APPENDIX I

APOLLO 15 GREEN VOLCANIC GLASSES (B-C trend) analyzed in thin-sections of 15426 and 15427. A minimum of four (4)- and a maximum of twelve (12)-complete analyses were made on each glass to verify sample homogeneity and to improve analytical precision. Each column is the average of all replicate analyses on an individual glass. Na_2O and K_2O were analyzed but not detected.

SiO_2	47.3	46.5	46.0	45.9	47.3	46.0	47.1	46.2	46.4	47.0
TiO_2	0.37	0.33	0.39	0.43	0.28	0.40	0.32	0.42	0.42	0.32
Al_2O_3	7.85	7.91	7.94	7.96	7.84	7.96	7.83	7.82	7.91	7.90
Cr_2O_3	0.58	0.54	0.55	0.56	0.53	0.57	0.55	0.52	0.57	0.57
FeO	17.0	18.2	19.1	19.2	17.0	18.9	17.3	18.9	18.7	17.5
MnO	0.23	0.23	0.20	0.18	0.21	0.25	0.23	0.20	0.14	0.23
MgO	18.1	17.4	17.1	17.1	18.3	17.2	18.1	17.3	17.2	17.9
CaO	8.58	8.78	8.77	8.74	8.61	8.76	8.56	8.69	8.71	8.66

SiO_2	46.9	46.3	46.3	45.9	46.3	46.0	46.0	46.0	45.8	45.7
TiO_2	0.34	0.41	0.36	0.36	0.45	0.41	0.40	0.41	0.40	0.34
Al_2O_3	7.89	8.02	7.98	7.99	7.99	7.91	8.01	7.94	7.89	8.06
Cr_2O_3	0.62	0.53	0.52	0.53	0.54	0.53	0.50	0.53	0.57	0.55
FeO	17.8	18.6	18.8	19.2	18.5	19.1	19.0	19.1	19.2	19.2
MnO	0.20	0.22	0.21	0.18	0.23	0.26	0.23	0.21	0.26	0.12
MgO	17.6	17.2	17.2	17.1	17.3	17.1	17.2	17.1	17.2	17.3
CaO	8.65	8.78	8.73	8.79	8.76	8.71	8.75	8.74	8.71	8.72

SiO_2	47.4	46.6	45.8	46.6	45.7	46.4	47.3	46.9	45.8	46.6
TiO_2	0.30	0.38	0.41	0.38	0.38	0.37	0.32	0.37	0.39	0.37
Al_2O_3	7.79	7.99	7.93	7.95	7.89	7.99	7.86	7.99	7.94	7.94
Cr_2O_3	0.54	0.56	0.52	0.56	0.59	0.58	0.58	0.55	0.54	0.58
FeO	16.9	17.9	19.1	18.2	19.4	18.4	16.9	17.8	19.2	18.0
MnO	0.17	0.21	0.21	0.18	0.18	0.20	0.21	0.23	0.22	0.23
MgO	18.3	17.6	17.3	17.3	17.2	17.3	18.3	17.6	17.2	17.5
CaO	8.49	8.72	8.72	8.76	8.70	8.76	8.56	8.68	8.73	8.72

APPENDIX I (cont'd)

SiO_2	46.3	46.3	46.1	47.4	46.9	46.0	47.2	45.7	45.9	46.0
TiO_2	0.38	0.39	0.37	0.29	0.37	0.42	0.38	0.40	0.44	0.40
Al_2O_3	7.91	8.00	7.83	7.79	7.89	7.86	7.82	7.81	7.96	7.91
Cr_2O_3	0.55	0.53	0.54	0.59	0.56	0.57	0.57	0.58	0.60	0.54
FeO	18.7	18.5	19.1	16.9	17.7	19.0	17.2	19.3	19.0	19.0
MnO	0.23	0.19	0.17	0.18	0.22	0.23	0.23	0.25	0.25	0.24
MgO	17.3	17.3	17.1	18.3	17.8	17.2	18.0	17.2	17.1	17.2
CaO	8.71	8.76	8.80	8.51	8.62	8.69	8.59	8.78	8.74	8.74

SiO_2	46.9	45.8	45.9	46.7	46.9	46.0	45.9	46.4	45.9	46.1
TiO_2	0.40	0.42	0.43	0.33	0.30	0.36	0.40	0.39	0.41	0.38
Al_2O_3	7.94	7.92	7.93	7.85	7.83	7.79	7.85	7.82	7.84	7.93
Cr_2O_3	0.59	0.62	0.55	0.51	0.50	0.54	0.50	0.55	0.56	0.57
FeO	17.3	19.2	19.1	18.1	17.6	19.1	19.1	18.5	19.0	19.0
MnO	0.29	0.23	0.21	0.21	0.19	0.22	0.21	0.17	0.23	0.20
MgO	18.0	17.1	17.2	17.6	18.0	17.1	17.2	17.5	17.3	17.1
CaO	8.62	8.65	8.78	8.71	8.66	8.80	8.80	8.75	8.80	8.77

SiO_2	46.4	47.5	46.1	47.9	47.9	47.8	48.3	47.6	48.3	48.2
TiO_2	0.39	0.30	0.41	0.27	0.26	0.27	0.23	0.30	0.24	0.22
Al_2O_3	7.91	7.74	7.99	7.75	7.74	7.78	7.77	7.80	7.77	7.67
Cr_2O_3	0.54	0.57	0.53	0.59	0.58	0.57	0.55	0.57	0.56	0.58
FeO	18.4	17.0	19.0	16.6	16.6	16.5	16.1	16.8	16.2	16.3
MnO	0.22	0.18	0.21	0.20	0.19	0.23	0.19	0.18	0.17	0.20
MgO	17.4	18.2	17.1	18.2	18.1	18.3	18.3	18.2	18.1	18.2
CaO	8.75	8.58	8.80	8.50	8.62	8.53	8.59	8.54	8.62	8.61

SiO_2	47.7
TiO_2	0.29
Al_2O_3	7.61
Cr_2O_3	0.52
FeO	16.9
MnO	0.18
MgO	18.3
CaO	8.53

APPENDIX II

APOLLO 16 GREEN VOLCANIC GLASSES that were handpicked from the < 1 mm size-fraction of soil 60501,95. Four (4) complete analyses were made of each glass to verify sample homogeneity and to improve analytical precision. Each column is the average of these four analyses per glass. (n.d. = analyzed but not detected)

SiO_2	44.1	44.1	44.1	43.9	43.7	43.9	43.9	44.0	43.9
TiO_2	0.40	0.40	0.38	0.38	0.44	0.40	0.34	0.40	0.38
Al_2O_3	8.65	8.01	7.71	7.88	7.88	7.85	7.80	7.88	7.80
Cr_2O_3	0.35	0.38	0.39	0.34	0.44	0.37	0.39	0.42	0.38
FeO	21.6	21.6	22.0	21.9	21.9	21.9	21.9	21.7	21.7
MnO	0.25	0.26	0.24	0.15	0.30	0.24	0.27	0.23	0.23
MgO	15.8	16.4	16.8	16.8	16.8	16.8	16.9	16.9	17.0
CaO	8.86	8.69	8.37	8.54	8.44	8.46	8.37	8.47	8.45
Na_2O	n.d.	0.14	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

APPENDIX III

APOLLO 11 GREEN VOLCANIC GLASSES from the following polished thin-sections: 10059,27; 10060,32; 10060,33; 10060,35; 10061,28. Eight (8) complete analyses were made of each glass to verify sample homogeneity and to improve analytical precision. Each column is the average of these eight analyses per glass. (n.d. = analyzed but not detected)

SiO_2	43.9	43.7	43.9	43.9	44.0	43.6	43.7	43.8	43.6	43.5	43.6	43.6
TiO_2	0.48	0.51	0.47	0.41	0.52	0.54	0.46	0.56	0.65	0.67	0.66	0.73
Al_2O_3	8.06	7.90	8.11	7.98	7.62	8.02	8.12	7.75	7.87	8.05	7.80	7.88
Cr_2O_3	0.44	0.46	0.48	0.45	0.47	0.48	0.45	0.46	0.48	0.47	0.49	0.49
FeO	21.2	21.4	21.2	21.3	21.2	21.6	21.4	21.7	21.6	21.6	21.9	21.7
MgO	17.3	17.4	17.2	17.3	17.4	17.0	17.1	17.0	16.7	16.9	16.6	16.8
CaO	8.38	8.41	8.37	8.34	8.26	8.48	8.45	8.47	8.43	8.46	8.49	8.40
Na_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

SiO_2	43.7	43.5	43.7	43.6	43.7	43.6	43.7	43.5	43.9	43.8	43.8	43.9
TiO_2	0.65	0.62	0.61	0.61	0.63	0.53	0.53	0.59	0.53	0.50	0.59	0.56
Al_2O_3	7.78	8.14	7.89	8.30	7.92	8.26	8.00	8.03	8.06	8.01	7.71	7.84
Cr_2O_3	0.46	0.52	0.47	0.38	0.44	0.47	0.41	0.47	0.44	0.45	0.45	0.44
FeO	21.7	21.5	21.8	21.6	21.7	21.6	21.6	21.6	21.2	21.3	21.6	21.6
MgO	17.0	17.0	16.7	16.6	16.9	16.8	17.0	17.0	17.1	17.2	17.2	16.9
CaO	8.38	8.40	8.49	8.61	8.45	8.52	8.48	8.52	8.41	8.39	8.39	8.46
Na_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.31	0.33	0.30	n.d.	n.d.	n.d.
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

APPENDIX IV

APOLLO 14 GREEN (group A) VOLCANIC GLASSES analyzed in the following thin-sections of soil breccias: 14047,106; 14049,38; 14307,36; 14307,45; 14307,48; 14307,49. Four (4) complete analyses were made of each glass to verify sample homogeneity and to improve analytical precision. Each column is the average of all analyses on a single glass. The analyses are listed in sequence of decreasing MgO (wt.%).

SiO_2	44.0	43.9	44.2	44.4	44.0	43.8	44.2	44.2	43.9	44.1
TiO_2	1.04	0.92	1.07	1.03	0.89	0.90	0.92	1.07	0.91	0.94
Al_2O_3	6.71	6.65	6.68	6.53	6.67	6.80	6.84	6.73	6.74	6.66
Cr_2O_3	0.54	0.56	0.56	0.58	0.56	0.56	0.61	0.57	0.57	0.51
FeO	23.1	22.7	23.4	22.9	23.0	22.7	23.4	23.1	23.4	22.8
MnO	0.26	0.26	0.18	0.28	0.35	0.34	0.28	0.28	0.28	0.30
MgO	16.8	16.7	16.6	16.6	16.6	16.6	16.5	16.5	16.5	16.5
CaO	7.97	7.77	8.00	7.82	7.94	8.19	7.84	7.83	8.06	8.22
Na_2O	n.d.	n.d.	n.d.	0.06	0.12	0.11	n.d.	n.d.	0.07	0.10
K_2O	n.d.	n.d.	n.d.	0.06	0.06	0.07	n.d.	n.d.	0.07	0.07
SiO_2	44.3	44.3	44.0	43.9	44.0	44.1	44.2	44.0	44.0	43.9
TiO_2	0.93	1.00	0.90	0.90	0.89	0.85	0.94	1.10	0.96	0.84
Al_2O_3	6.77	6.69	6.84	6.78	6.89	6.79	6.67	6.70	6.92	6.81
Cr_2O_3	0.56	0.58	0.55	0.56	0.53	0.59	0.53	0.53	0.56	0.60
FeO	23.1	22.7	23.2	22.9	23.0	23.1	23.2	23.0	23.1	23.4
MnO	0.30	0.29	0.32	0.33	0.33	0.29	0.30	0.32	0.31	0.30
MgO	16.5	16.4	16.4	16.4	16.3	16.3	16.2	16.2	16.2	16.2
CaO	7.69	8.11	8.15	8.09	8.21	7.87	8.10	7.92	8.19	8.06
Na_2O	0.09	n.d.	0.09	0.10	0.09	0.08	0.12	0.12	0.09	0.09
K_2O	0.06	n.d.	0.07	0.06	0.06	0.07	0.06	0.07	0.07	0.06
SiO_2	43.8	44.0	44.2	44.1	44.2	44.0	43.6	44.1	43.5	43.8
TiO_2	1.28	1.24	1.22	0.89	1.22	0.95	1.11	1.18	0.85	0.91
Al_2O_3	6.85	6.78	6.94	6.72	6.94	6.87	7.06	7.13	6.92	6.89
Cr_2O_3	0.61	0.57	0.56	0.61	0.56	0.61	0.52	0.55	0.55	0.54
FeO	23.2	23.3	23.0	23.8	23.0	23.4	22.9	23.1	23.1	22.9
MnO	0.29	0.22	0.27	0.22	0.27	0.26	0.29	0.28	0.29	0.30
MgO	16.2	16.2	16.1	16.1	16.1	16.1	16.1	16.0	16.0	15.9
CaO	7.81	8.06	7.94	8.17	7.94	7.80	8.37	8.04	8.22	8.30
Na_2O	0.07	0.08	0.05	n.d.	0.05	n.d.	0.13	0.06	0.12	0.12
K_2O	0.08	0.08	0.05	n.d.	0.05	n.d.	0.07	0.06	0.07	0.09

