

Table 1

Sample List

81-IR-4.....	Sedimentary inclusion in syenite
81-IR-5.....	Amphibole jacupirangite inclusion in nepheline syenite
81-IR-6.....	Biotite melteigite
81-IR-8.....	Biotite ijolite
81-IR-9.....	Urtite
81-IR-12.....	Amphibole foyaite
81-IR-13A,B.....	Nepheline syenite
81-IR-13C.....	Sodalite-fluorite syenite
81-IR-15.....	Natrolite-aegirine contact rock
81-IR-16.....	Amphibole melteigite
82-IR-2.....	Cancrinite vien in ultramafic regolith
82-IR-5.....	Amphibole foyaite
82-IR-6.....	Nepheline syenite dike with rinkite and diopside inclusions
82-IR-8.....	Amphibole foyaite
82-IR-10.....	Lamprophyre dike
82-IR-11.....	Syenite breccia
82-IR-12.....	Foyaite with ijolite inclusions
82-IR-13.....	Syenite dike with rinkite
82-IR-14.....	Lamprophyre dike
82-IR-15.....	Isotropic ijolite
82-IR-16.....	Biotite ijolite
82-IR-17.....	Homogeneous ijolite

Table 1 continued

82-IR-18,19,20.....	Pegmatitic ijolite
82-IR-21,22,23,24.....	Homogeneous ijolite
82-IR-25.....	Urtite pod
82-IR-26.....	Sphene and feldspar bearing ijolite
82-MC-1A.....	Feldspar pegmatite contact rock beneath jacupirangite
82-MC-1B,C.....	Jacupirangite breccia in syenite
82-MC-2A.....	Amphibole foyaite
82-MC-2B.....	Fine grained syenite dike
82-MC-3.....	Sphene and feldspar bearing ijolite
82-MC-4.....	Syenite breccia
82-MC-5.....	Sodalite-aegirine syenite
83-IR-2A,B.....	Natrolite-aegirine layer in biotite ijolite
83-IR-3.....	Silicocarbonatite dike
83-IR-4.....	Calcite segregation in silicocarbonatite
83-IR-5.....	Silicocarbonatite with abundant perovskite
83-IR-6.....	Syenite with albite-calcite carbonatite
83-IR-7.....	Ocellar amphibole jacupirangite
83-IR-13.....	Natrolite-aegirine segregation
83-IR-15.....	Buff weathering carbonatite
83-IR-16.....	Red weathering carbonatite
83-IR-17.....	Urtite pegmatite with radiating apatite

Table 2

Magnetite Analyses

	81-IR-6 core	81-IR-6 edge	82-MC-1C	82-IR-23
SiO_2	0.00	0.00	0.00	0.00
TiO_2	16.43	9.02	13.54	16.59
Al_2O_3	1.70	0.80	1.56	0.11
FeO	76.09	83.82	77.76	77.04
MnO	1.35	0.65	1.22	1.77
MgO	0.11	0.06	0.36	0.16
CaO	0.01	0.14	0.01	0.01
Na_2O	0.00	0.00	0.00	0.00
SUM	95.68	94.49	94.44	95.68

All Fe reported as FeO.

Table 3

Magnetite Analyses
Corrected for Fe_2O_3

	81-IR-6 core	81-IR-6 edge	82-MC-1C	82-IR-23
SiO_2	0.00	0.00	0.00	0.00
TiO_2	16.43	9.02	13.54	16.59
Al_2O_3	1.70	0.80	1.56	0.11
Fe_2O_3	34.75	50.35	40.14	36.46
FeO	44.82	38.50	41.63	44.23
MnO	1.35	0.65	1.22	1.77
MgO	0.11	0.06	0.36	0.16
CaO	0.01	0.14	0.01	0.01
Na_2O	0.00	0.00	0.00	0.00
SUM	99.15	99.52	98.45	99.32
Fe_3O_4	0.495	0.723	0.358	0.442
Fe_2TiO_4	0.443	0.244	0.576	0.522
SUM	0.938	0.967	0.934	0.964

Table 4

Perovskite Analyses

	81-IR-6	82-IR-23	82-MC-1C
SiO_2	0.00	0.00	0.00
TiO_2	58.24	52.83	56.57
Al_2O_3	0.29	0.13	0.19
FeO	1.27	1.31	0.56
MnO	0.09	0.07	0.05
MgO	0.02	0.03	0.02
CaO	33.46	34.01	35.46
Na_2O	0.85	1.02	0.18
SUM	94.22	89.40	93.33

All Fe reported as FeO.

