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Chemical compositions of the constituent minerals of the Kyrghyzstan high–P and ultrahigh–P metamorphic rocks

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Abstract

High–pressure and ultrahigh–pressure metamorphic rocks have been collected from three districts located in the Tien–Shan Mountains, Kyrghyzstan: the Aktyuz, Atbashy and Makbal districts. All of them have suffered high–pressure metamorphism, and one of them, has experienced ultrahigh–pressure conditions. Chemical compositions of the constituent minerals from the metamorphic rocks in these localities are provided in this paper.

Key words: Tien–Shan Mountains, Kyrghyzstan, high–pressure and ultrahigh–pressure (UHP) metamorphism, chemical composition, garnet, clinopyroxene, white mica, amphibole, plagioclase, epidote, chloritoid, talc.

Geological setting

High–pressure and ultrahigh–pressure (UHP) metamorphic rocks collected from three different districts in Kyrghyzstan have been examined. These localities are located in the Tien–Shan Mountains, and these areas have been described as high–pressure and ultrahigh–pressure terranes. These localities have been subdivided into two zones: the Northern Tien–Shan zone, where the Aktyuz and Makbal districts are located, and the Southern Tien–Shan zone, where the Atbashy district is situated (Fig. 1). The former has been identified as a Caledonian orogenic belt, and the latter probably belongs to the Hercynean fold belt (Bakirov, 1978, 1989; Sobolev et al., 1986; Tagiri and Bakirov, 1990).

The major metamorphic rock types in the Aktyuz district are eclogites (Grt+Omp+Qz), amphibolites (Grt +Hbl+Bt+Ab+Qz) and pelitic schists (Grt+Ab+Qz+ Phg), whereas in the Atbashy area, pelitic schists (Grt +Ep+Phg+Qz), glaucophane schists (Grt+Glp+Ep+Phg +Qz±Omp) and eclogites (Grt+Omp+Phg+Glp+Ep+ Qz) are the predominant lithologies. The discrimination between glaucophane schists and eclogites is based on the modal composition of the constituent minerals such as omphacite and garnet. A transitional change between both lithologies is suggested. The Makbal district is characterized by the occurrence of pelitic schists (Grt+Phg+Bt+Qz), glaucophane schists (Grt+ Glp+white mica+Qz+Ep) and eclogites (Grt+Omp+Phg +Qz±Glp±Ep). Pseudomorphs after coesite have been described as inclusions within garnet in Grt–Chld–Talc schists (Grt+Chld+Talc+Phg+Qz), suggesting UHP conditions (Tagiri and Bakirov, 1990).

The three districts studied in this work have suffered high–pressure metamorphism. However, the P–T path

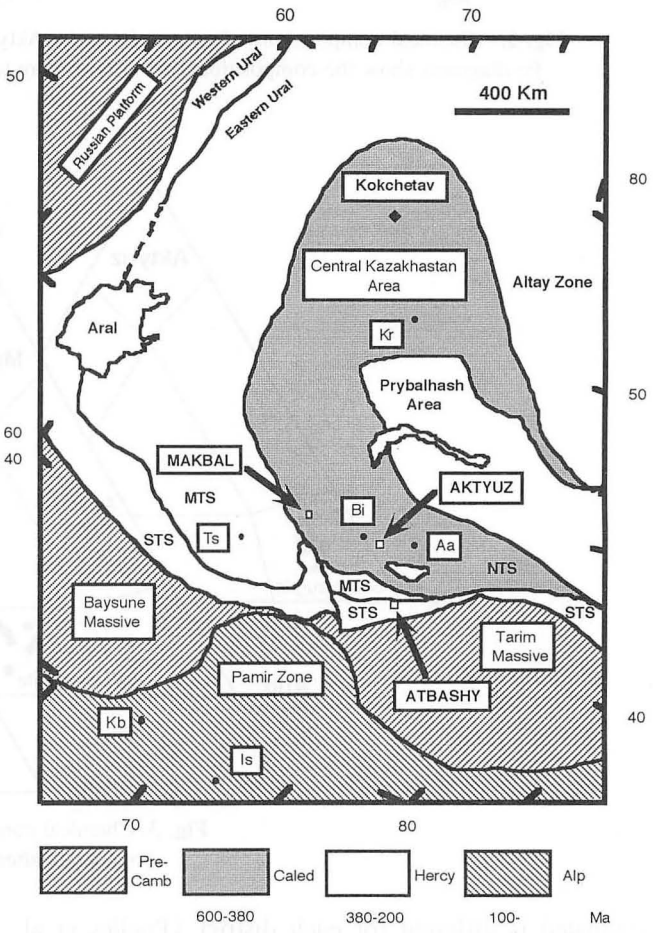

Fig. 1. Generalized tectonic division of the Tien–Shan Mountains (Tagiri and Bakirov, 1990). NTS: Northern Tien–Shan, MTS: Middle Tien–Shan Zone, STS: Southern Tien–Shan Zone, Aa: Alma–Ata, Bi: Bishkek, Is: Islamabad, Kb: Kabul, Kr: Karaganda, Ts: Tashkent.

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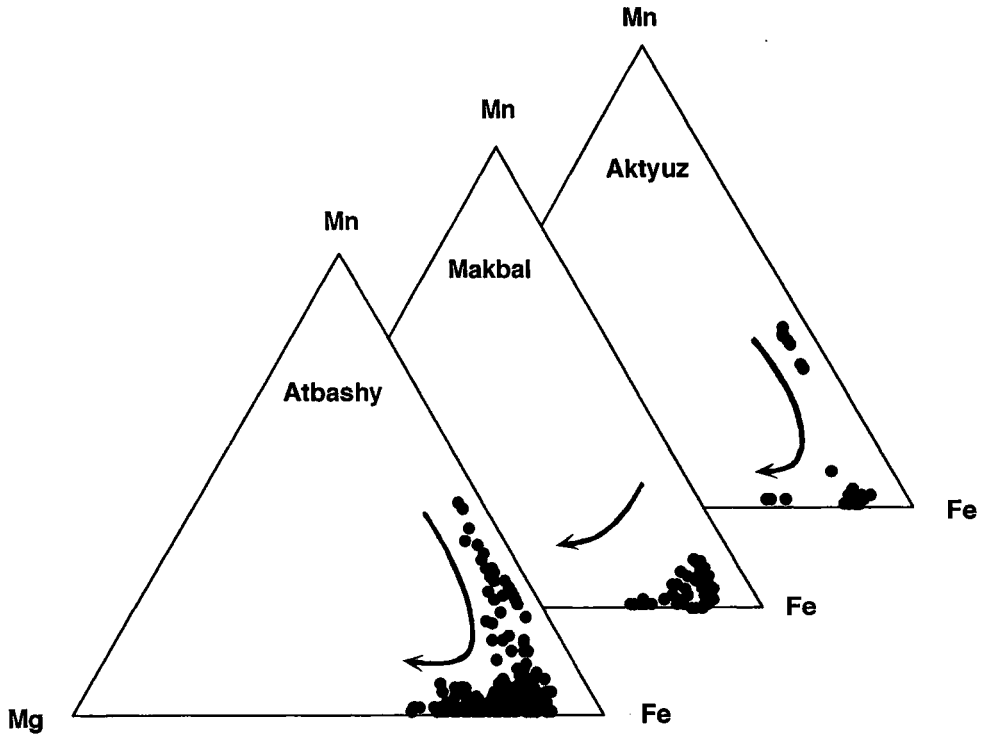


Fig. 2. Chemical compositions of garnets from the Aktyuz, Makbal and Atbashy districts . Arrows in the Mn–Mg–Fe diagrams show the compositional trend from core to rim.

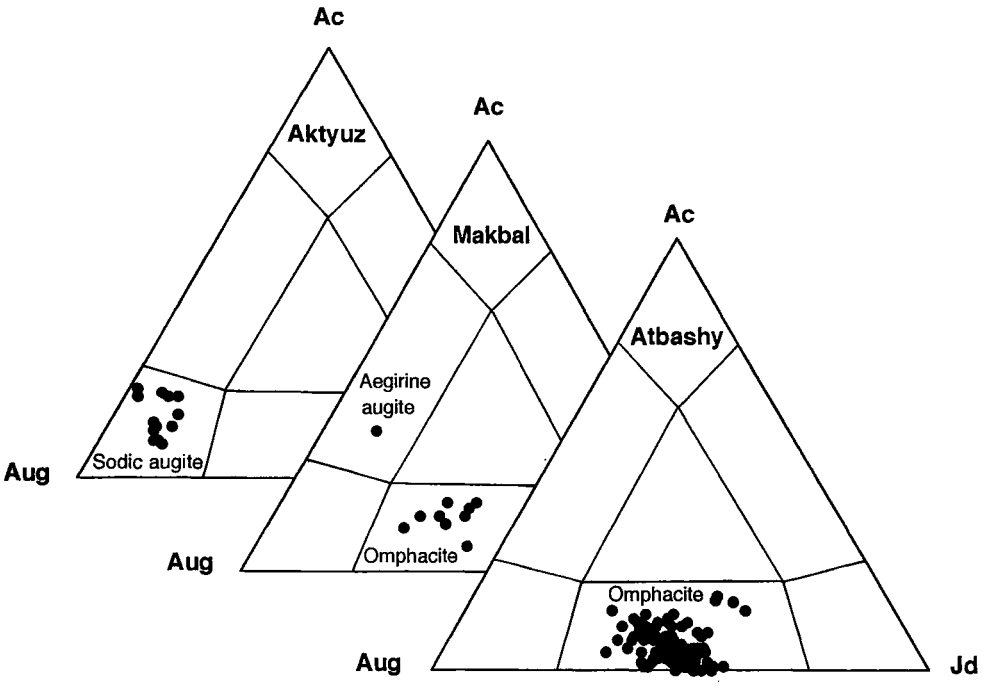
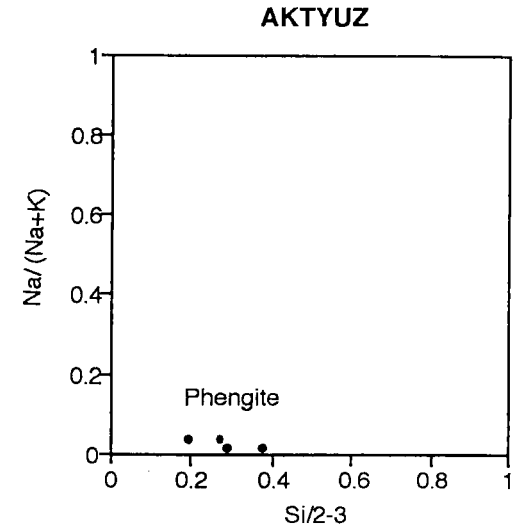
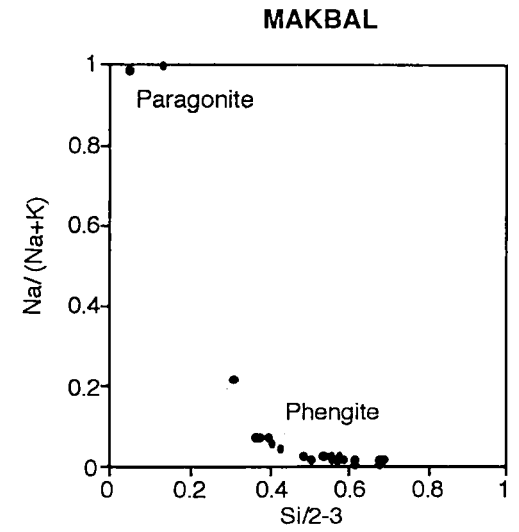


Fig. 3. Chemical compositions of clinopyroxenes (boundaries after Essene and Fyfe, 1967).

estimated is different for each district (Puelles et al., 1996). With respect to the Aktyuz district, an anti-clockwise P–T path can be described, evolving from the amphibolite facies through the eclogitic stability field to the epidote–amphibolite facies conditions. On the contrary, a clockwise P–T path can be ascribed to the Atbashy district, coming from the glaucophane schist through the eclogite to the epidote–amphibolite facies. Regarding the Makbal district, on the basis of the presence of a pseudomorph after coesite in garnet from a Grt–Chld–Tlc schist, UHP conditions must be considered.





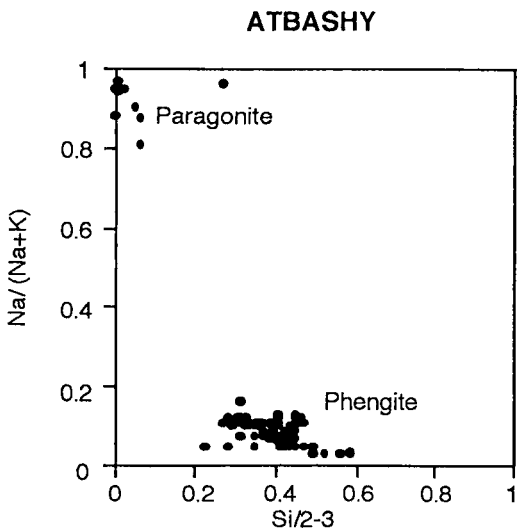
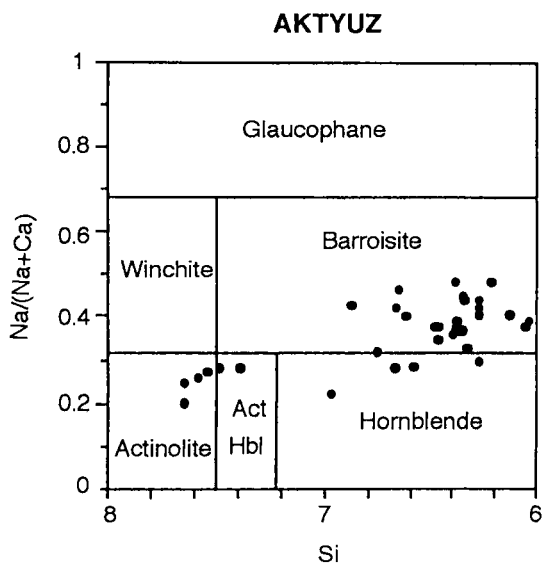
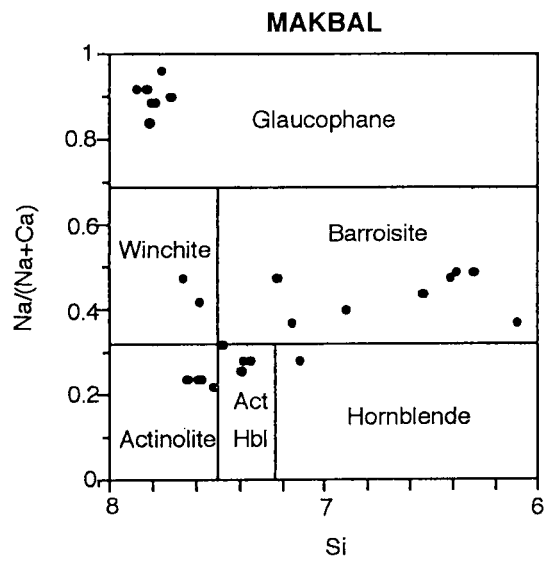


Fig. 4. Chemical compositions of white micas. Plot of Si /2–3 versus Na/(Na+K).