APPENDIX IV (cont'd)

SiO_2	43.6	43.9	43.8	44.0	44.1	44.0	44.1	44.1	44.4	44.2
TiO_2	1.07	0.87	1.17	1.13	0.92	1.08	0.83	1.20	1.28	1.05
Al_2O_3	6.90	6.94	7.07	7.05	6.86	6.77	6.75	6.96	6.86	6.87
Cr_2O_3	0.55	0.55	0.54	0.53	0.56	0.53	0.60	0.56	0.54	0.57
FeO	22.7	23.2	22.7	22.9	23.1	23.0	23.3	22.8	22.7	23.1
MnO	0.30	0.30	0.32	0.31	0.31	0.32	0.23	0.34	0.29	0.32
MgO	15.9	15.9	15.9	15.8	15.8	15.8	15.7	15.7	15.7	15.7
CaO	8.29	8.11	8.21	8.34	8.12	8.22	8.06	8.30	8.17	8.14
Na_2O	0.16	0.11	0.10	0.12	0.09	0.11	0.08	0.14	n.d.	0.11
K_2O	0.09	0.08	0.09	0.09	0.06	0.08	n.d.	0.08	n.d.	0.08
SiO_2	43.5	44.6	44.0	44.2	44.3	44.2	43.9	44.2	43.5	43.9
TiO_2	1.30	0.86	1.27	0.83	1.20	1.41	1.56	0.88	1.81	1.58
Al_2O_3	7.03	7.10	7.17	7.05	6.93	7.04	7.17	7.20	7.27	7.15
Cr_2O_3	0.56	0.53	0.50	0.55	0.57	0.54	0.59	0.54	0.55	0.54
FeO	22.9	22.8	22.9	23.1	22.9	22.8	23.3	22.9	23.1	22.5
MnO	0.19	0.31	0.30	0.30	0.33	0.31	0.22	0.34	0.28	0.30
MgO	15.6	15.6	15.5	15.5	15.5	15.5	15.3	15.2	15.1	15.1
CaO	8.44	8.39	8.22	8.51	8.10	8.17	7.93	8.45	8.35	8.33
Na_2O	0.07	0.11	0.12	0.11	0.14	n.d.	0.09	0.12	0.11	0.14
K_2O	0.06	0.06	0.09	0.08	0.10	n.d.	0.09	0.08	0.08	0.09
SiO_2	44.0	44.1	43.6	43.7	43.9	43.9	44.1	43.8	44.0	43.9
TiO_2	1.56	1.71	1.93	2.17	1.84	1.82	1.97	2.48	2.23	2.33
Al_2O_3	7.52	7.43	7.45	7.44	7.61	7.56	7.55	7.65	7.71	7.76
Cr_2O_3	0.54	0.54	0.54	0.54	0.49	0.52	0.49	0.54	0.58	0.50
FeO	22.7	22.8	23.1	22.8	22.7	22.7	22.9	22.6	22.3	22.2
MnO	0.29	0.34	0.27	0.19	0.31	0.31	0.28	0.31	0.17	0.31
MgO	14.7	14.6	14.4	14.4	14.4	14.4	14.3	13.9	13.8	13.7
CaO	8.43	8.44	8.23	8.05	8.72	8.39	8.10	8.48	8.30	8.67
Na_2O	0.16	0.19	0.18	0.19	0.18	0.21	0.18	0.22	0.17	0.19
K_2O	0.11	0.11	0.10	0.11	0.13	0.11	0.13	0.15	0.12	0.15

APPENDIX V

APOLLO 15 YELLOW VOLCANIC GLASSES analyzed in thin-sections of breccias 15318, 15425, 15426, and 15427. Four (4) complete analyses were made of <u>each</u> glass to verify sample homogeneity and to improve analytical precision. Each column is the average of these four analyses per glass.
(n.d. = analyzed but not detected)

SiO_2	42.7	42.8	42.8	42.7	42.8	42.8	42.7	42.8	42.5	42.7	43.1	42.7
TiO_2	3.78	3.82	3.62	3.43	3.74	3.58	3.81	3.78	3.84	3.79	3.48	3.77
Al_2O_3	8.70	8.70	8.60	8.14	8.70	8.44	8.69	8.62	8.56	8.71	8.32	8.68
Cr_2O_3	0.62	0.59	0.63	0.61	0.58	0.56	0.58	0.57	0.60	0.58	0.62	0.58
FeO	22.1	22.0	22.1	22.4	22.2	22.3	22.2	22.2	22.3	22.2	22.3	22.2
MnO	0.27	0.30	0.21	0.28	0.22	0.23	0.27	0.27	0.23	0.24	0.22	0.24
MgO	12.6	12.6	12.9	13.5	12.8	13.1	12.7	12.6	12.8	12.5	12.9	12.6
CaO	8.70	8.70	8.66	8.54	8.61	8.60	8.67	8.71	8.67	8.75	8.61	8.80
Na_2O	0.48	0.43	0.45	0.38	0.43	0.43	0.44	0.47	0.44	0.48	0.36	0.43
K_2O	0.11	0.10	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

SiO_2	42.7	42.9	42.8	42.7	42.9	43.3	43.0	43.3	43.1	43.1	43.2	42.9
TiO_2	3.78	3.64	3.48	3.80	3.62	3.40	3.55	3.59	3.50	3.61	3.67	3.60
Al_2O_3	8.65	8.59	8.15	8.75	8.82	8.21	8.46	8.80	8.44	8.76	8.80	8.50
Cr_2O_3	0.58	0.55	0.58	0.59	0.59	0.62	0.53	0.56	0.61	0.62	0.56	0.57
FeO	22.1	22.1	22.3	21.9	21.9	21.8	21.9	21.6	21.8	21.6	21.6	22.1
MnO	0.28	0.28	0.23	0.25	0.27	0.25	0.21	0.26	0.25	0.24	0.22	0.26
MgO	12.8	12.8	13.5	12.7	12.7	13.6	13.4	12.7	13.4	13.0	12.7	13.0
CaO	8.74	8.66	8.50	8.69	8.72	8.39	8.47	8.73	8.58	8.65	8.73	8.65
Na_2O	0.41	0.44	0.45	0.55	0.45	0.46	0.52	0.49	0.42	0.44	0.45	0.44
K_2O	n.d.	0.08	0.07	0.11	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

APPENDIX V (cont'd)

SiO_2	42.8	42.9	43.0	43.1	42.9	43.0	43.1	42.7	43.0	42.8	42.8	42.8
TiO_2	3.47	3.65	3.60	3.64	3.65	3.60	3.64	3.54	3.66	3.50	3.57	3.43
Al_2O_3	8.46	8.77	8.79	8.85	8.77	8.79	8.85	8.34	8.85	8.22	8.49	8.29
Cr_2O_3	0.60	0.59	0.63	0.53	0.59	0.63	0.53	0.58	0.54	0.64	0.52	0.61
FeO	22.2	21.9	21.9	21.9	21.9	21.9	21.9	22.2	21.8	22.2	22.0	22.3
MnO	0.22	0.25	0.26	0.24	0.25	0.26	0.24	0.27	0.23	0.23	0.28	0.28
MgO	13.2	12.8	12.7	12.6	12.8	12.7	12.6	13.4	12.7	13.6	13.2	13.3
CaO	8.54	8.68	8.74	8.76	8.68	8.74	8.76	8.46	8.68	8.42	8.58	8.51
Na_2O	0.47	0.46	0.47	0.44	0.46	0.47	0.44	0.46	0.47	0.46	0.47	0.49
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.08	n.d.	n.d.	n.d.

SiO_2	42.8	42.9	43.2	42.8	42.7	43.0	42.9	43.0	42.7	42.9	42.8	42.9
TiO_2	3.50	3.56	3.53	3.46	3.44	3.71	3.71	3.78	3.80	3.65	3.63	3.67
Al_2O_3	8.38	8.50	8.73	8.55	8.23	8.78	8.95	8.83	8.87	8.91	8.86	8.90
Cr_2O_3	0.53	0.58	0.48	0.51	0.60	0.56	0.51	0.58	0.55	0.56	0.57	0.57
FeO	22.1	22.0	21.8	22.1	22.2	21.9	21.8	21.8	21.9	21.8	21.9	21.7
MnO	0.38	0.31	0.31	0.33	0.27	0.25	0.26	0.21	0.27	0.27	0.28	0.30
MgO	13.3	13.0	12.9	13.1	13.6	12.6	12.6	12.4	12.6	12.6	12.7	12.7
CaO	8.59	8.53	8.70	8.60	8.46	8.74	8.66	8.85	8.76	8.78	8.71	8.74
Na_2O	0.38	0.45	0.30	0.45	0.42	0.43	0.52	0.51	0.57	0.49	0.47	0.52
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.08	n.d.	n.d.	n.d.

SiO_2	43.0	42.8	42.9	42.8	42.9	43.2
TiO_2	3.53	3.51	3.62	3.74	3.67	3.55
Al_2O_3	8.64	8.39	8.95	8.88	8.77	8.97
Cr_2O_3	0.61	0.54	0.52	0.55	0.57	0.56
FeO	21.9	22.1	21.8	21.7	21.9	21.6
MnO	0.25	0.27	0.27	0.27	0.26	0.28
MgO	12.9	13.4	12.7	12.7	12.7	12.6
CaO	8.62	8.51	8.76	8.76	8.76	8.76
Na_2O	0.55	0.47	0.49	0.57	0.49	0.44
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

APPENDIX VI

APOLLO 14 YELLOW VOLCANIC GLASSES analyzed in the following thin-sections of soil breccias: 14049,38; 14307,36; 14307,45; 14307,48; 14313,41. Four (4) complete analyses were made of each glass to verify sample homogeneity and to improve analytical precision. Each column is the average of all analyses on a single glass. The glasses are listed in sequence of decreasing MgO (wt.%).

SiO_2	40.8	40.8	40.7	41.3	41.2	41.3	41.7	41.8
TiO_2	4.53	4.55	4.66	4.74	4.83	4.83	4.97	5.15
Al_2O_3	6.14	6.13	6.20	6.09	6.39	6.18	6.46	6.97
Cr_2O_3	0.40	0.43	0.41	0.42	0.39	0.42	0.40	0.40
FeO	24.7	24.5	24.8	24.8	24.2	24.5	24.4	24.3
MnO	0.30	0.31	0.30	0.32	0.31	0.31	0.32	0.29
MgO	15.0	14.9	14.6	14.1	13.9	13.8	12.9	12.2
CaO	7.63	7.77	7.81	7.79	8.06	8.06	8.10	8.34
Na_2O	0.43	0.44	0.40	0.38	0.57	0.45	0.59	0.48
K_2O	0.10	0.10	0.10	0.10	0.14	0.13	0.17	0.18

APPENDIX VII

APOLLO 15 ORANGE VOLCANIC GLASSES analyzed in thin-sections of breccias 15318 and 15425. Four (4) complete analyses were made of each glass to verify sample homogeneity and to improve analytical precision. Each column is the average of these four analyses per glass. (n.a. = not analyzed; n.d. = not detected)

SiO_2	37.9	37.9	38.0	38.0	37.9	38.0
TiO_2	9.39	8.97	9.13	9.07	8.94	9.22
Al_2O_3	5.55	5.64	5.55	5.48	5.86	5.71
Cr_2O_3	0.64	0.67	0.65	0.67	0.65	0.64
FeO	24.0	23.4	23.9	23.8	23.3	23.7
MnO	0.27	0.29	0.23	0.32	n.a.	n.a.
MgO	14.5	15.3	15.0	14.8	15.2	14.7
CaO	7.49	7.34	7.30	7.37	7.38	7.59
Na_2O	0.31	0.36	0.34	0.50	0.39	0.24
K_2O	n.d.	n.d.	n.d.	0.09	n.d.	n.d.