Table 4 continued

Perovskite Analyses

	82-IR-18 Opaque var. core	82-IR-18 Opaque var. edge	82-IR-18 Translucent var.
SiO_2	0.00	0.00	0.00
TiO_2	53.74	56.45	56.01
Al_2O_3	0.24	0.10	0.14
FeO	1.22	0.97	1.07
MnO	0.06	0.05	0.06
CaO	33.04	35.00	34.93
Na_2O	0.72	0.45	0.42
SUM	89.05	93.04	92.66

All Fe reported as FeO.

Table 5

Garnet Analyses

	81-IR-6 Andradite in pectolite vug	81-IR-6 Grossular with melanite	81-IR-6 Melanite with grossular	81-IR-13 <i>Andradite - Almandine - Grossular sol'n</i>
SiO ₂	37.85	39.08	37.62	38.19
TiO ₂	1.25	0.98	3.82	1.30
Al ₂ O ₃	6.88	16.80	12.78	9.53
FeO	19.27	7.28	9.15	33.22
MnO	0.27	0.28	0.18	1.31
MgO	0.03	0.05	0.73	0.37
CaO	33.91	35.76	35.06	9.35
Na ₂ O	0.00	0.00	0.00	2.94
SUM	99.46	100.23	99.34	96.21

All Fe reported as FeO.

Table 5 continued

Garnet Analyses

	81-IR-6 Melanite	82-IR-17 Schorlomite	82-IR-21 Schorlomite
SiO ₂	36.19	27.59	29.15
TiO ₂	6.27	18.54	16.97
Al ₂ O ₃	9.72	1.31	1.28
FeO	12.43	18.24	19.09
MnO	0.21	0.41	0.42
MgO	0.85	0.89	0.64
CaO	33.97	31.73	30.61
Na ₂ O	0.00	0.18	0.15
SUM	99.58	98.89	98.31

All Fe reported as FeO.

Table 6

Melanite and Schorlomite Structural Formulae

	<u>Cations normalized to eight</u>		
	<u>81-IR-6</u>	<u>82-IR-17</u>	<u>82-IR-23</u>
Si	2.95	2.43	2.45
Ti	0.27	1.09	0.99
Al	0.34	0.07	0.04
Fe	1.42	1.37	1.41
Mn	0.01	0.04	0.03
Mg	0.01	0.11	0.07
Ca	3.00	2.80	2.98
Na	0.00	0.02	0.02

Site distributions (following page) are
 patterned after those determined by
 Huggins et al (1981).

Table 6 continued

Melanite and Schorlomite Structural Formulae

	<u>81-IR-6</u>	<u>82-IR-17</u>	<u>82-IR-23</u>
Tetrahedral cations			
Si	2.95	2.43	2.45
Fe ³⁺	0.05	0.21	0.13
Fe ²⁺	0.00	0.12	0.08
Al + Ti	0.00	0.22	0.34
Octahedral cations			
Fe ³⁺	1.20	0.87	1.15
Al + Ti	0.61	0.94	0.69
Fe ²⁺	0.18	0.19	0.08
Mg	0.01	0.00	0.01
Ca	0.00	0.00	0.00
Dodecahedral cations			
Mg	0.00	0.11	0.00
Fe ²⁺	0.00	0.03	0.00
Mn	0.00	0.04	0.02
Ca	3.00	2.80	2.98
Na	0.00	0.02	0.00

Table 7

Biotite Analyses

	81-IR-6	82-IR-21
SiO ₂	34.58	36.58
TiO ₂	2.65	1.95
Al ₂ O ₃	15.54	12.61
FeO	14.99	23.08
MgO	15.72	11.66
CaO	0.00	0.14
Na ₂ O	0.28	0.26
K ₂ O	8.92	8.72
SUM	92.68	94.50

All Fe reported as FeO.