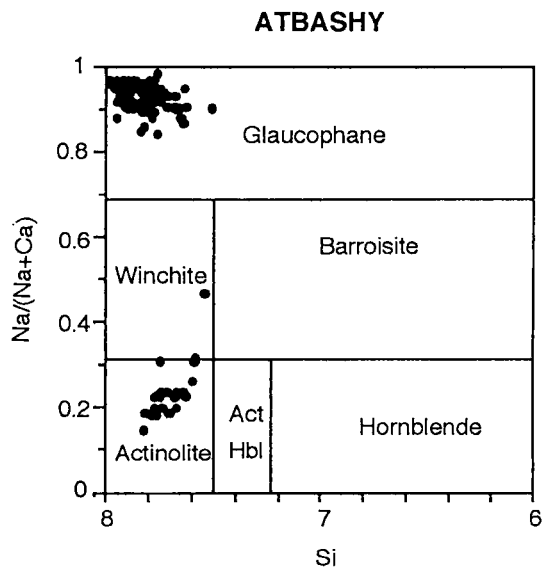


Fig. 5. Chemical compositions of amphiboles. Plot of Si versus Na/(Na+Ca).

Analytical procedure

Chemical compositions of minerals were determined by electron probe microanalyser (JEOL JXA-8800M) at the Research Center for Coastal Lagoon Environments, Shimane University. The accelerating voltage and specimen current are 15 kV and 2×10^{-8}A respectively. Correction procedures are after Bence and Albee (1968).

Chemical compositions

Chemical compositions of garnet, clinopyroxene, white mica, amphibole, plagioclase, epidote, chloritoid and talc are shown in Tables 1–5. These minerals are regarded as the main constituent minerals in the samples from the three districts described above.

1. Garnet

Garnet always shows almandine-rich compositions (Table 1, Fig. 2). In the Aktyuz district, normal zoning patterns have been found, with maximum Mn contents of X_{Mn}=0.37 in the core, decreasing towards the rim. With respect to the Makbal district, more homogeneous compositions can be observed, showing a lower Mn-content than those from the Aktyuz and Atbashy districts. The maximun X_{Mn}, X_{Mg} and X_{Fe} contents are 0.11, 0.26 and 0.90 respectively . Regarding the Atbashy district, not only reverse and normal zoned garnets have been found, but distinct sector zoned structures as well. The compositional range for the Atbashy garnets is wider than that of the Aktyuz and Makbal areas, varying from $Mn_{0.46}$ $Mg_{0.04}$ $Fe_{0.49}$ to $Mn_{0.01}$ $Mg_{0.36}$ $Fe_{0.63}$.

2. Clinopyroxene

Sodic augite is the clinopyroxene present in the eclogites from the Aktyuz area (Table 2, Fig. 3). It appears forming part of symplectitic aggregates after omphacite. In the Makbal area, all the clinopyroxenes analyzed display omphacitic compositions, except for one inclusion of aegirine-augite within garnet in a glaucophane schist. As far as the Atbashy district all the clinopyroxenes belong to the omphacite field.

3. White mica

White mica is phengite, when it occurs in the matrix of the rocks in the Aktyuz and Atbashy districts (Table 3, Fig. 4). It shows paragonite compositions when it appears as inclusions within garnet in the Atbashy district, and it rarely occurs in the matrix of glaucophane schists from the Makbal district. The Si content of the phengites from the Makbal district, is up to 7.39 on the basis of 22 oxygens.

4. Amphiboles

In the Aktyuz district, tschermackitic hornblende (Leake, 1978) is the main amphibole in amphibolites (Table 4, Fig. 5). Pargasite appears as inclusions within garnet, and hastingsite occurs in the symplectitic aggregates after omphacite in eclogites. Compositional variations from glaucophane in the core to winchite or actinolite at the rim are common in the amphiboles from the Atbashy district. In the Makbal district, a compositional zoning from crossite in the core through winchite in the mantle to barroisite at the rim has been observed.

5. Other minerals

Plagioclase is always identified as albite (An_{0-14}) in the three districts, except for some oligoclase inclusions (An_{20}) within garnet in an Aktyuz eclogite, representing a pre-eclogitic mineral assemblage (Table 5). Epidote, chloritoid and talc do not display significant compositional variations.

References

Bakirov, A., 1989, The peculiarities of the compositions and conditions of the formation of the Tien-Shan eclogite-bearing metamorphic complexes. In *Crystal Crust in Space and Time-metamorphic and hydrothermal processes*: Eds. V. A. Zharikov and V. I. Fonarev, Moscow, Nauka, 193–203.

Bence, A.E. and Albee, A.L., 1964, Empirical correction factors for the electron micro-analysis of silicates and oxides. *Jour. Geol.*, **76**, 382–403.

Leake, B.E., 1978, Nomenclature of amphiboles. *American Mineralogist,* Vol. **63**, 1023–1052.

Puelles, P., Takasu, A. and Kyrghyzstan Research Group, High-pressure and ultrahigh-pressure metamorphic rocks in Kyrghyzstan. *Abstract 30th International Geological Congress, Vol.* **2**, 602.

Sobolev, N.V., Dobrezov, N.L., Bakirov, A.B. and Shatsky, V.S., 1986, Eclogites from various types of metamorphic complexes in the USSR and the problems of their origin. *Geol. Soc. America, Memoir,* **164**, 349–363.

Tagiri, M. and Bakirov, A., 1990, Quartz pseudomorph after coesite in garnet-chloritoid-talc schist, Northern Tien-Shan, Kirghiz, USSR. *Proc. Japan Acad, 66, Ser. B,* 135–139.

（要　旨）

Puelles, P.・高須　晃, 1996, キルギス共和国高圧・超高圧変成岩中の変成鉱物の化学組成, 島根大学地球資源環境学研究報告, 15, 115–135.

キルギス共和国，天山山脈の Aktyuz，Atbashy，Makbal の 3 つの異った地域から超高圧－高圧変成岩が採集された．これらの岩石は，いずれも高圧型変成作用を受けている．そして，Makbal のものは超高圧変成作用を経ている．これらの 3 地域の変成岩の構成鉱物（ざくろ石，単斜輝石，白色雲母，角閃石，斜長石，緑れん石，クロリトイド滑石）の EPMA 分析による化学組成を示した．

Table 1. Chemical compositions of garnets.

SAMP	KYR.1										KYR.2			KYR.4A						
ANAL	1	2	3	4	5	6	7	1'	2'	5'	1	3	25	1	2	3	4	5	6	2'
MIN	core						rim							core					rim	
WT(%)																				
SiO2	37.918	37.752	37.991	37.780	37.734	37.803	37.866	38.452	38.002	37.423	38.182	37.892	38.171	38.202	37.729	37.862	37.962	38.089	37.921	37.553
TiO2	0.065	0.097	0.074	0.129	0.076	0.113	0.077	0.164	0.117	0.087	0.018	0.027	0.005	0.109	0.020	0.004	0.034	0.051	0.058	0.073
Al2O3	20.741	20.803	20.613	20.401	20.478	20.254	20.719	20.831	20.848	20.887	21.220	21.338	21.039	20.377	20.579	20.482	20.460	20.393	20.349	20.534
FeO	27.831	29.345	29.457	30.686	30.587	30.643	30.812	29.025	29.291	29.504	30.044	28.851	30.081	29.947	30.189	29.658	28.677	29.810	30.007	28.725
MnO	0.913	0.456	0.382	0.277	0.194	0.248	0.274	0.852	0.836	0.505	0.827	0.845	0.961	0.977	0.907	1.359	2.850	1.044	0.993	0.956
MgO	1.607	2.203	1.854	1.723	1.860	2.154	2.299	1.114	1.430	1.421	5.984	5.622	5.027	1.637	1.749	1.718	2.095	1.866	1.880	1.616
CaO	11.110	9.873	10.182	9.556	9.326	9.133	8.463	10.900	10.439	10.130	3.637	5.086	5.151	9.569	9.164	8.933	8.600	9.056	8.813	9.849
TOTAL	100.185	100.529	100.553	100.552	100.255	100.348	100.510	101.338	100.963	99.957	99.912	99.661	100.435	100.818	100.337	100.016	100.678	100.309	100.021	99.306
Cations on the basis of 12 oxygens																				
Si	3.014	2.994	3.015	3.011	3.012	3.015	3.009	3.028	3.008	2.994	3.002	2.984	3.002	3.032	3.012	3.028	3.018	3.034	3.031	3.017
Ti	0.004	0.006	0.004	0.008	0.005	0.007	0.005	0.010	0.007	0.005	0.001	0.002	0.000	0.007	0.001	0.000	0.002	0.003	0.004	0.004
Al	1.943	1.944	1.928	1.916	1.927	1.904	1.940	1.934	1.945	1.969	1.967	1.981	1.951	1.906	1.936	1.931	1.917	1.915	1.917	1.944
Fe	1.850	1.946	1.955	2.045	2.042	2.044	2.048	1.912	1.939	1.974	1.976	1.900	1.979	1.988	2.016	1.983	1.907	1.986	2.006	1.930
Mn	0.062	0.031	0.026	0.019	0.013	0.017	0.018	0.057	0.056	0.034	0.055	0.056	0.064	0.066	0.061	0.092	0.192	0.071	0.067	0.065
Mg	0.190	0.260	0.219	0.205	0.221	0.256	0.272	0.131	0.169	0.169	0.701	0.660	0.590	0.194	0.208	0.205	0.248	0.222	0.224	0.194
Ca	0.946	0.839	0.866	0.816	0.798	0.781	0.721	0.920	0.885	0.868	0.306	0.429	0.434	0.814	0.784	0.765	0.733	0.773	0.755	0.848
TOTAL	8.010	8.020	8.013	8.019	8.018	8.023	8.012	7.991	8.008	8.014	8.008	8.012	8.020	8.005	8.018	8.004	8.017	8.003	8.004	8.002

SAMP	KYR.4B										KYR.14A									
ANAL	1	2	3	4	5	6	3'	4'	5'	6'	7'	2	3	4	5	6	7	8	9	10
MIN	core					rim	core				rim	core					rim	core		
WT(%)																				
SiO2	37.575	37.997	37.832	38.031	37.608	38.134	37.127	36.437	37.390	37.032	37.047	36.861	36.820	37.177	37.044	36.908	37.670	36.945	36.910	37.019
TiO2	0.338	0.235	0.174	0.146	0.065	0.069	0.371	0.363	0.077	0.393	0.111	0.087	0.096	0.087	0.057	0.065	0.038	0.067	0.106	0.084
Al2O3	19.175	19.050	19.290	19.320	19.598	19.649	19.910	19.286	19.933	19.102	19.330	19.992	20.038	19.609	19.850	20.089	19.970	19.786	19.686	19.777
FeO	18.246	18.566	18.426	19.325	19.617	19.097	18.499	18.174	18.695	18.025	19.145	33.863	33.690	34.256	34.677	34.419	33.781	34.233	33.201	32.537
MnO	11.608	11.148	10.392	8.988	9.474	9.112	12.349	11.785	10.937	10.606	9.203	4.120	3.306	1.307	0.313	0.135	0.080	1.888	2.881	3.062
MgO	0.834	0.879	0.864	0.876	0.900	0.830	0.741	0.797	0.839	0.838	0.896	1.482	1.656	1.754	2.167	2.356	2.850	1.773	1.790	2.377
CaO	12.984	12.867	13.634	14.007	13.415	13.451	11.841	12.364	12.444	13.683	13.984	3.703	4.293	5.335	5.034	5.218	5.030	4.783	4.915	4.516
TOTAL	100.760	100.742	100.612	100.693	100.677	100.342	100.838	99.206	100.315	99.679	99.716	100.108	99.899	99.525	99.142	99.190	99.419	99.475	99.489	99.372
Cations on the basis of 12 oxygens																				
Si	3.008	3.036	3.022	3.030	3.006	3.040	2.970	2.969	2.997	2.993	2.990	3.004	3.004	3.030	3.021	3.003	3.040	3.016	3.014	3.014
Ti	0.020	0.014	0.011	0.009	0.004	0.004	0.020	0.022	0.005	0.024	0.007	0.005	0.005	0.004	0.004	0.004	0.002	0.004	0.007	0.005
Al	1.809	1.794	1.816	1.815	1.846	1.846	1.880	1.853	1.883	1.819	1.839	1.921	1.921	1.884	1.908	1.927	1.899	1.904	1.895	1.898
Fe	1.222	1.241	1.231	1.288	1.311	1.273	1.240	1.239	1.253	1.218	1.292	2.308	2.308	2.335	2.365	2.342	2.280	2.337	2.267	2.216
Mn	0.787	0.755	0.703	0.607	0.641	0.615	0.840	0.814	0.743	0.726	0.629	0.284	0.284	0.090	0.022	0.009	0.006	0.131	0.199	0.211
Mg	0.100	0.105	0.103	0.104	0.107	0.099	0.090	0.097	0.100	0.101	0.108	0.180	0.180	0.213	0.263	0.286	0.343	0.216	0.218	0.289
Ca	1.114	1.102	1.167	1.196	1.149	1.149	1.020	1.080	1.069	1.185	1.209	0.323	0.323	0.466	0.440	0.455	0.435	0.418	0.430	0.394
TOTAL	8.060	8.047	8.053	8.048	8.064	8.027	8.060	8.073	8.050	8.065	8.075	8.026	8.026	8.022	8.022	8.025	8.004	8.026	8.030	8.027