The Apollo 15 orange volcanic glasses are chemically indistinguishable from the Apollo 17 orange volcanic glasses (74220-type).

APPENDIX VIII

APOLLO 11 ORANGE VOLCANIC GLASSES analyzed in the following thin-sections: 10060,33; 10061,28; 10084,466; 10084,468. Four (4) complete analyses were made of each glass to verify sample homogeneity and to improve analytical precision. Each column is the average of these four analyses per glass. (n.d. = analyzed but not detected).

SiO_2	37.2	37.5	37.3	37.4	37.4	37.4	37.4	37.5	37.6	37.4
TiO_2	10.1	10.0	10.1	10.0	10.1	9.99	9.97	10.1	9.92	9.99
Al_2O_3	5.39	5.37	5.43	5.31	5.59	5.41	5.43	5.48	5.60	5.40
Cr_2O_3	0.64	0.61	0.64	0.60	0.60	0.64	0.65	0.59	0.61	0.63
FeO	24.1	23.9	23.9	24.0	23.8	23.9	24.0	23.8	23.8	24.1
MgO	14.4	14.5	14.4	14.6	14.1	14.4	14.4	14.4	14.3	14.3
CaO	7.59	7.49	7.59	7.50	7.65	7.56	7.57	7.50	7.52	7.54
Na_2O	0.28	0.23	0.24	0.15	0.34	0.23	0.27	0.28	0.28	0.27
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

SiO_2	37.3	37.6	37.3	37.2	37.2	37.1	37.1	37.4	37.3	37.3
TiO_2	10.1	10.6	10.6	10.6	10.3	10.3	9.97	9.95	10.4	9.99
Al_2O_3	5.29	5.96	5.98	5.99	5.60	5.67	5.41	5.67	6.05	5.60
Cr_2O_3	0.65	0.61	0.60	0.62	0.65	0.62	0.59	0.58	0.64	0.57
FeO	24.0	23.5	23.8	23.7	24.0	23.9	24.1	23.8	23.7	23.8
MgO	14.4	12.8	12.9	13.1	13.8	14.0	14.4	14.3	13.3	14.4
CaO	7.50	8.24	8.15	8.18	7.84	7.79	7.60	7.64	8.02	7.62
Na_2O	0.26	0.26	0.32	0.32	0.23	0.25	0.26	0.25	0.28	0.28
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

SiO_2	37.3	37.4	37.2	37.2	37.3	37.1	37.3	37.1	37.4	37.3
TiO_2	10.1	9.92	10.1	10.0	9.93	10.1	10.1	10.1	10.1	9.98
Al_2O_3	5.59	5.93	6.14	5.65	5.81	5.89	5.74	5.59	5.58	5.72
Cr_2O_3	0.61	0.64	0.62	0.59	0.57	0.69	0.62	0.69	0.68	0.62
FeO	23.9	23.6	23.7	24.0	23.9	23.9	23.8	24.1	23.8	23.8
MgO	14.3	14.4	13.8	14.4	14.4	14.2	14.2	14.2	14.4	14.5
CaO	7.58	7.52	7.79	7.52	7.56	7.60	7.64	7.55	7.55	7.51
Na_2O	0.26	0.30	0.23	0.27	0.22	0.24	0.36	0.25	0.24	0.27
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

APPENDIX VIII (cont'd)

SiO_2	37.2	37.5	37.4	37.4	37.3	37.1	37.2	37.2	37.2	37.3
TiO_2	10.6	10.1	10.0	10.0	10.0	10.4	9.96	10.1	10.5	10.3
Al_2O_3	6.35	5.75	5.60	5.74	5.77	6.07	5.93	5.76	6.24	5.91
Cr_2O_3	0.64	0.61	0.63	0.66	0.64	0.64	0.66	0.61	0.58	0.64
FeO	23.5	23.5	23.8	23.6	23.7	23.5	23.6	23.9	23.7	23.5
MgO	13.1	14.2	14.5	14.3	14.1	13.6	14.3	14.3	13.1	14.0
CaO	8.10	7.72	7.58	7.71	7.76	7.93	7.63	7.55	8.08	7.86
Na_2O	0.34	0.28	0.19	0.25	0.29	0.34	0.43	0.28	0.21	0.21
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
SiO_2	37.1	36.9	37.1	37.1	37.1	37.2	37.3	37.2	37.2	37.2
TiO_2	10.0	9.91	9.83	9.95	9.98	9.98	10.0	10.1	9.94	10.1
Al_2O_3	5.67	6.15	6.05	6.29	6.05	5.86	5.63	5.72	5.63	5.81
Cr_2O_3	0.64	0.61	0.60	0.68	0.64	0.65	0.66	0.64	0.67	0.63
FeO	24.0	23.8	23.6	23.3	23.9	23.7	23.8	23.8	23.9	23.8
MgO	14.3	14.4	14.5	14.2	14.4	14.1	14.4	14.2	14.4	14.1
CaO	7.57	7.54	7.60	7.58	7.49	7.75	7.61	7.70	7.56	7.72
Na_2O	0.29	0.27	0.32	0.61	0.26	0.35	0.25	0.31	0.34	0.35
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
SiO_2	37.2	37.3	37.3	37.3	37.3	36.9	37.1	36.9	37.0	37.0
TiO_2	10.3	9.97	10.0	10.0	9.96	9.93	10.4	10.3	10.3	10.0
Al_2O_3	5.94	5.87	5.79	5.68	5.73	5.79	5.96	5.79	5.83	5.59
Cr_2O_3	0.64	0.61	0.62	0.60	0.67	0.65	0.62	0.64	0.62	0.60
FeO	23.4	23.7	23.8	23.7	23.7	23.9	23.8	24.0	23.8	24.2
MgO	13.9	14.2	14.2	14.4	14.4	14.5	13.5	13.9	13.7	14.3
CaO	7.85	7.70	7.69	7.63	7.51	7.58	8.00	7.84	7.98	7.67
Na_2O	0.44	0.28	0.27	0.30	0.42	0.33	0.29	0.33	0.32	0.33
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

APPENDIX VIII (cont'd)

SiO_2	37.0	37.0	37.0	37.0	36.9	37.1	37.0	36.9	37.0	37.1
TiO_2	10.0	9.98	10.1	10.0	9.98	9.92	9.93	10.1	10.1	9.95
Al_2O_3	5.66	5.63	5.57	5.81	5.78	5.71	5.73	5.61	5.63	5.65
Cr_2O_3	0.66	0.62	0.70	0.67	0.62	0.60	0.62	0.60	0.57	0.63
FeO	24.0	24.1	24.0	23.9	24.0	23.8	24.1	24.3	24.1	23.9
MgO	14.2	14.2	14.3	14.2	14.2	14.4	14.3	14.2	14.3	14.4
CaO	7.73	7.68	7.64	7.65	7.73	7.70	7.63	7.62	7.60	7.64
Na_2O	0.32	0.32	0.39	0.37	0.35	0.33	0.30	0.30	0.34	0.36
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

SiO_2	37.0	36.9	37.1	37.2	37.4	37.6	37.6	37.8	37.6	37.5
TiO_2	10.2	9.98	10.3	9.92	10.3	9.97	9.81	10.8	10.2	10.7
Al_2O_3	5.79	5.72	5.98	5.70	5.89	5.62	5.89	6.10	5.75	6.22
Cr_2O_3	0.62	0.63	0.67	0.62	0.62	0.57	0.60	0.57	0.62	0.59
FeO	23.9	24.0	23.8	23.9	23.5	23.4	23.0	23.2	23.4	23.0
MgO	13.9	14.4	13.4	14.4	13.6	14.6	14.8	12.5	14.1	13.0
CaO	7.84	7.61	8.07	7.57	8.01	7.63	7.53	8.42	7.82	8.26
Na_2O	0.36	0.33	0.33	0.34	0.46	0.35	0.45	0.40	0.32	0.45
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

SiO_2	37.5	37.7	37.4	37.6	37.5	37.5	37.5	37.8	37.8	38.0
TiO_2	10.1	10.8	10.3	9.97	10.4	10.8	10.0	9.92	9.79	9.81
Al_2O_3	5.48	6.37	5.94	5.59	6.00	6.29	5.54	5.79	5.73	5.78
Cr_2O_3	0.58	0.63	0.65	0.67	0.62	0.66	0.66	0.64	0.58	0.60
FeO	23.7	22.9	23.4	23.4	23.2	23.1	23.5	23.1	23.1	22.9
MgO	14.5	12.6	13.6	14.6	13.4	12.5	14.6	14.3	14.5	14.4
CaO	7.59	8.47	7.98	7.63	8.13	8.40	7.58	7.72	7.60	7.63
Na_2O	0.38	0.37	0.46	0.32	0.47	0.45	0.32	0.38	0.40	0.45
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

APPENDIX VIII (cont'd)

SiO_2	37.9	37.6	37.8	37.9	37.7	37.7	37.7	37.4	37.3	37.4
TiO_2	9.91	9.98	9.94	10.4	10.4	9.92	10.3	10.2	10.1	10.6
Al_2O_3	5.66	5.68	5.61	5.97	6.09	5.64	5.99	5.84	5.56	5.97
Cr_2O_3	0.61	0.69	0.58	0.60	0.57	0.62	0.62	0.65	0.58	0.66
FeO	23.3	23.2	23.0	23.1	23.1	23.2	23.1	23.5	23.7	23.4
MgO	14.4	14.5	14.5	13.4	13.2	14.5	13.4	13.8	14.4	13.2
CaO	7.58	7.49	7.58	7.98	8.10	7.61	7.98	7.87	7.64	8.10
Na_2O	0.33	0.42	0.48	0.40	0.37	0.45	0.42	0.41	0.40	0.38
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

SiO_2	37.6	37.4	37.5	37.6
TiO_2	11.1	9.93	10.1	10.1
Al_2O_3	6.12	5.59	5.74	5.70
Cr_2O_3	0.57	0.59	0.62	0.61
FeO	23.6	23.8	23.5	23.5
MgO	11.6	14.5	14.0	14.1
CaO	8.61	7.59	7.87	7.77
Na_2O	0.46	0.30	0.35	0.32
K_2O	n.d.	n.d.	n.d.	n.d.

APPENDIX IX

APOLLO 14 ORANGE VOLCANIC GLASSES analyzed in thin-sections of soil breccias 14301 and 14307. Four (4) complete analyses were made of each glass to verify sample homogeneity and to improve analytical precision. Each column is the average of these four analyses per glass. The analyses are listed in sequence of decreasing MgO (wt.%). The specific thin-sections in which the samples occur are the following: 14301,9; 14301,11; 14301,13; 14301,16; 14301,17; 14301,84; 14307,49.

