CONTINUED

Section 21

Frag. No.	6	6	10	10	10	10	10	15	15	17
Grain No.	1	2	4	1	2	3	5	2	1	1
Cr_2O_3	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
FeO	11.0	11.0	11.6	13.7	14.0	14.7	15.9	8.4	15.1	16.3
MgO	29.5	29.6	20.3	23.6	23.1	20.1	23.0	16.8	23.3	24.9
CaO	1.82	1.85	9.8	4.3	4.8	8.1	3.9	16.8	3.9	2.4
Molecular End Members										
En	79.8	79.8	59.9	68.6	67.1	58.9	66.2	49.9	67.4	68.8
Wo	3.5	3.6	20.9	9.1	10.1	17.0	8.1	35.9	8.1	4.9
Fs	16.7	16.6	19.2	22.3	22.8	24.1	25.7	14.1	24.5	26.2
Group	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	NATA	NATA	NATA

TABLE 10: CONTINUED

Section 20

Frag. No.	1	1	1	1	1	1	1	4	4	4	16	21	21
Grain No.	6	3	7	1	5	4	2	2	1	3	1	1	2
TiO_2	n.d.	n.d.	.58	.29	.19	.23	.47	.81	.79	.80	.91	n.d.	n.d.
Al_2O_3	n.d.	n.d.	5.0	.46	.33	.37	.36	2.56	2.07	1.89	1.18	n.d.	n.d.
Cr_2O_3	n.d.	n.d.	.30	.10	.09	.11	.09	.63	.56	.49	.33	.37	.37
FeO	10.6	10.6	12.2	19.9	24.9	25.6	26.1	12.5	13.3	13.4	13.7	12.9	16.6
MgO	12.4	13.3	26.7	15.7	17.3	17.9	17.6	21.2	23.7	23.0	26.4	26.4	24.3
CaO	20.3	20.8	1.56	8.9	2.31	2.50	1.21	5.7	4.3	5.0	1.86	1.74	1.71
Molecular End Members													
En	37.6	38.9	77.0	47.2	52.5	51.3	53.1	65.6	69.1	67.4	74.5	75.6	69.7
Wo	44.3	43.7	3.2	19.2	5.0	5.4	2.7	12.6	9.1	10.6	3.8	3.6	3.5
Fs	18.1	17.4	19.7	33.6	42.4	43.3	44.2	21.7	21.8	22.0	21.7	20.7	26.7
Group	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	SPT	NATA	NATA

TABLE 10: CONTINUED

Section 20 Continued

Frag. No.	25	25	25	25	27	27	27	27	27	27	29	29
Grain No.	1	3	2	4	2	6	4	5	3	1	2	1
TiO_2	n.d.	n.d.	n.d.	n.d.	1.98	1.79	1.47	.88	.84	.85	n.d.	n.d.
Al_2O_3	n.d.	n.d.	n.d.	n.d.	2.48	2.47	2.15	1.10	.95	.95	n.d.	n.d.
Cr_2O_3	n.d.	n.d.	n.d.	n.d.	.56	.64	.6%	.41	.35	.30	n.d.	n.d.
FeO	13.6	15.8	15.9	15.9	8.5	8.7	9.0	15.1	15.2	15.8	12.5	14.0
MgO	19.6	22.9	22.4	22.9	16.3	16.3	16.7	24.7	24.3	24.4	25.5	24.5
CaO	6.1	4.4	4.3	4.3	17.4	17.5	16.8	2.34	2.41	2.17	4.2	4.3
Molecular End Members												
En	62.0	65.6	65.1	65.6	48.5	48.3	49.3	79.9	79.3	70.1	71.8	69.1
Wo	13.8	9.0	8.9	8.8	37.2	37.2	35.7	4.8	5.0	4.5	8.5	8.8
Fs	24.1	25.4	25.9	25.6	14.2	14.5	15.9	24.3	24.7	25.5	19.7	22.1
Group	HAB	HAB	HAB	HAB	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT	ANAT

K-FELDSPAR

TABLE 11: PARTIAL ANALYSES OF K-FELDSPAR

Section 17					Section 18
Frag. No.	95	95	95	95	48
Grain No.	2	3	1	4	
TiO_2	.08	.10	.10	.09	.25
Cr_2O_3	.02	*	.01	.01	n.d.
FeO	.10	.10	.12	.09	.17
MgO	*	*	*	*	.04
CaO	.37	.47	.41	.36	4.2
Na_2O	2.04	1.82	1.61	1.53	.57
K_2O	12.3	12.5	12.8	13.5	11.9
BaO	.31	.36	.31	.37	2.36
Molecular End Members					
An	2.0	2.5	2.2	1.9	21.6
Ab	19.7	17.7	15.7	14.4	5.0
Or	78.3	79.8	82.1	83.7	73.3

SiO_2-K_2O - R I C H R E S I D U A L G L A S S

TABLE 12: SiO_2-K_2O-RICH RESIDUAL GLASS

Section 1				Section 9	
Frag. No.	1	1	1	10	10
Grain No.	61	63	62	61	62
SiO_2	73.3	79.0	76.4	81.0	83.0
TiO_2	.66	.63	.88	.32	.44
Al_2O_3	12.4	11.8	11.5	11.2	9.4
FeO	3.3	.17	.67	.70	.55
MgO	.24	*	*	.01	.04
CaO	1.92	.31	.87	.86	.91
Na_2O	.93	.36	.76	.48	.54
K_2O	5.9	9.0	10.1	5.6	5.7
BaO	.01	.96	1.50	.46	.48
P_2O_5	.20	.07	.18	.10	.11
Total	98.86	102.30	102.86	100.73	101.17

Z I R K E L I T E

TABLE 13: PARTIAL ANALYSES OF ZIRKELITE

Section 2			Section 8
Frag. No.	8	8	27
Grain No.	15	14	
SiO_2	n.d.	1.20	.50
TiO_2	32.4	32.2	35.0
Al_2O_3	6.6	3.8	1.74
Cr_2O_3	.75	.79	.95
V_2O_3	n.d.	n.d.	.36
FeO	6.1	4.5	2.86
MnO	n.d.	n.d.	.16
MgO	.87	.92	.86
CaO	n.d.	10.1	12.4
ZrO_2	32.2	32.5	38.8
Ce_2O_3	.46	.50	n.d.