SAMP	YR.14A												KYR.14B							
ANAL	11	12	13	1'	2'	3'	4'	22'	23'	24'	36'	37'	46'	1	2	3	4	5	6	1'
MIN			rim											core					rim	core
WT(%)																				
SiO2	37.281	37.448	37.396	36.866	36.669	36.749	37.117	36.431	36.223	35.945	36.083	36.812	36.989	37.496	37.225	37.743	37.909	37.895	37.508	37.007
TiO2	0.110	0.093	0.124	0.062	0.073	0.081	0.031	0.085	0.055	0.054	0.115	0.092	0.049	0.333	0.139	0.127	0.089	0.040	0.064	0.131
Al2O3	19.897	19.978	20.013	20.397	19.957	19.835	20.024	19.710	19.229	19.752	19.392	20.233	19.461	20.134	20.193	20.262	20.250	20.263	20.331	20.929
FeO	32.878	34.070	33.804	34.219	35.470	35.426	34.962	34.439	35.806	35.762	32.885	34.486	34.516	34.733	36.544	36.730	36.407	36.959	36.858	36.316
MnO	2.845	2.186	1.198	4.194	1.060	0.521	0.097	1.927	0.931	0.138	4.156	2.652	1.707	0.673	0.579	0.523	0.480	0.576	1.727	0.556
MgO	2.129	2.025	2.061	1.534	1.691	1.875	2.764	1.562	1.729	2.439	1.477	1.357	1.545	3.373	3.807	3.817	3.497	3.400	3.056	3.726
CaO	4.514	4.807	5.743	3.570	5.337	5.134	4.910	4.989	4.895	4.858	4.870	4.789	5.119	2.681	0.756	0.713	0.765	0.584	0.529	0.831
TOTAL	99.654	100.607	100.339	100.959	100.328	99.719	99.975	99.207	98.927	99.006	99.087	100.488	99.426	99.423	99.243	99.915	99.397	99.717	100.073	99.496
Cations on the basis of 12 oxygens																				
Si	3.026	3.017	3.014	2.984	2.981	2.997	3.000	2.994	2.995	2.958	2.983	2.988	3.028	3.026	3.017	3.035	3.058	3.055	3.031	2.988
Ti	0.007	0.006	0.008	0.004	0.004	0.005	0.002	0.005	0.003	0.003	0.007	0.006	0.003	0.020	0.009	0.008	0.005	0.002	0.004	0.008
Al	1.903	1.897	1.901	1.946	1.912	1.906	1.908	1.909	1.874	1.916	1.890	1.936	1.878	1.915	1.929	1.921	1.926	1.926	1.936	1.992
Fe	2.232	2.295	2.278	2.316	2.412	2.416	2.364	2.367	2.476	2.461	2.274	2.341	2.363	2.344	2.477	2.470	2.456	2.492	2.491	2.453
Mn	0.196	0.149	0.082	0.288	0.073	0.036	0.007	0.134	0.065	0.010	0.291	0.182	0.118	0.046	0.040	0.036	0.033	0.039	0.118	0.038
Mg	0.258	0.243	0.248	0.185	0.205	0.228	0.333	0.191	0.213	0.299	0.182	0.164	0.188	0.406	0.460	0.458	0.421	0.409	0.368	0.449
Ca	0.393	0.415	0.496	0.310	0.465	0.449	0.425	0.439	0.434	0.428	0.431	0.416	0.449	0.232	0.066	0.061	0.066	0.050	0.046	0.072
TOTAL	8.013	8.022	8.026	8.033	8.052	8.037	8.039	8.039	8.060	8.075	8.058	8.033	8.027	7.989	7.996	7.988	7.965	7.973	7.994	8.000

SAMP	YR.14B	KYR.15						KYR.18												
ANAL	9'	1	2	3	4	5	6	7	2	3	5	6	7	8	9	31	32	33	34	35
MIN	rim	core						rim												
WT(%)																				
SiO2	35.557	37.458	37.346	37.156	37.289	37.483	37.515	38.082	36.982	36.602	37.327	36.860	37.440	37.219	37.693	37.454	37.530	37.301	36.851	37.730
TiO2	0.031	0.118	0.121	0.079	0.123	0.125	0.094	0.059	0.047	0.010	0.027	0.029	0.009	0.064	0.020	0.006	0.004	0.039	0.055	0.029
Al2O3	21.003	20.030	20.132	20.234	20.050	20.290	20.296	20.844	19.889	19.804	20.355	21.073	21.232	21.050	21.241	20.863	20.669	20.833	20.638	20.984
FeO	37.216	29.957	31.035	31.968	32.305	32.386	31.934	29.277	34.481	34.357	33.518	33.720	31.996	31.948	32.164	32.884	33.559	32.736	32.285	31.934
MnO	1.404	2.999	3.123	2.541	1.642	1.202	2.572	0.445	1.934	1.952	1.043	0.808	0.648	0.500	0.340	0.478	0.460	0.388	0.353	0.187
MgO	3.084	1.379	1.333	1.501	1.773	1.855	1.539	4.083	3.055	3.210	3.554	3.850	4.850	5.378	5.417	4.686	5.120	5.257	5.798	6.465
CaO	0.576	7.359	6.674	6.228	6.752	6.774	5.985	6.536	2.474	2.516	3.313	3.212	3.199	2.880	3.124	2.857	2.494	3.074	2.796	2.507
TOTAL	98.871	99.300	99.764	99.707	99.934	100.115	99.935	99.326	99.027	98.596	99.186	99.612	99.415	99.085	100.042	99.395	99.913	99.650	98.875	99.938
Cations on the basis of 12 oxygens																				
Si	2.926	3.035	3.021	3.010	3.012	3.015	3.028	3.025	3.018	3.004	3.017	2.966	2.986	2.977	2.983	2.998	2.994	2.977	2.962	2.910
Ti	0.002	0.007	0.007	0.005	0.007	0.008	0.006	0.004	0.003	0.001	0.002	0.002	0.000	0.004	0.001	0.000	0.000	0.002	0.003	0.002
Al	2.036	1.913	1.920	1.932	1.909	1.924	1.931	1.952	1.914	1.916	1.939	1.999	1.996	1.984	1.982	1.969	1.943	1.960	1.955	1.954
Fe	2.559	2.030	2.100	2.166	2.182	2.179	2.155	1.945	2.353	2.358	2.265	2.269	2.132	2.137	2.129	2.202	2.239	2.185	2.170	2.110
Mn	0.098	0.206	0.214	0.174	0.112	0.082	0.176	0.030	0.134	0.136	0.071	0.055	0.044	0.034	0.023	0.032	0.031	0.026	0.024	0.012
Mg	0.378	0.167	0.161	0.181	0.214	0.222	0.185	0.484	0.372	0.393	0.428	0.462	0.577	0.641	0.639	0.559	0.609	0.626	0.695	0.762
Ca	0.051	0.639	0.579	0.541	0.584	0.584	0.518	0.554	0.216	0.221	0.287	0.277	0.273	0.247	0.265	0.245	0.213	0.263	0.241	0.212
TOTAL	8.049	7.997	8.001	8.010	8.021	8.013	7.998	7.992	8.010	8.029	8.009	8.030	8.008	8.024	8.022	8.005	8.029	8.039	8.050	7.962

Table 1. (Continued)

SAMP	801																	802		
ANAL	1	2	3	4	5	6	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	12'	1	2	3
MIN	core					rim	rim						core				rim	core	rim	
WT(%)																				
SiO2	36.961	36.960	37.175	37.221	37.977	37.945	37.979	37.873	37.584	37.748	37.296	36.980	37.452	37.216	37.025	37.095	37.842	37.033	37.997	37.219
TiO2	0.193	0.146	0.174	0.099	0.106	0.061	20.994	20.536	20.421	20.453	20.194	20.122	19.887	20.105	20.397	20.507	20.843	0.106	0.050	0.018
Al2O3	20.733	20.691	20.761	20.980	21.268	21.167	0.080	0.154	0.149	0.134	0.174	0.179	0.169	0.204	0.167	0.130	0.101	20.892	21.707	21.569
FeO	25.214	26.458	27.683	28.457	27.495	26.997	26.362	28.127	28.126	28.158	26.026	26.002	25.104	27.149	28.193	28.569	27.128	25.728	24.431	24.977
MnO	5.049	4.484	2.590	1.083	0.583	0.240	0.348	0.677	1.216	2.198	4.778	5.337	5.019	3.572	1.833	1.162	0.311	1.731	0.459	0.577
MgO	1.188	1.381	2.124	2.160	2.957	4.115	4.842	2.885	2.527	2.057	1.454	1.394	1.361	1.800	2.084	2.426	3.349	2.225	5.453	5.152
CaO	10.614	9.653	9.429	9.552	10.062	8.726	9.264	9.792	9.978	9.497	9.735	10.089	10.621	9.589	9.595	9.524	10.306	11.108	8.541	9.192
TOTAL	99.952	99.773	99.936	99.552	100.448	99.251	99.869	100.044	100.001	100.245	99.657	100.103	99.613	99.635	99.294	99.413	99.880	98.823	98.638	98.704
Cations on the basis of 12 oxygens																				
Si	2.968	2.974	2.973	2.980	2.990	3.002	2.986	3.004	2.996	3.007	3.004	2.977	3.015	2.996	2.984	2.980	2.994	2.974	2.987	2.946
Ti	0.012	0.009	0.010	0.006	0.006	0.004	1.941	1.920	1.918	1.921	1.917	1.909	1.887	1.908	1.938	1.942	1.944	0.006	0.003	0.001
Al	1.962	1.963	1.957	1.980	1.973	1.974	0.005	0.009	0.009	0.008	0.011	0.011	0.010	0.012	0.010	0.008	0.006	1.978	2.012	2.012
Fe	1.693	1.781	1.852	1.905	1.809	1.786	1.734	1.866	1.878	1.876	1.753	1.751	1.690	1.828	1.900	1.919	1.795	1.728	1.606	1.634
Mn	0.343	0.306	0.176	0.074	0.039	0.016	0.023	0.046	0.082	0.148	0.326	0.364	0.342	0.244	0.125	0.079	0.021	0.118	0.031	0.039
Mg	0.142	0.166	0.253	0.258	0.347	0.485	0.568	0.341	0.300	0.244	0.175	0.167	0.163	0.216	0.250	0.290	0.395	0.266	0.639	0.608
Ca	0.913	0.832	0.808	0.819	0.848	0.740	0.780	0.832	0.852	0.811	0.840	0.870	0.916	0.827	0.829	0.820	0.874	0.956	0.720	0.780
TOTAL	8.034	8.031	8.030	8.022	8.012	8.006	8.036	8.018	8.036	8.015	8.026	8.049	8.025	8.031	8.037	8.037	8.028	8.027	7.998	8.019

SAMP	802										804									
ANAL	4	6	7	8	9	10	11	29	30	31	9	10	11	13	14	15	25	26	27	29
MIN							core	rim		core	core					rim	rim			core
WT(%)																				
SiO2	37.708	37.615	38.135	37.121	37.634	38.120	38.644	38.733	37.177	37.512	37.645	36.743	37.935	38.149	37.794	38.639	38.267	37.745	37.447	36.781
TiO2	0.036	0.048	0.037	0.055	0.098	0.127	0.077	0.000	0.066	0.102	0.078	0.104	0.032	0.053	0.025	0.028	0.029	0.014	0.074	0.057
Al2O3	21.159	21.254	21.613	20.804	20.656	21.213	20.989	21.582	20.485	20.840	20.548	20.651	20.450	21.094	21.107	21.632	21.370	21.346	20.522	21.507
FeO	25.801	25.278	23.539	21.817	16.856	18.186	24.396	23.335	26.475	27.500	28.632	28.649	29.761	28.710	27.795	25.011	25.415	25.800	28.859	27.732
MnO	0.520	0.635	1.025	6.148	11.445	8.358	2.036	0.824	0.996	1.789	3.350	3.098	0.961	0.705	0.650	0.598	0.754	0.548	0.626	0.500
MgO	3.486	4.087	5.291	1.986	1.254	3.021	4.482	7.212	2.070	2.329	1.997	2.168	3.589	4.089	4.892	6.572	5.676	6.699	4.156	5.529
CaO	10.459	10.051	9.303	11.643	12.064	11.099	9.243	7.819	11.253	10.115	8.168	7.815	7.760	7.410	6.939	7.287	7.690	6.552	7.001	6.586
TOTAL	99.169	98.968	98.943	99.574	100.007	100.124	99.867	99.505	98.522	100.187	100.418	99.228	100.488	100.210	99.202	99.767	99.201	98.704	98.685	98.692
Cations on the basis of 12 oxygens																				
Si	2.989	2.979	2.989	2.969	2.999	2.996	3.026	2.997	2.996	2.982	3.005	2.970	3.004	3.005	2.993	2.996	3.000	2.972	3.002	2.929
Ti	0.002	0.003	0.002	0.003	0.006	0.008	0.005	0.000	0.004	0.006	0.005	0.006	0.002	0.003	0.001	0.002	0.002	0.001	0.004	0.003
Al	1.977	1.984	1.997	1.961	1.940	1.965	1.937	1.968	1.946	1.952	1.933	1.968	1.909	1.958	1.970	1.977	1.975	1.981	1.939	2.019
Fe	1.711	1.674	1.543	1.460	1.123	1.196	1.598	1.510	1.784	1.828	1.911	1.937	1.971	1.891	1.841	1.622	1.666	1.699	1.935	1.847
Mn	0.035	0.043	0.069	0.417	0.773	0.557	0.135	0.054	0.068	0.120	0.227	0.212	0.064	0.047	0.044	0.039	0.050	0.037	0.043	0.034
Mg	0.412	0.482	0.618	0.237	0.149	0.354	0.523	0.832	0.249	0.276	0.238	0.261	0.424	0.480	0.577	0.760	0.663	0.787	0.497	0.656
Ca	0.888	0.853	0.781	0.998	1.030	0.935	0.775	0.649	0.972	0.862	0.699	0.677	0.658	0.625	0.589	0.606	0.646	0.553	0.601	0.562
TOTAL	8.014	8.017	7.998	8.045	8.019	8.010	7.998	8.010	8.019	8.026	8.016	8.031	8.032	8.010	8.015	8.002	8.002	8.030	8.021	8.050