SiO_2	37.3	37.4	37.1	37.0	37.2	36.5	37.8	36.7	36.6	37.3
TiO_2	12.3	12.6	12.5	12.5	12.3	12.9	12.0	12.4	12.6	12.3
Al_2O_3	5.73	5.70	5.58	5.74	5.86	5.62	5.82	5.93	6.45	6.16
Cr_2O_3	0.88	0.79	0.96	0.82	0.85	0.77	0.82	0.75	0.78	0.79
FeO	22.2	22.4	22.2	21.9	22.2	22.2	21.6	22.0	22.3	22.2
MnO	0.34	0.30	0.31	0.27	0.25	0.26	0.28	0.30	0.29	0.33
MgO	14.5	14.5	14.4	14.3	14.0	13.9	13.7	13.6	13.1	13.1
CaO	6.97	7.10	7.02	7.05	7.07	7.42	6.97	7.39	7.66	7.45
Na_2O	0.30	0.16	0.29	0.38	0.29	0.42	0.33	0.64	0.42	0.49
K_2O	0.41	0.32	0.27	0.16	0.11	0.19	0.15	0.24	0.18	0.21

SiO_2	36.7	36.6	37.0	36.9	37.1	36.7	37.2	36.9	36.9	36.8
TiO_2	12.2	12.5	12.5	12.8	12.7	12.3	12.5	12.5	12.7	12.3
Al_2O_3	6.35	6.21	6.19	6.16	6.31	6.24	6.39	6.42	6.24	6.23
Cr_2O_3	0.77	0.78	0.78	0.73	0.74	0.70	0.79	0.80	0.83	0.78
FeO	21.8	22.1	21.9	22.1	21.8	21.8	21.8	22.1	21.8	22.0
MnO	0.29	0.34	0.28	0.31	0.26	0.29	0.31	0.29	0.26	0.25
MgO	13.0	12.9	12.9	12.9	12.8	12.8	12.7	12.7	12.7	12.6
CaO	7.67	7.58	7.62	7.53	7.75	7.61	7.61	7.64	7.62	7.70
Na_2O	0.39	0.43	0.43	0.49	0.55	0.52	0.55	0.47	0.38	0.45
K_2O	0.18	0.17	0.19	0.17	0.21	0.23	0.20	0.21	0.17	0.18

SiO_2	36.6	36.6	37.1	37.0	36.9	36.7	37.1	36.8	37.2
TiO_2	12.4	12.7	12.4	12.5	12.8	12.6	12.5	12.6	12.6
Al_2O_3	6.41	6.57	6.53	6.53	6.47	6.41	6.61	6.89	6.81
Cr_2O_3	0.77	0.73	0.76	0.76	0.78	0.73	0.75	0.75	0.74
FeO	21.9	21.8	22.4	21.9	22.0	21.8	21.8	21.5	21.7
MnO	0.28	0.30	0.31	0.32	0.29	0.28	0.30	0.32	0.31
MgO	12.6	12.3	12.2	12.1	12.1	12.0	12.0	11.7	11.7
CaO	7.62	7.98	7.81	7.80	7.73	8.08	7.96	8.13	8.26
Na_2O	0.48	0.51	0.55	0.52	0.54	0.45	0.42	0.48	0.50
K_2O	0.23	0.19	0.24	0.24	0.21	0.18	0.18	0.20	0.19

APPENDIX IX (cont'd)

SiO_2	37.1	37.3	37.1	37.0	36.8	37.5	37.9	38.0
TiO_2	12.7	12.7	12.5	12.8	12.6	12.7	12.8	13.0
Al_2O_3	6.87	6.85	6.98	6.97	6.84	7.90	7.90	7.87
Cr_2O_3	0.76	0.71	0.75	0.70	0.73	0.59	0.52	0.51
FeO	21.8	22.0	21.7	21.8	21.1	21.3	21.0	21.1
MnO	0.31	0.32	0.31	0.33	0.23	0.29	0.28	0.27
MgO	11.7	11.7	11.6	11.4	11.3	9.88	9.52	9.29
CaO	8.17	8.08	8.23	8.11	8.22	8.89	8.94	9.08
Na_2O	0.45	0.46	0.45	0.54	0.40	0.51	0.47	0.41
K_2O	0.20	0.20	0.19	0.22	0.19	0.19	0.17	0.16

APPENDIX X

APOLLO 14 BLACK VOLCANIC "GLASSES" analyzed in thin-sections of soil breccias 14301 and 14307. At least four (4) complete analyses were made for each of these devitrified volcanic glasses in order to improve analytical accuracy and precision. Each column is the average of all replicate analyses per sample. The analyses are listed in sequence of increasing abundances of $Na_2O + K_2O$ (metasomatic process ?). The specific thin-sections in which the samples occur are the following: 14301,9; 14301,11; 14301,13; 14301,16; 14301,17; 14301,84; 14307,3; 14307,45; 14307,49.

SiO_2	33.1	33.0	33.6	33.7	34.4	34.4	34.9	33.9	34.5	34.0
TiO_2	16.9	17.1	16.4	16.9	16.4	16.0	16.0	16.2	16.3	16.6
Al_2O_3	4.04	3.91	4.00	3.84	4.40	4.69	4.80	4.69	4.62	4.66
Cr_2O_3	0.97	0.94	0.96	0.87	0.91	0.96	0.78	0.96	0.99	0.92
FeO	25.3	25.8	25.8	25.2	25.1	23.8	24.3	24.3	24.6	24.2
MnO	0.33	0.29	0.35	0.30	0.35	0.34	0.34	0.29	0.28	0.30
MgO	14.0	13.9	14.2	14.0	12.6	14.1	12.9	12.7	13.5	12.9
CaO	6.50	6.44	6.76	6.64	7.27	6.71	6.96	7.01	6.88	6.86
Na_2O	0.07	0.06	0.06	0.11	0.25	0.16	0.25	0.26	0.24	0.27
K_2O	0.08	0.15	0.17	0.18	0.11	0.20	0.11	0.11	0.15	0.12

SiO_2	34.2	34.1	34.0	33.9	34.2	33.8	33.9	34.2	34.2	34.6
TiO_2	16.3	16.2	16.2	16.1	16.6	16.4	16.6	16.2	16.5	16.1
Al_2O_3	4.50	4.49	4.83	4.60	4.74	4.64	4.60	5.20	4.76	4.61
Cr_2O_3	0.97	0.75	0.93	0.94	0.90	0.98	0.93	0.88	0.91	0.89
FeO	24.7	24.2	24.1	23.9	24.0	24.6	24.8	23.9	24.0	24.0
MnO	0.31	0.31	0.35	0.28	0.27	0.32	0.28	0.26	0.31	0.28
MgO	13.6	12.7	13.1	13.3	13.1	12.9	13.2	12.5	13.0	13.3
CaO	6.75	7.54	6.92	6.90	6.89	6.97	7.05	7.14	7.16	6.88
Na_2O	0.26	0.26	0.28	0.30	0.30	0.31	0.25	0.29	0.14	0.28
K_2O	0.14	0.14	0.14	0.13	0.13	0.14	0.20	0.17	0.33	0.20

SiO_2	34.3	34.2	33.9	34.4	34.0	33.4	33.8	34.5	34.0	33.6
TiO_2	16.5	16.4	16.4	16.3	17.0	16.7	16.3	16.6	16.1	16.0
Al_2O_3	4.84	4.83	4.61	4.92	4.21	3.93	4.51	4.53	4.51	5.47
Cr_2O_3	0.91	0.89	0.96	0.90	0.83	0.79	1.00	0.74	0.82	0.86
FeO	24.3	24.5	24.6	25.0	25.4	24.9	25.3	24.0	23.8	23.7
MnO	0.35	0.32	0.34	0.37	0.34	0.32	0.28	0.35	0.35	0.31
MgO	13.2	13.1	13.9	12.9	12.5	14.4	13.5	13.1	13.42	12.2
CaO	6.86	6.89	6.54	7.22	7.64	6.49	6.57	7.16	7.01	7.00
Na_2O	0.28	0.28	0.26	0.34	0.28	0.23	0.43	0.28	0.29	0.28
K_2O	0.20	0.21	0.28	0.20	0.28	0.38	0.19	0.35	0.35	0.39

APPENDIX X (cont'd)

SiO_2	33.2	33.7	33.4	33.4	33.0	33.9	33.9	33.2	34.8	33.7
TiO_2	16.9	16.4	16.2	17.1	16.5	16.3	16.3	16.6	16.1	16.5
Al_2O_3	3.91	4.09	4.16	3.97	4.34	4.52	4.41	4.49	4.87	4.34
Cr_2O_3	0.95	0.96	1.00	0.90	0.89	0.85	0.97	0.81	0.61	0.91
FeO	25.2	25.0	25.1	25.2	24.1	22.9	22.2	23.4	21.9	21.5
MnO	0.28	0.34	0.36	0.34	0.35	0.34	0.33	0.31	0.28	0.28
MgO	13.6	13.6	14.0	14.4	13.2	13.5	13.3	12.9	12.3	13.4
CaO	6.21	6.71	6.47	5.92	6.75	7.10	6.83	7.03	7.36	6.84
Na_2O	0.21	0.33	0.47	0.51	0.95	0.59	1.22	1.96	1.82	1.72
K_2O	0.54	0.44	0.52	0.55	0.31	0.80	1.20	0.72	1.04	1.74

SiO_2	33.5	33.6	33.2
TiO_2	16.0	16.6	16.4
Al_2O_3	4.56	4.49	4.39
Cr_2O_3	0.92	0.90	0.81
FeO	21.9	21.3	20.9
MnO	0.29	0.34	0.34
MgO	13.1	13.1	13.1
CaO	6.94	6.97	6.99
Na_2O	2.66	2.34	3.78
K_2O	1.20	1.70	1.43

APPENDIX XI

APOLLO 14 GREEN (group B) VOLCANIC GLASSES analyzed in the following thin-sections of soil breccias: 14307,36; 14307,45; 14307,48; 14307,49; 14313,41. Four (4) complete analyses were made of <u>each</u> glass to verify sample homogeneity and to improve analytical precision. Each column is the average of all analyses on a single glass. The glasses are listed in sequence of decreasing MgO (wt.%).

SiO_2	44.5	45.0	44.7	44.9	44.7	45.1	44.6	44.5	45.2	44.8
TiO_2	0.44	0.42	0.53	0.39	0.48	0.41	0.57	0.58	0.58	0.60
Al_2O_3	7.10	6.98	7.33	7.05	7.23	7.13	7.42	7.39	7.30	7.39
Cr_2O_3	0.48	0.56	0.60	0.55	0.51	0.54	0.48	0.51	0.52	0.54
FeO	19.6	19.8	20.1	19.8	19.8	19.7	19.8	19.5	19.9	19.6
MnO	0.28	0.22	0.23	0.21	0.28	0.23	0.31	0.29	0.24	0.26
MgO	19.3	19.1	19.1	19.1	19.1	18.9	18.8	18.7	18.7	18.6
CaO	8.13	8.01	7.87	8.01	8.08	8.06	8.30	8.21	7.86	8.16
Na_2O	0.09	n.d.	0.06	n.d.	0.08	n.d.	0.10	0.07	0.08	0.10
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
SiO_2	45.1	44.8	44.9	45.2	45.2	45.0	45.1	45.3	44.4	44.9
TiO_2	0.64	0.68	0.68	0.83	0.80	0.77	0.79	0.73	0.90	0.78
Al_2O_3	7.32	7.53	7.46	7.76	7.68	7.68	7.60	7.60	7.70	7.67
Cr_2O_3	0.58	0.52	0.52	0.47	0.53	0.51	0.56	0.58	0.54	0.53
FeO	19.9	19.8	19.8	19.7	19.7	20.0	20.0	19.8	20.0	19.8
MnO	0.19	0.20	0.25	0.24	0.18	0.30	0.20	0.21	0.25	0.26
MgO	18.2	18.2	17.9	17.8	17.8	17.8	17.7	17.6	17.6	17.5
CaO	7.95	8.10	8.56	8.24	8.34	8.51	8.17	8.10	8.69	8.56
Na_2O	0.06	n.d.	0.09	0.07	0.07	0.11	0.07	0.08	0.17	0.12
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.