Table 8

Pyroxene Analyses

	81-IR-6 core	81-IR-6 edge	81-IR-6 Diopside with melanite	82-IR-17
SiO ₂	45.75	47.68	53.15	51.20
TiO ₂	3.34	1.91	0.24	1.46
Al ₂ O ₃	6.98	4.82	1.36	2.60
FeO	8.20	8.67	3.62	8.73
MnO	0.19	0.19	0.18	0.27
MgO	11.22	11.71	16.23	12.05
CaO	23.84	23.95	25.10	24.69
Na ₂ O	0.51	0.47	0.13	0.59
SUM	100.02	99.40	100.01	101.59

All Fe reported as FeO.

Table 8 continued

Pyroxene Analyses

	82-IR-18 core	82-IR-18 edge	82-IR-23 core	82-IR-23 edge
SiO ₂	47.01	48.73	50.21	50.80
TiO ₂	2.66	1.70	0.64	0.42
Al ₂ O ₃	5.69	3.87	1.11	0.80
FeO	8.55	9.25	14.31	15.50
MnO	0.22	0.33	0.50	0.60
MgO	11.75	11.53	9.05	8.17
CaO	24.05	24.12	23.18	22.93
Na ₂ O	0.57	0.54	0.81	0.81
SUM	100.49	100.07	99.80	99.98

All Fe reported as FeO.

Table 8 continued

Pyroxene Analyses

	82-MC-1C	82-MC-1C containing exsolved ilmenite	82-MC-3	81-IR-16
SiO_2	41.57	42.12	47.75	45.54
TiO_2	4.50	4.99	1.34	2.73
Al_2O_3	9.72	8.94	3.35	6.09
FeO	9.35	9.06	15.22	10.56
MnO	0.25	0.31	0.59	0.30
MgO	9.94	10.79	7.69	9.95
CaO	23.23	22.49	21.82	22.68
Na_2O	0.46	0.43	1.25	0.98
SUM	99.02	99.13	99.01	98.83

All Fe reported as FeO.

Table 8 continued

Pyroxene Analyses

	81-IR-5	81-IR-13A	83-IR-3 Aegirine in calcite
SiO ₂	45.98	48.20	53.94
TiO ₂	1.67	0.48	0.07
Al ₂ O ₃	5.69	1.48	2.90
FeO	15.98	26.55	27.25
MnO	0.10	1.70	0.04
MgO	6.82	0.54	0.02
CaO	22.10	18.64	0.45
Na ₂ O	0.98	2.20	12.78
SUM	99.21	99.79	97.43

All Fe reported as FeO.

Table 9

Pyroxene Formulae

Cations normalized to four

	81-IR-6 core	81-IR-6 edge	81-IR-6 Diopside with melanite	82-IR-17
Si	1.71	1.80	1.94	1.89
Ti	0.09	0.05	0.01	0.04
Al	0.31	0.21	0.06	0.11
Fe ³⁺	0.04	0.04	0.02	0.02
Fe ²⁺	0.22	0.23	0.09	0.25
Mn	0.01	0.01	0.01	0.01
Mg	0.63	0.66	0.88	0.66
Ca	0.96	0.97	0.98	0.98
Na	0.04	0.03	0.01	0.04

En	0.08	0.07	0.04	0.00
Di	0.52	0.56	0.82	0.66
He	0.21	0.22	0.09	0.24
Ac	0.04	0.03	0.01	0.02
CaTiAl ₂ O ₆	0.09	0.05	0.01	0.04

Table 9 continued

Pyroxene Formulae

Cations normalized to four

	82-IR-18	82-IR-18	82-IR-23	82-IR-23
	core	edge	core	edge
Si	1.75	1.83	1.93	1.96
Ti	0.07	0.05	0.02	0.01
Al	0.25	0.17	0.05	0.04
Fe ³⁺	0.05	0.04	0.04	0.03
Fe ²⁺	0.22	0.25	0.42	0.47
Mn	0.01	0.01	0.02	0.02
Mg	0.65	0.64	0.52	0.47
Ca	0.96	0.97	0.95	0.95
Na	0.04	0.04	0.06	0.06