SAMP	805				807.1															
ANAL	1	3	4	5	33	34	35	36	37	38	39	40	21	22	23	24	25	26	41	42
MIN	core			rim	core							rim	core							
WT(%)																				
SiO2	36.649	37.413	38.397	39.011	36.501	37.298	36.756	36.648	37.444	36.658	37.383	37.969	37.236	37.425	37.671	36.632	36.547	37.365	37.931	37.613
TiO2	0.138	0.110	0.005	0.000	0.155	0.206	0.646	0.101	0.126	0.050	0.073	0.053	0.248	0.198	0.193	0.139	0.164	0.128	0.109	0.097
Al2O3	20.136	20.285	21.134	21.724	21.317	21.098	21.088	21.630	21.748	21.679	21.717	22.054	20.771	21.228	21.033	21.334	21.471	21.137	21.520	20.631
FeO	27.832	27.992	26.817	24.221	19.481	20.723	23.329	26.625	26.403	27.387	26.730	25.257	18.392	19.927	21.556	23.855	27.472	27.748	28.031	28.714
MnO	3.391	2.211	1.542	0.503	10.944	8.482	4.413	1.513	1.152	0.648	0.484	0.404	11.349	9.396	8.088	5.265	1.057	1.251	0.561	0.485
MgO	2.223	3.277	5.086	7.658	1.192	1.395	1.754	2.583	3.499	3.392	4.382	5.856	0.894	1.092	1.130	1.656	1.558	1.935	2.842	2.737
CaO	8.227	8.399	7.504	7.231	10.217	11.002	11.460	10.309	9.531	9.617	9.049	8.207	11.254	11.124	10.970	10.884	11.004	10.226	9.602	9.254
TOTAL	98.596	99.687	100.485	100.348	99.807	100.204	99.446	99.409	99.903	99.431	99.818	99.800	100.144	100.390	100.641	99.765	99.273	99.790	100.596	99.531
Cations on the basis of 12 oxygens																				
Si	2.981	2.988	2.996	2.993	2.935	2.971	2.941	2.928	2.953	2.920	2.945	2.957	2.979	2.976	2.990	2.935	2.937	2.980	2.982	3.002
Ti	0.008	0.007	0.000	0.000	0.009	0.012	0.039	0.006	0.008	0.003	0.004	0.003	0.015	0.012	0.012	0.008	0.010	0.008	0.007	0.006
Al	1.931	1.910	1.944	1.965	2.020	1.981	1.989	2.037	2.022	2.035	2.017	2.025	1.959	1.990	1.968	2.015	2.034	1.987	1.994	1.941
Fe	1.893	1.870	1.750	1.554	1.310	1.381	1.561	1.779	1.742	1.824	1.761	1.645	1.231	1.325	1.431	1.598	1.846	1.851	1.843	1.916
Mn	0.234	0.150	0.102	0.033	0.745	0.572	0.299	0.102	0.077	0.044	0.032	0.027	0.769	0.633	0.544	0.357	0.072	0.085	0.037	0.033
Mg	0.270	0.390	0.592	0.876	0.143	0.166	0.209	0.308	0.411	0.403	0.515	0.680	0.107	0.130	0.134	0.198	0.187	0.230	0.333	0.326
Ca	0.717	0.719	0.627	0.594	0.880	0.939	0.983	0.883	0.805	0.821	0.764	0.685	0.965	0.948	0.933	0.934	0.948	0.874	0.809	0.791
TOTAL	8.034	8.033	8.011	8.015	8.042	8.023	8.021	8.043	8.017	8.050	8.038	8.022	8.023	8.014	8.012	8.046	8.033	8.015	8.005	8.014

SAMP	807.1																	807.2		
ANAL	31	82	83	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	10	11
MIN				core						rim	core							rim	core	
WT(%)																				
SiO2	37.202	37.296	37.467	37.447	38.272	38.765	38.581	38.337	38.351	38.953	38.087	38.032	38.253	38.170	38.991	38.459	38.456	38.717	38.171	36.772
TiO2	0.022	0.994	0.139	0.152	0.165	0.136	0.143	0.161	2.623	0.133	0.099	0.122	0.127	0.183	0.114	0.099	0.083	0.007	0.080	0.070
Al2O3	22.004	20.092	21.623	20.716	20.836	20.973	20.908	20.649	19.703	21.293	20.571	20.616	20.631	20.835	21.387	20.791	20.848	20.948	21.013	20.553
FeO	25.928	26.972	26.425	19.635	23.068	22.813	25.330	24.933	23.799	23.668	22.691	25.590	26.785	26.500	24.824	28.074	28.261	27.525	27.788	28.351
MnO	0.326	0.955	1.306	11.079	4.987	3.665	1.049	1.120	0.912	0.682	7.261	2.308	1.484	1.156	0.886	0.679	0.518	0.303	1.278	0.641
MgO	6.148	1.674	3.075	0.925	2.377	2.489	2.767	3.356	3.981	4.981	1.556	1.666	1.324	2.516	4.305	2.785	3.083	4.022	2.573	2.788
CaO	7.561	11.838	10.217	10.973	11.154	11.843	12.054	10.910	11.387	10.730	10.367	12.133	12.013	10.907	10.000	9.946	9.559	8.954	8.964	9.337
TOTAL	99.191	99.821	100.252	100.927	100.859	100.684	100.832	99.466	100.756	100.440	100.632	100.467	100.617	100.267	100.507	100.833	100.808	100.476	99.867	98.512
Cations on the basis of 12 oxygens																				
Si	2.925	2.978	2.953	2.981	3.008	3.032	3.015	3.028	2.981	3.013	3.019	3.011	3.025	3.011	3.025	3.021	3.018	3.028	3.023	2.973
Ti	0.001	0.060	0.008	0.009	0.010	0.008	0.008	0.010	0.153	0.008	0.006	0.007	0.008	0.011	0.007	0.006	0.005	0.000	0.005	0.004
Al	2.039	1.891	2.009	1.944	1.930	1.934	1.926	1.922	1.805	1.942	1.922	1.924	1.923	1.938	1.956	1.925	1.929	1.931	1.961	1.958
Fe	1.705	1.801	1.742	1.307	1.516	1.492	1.656	1.647	1.547	1.531	1.504	1.695	1.772	1.749	1.611	1.844	1.855	1.801	1.840	1.917
Mn	0.022	0.065	0.087	0.747	0.332	0.243	0.070	0.075	0.060	0.045	0.488	0.155	0.099	0.077	0.058	0.045	0.035	0.020	0.086	0.044
Mg	0.721	0.199	0.361	0.110	0.278	0.290	0.322	0.395	0.461	0.574	0.184	0.197	0.156	0.296	0.498	0.326	0.361	0.469	0.304	0.336
Ca	0.637	1.013	0.863	0.936	0.939	0.993	1.009	0.923	0.949	0.889	0.881	1.029	1.018	0.922	0.831	0.837	0.804	0.750	0.761	0.809
TOTAL	8.049	8.007	8.023	8.034	8.013	7.992	8.006	8.000	7.957	8.002	8.004	8.018	8.001	8.003	7.985	8.005	8.006	8.000	7.980	8.040

Table 1. (Continued)

SAMP	807.2			808																
ANAL	12	13	14	1	2	3	4	5	6	7	8	9	35	37	39	1'	2'	3'	4'	5'
MIN			rim	core					rim			rim				core				rim
WT(%)																				
SiO2	37.496	37.342	39.352	37.549	37.617	37.332	37.716	37.744	38.210	37.686	37.748	38.148	38.395	38.297	38.272	37.086	37.419	37.396	37.487	37.720
TiO2	0.080	0.066	0.047	0.266	0.142	0.136	0.090	0.042	0.112	2.923	0.104	0.060	0.006	0.053	0.037	20.411	20.829	20.595	20.995	20.901
Al2O3	20.629	20.932	21.210	20.839	20.775	20.661	20.959	21.209	21.605	19.610	21.082	21.190	21.547	21.199	21.144	0.163	0.078	0.098	0.062	0.108
FeO	27.577	27.601	24.682	22.423	21.168	26.869	28.333	26.982	24.946	23.915	26.595	25.815	25.169	25.476	24.122	20.004	27.847	27.727	27.798	26.702
MnO	0.467	0.196	0.264	6.230	6.259	1.565	0.706	0.412	0.714	1.989	1.236	0.632	1.809	1.566	1.253	10.289	1.233	0.579	0.346	0.235
MgO	3.073	3.908	6.008	1.945	2.198	1.708	2.243	2.980	5.005	2.545	3.357	4.015	5.807	5.245	4.033	1.099	2.460	2.856	3.095	4.054
CaO	9.870	9.232	8.564	10.741	11.245	10.956	9.740	9.914	8.783	11.677	9.188	9.488	6.554	6.717	10.382	10.791	9.870	9.814	10.315	9.388
TOTAL	99.192	99.277	100.127	99.993	99.404	99.227	99.787	99.283	99.375	100.345	99.310	99.348	99.287	98.553	99.243	99.843	99.736	99.065	100.098	99.108
Cations on the basis of 12 oxygens																				
Si	2.995	2.971	3.040	2.986	2.996	2.996	3.002	2.996	2.992	2.964	2.997	3.007	3.007	3.026	3.013	2.982	2.985	2.994	2.969	2.992
Ti	0.005	0.004	0.003	0.016	0.009	0.008	0.005	0.003	0.007	0.173	0.006	0.004	0.000	0.003	0.003	1.935	1.958	1.944	1.960	1.954
Al	1.942	1.963	1.931	1.953	1.951	1.955	1.966	1.984	1.994	1.818	1.973	1.969	1.990	1.974	1.962	0.010	0.005	0.006	0.004	0.006
Fe	1.842	1.837	1.595	1.491	1.410	1.804	1.886	1.791	1.634	1.573	1.766	1.702	1.648	1.684	1.588	1.345	1.858	1.857	1.841	1.772
Mn	0.032	0.013	0.017	0.420	0.422	0.106	0.048	0.028	0.047	0.133	0.083	0.042	0.120	0.105	0.084	0.701	0.083	0.039	0.023	0.016
Mg	0.366	0.464	0.692	0.231	0.261	0.204	0.266	0.353	0.584	0.298	0.397	0.472	0.678	0.618	0.473	0.132	0.293	0.341	0.365	0.479
Ca	0.845	0.787	0.709	0.915	0.960	0.942	0.831	0.843	0.737	0.984	0.782	0.801	0.550	0.569	0.876	0.930	0.844	0.842	0.875	0.798
TOTAL	8.026	8.039	7.987	8.011	8.008	8.015	8.004	7.998	7.996	7.943	8.005	7.997	7.993	7.979	7.998	8.035	8.025	8.022	8.038	8.018

SAMP	808														812				813.1	
ANAL	6"	7'	8'	9'	1"	2"	3"	4"	5"	6"	7"	8"	9"	10"	19	20	23	24	10	11
MIN				rim	core					rim				rim	core			rim	core	
WT(%)																				
SiO2	37.057	37.482	37.454	37.595	36.602	36.986	37.062	37.552	37.519	37.462	37.162	37.399	37.561	37.726	37.528	37.947	37.614	37.995	38.688	37.447
TiO2	20.685	20.646	20.818	21.029	19.456	20.417	20.452	20.863	20.766	20.489	20.626	20.926	20.777	21.127	0.193	0.162	0.092	0.051	0.061	0.071
Al2O3	0.172	0.094	0.131	0.026	1.868	0.198	0.128	0.123	0.057	0.065	0.313	0.107	0.077	0.053	20.542	21.188	21.344	21.229	20.387	20.675
FeO	23.446	26.791	27.742	26.134	16.745	19.346	20.276	26.420	27.567	28.102	21.081	25.429	26.798	26.700	25.813	27.418	29.510	28.520	29.415	28.386
MnO	5.116	1.906	0.606	0.457	12.386	10.779	9.008	1.571	1.027	0.657	7.690	2.339	1.692	1.260	4.391	2.576	0.585	0.349	1.635	1.285
MgO	1.906	2.519	2.828	4.360	0.786	0.997	0.961	2.306	2.116	2.763	1.473	2.152	2.843	3.649	1.243	1.573	2.550	2.680	3.657	3.971
CaO	11.319	10.025	9.648	9.285	12.229	11.224	11.374	11.216	10.566	9.221	11.436	11.293	9.819	9.423	10.868	10.187	9.484	10.392	7.281	7.601
TOTAL	99.701	99.463	99.227	98.886	100.072	99.947	99.261	100.051	99.618	98.759	99.781	99.645	99.567	99.938	100.578	101.051	101.179	101.216	101.124	99.436
Cations on the basis of 12 oxygens																				
Si	2.964	2.993	2.991	2.985	2.942	2.974	2.989	2.982	2.996	3.009	2.974	2.980	2.991	2.979	2.992	2.995	2.964	2.980	3.038	2.985
Ti	1.950	1.943	1.959	1.968	1.843	1.935	1.944	1.953	1.954	1.940	1.945	1.965	1.950	1.967	0.012	0.010	0.005	0.003	0.004	0.004
Al	0.010	0.006	0.008	0.002	0.113	0.012	0.008	0.007	0.003	0.004	0.019	0.006	0.005	0.003	1.930	1.971	1.982	1.963	1.887	1.942
Fe	1.569	1.789	1.853	1.735	1.126	1.301	1.368	1.754	1.841	1.888	1.411	1.694	1.784	1.764	1.721	1.810	1.945	1.871	1.932	1.892
Mn	0.347	0.129	0.041	0.031	0.843	0.734	0.615	0.106	0.069	0.045	0.521	0.158	0.114	0.084	0.297	0.172	0.039	0.023	0.109	0.087
Mg	0.227	0.300	0.337	0.516	0.094	0.119	0.116	0.273	0.252	0.331	0.176	0.256	0.337	0.430	0.148	0.185	0.300	0.313	0.428	0.472
Ca	0.970	0.858	0.826	0.790	1.053	0.967	0.983	0.954	0.904	0.794	0.981	0.964	0.838	0.797	0.928	0.862	0.801	0.873	0.613	0.649
TOTAL	8.038	8.017	8.014	8.027	8.015	8.042	8.023	8.029	8.019	8.009	8.026	8.023	8.019	8.024	8.028	8.005	8.035	8.026	8.009	8.031