APPENDIX XI (cont'd)

SiO_2	45.1	44.8	44.9	44.9	44.5	45.1	45.2	45.0	45.0	45.4
TiO_2	0.78	0.83	0.77	0.79	0.82	0.84	0.82	0.76	0.91	0.81
Al_2O_3	7.55	7.69	7.95	8.08	7.82	8.07	8.35	8.46	8.12	8.39
Cr_2O_3	0.52	0.51	0.52	0.47	0.53	0.47	0.46	0.47	0.50	0.49
FeO	19.6	20.1	19.8	19.5	20.0	19.7	19.4	19.3	19.9	19.2
MnO	0.27	0.24	0.19	0.27	0.30	0.23	0.18	0.27	0.26	0.25
MgO	17.4	17.4	17.3	17.3	17.2	17.0	16.5	16.4	16.2	16.1
CaO	8.68	8.65	8.43	8.60	8.70	8.76	8.64	8.93	9.05	9.00
Na_2O	0.12	0.11	0.10	0.14	0.12	0.11	0.12	0.20	0.12	0.20
K_2O	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.08	0.11	n.d.	0.09

SiO_2	45.1	45.5	45.8
TiO_2	0.75	0.81	0.90
Al_2O_3	8.08	8.67	8.89
Cr_2O_3	0.57	0.46	0.46
FeO	19.7	19.5	18.8
MnO	0.22	0.29	0.30
MgO	15.9	15.7	15.2
CaO	8.96	9.24	9.29
Na_2O	0.06	0.16	0.18
K_2O	n.d.	0.10	0.07

APPENDIX XII

APOLLO 17 ORANGE VOLCANIC GLASSES analyzed in thin-section 74220,128. Four complete analyses were made of <u>each</u> glass to verify sample homogeneity and to improve analytical precision. Each column is the average of all analyses on a single glass. K_2O was analyzed but never detected

SiO_2	38.7	38.7	38.8	38.8	38.9	38.9	38.9	38.7	38.7	38.6
TiO_2	9.16	9.23	9.18	9.08	9.08	9.09	9.11	9.17	9.10	9.09
Al_2O_3	5.56	5.79	5.71	5.75	5.85	5.82	5.54	5.85	5.75	5.75
Cr_2O_3	0.59	0.69	0.69	0.71	0.71	0.66	0.70	0.64	0.62	0.70
FeO	23.5	23.1	23.2	22.9	22.8	22.8	23.0	22.8	22.9	22.9
MnO	0.25	0.22	0.21	0.22	0.24	0.26	0.20	0.24	0.23	0.22
MgO	14.6	14.4	14.5	14.9	14.7	14.7	15.0	14.8	15.2	15.2
CaO	7.50	7.53	7.50	7.36	7.44	7.45	7.36	7.44	7.30	7.32
Na_2O	0.25	0.33	0.35	0.35	0.34	0.29	0.26	0.38	0.30	0.31

SiO_2	38.6	38.7	38.6	38.6	38.5	38.5	38.7	38.5	38.7	38.5
TiO_2	9.05	9.07	9.19	9.07	9.09	9.04	9.02	9.02	9.10	9.13
Al_2O_3	5.75	5.84	5.93	5.74	5.89	5.71	5.91	5.79	5.84	5.69
Cr_2O_3	0.70	0.70	0.70	0.66	0.65	0.70	0.71	0.73	0.72	0.69
FeO	22.9	22.8	22.8	22.9	22.9	23.0	22.6	22.8	22.8	23.0
MnO	0.25	0.20	0.26	0.26	0.29	0.24	0.21	0.26	0.26	0.20
MgO	15.0	14.9	14.6	15.2	14.9	15.2	15.1	15.1	14.9	15.1
CaO	7.36	7.47	7.53	7.34	7.44	7.30	7.40	7.44	7.42	7.36
Na_2O	0.38	0.34	0.42	0.36	0.33	0.36	0.40	0.39	0.38	0.38

APPENDIX XII (cont'd)

SiO_2	38.7	38.4	38.6	38.4	38.5	38.7	38.6	38.6	38.5	38.5
TiO_2	9.05	9.15	9.16	9.11	9.26	9.11	9.27	9.19	9.24	9.05
Al_2O_3	5.86	5.64	6.02	5.85	5.83	5.74	5.77	5.90	5.84	5.72
Cr_2O_3	0.68	0.71	0.72	0.71	0.70	0.65	0.67	0.70	0.66	0.67
FeO	22.7	22.9	22.7	22.8	22.8	22.7	23.0	22.9	23.0	22.9
MnO	0.24	0.24	0.25	0.23	0.27	0.26	0.21	0.25	0.22	0.26
MgO	15.1	15.4	14.6	15.1	14.8	15.2	14.7	14.7	14.7	15.3
CaO	7.38	7.35	7.54	7.39	7.42	7.33	7.44	7.50	7.47	7.24
Na_2O	0.38	0.34	0.36	0.43	0.39	0.38	0.36	0.36	0.41	0.34

SiO_2	38.6	38.6	38.5	38.6	38.6	38.7	38.5	38.5	38.6	38.5
TiO_2	9.08	9.12	9.10	9.22	9.07	9.00	9.14	9.09	9.17	9.20
Al_2O_3	5.96	5.78	5.71	5.92	5.65	5.65	5.77	5.86	5.78	6.00
Cr_2O_3	0.67	0.64	0.67	0.68	0.64	0.67	0.69	0.71	0.67	0.68
FeO	22.9	22.8	22.9	22.9	22.9	22.9	22.9	22.9	23.0	22.8
MnO	0.23	0.20	0.20	0.24	0.25	0.23	0.25	0.27	0.26	0.26
MgO	14.8	15.1	15.2	14.5	15.2	15.3	14.9	14.9	14.8	14.6
CaO	7.46	7.39	7.36	7.49	7.33	7.26	7.45	7.39	7.44	7.56
Na_2O	0.42	0.33	0.39	0.44	0.35	0.34	0.40	0.40	0.32	0.46

APPENDIX XII (cont'd)

SiO_2	38.5	38.6	38.6	38.7	38.5	38.3	38.7	38.5	38.7	38.7
TiO_2	8.87	8.98	9.06	9.22	9.15	9.09	9.16	9.11	9.01	9.09
Al_2O_3	5.81	5.70	5.71	5.96	5.68	5.68	5.87	5.79	5.76	5.93
Cr_2O_3	0.67	0.72	0.63	0.68	0.68	0.71	0.71	0.69	0.70	0.68
FeO	22.7	23.0	22.7	23.0	22.9	22.9	22.9	22.9	22.7	22.7
MnO	0.24	0.23	0.26	0.27	0.22	0.26	0.22	0.24	0.22	0.24
MgO	15.5	15.2	15.4	14.4	15.2	15.4	14.8	15.0	15.2	14.9
CaO	7.30	7.29	7.30	7.53	7.31	7.25	7.42	7.40	7.36	7.40
Na_2O	0.41	0.33	0.33	0.33	0.41	0.40	0.34	0.32	0.36	0.41

SiO_2	38.4	38.5	38.5	38.4	38.3	38.4	38.6	38.4	38.3	38.5
TiO_2	9.03	9.09	9.04	9.06	9.23	9.01	9.15	9.13	9.07	9.26
Al_2O_3	5.75	5.70	5.76	5.73	5.82	5.75	6.03	5.71	5.71	5.84
Cr_2O_3	0.68	0.67	0.73	0.67	0.67	0.71	0.68	0.69	0.69	0.66
FeO	22.9	22.9	23.0	23.0	23.0	22.8	22.9	23.0	23.0	23.0
MnO	0.25	0.24	0.18	0.25	0.21	0.26	0.24	0.26	0.22	0.25
MgO	15.3	15.3	15.0	15.2	14.9	15.4	14.6	15.2	15.3	14.7
CaO	7.28	7.29	7.39	7.35	7.45	7.27	7.47	7.24	7.28	7.42
Na_2O	0.36	0.36	0.38	0.38	0.46	0.48	0.35	0.46	0.40	0.43

APPENDIX XII (cont'd)

SiO_2	38.7	39.0	38.8	39.2	38.5	38.5	38.4	38.3	38.3	38.5
TiO_2	9.18	9.11	9.08	9.04	9.08	9.20	9.17	9.02	9.14	9.02
Al_2O_3	5.92	5.77	5.66	5.76	5.66	5.75	5.81	5.66	5.78	5.75
Cr_2O_3	0.70	0.69	0.68	0.68	0.71	0.74	0.70	0.72	0.70	0.69
FeO	22.9	22.7	23.2	22.7	22.9	23.0	23.0	23.0	23.3	22.8
MnO	0.21	0.24	0.24	0.22	0.24	0.25	0.24	0.27	0.29	0.26
MgO	14.5	14.9	14.6	14.8	15.3	14.8	14.9	15.2	14.7	15.2
CaO	7.54	7.35	7.37	7.35	7.29	7.40	7.43	7.32	7.44	7.31
Na_2O	0.37	0.35	0.37	0.34	0.35	0.37	0.39	0.45	0.35	0.42

SiO_2	38.4	38.5	38.5	38.6	38.6	38.6	38.5	38.4	38.6	38.5
TiO_2	9.11	9.14	9.25	9.11	9.12	9.02	9.01	9.01	9.13	9.15
Al_2O_3	5.74	5.83	5.81	5.75	5.86	5.66	5.85	5.77	5.88	5.77
Cr_2O_3	0.65	0.68	0.72	0.73	0.63	0.68	0.73	0.72	0.70	0.71
FeO	22.9	22.8	22.9	22.9	23.1	23.1	22.7	22.9	22.8	23.1
MnO	0.26	0.22	0.24	0.25	0.23	0.24	0.28	0.27	0.25	0.19
MgO	15.2	15.0	14.5	15.0	14.7	15.1	15.1	15.1	14.9	14.8
CaO	7.34	7.40	7.58	7.35	7.51	7.30	7.38	7.33	7.45	7.43
Na_2O	0.38	0.37	0.39	0.37	0.35	0.34	0.47	0.47	0.42	0.37

APPENDIX XII (cont'd)

SiO_2	38.5	38.3	38.4	38.4	38.4	38.6	38.4	38.5	38.4	38.5
TiO_2	9.06	9.16	9.28	9.18	9.07	9.04	9.21	8.96	9.11	9.26
Al_2O_3	5.74	5.64	5.94	5.69	5.90	5.71	5.72	5.64	5.77	5.85
Cr_2O_3	0.72	0.70	0.71	0.71	0.72	0.69	0.72	0.70	0.66	0.72
FeO	22.9	23.1	23.1	23.0	22.9	22.9	23.1	22.9	23.1	22.9
MnO	0.25	0.29	0.25	0.23	0.26	0.23	0.27	0.31	0.22	0.23
MgO	15.1	15.1	14.5	15.1	14.9	15.2	14.8	15.3	15.0	14.7
CaO	7.35	7.31	7.53	7.26	7.44	7.29	7.42	7.31	7.43	7.46
Na_2O	0.45	0.33	0.40	0.41	0.41	0.39	0.35	0.36	0.37	0.46

SiO_2	38.5	38.3	38.5	38.5	38.6	38.4	38.5	38.3	38.4	38.4
TiO_2	9.07	9.11	9.25	9.07	9.07	9.25	9.25	9.06	9.10	9.15
Al_2O_3	5.63	5.74	5.80	5.65	5.87	5.71	5.97	5.91	5.88	5.88
Cr_2O_3	0.70	0.73	0.70	0.71	0.65	0.72	0.67	0.71	0.70	0.71
FeO	23.1	23.2	23.2	22.9	22.9	23.3	22.9	22.8	23.0	23.0
MnO	0.22	0.26	0.24	0.21	0.18	0.24	0.21	0.30	0.24	0.23
MgO	15.2	14.9	14.6	15.3	15.0	14.7	14.5	15.1	14.9	14.7
CaO	7.35	7.41	7.55	7.31	7.39	7.48	7.59	7.38	7.41	7.51
Na_2O	0.30	0.37	0.34	0.40	0.36	0.33	0.34	0.43	0.41	0.43

APPENDIX XII (cont'd)