En	0.08	0.05	0.00	0.00
Di	0.54	0.58	0.51	0.46
He	0.21	0.24	0.42	0.47
Ac	0.04	0.04	0.02	0.02
CaTiAl ₂ O ₆	0.07	0.05	0.02	0.01

Table 9 continued

Pyroxene Formulae

Cations normalized to four

	82-MC-1C	82-MC-1C containing exsolved ilmenite	82-MC-3
Si	1.58	1.60	1.85
Ti	0.13	0.14	0.04
Al	0.44	0.40	0.15
Fe ³⁺	0.06	0.05	0.05
Fe ²⁺	0.24	0.24	0.44
Mn	0.01	0.01	0.02
Mg	0.56	0.61	0.44
Ca	0.95	0.92	0.91
Na	0.03	0.03	0.09
En	0.13	0.17	0.05
Di	0.39	0.38	0.38
He	0.22	0.22	0.42
Ac	0.03	0.03	0.05
CaTiAl ₂ O ₆	0.12	0.13	0.04

Table 10

Amphibole Analyses

	81-IR-16	81-IR-5 in syenite	81-IR-5 in jacupirangite inclusion
SiO_2	37.40	37.14	37.39
TiO_2	5.42	2.96	2.64
Al_2O_3	12.46	13.07	13.02
FeO	17.04	22.50	21.69
MnO	0.30	0.25	0.32
MgO	8.63	5.77	6.55
CaO	11.52	11.14	11.20
Na_2O	2.19	2.02	1.95
SUM	96.96	94.85	94.76

All Fe reported as FeO.

Table 9 continued

Pyroxene Formulae

Cations normalized to four

	81-IR-16	81-IR-5
Si	1.72	1.77
Ti	0.09	0.06
Al	0.31	0.27
Fe ³⁺	0.04	0.05
Fe ²⁺	0.21	0.44
Mn	0.01	0.01
Mg	0.63	0.41
Ca	0.93	0.92
Na	0.06	0.07

En	0.09	0.10
Di	0.51	0.29
He	0.20	0.42
Ac	0.04	0.05
CaTiAl ₂ O ₆	0.09	0.05

Table 11

Nepheline Analyses

	81-IR-6	82-MC-1C	81-IR-5
SiO ₂	41.01	41.99	43.53
TiO ₂	0.00	0.01	0.00
Al ₂ O ₃	35.24	35.02	33.66
FeO	0.05	0.09	0.02
MgO	0.00	0.00	0.00
CaO	0.02	1.97	0.02
Na ₂ O	16.44	15.34	16.08
K ₂ O	7.21	5.55	6.64
SUM	99.97	99.95	99.93
NaAlSiO ₄	0.77	0.71	0.72
KAlSiO ₄	0.22	0.17	0.19
SiO ₂	0.00	0.12	0.09
Al ₂ O ₃	0.01	0.00	0.00

The stoichiometry of 82-MC-1C was corrected
for CaAl(AlO₄).

Table 12

Miscellaneous Analyses

	82-IR-6	81-IR-6	83-IR-3	83-IR-3
	Rinkite	Pectolite	Berthierine	Calcite
SiO_2	33.52	53.57	26.15	0.00
TiO_2	11.91	0.03	0.12	0.00
Al_2O_3	0.16	0.37	13.70	0.00
FeO	0.31	0.17	38.82	0.74
MnO	0.13	0.11	0.59	2.30
MgO	0.05	0.00	7.53	0.02
CaO	39.05	33.35	0.16	50.03
Na_2O	6.60	9.42	0.00	0.00
SUM	91.72	97.02	87.07	53.09

Table 13

Densities of Selected Samples

Sample	Density (g/cm ³)
81-IR-12 Foyaite	2.93
81-IR-13A Nepheline syenite	2.61
82-IR-17 Ijolite	3.00
82-IR-19 Pegmatitic ijolite	2.97