SAMP	813.1			815.1															816.1	
ANAL	12	13	14	1	2	3	4	5	10	2	4	6	1'	2'	3'	4'	5'	6'	1	2
MIN			rim	core				rim					core			core	core		core	
WT(%)																				
SiO2	37.767	39.030	38.408	37.657	38.385	37.934	37.482	37.408	37.795	38.587	38.191	38.023	38.510	38.535	38.070	38.865	38.510	37.521	37.729	38.040
TiO2	0.011	0.005	0.000	0.150	0.223	0.152	0.132	0.025	0.000	0.045	0.086	0.054	0.160	0.188	0.105	0.048	0.160	0.093	0.162	0.193
Al2O3	20.989	21.041	20.869	21.159	20.977	21.024	21.106	21.902	21.912	21.607	21.675	21.379	20.610	20.712	20.745	20.965	20.610	20.248	21.447	21.572
FeO	27.136	26.761	25.537	27.985	26.770	27.635	27.481	26.408	23.597	26.799	26.508	26.578	23.520	22.670	23.971	23.743	23.520	24.117	25.110	25.831
MnO	1.741	0.738	0.855	1.602	1.169	0.915	0.876	0.366	0.690	0.416	0.596	0.615	1.950	2.527	1.334	1.322	1.950	2.688	2.693	2.615
MgO	5.079	6.447	6.657	2.324	2.747	2.652	3.028	5.249	7.192	4.502	3.272	3.286	4.610	5.336	2.814	5.043	4.610	1.361	3.085	2.822
CaO	7.111	6.953	7.316	10.147	10.308	9.630	9.928	8.662	8.510	8.794	10.284	9.767	9.570	9.534	12.873	9.216	9.570	13.021	10.145	9.812
TOTAL	99.834	100.975	99.642	101.024	100.579	99.942	100.033	100.020	99.696	100.750	100.612	99.702	98.930	99.502	99.912	99.202	98.930	99.049	100.371	100.885
Cations on the basis of 12 oxygens																				
Si	2.979	3.014	3.000	2.970	3.015	3.004	2.970	2.930	2.934	2.998	2.986	3.000	3.036	3.016	3.001	3.041	3.040	3.012	2.969	2.979
Ti	0.001	0.000	0.000	0.009	0.013	0.009	0.008	0.002	0.000	0.003	0.005	0.003	0.009	0.011	0.006	0.003	0.010	0.006	0.010	0.011
Al	1.951	1.915	1.921	1.967	1.942	1.963	1.971	2.022	2.005	1.979	1.998	1.988	1.915	1.911	1.928	1.934	1.910	1.916	1.989	1.991
Fe	1.790	1.728	1.668	1.846	1.757	1.830	1.821	1.730	1.532	1.742	1.733	1.754	1.550	1.484	1.580	1.554	1.550	1.619	1.852	1.692
Mn	0.116	0.048	0.057	0.107	0.078	0.061	0.059	0.024	0.045	0.027	0.040	0.041	0.130	0.168	0.089	0.088	0.130	0.183	0.180	0.179
Mg	0.597	0.742	0.775	0.273	0.322	0.313	0.358	0.613	0.832	0.522	0.381	0.387	0.542	0.623	0.331	0.588	0.540	0.163	0.362	0.330
Ca	0.601	0.575	0.612	0.858	0.867	0.817	0.843	0.727	0.708	0.732	0.862	0.826	0.808	0.800	1.087	0.773	0.810	1.120	0.855	0.823
TOTAL	8.035	8.023	8.033	8.030	7.994	7.998	8.030	8.047	8.056	8.002	8.004	7.999	7.990	8.011	8.023	7.980	7.990	8.018	8.217	8.006

SAMP	816.1						816.3										817				
ANAL	3	4	5	6	7	20	1	2	4	5	6	9	11	14	22	7	8	10	11	12
MIN					rim		core		rim	core	rim					core				
WT(%)																				
SiO2	38.514	37.856	37.336	37.422	38.895	38.647	37.459	37.734	38.192	37.342	38.092	38.446	38.283	38.027	37.770	38.645	38.565	38.751	38.361	38.470
TiO2	0.160	0.000	0.000	0.003	0.000	0.008	0.098	0.028	0.000	0.120	0.003	0.021	0.037	0.020	0.088	0.073	0.044	0.090	0.058	0.046
Al2O3	21.381	21.307	21.474	21.523	22.464	21.992	20.580	21.161	21.571	20.720	21.714	21.637	21.614	21.201	21.000	21.546	20.359	22.041	21.893	20.391
FeO	26.340	26.520	26.629	26.175	25.159	24.339	25.478	25.793	23.241	19.690	23.688	23.851	24.852	27.202	25.915	26.193	27.557	25.539	25.785	26.372
MnO	1.837	1.501	0.961	1.006	0.644	0.881	0.277	0.582	1.959	9.822	1.958	2.003	1.322	0.284	0.369	2.421	1.842	1.255	1.015	0.887
MgO	3.088	3.132	3.824	4.779	6.035	7.181	1.615	2.640	4.698	0.947	4.609	4.763	4.222	1.511	1.604	3.148	3.694	4.150	4.586	4.993
CaO	9.884	9.359	9.195	8.417	7.618	7.848	13.299	11.081	9.481	11.680	9.653	9.560	9.989	12.421	13.257	9.157	8.401	9.525	9.098	8.322
TOTAL	101.204	99.675	99.419	99.325	100.815	100.896	98.806	99.019	99.142	100.321	99.717	100.281	100.319	100.666	100.003	101.183	100.462	101.351	100.796	99.481
Cations on the basis of 12 oxygens																				
Si	3.001	2.997	2.961	2.958	2.986	2.962	3.003	3.001	2.999	2.982	2.982	2.991	2.987	2.998	2.993	3.010	3.036	2.989	2.978	3.031
Ti	0.009	0.000	0.000	0.000	0.000	0.001	0.006	0.002	0.000	0.007	0.000	0.001	0.002	0.001	0.005	0.004	0.003	0.005	0.003	0.003
Al	1.964	1.988	2.007	2.005	2.033	1.987	1.944	1.984	1.996	1.950	2.004	1.984	1.988	1.970	1.961	1.978	1.889	2.004	2.003	1.894
Fe	1.717	1.756	1.766	1.730	1.615	1.560	1.708	1.716	1.526	1.315	1.551	1.552	1.622	1.794	1.717	1.707	1.814	1.647	1.674	1.738
Mn	0.121	0.101	0.065	0.067	0.042	0.057	0.019	0.039	0.130	0.664	0.130	0.132	0.087	0.019	0.025	0.160	0.123	0.082	0.067	0.059
Mg	0.359	0.370	0.452	0.563	0.691	0.821	0.193	0.313	0.550	0.113	0.538	0.552	0.491	0.178	0.189	0.366	0.433	0.477	0.531	0.586
Ca	0.825	0.794	0.781	0.713	0.627	0.645	1.142	0.944	0.798	0.999	0.810	0.787	0.835	1.049	1.125	0.764	0.709	0.787	0.757	0.703
TOTAL	7.996	8.006	8.031	8.037	7.993	8.032	8.015	7.998	7.999	8.031	8.014	7.999	8.012	8.009	8.016	7.989	8.006	7.992	8.012	8.014

Table 1. (Continued)

SAMP	817	818.2		906.2B		907			KYR.6											
ANAL	13	2	4	26	27	6	9	10	1	2	3	4	5	6	7	8	38	39	40	41
MIN	rim	core	rim	core	rim	core		rim												
WT(%)																				
SiO2	39.229	36.558	36.959	37.264	37.297	37.001	37.359	37.410	37.254	37.842	37.813	37.684	37.302	37.389	37.839	38.347	36.529	36.959	37.025	37.140
TiO2	0.016	0.085	0.090	0.133	0.098	0.120	0.078	0.075	0.093	0.104	0.052	0.002	0.045	0.064	0.038	0.006	0.113	0.060	0.087	0.053
Al2O3	20.825	21.181	21.485	20.996	20.940	20.690	21.717	21.119	20.354	20.762	21.148	21.007	21.053	21.157	20.615	20.675	20.067	20.184	20.005	20.195
FeO	24.725	28.459	27.838	27.970	28.458	28.633	27.413	27.108	29.050	29.335	30.086	30.412	29.492	29.783	28.946	28.326	30.391	30.199	30.753	30.286
MnO	0.597	2.485	0.895	0.725	0.713	0.721	0.423	0.533	2.761	2.400	0.855	0.695	0.582	0.497	0.577	0.685	2.092	1.715	1.548	1.206
MgO	6.070	3.207	4.536	2.293	2.690	2.390	3.588	3.984	1.987	1.907	2.377	2.829	3.325	3.481	3.652	4.120	2.119	2.272	2.116	2.586
CaO	8.325	7.075	7.005	9.192	8.915	8.996	8.724	8.430	8.087	7.895	8.183	7.638	7.526	7.202	8.020	7.202	7.617	7.613	8.023	7.606
TOTAL	99.787	99.050	98.808	98.573	99.111	98.551	99.302	98.659	99.700	100.339	100.590	100.353	99.448	99.697	99.754	99.446	99.032	99.061	99.720	99.277
Cations on the basis of 12 oxygens																				
Si	3.047	2.944	2.948	2.997	2.987	2.988	2.963	2.984	3.000	3.017	2.998	2.994	2.980	2.979	3.007	3.038	2.976	2.997	2.992	2.999
Ti	0.001	0.005	0.005	0.008	0.006	0.007	0.005	0.005	0.006	0.006	0.003	0.000	0.003	0.004	0.002	0.000	0.007	0.004	0.005	0.003
Al	1.906	2.010	2.020	1.990	1.977	1.969	2.030	1.986	1.932	1.951	1.976	1.968	1.983	1.987	1.931	1.931	1.927	1.929	1.906	1.922
Fe	1.606	1.917	1.857	1.881	1.906	1.934	1.819	1.809	1.957	1.956	1.995	2.021	1.971	1.984	1.924	1.877	2.070	2.048	2.078	2.045
Mn	0.039	0.170	0.061	0.049	0.048	0.049	0.028	0.036	0.188	0.162	0.057	0.047	0.039	0.034	0.039	0.046	0.144	0.118	0.106	0.083
Mg	0.703	0.385	0.539	0.275	0.321	0.288	0.424	0.474	0.239	0.227	0.281	0.335	0.396	0.413	0.433	0.487	0.257	0.275	0.255	0.311
Ca	0.693	0.611	0.599	0.792	0.765	0.778	0.742	0.721	0.698	0.674	0.695	0.650	0.644	0.615	0.683	0.611	0.665	0.661	0.695	0.658
TOTAL	7.995	8.041	8.028	7.992	8.010	8.013	8.011	8.014	8.020	7.993	8.005	8.015	8.016	8.015	8.019	7.990	8.046	8.031	8.037	8.021