SiO_2	38.3	38.3	38.6	38.4	38.6	38.7	38.6	38.8	38.4	38.3
TiO_2	9.10	9.24	9.08	9.21	9.06	9.11	9.07	9.06	9.15	9.22
Al_2O_3	5.78	6.05	5.83	5.88	5.77	5.71	5.69	5.71	5.67	5.73
Cr_2O_3	0.68	0.69	0.69	0.69	0.70	0.67	0.71	0.69	0.68	0.70
FeO	23.2	23.0	22.8	23.1	23.0	23.1	22.7	22.9	23.1	23.2
MnO	0.25	0.26	0.18	0.26	0.31	0.27	0.26	0.24	0.24	0.24
MgO	15.0	14.3	15.0	14.5	14.8	14.8	15.3	15.0	15.1	14.8
CaO	7.37	7.65	7.38	7.49	7.37	7.39	7.28	7.30	7.34	7.46
Na_2O	0.37	0.43	0.47	0.42	0.37	0.34	0.49	0.36	0.37	0.40

SiO_2	38.5	38.5	38.5	38.4	38.4	38.4	38.2	38.3	38.2	38.3
TiO_2	9.56	9.02	9.10	9.15	9.23	9.18	9.14	9.07	9.12	9.15
Al_2O_3	6.06	5.72	5.88	5.82	5.93	5.66	5.75	5.71	5.75	5.69
Cr_2O_3	0.67	0.73	0.67	0.73	0.71	0.73	0.71	0.69	0.72	0.65
FeO	23.1	22.9	22.9	23.2	23.0	23.0	23.2	23.2	23.3	23.2
MnO	0.27	0.27	0.24	0.23	0.25	0.24	0.27	0.25	0.25	0.28
MgO	13.7	15.2	15.0	14.7	14.5	15.0	15.0	15.1	14.8	15.0
CaO	7.79	7.32	7.33	7.43	7.53	7.40	7.38	7.34	7.41	7.41
Na_2O	0.36	0.41	0.46	0.35	0.48	0.38	0.39	0.40	0.44	0.34

APPENDIX XII (cont'd)

SiO_2	38.6	38.3	38.3	38.4	38.4	38.4	38.4	38.5	38.6	38.5
TiO_2	9.21	9.15	9.10	9.08	9.04	9.08	9.12	9.12	9.11	9.24
Al_2O_3	5.79	5.65	5.74	5.89	5.78	5.81	5.76	5.84	5.82	5.96
Cr_2O_3	0.66	0.72	0.72	0.66	0.68	0.70	0.71	0.67	0.73	0.70
FeO	22.9	23.2	23.0	23.0	23.0	23.1	23.0	23.1	22.5	22.9
MnO	0.21	0.23	0.22	0.24	0.27	0.28	0.25	0.25	0.26	0.28
MgO	14.9	15.0	15.2	14.9	15.2	14.9	15.0	14.8	15.2	14.6
CaO	7.41	7.38	7.34	7.41	7.28	7.43	7.43	7.46	7.35	7.46
Na_2O	0.44	0.37	0.39	0.42	0.40	0.38	0.32	0.30	0.47	0.46

SiO_2	38.6	38.8	38.7	38.5	38.3	38.5	38.9	38.8	38.2	38.3
TiO_2	9.07	9.19	9.12	9.11	9.20	9.19	9.06	9.04	9.16	9.08
Al_2O_3	5.66	5.90	5.83	5.83	5.76	5.81	5.86	5.63	5.73	5.72
Cr_2O_3	0.65	0.65	0.67	0.68	0.68	0.72	0.67	0.66	0.74	0.73
FeO	23.0	22.9	23.0	23.1	23.0	23.0	22.8	22.8	23.0	23.2
MnO	0.25	0.28	0.24	0.23	0.30	0.30	0.25	0.27	0.26	0.27
MgO	15.1	14.4	14.7	14.8	15.0	14.8	14.8	15.2	15.0	15.0
CaO	7.30	7.56	7.47	7.46	7.41	7.41	7.37	7.32	7.34	7.42
Na_2O	0.33	0.35	0.34	0.34	0.44	0.33	0.35	0.33	0.53	0.35

APPENDIX XIII

APOLLO 15 GREEN VOLCANIC GLASSES (GROUP A) analyzed in thin-section 15426,72. Four complete analyses were made on each glass to verify sample homogeneity and to improve analytical precision. Each column is the average of all analyses on a single glass. Na_2O and K_2O were analyzed but not detected.

SiO_2	45.8	45.5	45.7	45.7	45.6	45.5	45.4	45.6	45.5	45.5
TiO_2	0.40	0.36	0.35	0.36	0.36	0.40	0.40	0.40	0.42	0.35
Al_2O_3	7.95	7.90	7.65	7.93	7.75	7.76	7.69	7.70	7.73	7.65
Cr_2O_3	0.53	0.57	0.47	0.53	0.57	0.55	0.52	0.53	0.57	0.60
FeO	19.4	19.7	19.9	19.5	19.6	19.8	19.9	19.8	19.7	19.9
MnO	0.18	0.19	0.22	0.19	0.26	0.21	0.24	0.23	0.23	0.22
MgO	17.1	17.0	17.2	17.1	17.1	17.1	17.3	17.2	17.2	17.2
CaO	8.68	8.75	8.55	8.65	8.69	8.67	8.59	8.56	8.59	8.57
SiO_2	45.6	45.6	45.7	45.6	45.4	45.5	45.7	45.4	45.6	45.5
TiO_2	0.40	0.38	0.35	0.37	0.38	0.39	0.35	0.43	0.37	0.39
Al_2O_3	7.84	7.80	7.67	7.83	7.80	7.68	7.63	7.88	7.97	7.87
Cr_2O_3	0.55	0.57	0.52	0.54	0.53	0.56	0.49	0.59	0.58	0.57
FeO	19.7	19.8	19.8	19.7	19.8	19.7	19.7	19.7	19.5	19.6
MnO	0.18	0.21	0.21	0.21	0.20	0.23	0.27	0.26	0.21	0.23
MgO	17.1	17.1	17.4	17.2	17.2	17.3	17.2	17.1	17.1	17.2
CaO	8.71	8.59	8.61	8.70	8.62	8.69	8.72	8.65	8.70	8.67
SiO_2	45.4	45.8	45.5	45.4	45.6	45.5	45.6	45.6	45.6	45.6
TiO_2	0.40	0.32	0.37	0.40	0.42	0.37	0.38	0.38	0.36	0.33
Al_2O_3	7.86	7.84	7.97	7.68	7.81	7.67	7.71	7.93	7.83	7.65
Cr_2O_3	0.58	0.58	0.51	0.61	0.55	0.55	0.57	0.53	0.55	0.59
FeO	19.8	19.4	19.7	19.8	19.6	19.9	19.7	19.5	19.7	19.9
MnO	0.24	0.25	0.19	0.26	0.20	0.20	0.22	0.27	0.18	0.16
MgO	17.1	17.2	17.1	17.2	17.2	17.2	17.1	17.2	17.1	17.3
CaO	8.61	8.67	8.68	8.62	8.66	8.66	8.67	8.63	8.67	8.59

APPEXDIX XIII (cont'd)

SiO_2	45.6	45.5	45.4	45.4	45.5	45.5	45.7	45.6	45.5	45.5
TiO_2	0.38	0.32	0.36	0.41	0.46	0.39	0.35	0.35	0.35	0.39
Al_2O_3	7.68	7.70	7.92	7.80	7.82	7.85	7.76	7.61	7.84	7.72
Cr_2O_3	0.56	0.56	0.56	0.57	0.58	0.57	0.61	0.55	0.60	0.62
FeO	19.7	19.9	19.7	19.9	19.6	19.7	19.6	19.9	19.8	19.8
MnO	0.23	0.21	0.23	0.18	0.26	0.22	0.21	0.22	0.22	0.22
MgO	17.2	17.2	17.2	17.1	17.1	17.1	17.2	17.2	17.1	17.1
CaO	8.65	8.61	8.69	8.67	8.69	8.68	8.63	8.58	8.65	8.67

SiO_2	45.5	45.5	45.6	45.6	45.7	45.5	45.5	45.6	45.4	45.4
TiO_2	0.40	0.42	0.37	0.40	0.36	0.43	0.35	0.39	0.35	0.35
Al_2O_3	7.92	7.62	7.73	7.78	7.78	7.94	7.80	7.81	7.70	7.65
Cr_2O_3	0.59	0.55	0.57	0.53	0.57	0.53	0.49	0.56	0.56	0.58
FeO	19.6	19.9	19.8	19.7	19.7	19.7	19.9	19.6	19.8	19.9
MnO	0.26	0.20	0.19	0.22	0.16	0.22	0.24	0.23	0.22	0.21
MgO	17.1	17.3	17.2	17.2	17.1	17.0	17.1	17.1	17.3	17.2
CaO	8.68	8.61	8.64	8.62	8.69	8.61	8.67	8.68	8.70	8.69

SiO_2	45.6	45.6	45.4	45.5	45.5	45.4	45.3	45.4	45.4	45.4
TiO_2	0.38	0.[illegible]	0.39	0.38	0.34	0.37	0.44	0.44	0.39	0.42
Al_2O_3	7.90	7.83	7.70	7.67	7.70	7.60	7.78	7.80	7.75	7.76
Cr_2O_3	0.57	0.56	0.61	0.60	0.57	0.54	0.55	0.56	0.54	0.54
FeO	19.6	19.5	19.8	19.8	19.8	20.0	19.9	19.8	19.9	19.9
MnO	0.26	0.23	0.24	0.28	0.18	0.22	0.26	0.25	0.25	0.16
MgO	17.1	17.2	17.2	17.2	17.2	17.3	17.1	17.1	17.1	17.1
CaO	8.73	8.70	8.62	8.60	8.69	8.60	8.68	8.68	8.62	8.71

APPENDIX XIII (cont'd)

SiO_2	45.5	45.5	45.3	45.5	45.4	45.5	45.5	45.4	45.5	45.4
TiO_2	0.42	0.34	0.38	0.39	0.38	0.38	0.33	0.38	0.35	0.40
Al_2O_3	7.67	7.54	7.65	7.69	7.62	7.74	7.59	7.66	7.80	7.61
Cr_2O_3	0.58	0.54	0.59	0.55	0.54	0.53	0.59	0.53	0.58	0.54
FeO	19.8	20.0	19.9	19.9	20.0	19.8	20.0	19.9	19.8	20.0
MnO	0.20	0.23	0.23	0.19	0.21	0.24	0.20	0.25	0.19	0.20
MgO	17.2	17.3	17.3	17.2	17.2	17.2	17.2	17.3	17.1	17.3
CaO	8.68	8.66	8.72	8.64	8.65	8.65	8.58	8.62	8.70	8.57

SiO_2	45.7	45.5	45.4	45.4	45.6	45.5	45.5	45.5	45.4	45.5
TiO_2	0.39	0.38	0.41	0.42	0.37	0.37	0.38	0.32	0.38	0.38
Al_2O_3	7.78	7.77	7.74	7.73	7.75	7.76	7.74	7.82	7.62	7.83
Cr_2O_3	0.52	0.55	0.56	0.52	0.54	0.54	0.61	0.59	0.57	0.54
FeO	19.7	19.6	19.8	19.9	19.6	19.8	19.8	19.8	20.0	19.9
MnO	0.26	0.22	0.23	0.29	0.25	0.20	0.11	0.20	0.21	0.20
MgO	17.1	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.2	17.1
CaO	8.62	8.77	8.66	8.61	8.68	8.66	8.69	8.62	8.59	8.68

SiO_2	45.3	45.4	45.5	45.5	45.5	45.5	45.5	45.5	45.4	45.5
TiO_2	0.42	0.36	0.41	0.44	0.40	0.39	0.38	0.33	0.41	0.38
Al_2O_3	7.78	7.78	7.78	7.74	7.67	7.79	7.75	7.70	7.64	7.67
Cr_2O_3	0.55	0.59	0.53	0.54	0.57	0.56	0.53	0.58	0.56	0.55
FeO	19.9	19.7	19.7	19.8	19.8	19.8	19.7	19.8	20.0	19.9
MnO	0.18	0.23	0.26	0.23	0.24	0.21	0.26	0.23	0.19	0.21
MgO	17.3	17.2	17.2	17.1	17.3	17.1	17.2	17.2	17.2	17.2
CaO	8.66	8.69	8.69	8.67	8.58	8.65	8.62	8.63	8.63	8.59

APPENDIX XIII (cont'd)

SiO_2	45.5	45.4	45.5	45.5	45.5	45.5	45.5	45.4	45.4	45.5
TiO_2	0.38	0.38	0.37	0.43	0.37	0.38	0.37	0.36	0.37	0.41
Al_2O_3	7.62	7.81	7.83	7.70	7.60	7.83	7.83	7.76	7.63	7.57
Cr_2O_3	0.60	0.57	0.58	0.51	0.57	0.55	0.54	0.59	0.57	0.52
FeO	19.9	19.8	19.7	19.9	19.8	19.8	19.7	19.9	19.9	19.9
MnO	0.21	0.21	0.22	0.27	0.23	0.24	0.23	0.23	0.24	0.26
MgO	17.2	17.3	17.2	17.1	17.3	17.2	17.2	17.2	17.3	17.3
CaO	8.59	8.64	8.63	8.61	8.66	8.63	8.68	8.64	8.59	8.58

SiO_2	45.6	45.5	45.6	45.3	45.5	45.4	45.6	45.4	45.5	45.4
TiO_2	0.36	0.45	0.34	0.39	0.38	0.36	0.37	0.37	0.36	0.34
Al_2O_3	7.69	7.66	7.76	7.63	7.76	7.73	7.71	7.81	7.87	7.72
Cr_2O_3	0.54	0.55	0.55	0.56	0.53	0.57	0.53	0.53	0.53	0.57
FeO	19.8	19.9	19.8	20.0	19.9	19.9	19.8	19.9	19.8	19.9
MnO	0.25	0.23	0.22	0.27	0.18	0.24	0.19	0.26	0.20	0.24
MgO	17.1	17.1	17.1	17.2	17.0	17.1	17.1	17.1	17.1	17.1
CaO	8.69	8.66	8.65	8.65	8.71	8.71	8.76	8.69	8.74	8.70

SiO_2	45.5	45.5	45.4	45.4	45.5	45.4	45.5	45.4	45.5	45.5
TiO_2	0.38	0.36	0.41	0.40	0.38	0.35	0.38	0.37	0.38	0.37
Al_2O_3	7.87	7.86	7.70	7.74	7.82	7.77	7.75	7.65	7.81	7.86
Cr_2O_3	0.55	0.55	0.59	0.57	0.53	0.54	0.55	0.55	0.53	0.54
FeO	19.7	19.8	20.0	19.9	19.7	19.8	19.8	19.9	19.7	19.7
MnO	0.21	0.20	0.19	0.21	0.27	0.20	0.22	0.22	0.26	0.25
MgO	17.1	17.0	17.1	17.1	17.1	17.1	17.1	17.2	17.2	17.1
CaO	8.71	8.75	8.67	8.69	8.71	8.76	8.69	8.70	8.59	8.68

APPENDIX XIII (cont'd)

SiO_2	45.5	45.4	45.6	45.4	45.6	45.5	45.5	45.6	45.4	45.5
TiO_2	0.41	0.39	0.39	0.44	0.42	0.38	0.39	0.40	0.36	0.41
Al_2O_3	7.75	7.82	7.71	7.77	7.73	7.68	7.76	7.69	7.79	7.69
Cr_2O_3	0.60	0.55	0.55	0.58	0.60	0.60	0.57	0.52	0.54	0.54
FeO	19.7	19.9	19.7	19.8	19.8	19.8	19.8	19.7	19.8	19.7
MnO	0.21	0.25	0.21	0.23	0.22	0.21	0.26	0.24	0.25	0.17
MgO	17.2	17.1	17.1	17.2	17.1	17.2	17.1	17.2	17.2	17.3
CaO	8.67	8.62	8.74	8.66	8.60	8.66	8.65	8.70	8.67	8.66

SiO_2	45.6	45.7	45.6	45.6	45.6	45.7	45.5	45.6	45.6	45.6
TiO_2	0.43	0.37	0.37	0.39	0.42	0.40	0.34	0.38	0.41	0.36
Al_2O_3	7.73	7.69	7.82	7.75	7.74	7.72	7.69	7.91	7.90	7.63
Cr_2O_3	0.54	0.55	0.57	0.58	0.56	0.53	0.52	0.55	0.53	0.56
FeO	19.6	19.6	19.6	19.7	19.5	19.6	19.7	19.5	19.5	19.7
MnO	0.26	0.16	0.25	0.23	0.27	0.25	0.24	0.23	0.23	0.22
MgO	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.2	17.2	17.3
CaO	8.62	8.63	8.57	8.56	8.60	8.56	8.64	8.59	8.66	8.61

SiO_2	45.7	45.5	45.5	45.6	45.5	45.5	45.5	45.6	45.6	45.6
TiO_2	0.36	0.40	0.37	0.38	0.43	0.40	0.39	0.40	0.44	0.38
Al_2O_3	7.74	7.71	7.65	7.77	7.72	7.73	7.97	7.71	7.84	7.73
Cr_2O_3	0.53	0.52	0.58	0.52	0.59	0.55	0.56	0.57	0.57	0.60
FeO	19.6	19.7	19.8	19.7	19.8	19.7	19.5	19.6	19.4	19.6
MnO	0.20	0.20	0.25	0.23	0.29	0.20	0.17	0.25	0.21	0.21
MgO	17.3	17.4	17.4	17.2	17.1	17.3	17.2	17.4	17.3	17.4
CaO	8.59	8.58	8.52	8.67	8.56	8.61	8.70	8.58	8.62	8.56

APPENDIX XIII (cont'd)

SiO_2	45.7	45.5	45.6	45.7	45.6	45.6	45.6	45.4	45.7	45.6
TiO_2	0.37	0.39	0.39	0.36	0.38	0.39	0.43	0.37	0.36	0.41
Al_2O_3	7.78	7.66	7.83	7.77	7.74	7.70	7.90	7.64	7.82	7.58
Cr_2O_3	0.54	0.55	0.54	0.56	0.55	0.51	0.54	0.55	0.57	0.62
FeO	19.5	19.8	19.5	19.5	19.6	19.5	19.5	19.8	19.4	19.7
MnO	0.15	0.21	0.22	0.22	0.24	0.20	0.18	0.23	0.25	0.22
MgO	17.3	17.3	17.3	17.3	17.3	17.4	17.2	17.4	17.4	17.3
CaO	8.66	8.63	8.63	8.63	8.54	8.62	8.71	8.70	8.61	8.65

SiO_2	45.5	45.5	45.4	45.5	45.4	45.6	45.5	45.5	45.5	45.4
TiO_2	0.40	0.37	0.37	0.38	0.36	0.36	0.42	0.38	0.35	0.37
Al_2O_3	7.81	7.77	7.66	7.64	7.65	7.80	7.64	7.75	7.77	7.79
Cr_2O_3	0.54	0.53	0.54	0.59	0.56	0.55	0.62	0.58	0.58	0.55
FeO	19.7	19.6	19.8	19.8	19.9	19.6	19.8	19.9	19.8	19.8
MnO	0.22	0.25	0.15	0.26	0.20	0.19	0.27	0.23	0.20	0.22
MgO	17.2	17.3	17.4	17.3	17.4	17.2	17.2	17.1	17.1	17.2
CaO	8.69	8.64	8.68	8.61	8.60	8.72	8.61	8.64	8.70	8.68

SiO_2	45.5	45.3	45.5
TiO_2	0.36	0.37	0.40
Al_2O_3	7.81	7.70	7.64
Cr_2O_3	0.55	0.57	0.58
FeO	19.6	19.9	19.9
MnO	0.26	0.26	0.20
MgO	17.2	17.2	17.2
CaO	8.66	8.70	8.62

APPENDIX XIV

APOLLO 15 GREEN VOLCANIC GLASSES (GROUP D) analyzed in thin-section 15426,72. A minimum of four complete analyses were made of <u>each</u> glass to verify sample homogeneity and to improve analytical precision. Each column is an average of all analyses on a single glass.
Na_2O and K_2O were analyzed but not detected

SiO_2	45.2	45.0	45.3	45.1	45.0	44.8	44.9	45.3	45.0	45.1
TiO_2	0.38	0.44	0.36	0.41	0.39	0.41	0.49	0.41	0.42	0.37
Al_2O_3	7.60	7.42	7.46	7.46	7.53	7.42	7.52	7.53	7.34	7.39
Cr_2O_3	0.54	0.57	0.54	0.52	0.53	0.59	0.58	0.55	0.53	0.53
FeO	20.2	20.2	20.2	20.3	20.4	20.5	20.5	20.1	20.5	20.6
MnO	0.22	0.25	0.16	0.19	0.23	0.24	0.24	0.26	0.26	0.22
MgO	17.3	17.8	17.5	17.6	17.4	17.5	17.4	17.6	17.5	17.4
CaO	8.55	8.30	8.41	8.44	8.41	8.44	8.41	8.38	8.43	8.48

SiO_2	45.1	45.0	45.0	45.0	45.1	45.2	45.0	45.2	44.9	45.2
TiO_2	0.44	0.41	0.43	0.39	0.40	0.39	0.44	0.41	0.39	0.45
Al_2O_3	7.46	7.31	7.36	7.36	7.64	7.38	7.36	7.50	7.41	7.65
Cr_2O_3	0.57	0.52	0.54	0.54	0.54	0.54	0.49	0.56	0.61	0.55
FeO	20.3	20.5	20.3	20.5	20.3	20.2	20.5	20.3	20.5	20.0
MnO	0.26	0.25	0.23	0.22	0.18	0.22	0.23	0.21	0.26	0.20
MgO	17.5	17.7	18.0	17.7	17.4	17.7	17.7	17.4	17.5	17.5
CaO	8.39	8.39	8.23	8.41	8.47	8.35	8.32	8.50	8.45	8.43

SiO_2	45.2	45.0	45.1	45.1	45.1	45.1	45.2	45.1	45.3	45.1
TiO_2	0.40	0.42	0.44	0.37	0.38	0.40	0.39	0.40	0.42	0.39
Al_2O_3	7.48	7.41	7.50	7.63	7.29	7.68	7.61	7.43	7.46	7.34
Cr_2O_3	0.54	0.54	0.51	0.57	0.56	0.55	0.50	0.52	0.55	0.53
FeO	20.3	20.2	20.3	20.3	20.4	20.2	20.1	20.5	20.1	20.4
MnO	0.21	0.23	0.16	0.20	0.21	0.21	0.22	0.18	0.20	0.24
MgO	17.4	17.9	17.7	17.2	17.8	17.3	17.4	17.4	17.5	17.7
CaO	8.53	8.25	8.41	8.56	8.33	8.60	8.57	8.53	8.44	8.32

APPENDIX XIV (cont'd)

SiO_2	45.0	45.1	45.2	45.1	44.9	44.9	45.2	45.0	45.1	45.2
TiO_2	0.41	0.37	0.42	0.42	0.39	0.45	0.45	0.42	0.43	0.43
Al_2O_3	7.31	7.43	7.44	7.55	7.76	7.30	7.57	7.20	7.42	7.45
Cr_2O_3	0.54	0.54	0.56	0.55	0.53	0.58	0.55	0.55	0.53	0.53
FeO	20.5	20.5	20.2	20.2	20.2	20.5	20.0	20.5	20.4	20.2
MnO	0.22	0.24	0.24	0.20	0.21	0.24	0.29	0.19	0.20	0.20
MgO	17.7	17.3	17.5	17.4	17.5	17.6	17.6	17.9	17.5	17.6
CaO	8.33	8.57	8.45	8.56	8.47	8.45	8.38	8.23	8.45	8.39

SiO_2	45.1	45.2	44.9	44.9	45.0	45.2	45.1	45.2	44.8	45.2
TiO_2	0.41	0.36	0.45	0.45	0.44	0.37	0.44	0.38	0.43	0.42
Al_2O_3	7.40	7.49	7.48	7.27	7.37	7.55	7.37	7.58	7.38	7.42
Cr_2O_3	0.55	0.55	0.58	0.58	0.52	0.52	0.59	0.54	0.60	0.54
FeO	20.5	20.3	20.5	20.4	20.6	20.2	20.3	20.2	20.6	20.3
MnO	0.23	0.25	0.18	0.24	0.25	0.24	0.26	0.21	0.24	0.22
MgO	17.5	17.4	17.7	18.0	17.5	17.5	17.6	17.4	17.6	17.5
CaO	8.35	8.49	8.35	8.19	8.39	8.39	8.46	8.53	8.37	8.46