SAMP	KYR.6											KYR.9A								
ANAL	42	43	44	45	46	75	76	77	78	79	80	81	9	11	13	15	8'	9'	11'	12
MIN																	core			
WT(%)																				
SiO2	37.584	37.401	36.712	37.337	37.775	37.034	36.279	36.686	36.784	37.461	37.664	37.651	37.472	37.678	37.478	37.646	37.806	37.307	36.641	37.383
TiO2	0.051	0.056	1.571	0.035	0.025	0.102	0.045	0.085	0.049	0.023	0.029	0.005	0.057	0.035	0.111	0.129	0.131	0.098	0.093	0.071
Al2O3	20.248	20.226	20.714	21.327	21.304	19.778	20.393	20.009	20.072	20.271	20.273	20.500	20.899	21.394	21.035	21.128	20.762	20.748	20.809	20.947
FeO	31.485	30.082	28.519	28.568	27.892	30.137	30.022	30.438	31.832	30.068	29.015	29.587	27.607	27.388	27.018	27.464	26.595	27.818	27.584	27.698
MnO	0.725	0.627	0.855	0.668	0.640	2.097	1.981	1.055	0.774	0.705	0.729	0.618	0.558	0.526	0.773	0.529	0.512	0.441	0.387	0.288
MgO	2.844	3.432	3.788	4.329	4.993	2.089	2.098	2.306	2.651	3.267	4.092	3.709	2.376	2.778	2.368	2.428	2.506	2.254	2.422	3.607
CaO	7.187	7.258	7.123	7.093	7.078	8.399	7.945	8.129	7.544	7.328	7.180	7.373	10.407	10.434	10.780	10.686	10.591	10.577	10.655	8.901
TOTAL	100.258	99.224	99.315	99.418	99.782	99.773	98.806	98.892	99.926	99.283	99.077	99.576	99.376	100.233	99.563	100.010	98.903	99.243	98.591	98.895
Cations on the basis of 12 oxygens																				
Si	3.005	3.005	2.931	2.967	2.978	2.994	2.959	2.983	2.969	3.008	3.014	3.004	2.992	2.974	2.984	2.983	3.016	2.988	2.956	2.984
Ti	0.003	0.003	0.094	0.002	0.002	0.006	0.003	0.005	0.003	0.001	0.002	0.000	0.003	0.002	0.007	0.008	0.008	0.006	0.006	0.004
Al	1.908	1.915	1.950	1.998	1.980	1.885	1.960	1.918	1.910	1.919	1.912	1.928	1.967	1.990	1.974	1.974	1.953	1.959	1.979	1.971
Fe	2.106	2.021	1.904	1.899	1.839	2.038	2.048	2.070	2.149	2.019	1.942	1.975	1.843	1.808	1.799	1.820	1.775	1.863	1.861	1.849
Mn	0.049	0.043	0.058	0.045	0.043	0.144	0.137	0.073	0.053	0.048	0.049	0.042	0.038	0.035	0.052	0.036	0.035	0.030	0.027	0.020
Mg	0.339	0.411	0.451	0.513	0.587	0.252	0.255	0.280	0.319	0.391	0.488	0.441	0.283	0.327	0.281	0.287	0.298	0.269	0.291	0.429
Ca	0.616	0.625	0.609	0.604	0.598	0.728	0.694	0.708	0.653	0.631	0.616	0.630	0.915	0.882	0.920	0.907	0.905	0.908	0.921	0.761
TOTAL	8.026	8.023	7.998	8.028	8.026	8.045	8.056	8.037	8.055	8.018	8.022	8.021	8.041	8.018	8.016	8.015	7.989	8.023	8.041	8.019

SAMP	KYR.9A	KYR.9B																KYR.10		
ANAL	13	1	2	3	4	5	6	7	8	10	11	12	13	1	2	3	4	5	1	2
MIN	rim	core						rim	core				rim	core				rim	core	
WT(%)																				
SiO2	38.051	36.999	37.468	38.299	38.081	38.028	38.355	38.632	37.160	37.456	37.585	38.335	38.940	37.387	37.212	37.377	37.657	37.729	36.546	36.657
TiO2	0.023	0.197	0.175	0.080	0.111	0.185	0.095	0.051	0.181	0.089	0.123	0.065	0.000	0.149	0.121	0.040	0.102	0.057	0.060	0.021
Al2O3	21.486	20.062	20.527	20.849	20.581	20.618	20.704	21.205	20.435	20.553	20.545	21.020	21.143	20.806	20.754	20.912	21.042	21.392	20.245	20.240
FeO	25.595	16.970	20.045	25.762	27.340	28.150	27.144	27.432	17.660	25.984	26.985	27.317	27.880	26.796	26.672	28.291	27.069	27.218	28.005	28.541
MnO	0.427	15.669	9.412	1.771	1.410	1.325	0.820	0.636	15.428	2.567	1.309	0.844	0.604	1.438	1.601	1.273	0.934	0.415	12.025	11.302
MgO	5.491	0.827	0.856	1.800	1.741	2.103	2.532	3.760	0.696	1.177	1.885	3.177	5.335	1.153	1.323	2.238	2.503	5.277	0.857	0.862
CaO	7.837	8.993	11.056	11.966	11.051	10.134	10.223	8.425	8.879	11.585	11.275	9.885	6.784	12.296	11.715	9.125	10.543	6.726	2.566	2.741
TOTAL	98.910	99.717	99.539	100.527	100.315	100.543	99.873	100.141	100.439	99.411	99.707	100.643	100.686	100.025	99.398	99.256	99.850	98.814	100.304	100.364
Cations on the basis of 12 oxygens																				
Si	2.993	2.997	3.010	3.020	3.021	3.011	3.036	3.029	2.990	3.007	3.001	3.009	3.028	2.984	2.986	2.996	2.988	2.987	2.989	2.995
Ti	0.001	0.012	0.011	0.005	0.007	0.011	0.006	0.003	0.011	0.005	0.007	0.004	0.000	0.009	0.007	0.002	0.006	0.003	0.004	0.000
Al	1.992	1.915	1.944	1.938	1.924	1.924	1.932	1.960	1.938	1.945	1.933	1.944	1.938	1.957	1.963	1.976	1.968	1.996	1.952	1.949
Fe	1.684	1.150	1.347	1.699	1.814	1.864	1.798	1.799	1.188	1.744	1.802	1.793	1.813	1.788	1.790	1.896	1.796	1.802	1.916	1.950
Mn	0.029	1.075	0.640	0.118	0.095	0.089	0.055	0.042	1.052	0.175	0.089	0.056	0.040	0.097	0.109	0.086	0.063	0.028	0.833	0.782
Mg	0.644	0.100	0.103	0.212	0.206	0.248	0.299	0.440	0.084	0.141	0.224	0.372	0.618	0.137	0.158	0.267	0.296	0.623	0.105	0.105
Ca	0.661	0.781	0.952	1.011	0.939	0.860	0.867	0.708	0.766	0.996	0.964	0.831	0.565	1.051	1.007	0.784	0.896	0.571	0.225	0.240
TOTAL	8.004	8.029	8.005	8.001	8.006	8.008	7.992	7.981	8.028	8.013	8.020	8.009	8.002	8.024	8.020	8.007	8.012	8.009	8.023	8.022

SAMP	KYR.10				KYR.12A								
ANAL	3	4	5	6	7	1	2	3	4	5	8	14	35
MIN					rim	core				rim			
WT(%)													
SiO2	36.726	37.043	36.468	36.543	36.949	37.257	37.422	37.526	37.917	38.521	38.315	37.891	38.127
TiO2	0.058	0.020	0.035	0.052	0.008	0.145	0.126	0.087	0.095	0.004	0.017	0.052	0.069
Al2O3	20.160	20.000	20.184	20.311	20.276	20.760	21.042	21.527	21.511	21.906	21.862	21.585	21.528
FeO	28.777	29.027	28.806	29.502	30.944	29.574	29.372	28.865	27.815	24.809	27.775	27.928	28.331
MnO	10.864	10.481	10.088	9.567	8.785	1.024	0.871	0.878	0.614	0.285	0.534	0.550	0.543
MgO	0.893	0.931	0.893	0.942	1.010	2.251	2.261	2.723	3.329	6.173	3.906	3.409	3.515
CaO	2.745	2.743	2.767	2.816	2.719	9.050	8.806	8.633	9.056	8.172	8.206	8.665	8.630
TOTAL	100.223	100.245	99.241	99.733	100.691	100.061	99.900	100.239	100.337	99.870	100.615	100.080	100.743
Cations on the basis of 12 oxygens													
Si	3.003	3.023	3.004	2.996	3.005	2.978	2.986	2.972	2.982	2.986	2.992	2.984	2.988
Ti	0.004	0.001	0.002	0.003	0.001	0.009	0.008	0.005	0.006	0.000	0.001	0.003	0.004
Al	1.943	1.924	1.960	1.963	1.943	1.956	1.979	2.010	1.994	2.002	2.013	2.004	1.988
Fe	1.968	1.981	1.984	2.023	2.105	1.977	1.960	1.912	1.829	1.608	1.814	1.840	1.857
Mn	0.753	0.724	0.704	0.665	0.605	0.069	0.059	0.059	0.041	0.019	0.035	0.037	0.036
Mg	0.109	0.113	0.110	0.115	0.123	0.268	0.269	0.322	0.390	0.713	0.455	0.400	0.411
Ca	0.241	0.240	0.244	0.247	0.237	0.775	0.753	0.733	0.763	0.679	0.687	0.731	0.725
TOTAL	8.020	8.006	8.008	8.013	8.018	8.031	8.012	8.013	8.005	8.007	7.997	7.999	8.008

Table 2. Chemical compositions of clinopyroxenes.

SAMP	KYR.1										KYR.14A							KYR.15		
ANAL	20	21	22	23	28	31	32	39	8	10	11	12	16	1	2	3	4	5	21	1
MIN	Na-aug													Omp				Aeg-Aug		
WT(%)																				
SiO2	50.665	51.169	51.666	50.595	51.560	54.142	54.321	53.173	52.620	53.040	52.490	52.930	52.770	55.268	55.018	54.545	55.456	55.046	54.338	53.860
TiO2	0.092	0.091	0.160	0.083	0.152	0.127	0.066	0.038	0.110	0.070	0.200	0.090	0.090	0.006	0.013	0.046	0.006	0.036	0.055	0.030
Al2O3	2.368	3.122	3.453	2.358	3.677	3.261	3.306	2.094	2.660	2.600	3.330	2.430	2.680	6.463	6.278	5.251	6.513	7.239	5.417	5.290
FeO	12.522	12.364	12.564	12.104	12.166	9.270	9.111	13.662	12.390	12.790	12.640	12.490	12.290	10.732	11.114	11.237	11.216	11.553	10.787	11.490
MnO	0.080	0.106	0.177	0.144	0.112	0.126	0.100	0.199	0.150	0.100	0.120	0.150	0.140	0.000	0.000	0.000	0.000	0.065	0.019	0.040
MgO	10.361	9.793	9.456	10.560	9.249	11.520	11.610	9.427	9.810	9.930	9.270	9.860	10.040	7.556	7.718	8.290	7.212	6.783	7.980	7.770
CaO	19.504	18.697	18.397	19.629	18.165	19.079	18.807	19.641	19.480	18.870	18.410	19.150	19.000	12.958	12.973	14.021	11.449	10.673	14.317	14.940
Na2O	2.881	3.582	3.813	3.059	4.017	3.405	3.928	2.991	2.880	2.900	3.360	2.770	2.960	6.553	6.597	5.905	7.274	7.745	6.348	5.210
K2O	0.006	0.035	0.038	0.006	0.044	0.049	0.022	0.019	0.040	0.000	0.050	0.030	0.020	0.031	0.038	0.023	0.031	0.031	0.032	0.040
Cr2O3	0.028	0.000	0.001	0.000	0.000	0.030	0.021	0.000	0.010	0.000	0.000	0.020	0.000	0.000	0.000	0.025	0.022	0.000	0.288	0.380
TOTAL	98.507	98.959	99.725	98.538	99.142	101.009	101.292	101.244	100.150	100.310	99.880	99.900	99.990	99.567	99.749	99.343	99.179	99.171	99.581	99.050
Cations on the basis of 6 oxygens																				
Si	1.957	1.961	1.964	1.953	1.967	1.992	1.992	1.998	1.990	2.000	1.980	2.000	1.990	2.041	2.034	2.033	2.055	2.042	1.935	2.020
Ti	0.003	0.003	0.005	0.002	0.004	0.004	0.002	0.001	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.001	0.000
Al	0.108	0.141	0.155	0.107	0.165	0.141	0.143	0.093	0.120	0.120	0.150	0.110	0.120	0.281	0.274	0.231	0.284	0.317	0.227	0.230
Fe	0.404	0.396	0.399	0.391	0.388	0.285	0.280	0.429	0.390	0.400	0.400	0.390	0.390	0.332	0.344	0.350	0.348	0.358	0.321	0.360
Mn	0.003	0.003	0.006	0.005	0.004	0.004	0.003	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.001	0.000
Mg	0.597	0.560	0.536	0.608	0.526	0.632	0.635	0.528	0.550	0.560	0.520	0.560	0.560	0.416	0.425	0.461	0.398	0.375	0.424	0.440
Ca	0.807	0.768	0.749	0.812	0.742	0.752	0.739	0.791	0.790	0.760	0.750	0.780	0.770	0.513	0.514	0.560	0.455	0.424	0.546	0.600
Na	0.216	0.266	0.281	0.229	0.297	0.213	0.279	0.218	0.210	0.210	0.250	0.200	0.220	0.469	0.473	0.427	0.523	0.557	0.438	0.380
K	0.000	0.002	0.002	0.000	0.002	0.002	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.001	0.002	0.002	0.001	0.000
Cr	0.001	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.008	0.010
TOTAL	4.095	4.100	4.096	4.106	4.096	4.026	4.074	4.064	4.060	4.050	4.060	4.050	4.060	4.054	4.066	4.064	4.065	4.078	3.902	4.040