SiO_2	45.0	45.1	45.0	45.3	44.9	45.2	45.1	45.0	45.0	45.1
TiO_2	0.45	0.41	0.43	0.39	0.46	0.41	0.43	0.40	0.44	0.38
Al_2O_3	7.31	7.57	7.41	7.37	7.31	7.53	7.51	7.26	7.40	7.41
Cr_2O_3	0.57	0.50	0.57	0.53	0.54	0.50	0.56	0.56	0.59	0.53
FeO	20.4	20.3	20.5	20.5	20.5	20.3	20.2	20.7	20.4	20.4
MnO	0.20	0.25	0.23	0.18	0.22	0.20	0.22	0.19	0.25	0.24
MgO	17.9	17.4	17.4	17.4	17.8	17.4	17.6	17.5	17.5	17.5
CaO	8.23	8.50	8.49	8.39	8.26	8.47	8.42	8.45	8.44	8.47

APPENDIX XIV (cont'd)

SiO_2	45.1	45.1	45.1	45.0	45.0	45.0	45.0	45.3	45.0	45.2
TiO_2	0.38	0.41	0.41	0.43	0.45	0.41	0.43	0.38	0.45	0.43
Al_2O_3	7.56	7.29	7.32	7.34	7.31	7.23	7.54	7.58	7.35	7.46
Cr_2O_3	0.57	0.55	0.54	0.59	0.59	0.59	0.53	0.55	0.59	0.55
FeO	20.3	20.5	20.6	20.6	20.3	20.5	20.3	19.9	20.3	20.2
MnO	0.25	0.22	0.20	0.24	0.24	0.26	0.26	0.23	0.20	0.16
MgO	17.3	17.6	17.4	17.4	17.7	17.8	17.4	17.6	17.8	17.6
CaO	8.52	8.36	8.41	8.42	8.38	8.28	8.55	8.44	8.31	8.45

SiO_2	45.2	45.1	45.2	45.3	45.2	45.1	45.1	44.9	45.2	45.1
TiO_2	0.41	0.40	0.41	0.39	0.40	0.46	0.42	0.40	0.38	0.39
Al_2O_3	7.37	7.45	7.42	7.58	7.57	7.40	7.58	7.43	7.36	7.45
Cr_2O_3	0.52	0.55	0.50	0.52	0.49	0.53	0.58	0.51	0.56	0.56
FeO	20.2	20.3	20.2	20.0	20.2	20.2	20.1	20.4	20.2	20.2
MnO	0.16	0.26	0.26	0.25	0.21	0.21	0.21	0.25	0.21	0.22
MgO	17.7	17.6	17.6	17.5	17.5	17.6	17.5	17.8	17.8	17.8
CaO	8.39	8.38	8.42	8.47	8.52	8.48	8.45	8.40	8.30	8.27

SiO_2	45.1	45.2	45.2	45.1	45.3	45.2	45.1	45.2	45.1	45.1
TiO_2	0.43	0.38	0.38	0.40	0.41	0.42	0.41	0.43	0.42	0.47
Al_2O_3	7.39	7.44	7.43	7.39	7.48	7.32	7.53	7.33	7.33	7.56
Cr_2O_3	0.54	0.56	0.54	0.58	0.51	0.49	0.52	0.54	0.55	0.54
FeO	20.2	20.2	20.3	20.3	20.2	20.2	20.2	20.3	20.3	20.2
MnO	0.19	0.21	0.22	0.26	0.24	0.23	0.22	0.21	0.23	0.21
MgO	17.8	17.6	17.5	17.6	17.5	17.8	17.5	17.7	17.6	17.4
CaO	8.37	8.45	8.42	8.36	8.38	8.35	8.51	8.42	8.49	8.57

APPENDIX XIV (cont'd)

SiO_2	45.2	45.2	45.1	45.4	45.1	45.1	45.3	45.2	45.0	45.2
TiO_2	0.42	0.41	0.43	0.39	0.42	0.39	0.39	0.40	0.43	0.37
Al_2O_3	7.47	7.45	7.40	7.56	7.24	7.45	7.37	7.49	7.29	7.47
Cr_2O_3	0.56	0.57	0.53	0.52	0.54	0.58	0.57	0.59	0.58	0.57
FeO	20.3	20.1	20.3	19.8	20.5	20.3	20.3	20.2	20.4	20.1
MnO	0.24	0.26	0.18	0.29	0.22	0.21	0.21	0.23	0.21	0.26
MgO	17.3	17.6	17.7	17.6	17.7	17.5	17.5	17.5	17.7	17.5
CaO	8.52	8.41	8.34	8.43	8.31	8.53	8.46	8.47	8.39	8.44

SiO_2	45.1	45.1	45.1	45.2	45.1	45.0	45.0	45.2	45.3	45.1
TiO_2	0.38	0.39	0.39	0.37	0.41	0.37	0.42	0.40	0.39	0.42
Al_2O_3	7.34	7.39	7.46	7.38	7.21	7.23	7.24	7.31	7.40	7.34
Cr_2O_3	0.57	0.56	0.55	0.53	0.52	0.57	0.56	0.56	0.56	0.59
FeO	20.3	20.3	20.4	20.4	20.5	20.5	20.6	20.4	20.2	20.4
MnO	0.22	0.18	0.18	0.20	0.18	0.22	0.23	0.24	0.22	0.28
MgO	17.6	17.6	17.5	17.4	17.8	17.7	17.7	17.5	17.5	17.5
CaO	8.52	8.40	8.50	8.45	8.30	8.46	8.31	8.48	8.50	8.42

SiO_2	45.1	45.1	45.0	45.2	44.9	45.1	45.1	45.2	45.2	45.0
TiO_2	0.42	0.45	0.44	0.39	0.40	0.43	0.41	0.36	0.39	0.44
Al_2O_3	7.39	7.50	7.39	7.68	7.72	7.30	7.41	7.50	7.46	7.35
Cr_2O_3	0.51	0.55	0.57	0.52	0.53	0.55	0.58	0.55	0.58	0.55
FeO	20.4	20.2	20.4	20.1	20.5	20.4	20.2	20.3	20.3	20.4
MnO	0.24	0.19	0.21	0.27	0.22	0.26	0.19	0.25	0.17	0.24
MgO	17.2	17.6	17.6	17.4	17.6	17.6	17.8	17.3	17.4	17.7
CaO	8.65	8.38	8.46	8.50	8.40	8.44	8.35	8.52	8.45	8.28

APPENDIX XIV (cont'd)

SiO_2	45.2	45.0	45.4	45.1	44.9	45.1	45.0	45.0	45.0	45.0
TiO_2	0.37	0.44	0.44	0.42	0.43	0.43	0.39	0.41	0.41	0.46
Al_2O_3	7.42	7.46	7.42	7.35	7.43	7.42	7.51	7.46	7.33	7.43
Cr_2O_3	0.52	0.53	0.53	0.54	0.57	0.51	0.57	0.54	0.55	0.57
FeO	20.2	20.3	20.0	20.3	20.5	20.3	20.4	20.3	20.4	20.2
MnO	0.20	0.22	0.18	0.24	0.23	0.20	0.24	0.25	0.21	0.23
MgO	17.6	17.7	17.7	17.7	17.7	17.5	17.5	17.6	17.8	17.7
CaO	8.45	8.41	8.43	8.32	8.32	8.55	8.50	8.44	8.30	8.41

SiO_2	45.2	45.2	44.9	45.1	45.0	45.2	45.0	45.0	44.9	45.0
TiO_2	0.39	0.40	0.40	0.45	0.44	0.40	0.41	0.39	0.41	0.46
Al_2O_3	7.42	7.39	7.47	7.42	7.46	7.23	7.58	7.32	7.37	7.44
Cr_2O_3	0.54	0.54	0.55	0.52	0.59	0.50	0.53	0.53	0.50	0.57
FeO	20.3	20.3	20.4	20.4	20.2	20.4	20.2	20.4	20.5	20.1
MnO	0.14	0.21	0.26	0.23	0.26	0.28	0.21	0.21	0.23	0.29
MgO	17.6	17.6	17.5	17.4	17.6	17.7	17.7	17.8	17.6	17.8
CaO	8.34	8.44	8.43	8.51	8.41	8.31	8.37	8.36	8.46	8.30

SiO_2	45.0	45.2	45.3	45.2	45.2	45.0	45.1	45.1	45.1	45.2
TiO_2	0.42	0.42	0.37	0.36	0.39	0.51	0.40	0.38	0.40	0.46
Al_2O_3	7.40	7.51	7.50	7.49	7.43	7.47	7.57	7.40	7.31	7.60
Cr_2O_3	0.54	0.55	0.55	0.49	0.52	0.54	0.55	0.55	0.49	0.54
FeO	20.4	20.3	20.2	20.2	20.3	20.3	20.3	20.5	20.5	20.0
MnO	0.24	0.24	0.19	0.21	0.23	0.20	0.26	0.17	0.23	0.23
MgO	17.7	17.3	17.5	17.5	17.5	17.5	17.4	17.4	17.7	17.5
CaO	8.38	8.51	8.43	8.49	8.44	8.48	8.53	8.53	8.35	8.47

APPENDIX XIV (cont'd)

SiO_2	45.1	45.1	45.1	45.0	45.2	45.2	45.2	45.0	45.0	45.0
TiO_2	0.42	0.38	0.42	0.42	0.42	0.41	0.38	0.42	0.37	0.40
Al_2O_3	7.50	7.63	7.53	7.39	7.49	7.47	7.48	7.60	7.33	7.25
Cr_2O_3	0.57	0.57	0.56	0.52	0.58	0.57	0.53	0.56	0.53	0.55
FeO	20.4	20.2	20.3	20.5	20.2	20.1	20.3	20.3	20.6	20.3
MnO	0.17	0.19	0.21	0.24	0.23	0.20	0.23	0.18	0.26	0.20
MgO	17.4	17.3	17.4	17.5	17.5	17.6	17.5	17.5	17.5	18.0
CaO	8.47	8.62	8.55	8.44	8.42	8.38	8.43	8.43	8.46	8.28

APPENDIX XV

APOLLO 15 GREEN VOLCANIC GLASSES (Group E) analyzed in thin-section 15426,72. A minimum of four complete analyses were made of <u>each</u> glass to verify sample homogeneity and to improve analytical precision. Each column is an average of all analyses on a single glass. Na_2O and K_2O were analyzed but not detected.

SiO_2	45.3	45.3	45.1	45.1	45.3	45.2	45.2	45.2	45.2	45.4
TiO_2	0.41	0.42	0.39	0.45	0.46	0.42	0.46	0.46	0.43	0.41
Al_2O_3	7.51	7.62	7.49	7.26	7.42	7.36	7.39	7.44	7.43	7.47
Cr_2O_3	0.49	0.56	0.50	0.58	0.55	0.54	0.55	0.56	0.57	0.53
FeO	19.9	19.6	20.0	19.9	19.4	20.0	19.7	19.7	19.6	19.8
MnO	0.14	0.22	0.20	0.26	0.24	0.26	0.19	0.25	0.21	0.20
MgO	18.1	18.1	18.3	18.4	18.6	18.0	18.4	18.2	18.5	18.0
CaO	8.16	8.24	8.12	8.08	8.06	8.27	8.09	8.18	8.10	8.21

SiO_2	45.2	45.2	45.3	45.2	45.3	45.1
TiO_2	0.47	0.37	0.43	0.42	0.42	0.42
Al_2O_3	7.30	7.44	7.54	7.42	7.48	7.40
Cr_2O_3	0.54	0.54	0.52	0.56	0.52	0.52
FeO	19.9	19.5	19.5	20.0	19.9	20.0
MnO	0.18	0.24	0.21	0.22	0.21	0.21
MgO	18.2	18.6	18.4	18.2	18.1	18.2
CaO	8.16	8.05	8.12	8.15	8.20	8.17