SAMP	SN.3		801.1													802				
ANAL	1	2	10	11	12	13	14	15	24	25	27	28	29	32	34	16	17	18	19	20
MIN	Omp		Omp													Omp				
WT(%)																				
SiO2	54.640	55.460	55.178	55.554	55.126	56.019	55.157	55.848	56.849	56.478	56.384	56.226	56.178	55.799	56.457	56.504	56.188	56.282	56.591	56.617
TiO2	0.010	0.050	0.054	0.038	0.051	0.045	0.051	0.055	0.024	0.031	0.054	0.053	0.008	0.016	0.023	0.020	0.018	0.037	0.036	0.040
Al2O3	8.760	9.140	10.471	11.526	9.249	11.417	10.685	10.788	11.734	11.295	11.239	11.979	11.513	10.313	11.119	11.169	10.611	10.998	11.358	10.739
FeO	6.100	7.470	3.997	2.731	4.518	3.419	4.122	3.702	3.301	3.384	3.800	3.159	3.149	4.122	3.885	3.355	3.664	3.349	3.078	3.810
MnO	0.000	0.070	0.021	0.000	0.059	0.000	0.000	0.026	0.000	0.024	0.002	0.010	0.000	0.000	0.005	0.003	0.000	0.024	0.014	0.000
MgO	8.880	8.190	8.426	8.353	9.133	8.376	8.355	8.384	8.143	8.408	8.053	8.197	8.259	8.544	8.364	8.710	8.931	8.614	8.689	8.742
CaO	14.230	12.690	13.659	13.156	14.807	13.339	13.763	13.497	12.520	13.242	12.983	12.655	12.954	14.038	13.206	13.286	13.565	13.474	13.157	13.441
Na2O	7.050	7.700	7.023	7.387	6.309	7.182	7.176	6.992	7.302	7.349	7.292	7.421	7.184	6.748	7.288	7.452	6.852	7.485	7.367	7.293
K2O	0.020	0.000	0.028	0.029	0.041	0.031	0.038	0.052	0.060	0.034	0.041	0.024	0.024	0.031	0.031	0.018	0.034	0.030	0.038	0.035
Cr2O3	0.020	0.010	0.020	0.006	0.000	0.015	0.055	0.040	0.000	0.016	0.035	0.018	0.048	0.030	0.020	0.070	0.059	0.085	0.118	0.030
TOTAL	99.710	100.800	98.877	98.780	99.293	99.843	99.402	99.384	99.933	100.261	99.883	99.742	99.317	99.641	100.398	100.587	99.922	100.378	100.446	100.747
Cations on the basis of 6 oxygens																				
Si	1.980	2.000	1.990	1.989	1.991	1.990	1.982	1.997	2.008	1.997	2.002	1.992	1.999	1.997	1.998	1.993	1.997	1.992	1.994	1.998
Ti	0.000	0.000	0.002	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001
Al	0.380	0.390	0.445	0.487	0.394	0.478	0.453	0.455	0.488	0.471	0.471	0.500	0.483	0.435	0.464	0.464	0.445	0.459	0.472	0.447
Fe	0.180	0.220	0.121	0.082	0.137	0.102	0.124	0.111	0.098	0.100	0.113	0.094	0.094	0.123	0.115	0.099	0.109	0.099	0.091	0.112
Mn	0.000	0.000	0.001	0.000	0.002	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000
Mg	0.480	0.440	0.453	0.446	0.492	0.444	0.448	0.447	0.429	0.443	0.426	0.433	0.438	0.456	0.441	0.458	0.473	0.454	0.456	0.460
Ca	0.550	0.490	0.528	0.505	0.573	0.508	0.530	0.517	0.474	0.502	0.494	0.480	0.494	0.538	0.501	0.502	0.517	0.511	0.497	0.508
Na	0.500	0.540	0.491	0.513	0.442	0.495	0.500	0.485	0.500	0.504	0.502	0.510	0.496	0.468	0.500	0.510	0.472	0.514	0.503	0.499
K	0.000	0.000	0.001	0.001	0.002	0.001	0.002	0.002	0.003	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.002
Cr	0.000	0.000	0.001	0.000	0.000	0.000	0.002	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.002	0.003	0.001
TOTAL	4.080	4.080	4.032	4.024	4.033	4.018	4.041	4.017	3.999	4.020	4.013	4.012	4.007	4.020	4.021	4.029	4.016	4.034	4.020	4.028

SAMP	802				804.2						805									
ANAL	21	26	27	34	1	2	21	22	23	24	6	7	9	11	13	16	17	18	19	20
MIN	Omp				Omp						Omp									
WT(%)																				
SiO2	55.641	55.183	55.425	55.026	55.782	55.458	55.885	55.547	56.134	55.213	56.060	55.973	56.373	55.390	56.386	56.277	55.351	55.475	54.923	55.421
TiO2	0.015	0.005	0.011	0.033	0.021	0.023	0.033	0.028	0.057	0.013	0.028	0.063	0.040	0.026	0.010	0.035	0.036	0.002	0.028	0.000
Al2O3	11.038	9.804	10.833	10.660	11.198	11.279	11.523	11.075	12.311	9.863	9.391	10.468	9.427	9.393	10.650	11.589	10.588	10.920	8.681	9.061
FeO	3.863	4.631	3.718	3.285	5.098	7.497	6.177	8.308	7.989	9.733	7.222	6.447	6.644	7.126	5.234	3.632	4.733	5.271	5.647	5.655
MnO	0.031	0.065	0.000	0.014	0.045	0.044	0.021	0.003	0.024	0.000	0.055	0.031	0.000	0.072	0.100	0.000	0.000	0.024	0.021	0.017
MgO	8.478	8.797	8.530	9.066	7.625	6.045	6.508	5.181	4.787	5.216	8.006	7.548	8.306	7.721	8.238	8.400	8.073	7.858	9.034	8.834
CaO	13.023	13.503	13.071	13.713	11.445	9.524	10.088	8.728	7.983	9.120	12.255	11.442	12.736	11.953	12.503	12.772	12.431	12.337	13.613	13.519
Na2O	7.522	6.981	7.249	7.109	8.343	9.384	8.763	9.776	10.186	9.341	7.833	8.019	7.602	7.671	7.589	7.684	7.609	7.792	6.898	6.863
K2O	0.025	0.037	0.039	0.028	0.031	0.036	0.047	0.033	0.030	0.042	0.033	0.027	0.038	0.029	0.026	0.043	0.028	0.047	0.021	0.045
Cr2O3	0.068	0.049	0.024	0.055	0.043	0.106	0.027	0.044	0.068	0.038	0.052	0.072	0.039	0.045	0.062	0.000	0.070	0.116	0.033	0.064
TOTAL	99.704	99.055	98.900	98.989	99.631	99.396	99.072	98.723	99.569	98.579	100.935	100.090	101.205	99.426	100.798	100.432	98.919	99.842	98.899	99.479
Cations on the basis of 6 oxygens																				
Si	1.987	1.994	1.992	1.978	1.998	2.009	2.015	2.029	2.023	2.036	2.007	2.006	2.007	2.011	2.000	1.988	1.997	1.989	2.000	2.003
Ti	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.002	0.000	0.008	0.002	0.001	0.001	0.000	0.001	0.001	0.000	0.001	0.000
Al	0.465	0.418	0.459	0.452	0.473	0.482	0.490	0.477	0.523	0.429	0.396	0.442	0.396	0.402	0.445	0.483	0.450	0.462	0.373	0.386
Fe	0.115	0.140	0.112	0.099	0.153	0.227	0.186	0.254	0.241	0.300	0.216	0.193	0.198	0.216	0.155	0.107	0.143	0.158	0.172	0.171
Mn	0.001	0.002	0.000	0.000	0.001	0.001	0.001	0.000	0.001	0.000	0.002	0.001	0.000	0.002	0.003	0.000	0.000	0.001	0.001	0.001
Mg	0.451	0.474	0.457	0.486	0.407	0.326	0.350	0.282	0.257	0.287	0.427	0.403	0.441	0.418	0.436	0.442	0.434	0.420	0.490	0.476
Ca	0.498	0.523	0.503	0.528	0.439	0.370	0.390	0.342	0.308	0.360	0.470	0.439	0.486	0.465	0.475	0.484	0.481	0.474	0.531	0.524
Na	0.521	0.489	0.505	0.496	0.580	0.659	0.613	0.692	0.712	0.668	0.544	0.557	0.525	0.540	0.522	0.527	0.533	0.542	0.487	0.481
K	0.001	0.002	0.002	0.001	0.001	0.002	0.002	0.002	0.001	0.002	0.002	0.001	0.002	0.001	0.001	0.002	0.001	0.002	0.001	0.002
Cr	0.002	0.001	0.001	0.002	0.001	0.003	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.001	0.002	0.000	0.002	0.003	0.001	0.002
TOTAL	4.041	4.042	4.031	4.043	4.054	4.079	4.047	4.078	4.070	4.084	4.073	4.047	4.056	4.058	4.038	4.034	4.042	4.050	4.057	4.045

Table 2. (Continued)

SAMP	805	807.1	807.2			812									813.1					
ANAL	1	55	1	16	17	33	34	35	36	37	38	39	40	41	7	8	9	10	11	12
MIN	Omp	Omp	Omp			Omp									Omp					
WT(%)																				
SiO2	55.810	56.099	56.440	54.519	57.190	56.236	56.992	56.426	55.958	55.419	55.969	56.580	56.909	55.839	56.182	56.375	56.521	56.090	56.510	56.700
TiO2	0.030	0.043	0.018	0.051	0.034	0.035	0.048	0.016	0.000	0.048	0.025	0.001	0.021	0.010	0.009	0.024	0.009	0.030	0.050	0.030
Al2O3	10.470	11.333	12.456	11.172	10.922	10.565	11.504	11.196	10.537	10.264	10.628	11.533	11.456	11.112	8.990	9.673	9.567	9.580	9.970	10.130
FeO	4.990	3.043	2.592	3.140	3.172	3.448	3.250	3.228	3.866	3.990	3.442	3.201	3.364	3.359	6.216	7.246	5.807	5.700	6.460	6.140
MnO	0.040	0.034	0.000	0.080	0.080	0.066	0.024	0.026	0.016	0.000	0.000	0.000	0.062	0.046	0.000	0.000	0.000	0.000	0.000	0.080
MgO	8.150	8.773	8.436	8.965	8.772	8.865	8.364	8.692	8.829	8.710	8.584	8.307	8.719	8.774	9.099	7.747	8.450	8.640	8.080	8.100
CaO	13.160	13.483	13.164	13.470	13.622	14.500	13.306	13.860	14.392	14.076	13.938	13.298	13.573	13.751	13.717	11.973	13.233	13.470	12.340	12.240
Na2O	6.430	6.585	7.625	7.207	7.413	6.826	7.259	6.985	6.636	6.751	6.878	7.406	7.145	7.026	6.868	8.091	7.136	6.280	6.980	7.210
K2O	0.040	0.071	0.032	0.008	0.022	0.044	0.013	0.027	0.035	0.010	0.045	0.024	0.012	0.037	0.047	0.034	0.037	0.030	0.030	0.040
Cr2O3	0.140	0.026	0.001	0.027	0.032	0.000	0.014	0.000	0.014	0.000	0.000	0.029	0.027	0.011	0.063	0.074	0.050	0.100	0.120	0.100
TOTAL	99.260	99.490	100.764	98.639	101.259	100.585	100.774	100.456	100.283	99.268	99.509	100.379	101.288	99.965	101.191	101.237	100.810	99.920	100.530	100.760
Cations on the basis of 6 oxygens																				
Si	2.000	1.993	1.978	1.966	2.002	1.990	2.001	1.992	1.989	1.991	1.997	1.996	1.991	1.984	2.001	2.010	2.011	2.010	2.010	2.010
Ti	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000
Al	0.440	0.475	0.515	0.475	0.451	0.441	0.476	0.466	0.441	0.435	0.449	0.480	0.473	0.465	0.377	0.407	0.401	0.400	0.420	0.420
Fe	0.150	0.090	0.076	0.095	0.093	0.102	0.095	0.095	0.115	0.120	0.103	0.094	0.098	0.100	0.185	0.216	0.173	0.170	0.190	0.180
Mn	0.000	0.001	0.000	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Mg	0.440	0.465	0.441	0.482	0.458	0.468	0.438	0.457	0.468	0.467	0.457	0.437	0.455	0.465	0.483	0.412	0.448	0.460	0.430	0.430
Ca	0.510	0.513	0.494	0.521	0.511	0.550	0.501	0.524	0.548	0.542	0.533	0.503	0.509	0.524	0.523	0.457	0.505	0.520	0.470	0.470
Na	0.450	0.454	0.518	0.504	0.503	0.468	0.494	0.478	0.457	0.470	0.476	0.507	0.485	0.484	0.474	0.559	0.492	0.440	0.480	0.500
K	0.000	0.003	0.001	0.000	0.001	0.002	0.001	0.001	0.002	0.000	0.002	0.001	0.001	0.002	0.002	0.002	0.002	0.000	0.000	0.000
Cr	0.000	0.001	0.000	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.002	0.002	0.001	0.000	0.000	0.000
TOTAL	3.990	3.996	4.024	4.047	4.023	4.024	4.007	4.015	4.020	4.026	4.017	4.018	4.014	4.026	4.048	4.065	4.034	4.000	4.020	4.020

SAMP	813.1				815.1						816.1							816.3		
ANAL	13	14	15	16	9	11	20	1	2	3	8	19	29	30	33	1	2	7	8	10
MIN	Omp				Omp						Omp							Omp		
WT(%)																				
SiO2	56.340	56.730	56.390	56.940	54.940	55.019	56.282	55.600	55.710	55.890	54.358	54.886	55.108	54.762	55.022	54.940	54.490	55.790	56.000	56.611
TiO2	0.030	0.030	0.030	0.030	0.015	0.034	0.063	0.050	0.040	0.000	0.000	0.013	0.065	0.065	0.022	0.060	0.020	0.018	0.012	0.052
Al2O3	9.020	9.980	9.240	10.440	11.064	11.405	11.225	8.120	10.380	9.600	9.467	10.001	9.999	10.732	8.899	8.940	8.700	10.718	11.510	11.439
FeO	6.850	7.330	5.480	6.130	3.728	3.612	3.281	5.580	5.240	5.850	5.448	5.484	4.680	4.124	5.834	6.320	6.160	3.185	2.689	3.060
MnO	0.030	0.090	0.050	0.010	0.000	0.000	0.007	0.000	0.050	0.090	0.099	0.066	0.023	0.029	0.140	0.050	0.120	0.070	0.000	0.042
MgO	8.420	7.390	8.890	7.640	8.839	8.696	8.831	9.480	8.140	8.060	8.487	8.714	9.348	9.010	9.436	8.550	8.920	8.652	8.425	8.403
CaO	13.190	11.550	13.810	12.010	13.455	13.371	13.273	15.550	13.820	13.870	13.946	13.474	13.876	13.680	14.553	14.120	14.620	14.143	13.693	13.557
Na2O	6.790	7.430	6.490	7.330	7.356	7.533	7.201	5.480	6.560	6.270	6.886	7.192	6.939	7.046	6.347	6.080	6.000	6.426	6.936	6.634
K2O	0.040	0.050	0.060	0.030	0.028	0.043	0.025	0.030	0.020	0.040	0.034	0.057	0.005	0.057	0.053	0.030	0.040	0.023	0.042	0.051
Cr2O3	0.060	0.080	0.080	0.090	0.098	0.037	0.010	0.050	0.000	0.100	0.001	0.082	0.000	0.087	0.096	0.060	0.060	0.048	0.070	0.009
TOTAL	100.760	100.670	100.510	100.650	99.523	99.750	100.198	99.940	99.960	99.770	98.726	99.969	100.043	99.592	100.402	99.150	99.130	99.073	99.377	99.858
Cations on the basis of 6 oxygens																				
Si	2.010	2.030	2.010	2.020	1.969	1.966	1.991	2.000	2.000	2.010	1.984	1.976	1.975	1.966	1.980	2.000	1.990	1.997	1.992	2.002
Ti	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.001	0.000	0.000	0.001	0.000	0.001
Al	0.380	0.420	0.390	0.440	0.467	0.480	0.468	0.340	0.440	0.410	0.407	0.424	0.422	0.454	0.377	0.380	0.370	0.452	0.483	0.477
Fe	0.200	0.220	0.160	0.180	0.112	0.108	0.097	0.170	0.160	0.180	0.166	0.165	0.140	0.124	0.176	0.190	0.190	0.095	0.080	0.091
Mn	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.002	0.001	0.001	0.004	0.000	0.000	0.002	0.000	0.001
Mg	0.450	0.390	0.470	0.400	0.472	0.463	0.466	0.510	0.430	0.430	0.462	0.468	0.499	0.482	0.506	0.460	0.480	0.462	0.447	0.443
Ca	0.510	0.440	0.530	0.460	0.517	0.522	0.503	0.600	0.530	0.540	0.545	0.520	0.533	0.526	0.561	0.550	0.570	0.542	0.522	0.514
Na	0.470	0.510	0.450	0.500	0.511	0.522	0.494	0.380	0.460	0.440	0.487	0.502	0.482	0.491	0.443	0.430	0.420	0.446	0.478	0.455
K	0.000	0.000	0.000	0.000	0.001	0.002	0.001	0.000	0.000	0.000	0.002	0.003	0.000	0.003	0.002	0.000	0.000	0.001	0.002	0.002
Cr	0.000	0.000	0.000	0.000	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.003	0.003	0.000	0.000	0.001	0.002	0.000
TOTAL	4.030	4.020	4.020	4.010	4.052	4.065	4.021	4.000	4.020	4.010	4.057	4.063	4.054	4.051	4.053	4.010	4.020	3.999	4.006	3.987

SAMP	816.3					907	KYR.6	KYR.12A									KYR.6		KYR.9	
ANAL	13	13	17	21	27	13	59	61	6	7	12	15	18	19	21	34	59	61	1	2
MIN	Omp					Omp	Omp		Omp								Omp		Omp	
WT(%)																				
SiO2	56.048	56.048	55.663	55.983	55.822	54.314	55.305	55.607	56.420	56.322	56.273	56.703	56.136	55.897	56.141	56.188	55.305	55.607	56.212	55.795
TiO2	0.032	0.032	0.043	0.000	0.005	0.023	0.000	0.049	0.071	0.063	0.022	0.002	0.006	0.044	0.032	0.060	0.000	0.049	0.032	0.022
Al2O3	11.152	11.152	10.280	11.797	11.473	10.352	11.526	10.867	10.516	10.335	10.466	11.466	10.584	9.317	9.934	10.491	11.526	10.867	12.272	11.259
FeO	4.099	4.099	3.476	2.840	2.717	3.720	9.706	8.841	4.442	4.353	3.978	2.224	4.196	4.199	4.326	3.599	9.706	8.841	3.205	3.889
MnO	0.119	0.119	0.049	0.056	0.000	0.016	0.043	0.033	0.008	0.008	0.048	0.038	0.000	0.034	0.048	0.014	0.043	0.033	0.015	0.000
MgO	8.180	8.180	8.606	8.038	8.506	9.300	4.494	5.536	8.744	8.593	8.991	8.953	8.616	9.219	8.670	8.895	4.494	5.536	7.559	8.067
CaO	13.626	13.626	14.538	13.454	13.709	14.524	7.570	8.813	14.410	14.317	14.590	14.285	14.168	15.143	14.512	14.538	7.570	8.813	12.393	13.160
Na2O	6.879	6.879	6.310	7.140	6.750	6.420	9.814	9.126	6.398	6.292	6.238	6.295	6.428	5.860	6.259	6.416	9.814	9.126	7.743	7.307
K2O	0.007	0.007	0.034	0.058	0.044	0.007	0.035	0.038	0.014	0.049	0.010	0.018	0.042	0.030	0.019	0.056	0.035	0.038	0.041	0.051
Cr2O3	0.011	0.011	0.006	0.020	0.031	0.009	0.101	0.043	0.040	0.007	0.046	0.061	0.026	0.019	0.014	0.018	0.101	0.043	0.035	0.000
TOTAL	100.153	100.153	99.005	99.386	99.057	98.685	99.594	98.953	101.063	100.339	100.662	100.045	100.202	99.762	99.955	100.275	99.594	98.953	99.507	99.550
Cations on the basis of 6 oxygens																				
Si	1.991	1.991	1.999	1.992	1.991	1.966	2.028	2.028	1.991	2.000	1.991	1.996	1.995	2.002	2.004	1.993	2.028	2.028	1.996	1.992
Ti	0.001	0.001	0.001	0.000	0.000	0.001	0.000	0.001	0.002	0.002	0.001	0.000	0.000	0.001	0.001	0.002	0.000	0.001	0.001	0.001
Al	0.467	0.467	0.435	0.495	0.482	0.442	0.498	0.467	0.438	0.433	0.436	0.476	0.443	0.393	0.418	0.439	0.498	0.467	0.514	0.474
Fe	0.122	0.122	0.104	0.085	0.081	0.113	0.298	0.270	0.131	0.129	0.118	0.066	0.125	0.126	0.129	0.107	0.298	0.270	0.095	0.116
Mn	0.004	0.004	0.002	0.002	0.000	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.000	0.001	0.002	0.000	0.001	0.001	0.000	0.000
Mg	0.433	0.433	0.461	0.426	0.452	0.502	0.246	0.301	0.460	0.455	0.474	0.470	0.457	0.492	0.461	0.470	0.246	0.301	0.400	0.429
Ca	0.519	0.519	0.559	0.513	0.524	0.563	0.297	0.344	0.545	0.545	0.553	0.539	0.540	0.581	0.555	0.553	0.297	0.344	0.472	0.504
Na	0.474	0.474	0.439	0.493	0.467	0.451	0.698	0.645	0.438	0.433	0.428	0.430	0.443	0.407	0.433	0.441	0.698	0.645	0.533	0.506
K	0.000	0.000	0.002	0.003	0.002	0.000	0.002	0.002	0.001	0.002	0.000	0.001	0.002	0.001	0.001	0.003	0.002	0.002	0.002	0.002
Cr	0.000	0.000	0.000	0.001	0.001	0.000	0.003	0.001	0.001	0.000	0.001	0.002	0.001	0.001	0.000	0.001	0.003	0.001	0.001	0.000
TOTAL	4.011	4.011	4.003	4.008	4.001	4.038	4.071	4.060	4.007	3.999	4.004	3.980	4.005	4.005	4.004	4.008	4.071	4.060	4.014	4.024

Table 2. (Continued)

SAMP	KYR.9						
ANAL	3	4	7	8	10	12	14
MIN	Omp						
WT (%)							
SiO2	55.440	55.871	56.137	55.834	55.730	54.936	55.447
TiO2	0.029	0.016	0.026	0.053	0.022	0.041	0.005
Al2O3	11.823	11.907	11.395	10.608	11.156	10.351	11.533
FeO	3.370	3.047	3.799	5.415	3.403	5.468	3.419
MnO	0.002	0.020	0.015	0.010	0.023	0.050	0.020
MgO	8.031	8.173	7.854	7.689	8.381	7.785	8.041
CaO	13.042	13.087	12.889	13.600	13.265	13.875	13.168
Na2O	7.448	7.364	7.504	7.013	7.061	7.027	7.443
K2O	0.040	0.035	0.039	0.029	0.034	0.051	0.034
Cr2O3	0.032	0.051	0.007	0.074	0.042	0.021	0.056
TOTAL	99.257	99.571	99.665	100.325	99.117	99.605	99.166
Cations on the basis of 6 oxygens							
Si	1.981	1.986	1.999	1.994	1.994	1.983	1.985
Ti	0.001	0.000	0.001	0.001	0.001	0.001	0.000
Al	0.498	0.499	0.478	0.447	0.471	0.441	0.487
Fe	0.101	0.091	0.113	0.162	0.102	0.165	0.102
Mn	0.000	0.001	0.000	0.000	0.001	0.002	0.001
Mg	0.428	0.433	0.417	0.409	0.447	0.419	0.429
Ca	0.499	0.498	0.492	0.521	0.509	0.537	0.505
Na	0.516	0.508	0.518	0.486	0.490	0.492	0.517
K	0.002	0.002	0.002	0.001	0.002	0.002	0.002
Cr	0.001	0.001	0.000	0.002	0.001	0.001	0.002
TOTAL	4.027	4.018	4.021	4.023	4.016	4.042	4.029

Table 3. Chemical compositions of white micas.

SAMP	KYR.4B			KYR.14A						KYR.14A						KYR.14B				
ANAL	10	8'	9'	10'	17	18	19	20	21	32	33	40	49	50	51	6	8	11	12	14
MIN	Phg	Phg			Phg						Phg					Phg				
WT(%)																				
SiO2	45.874	47.117	47.145	48.939	50.440	51.679	51.477	51.441	51.476	51.303	51.958	51.822	48.046	51.315	50.086	53.652	53.662	52.507	50.015	53.469
TiO2	0.793	0.591	0.739	0.659	0.326	0.259	0.291	0.197	0.254	0.309	0.247	0.215	0.458	0.258	0.252	0.188	0.343	0.397	0.443	0.324
Al2O3	28.040	26.601	27.096	24.681	22.882	20.857	21.523	21.358	20.903	20.740	20.006	21.066	26.379	20.468	20.253	20.902	21.924	23.277	25.413	23.674
FeO	6.800	7.107	6.974	7.074	4.215	3.913	4.123	3.799	4.358	3.975	3.939	4.096	5.420	4.034	3.647	3.552	3.628	3.793	3.656	3.937
MnO	0.060	0.007	0.090	0.123	0.000	0.000	0.060	0.040	0.000	0.000	0.000	0.000	0.033	0.033	0.000	0.000	0.020	0.043	0.076	0.000
MgO	1.670	1.818	1.809	2.486	4.061	4.775	4.476	4.924	4.768	4.616	4.923	4.803	1.715	5.023	4.887	5.651	5.706	4.905	3.808	4.463
CaO	0.000	0.000	0.000	0.024	0.014	0.008	0.006	0.000	0.000	0.009	0.027	0.000	0.779	0.021	0.019	0.011	0.000	0.012	0.042	0.009
Na2O	0.204	0.139	0.218	0.125	0.134	0.063	0.119	0.097	0.087	0.055	0.072	0.073	1.731	0.127	0.112	0.033	0.065	0.069	0.326	0.159
K2O	11.046	10.562	10.436	10.620	11.723	11.711	11.601	11.604	11.826	11.837	11.713	11.522	10.163	11.690	11.450	11.389	11.755	11.452	10.025	10.874
Cr2O3	0.018	0.000	0.016	0.000	0.000	0.000	0.032	0.006	0.000	0.049	0.000	0.011	0.000	0.000	0.011	0.000	0.000	0.011	0.012	0.000
TOTAL	94.505	93.942	94.523	94.731	93.795	93.265	93.708	93.466	93.672	92.893	92.885	93.608	94.724	92.969	90.717	95.378	97.103	96.466	93.816	96.909
Cations on the basis of 22 oxygens																				
Si	6.387	6.574	6.531	6.765	6.978	7.171	7.115	7.118	7.137	7.161	7.241	7.160	6.626	7.159	7.149	7.231	7.124	7.014	6.826	7.072
Ti	0.083	0.062	0.077	0.069	0.034	0.027	0.030	0.021	0.027	0.033	0.026	0.022	0.048	0.027	0.027	0.019	0.034	0.040	0.046	0.032
Al	4.602	4.375	4.425	4.021	3.731	3.411	3.506	3.483	3.426	3.412	3.286	3.431	4.288	3.366	3.407	3.320	3.431	3.665	4.088	3.691
Fe	0.792	0.829	0.808	0.818	0.488	0.454	0.477	0.440	0.505	0.464	0.459	0.473	0.625	0.471	0.435	0.400	0.403	0.424	0.417	0.436
Mn	0.007	0.001	0.011	0.014	0.000	0.000	0.007	0.005	0.000	0.000	0.000	0.000	0.004	0.004	0.000	0.000	0.002	0.005	0.009	0.000
Mg	0.347	0.378	0.374	0.512	0.837	0.988	0.922	1.016	0.986	0.961	1.023	0.989	0.353	1.045	1.040	1.135	0.129	0.977	0.775	0.880
Ca	0.000	0.000	0.000	0.004	0.002	0.001	0.001	0.000	0.000	0.001	0.004	0.000	0.115	0.003	0.003	0.002	0.000	0.002	0.006	0.001
Na	0.055	0.038	0.059	0.034	0.036	0.017	0.032	0.026	0.023	0.015	0.019	0.020	0.463	0.034	0.031	0.009	0.017	0.018	0.086	0.041
K	1.962	1.880	1.845	1.873	2.069	2.073	2.046	2.049	2.092	2.108	2.083	2.031	1.788	2.081	2.085	1.958	1.991	1.952	1.746	1.835
Cr	0.002	0.000	0.002	0.000	0.000	0.000	0.004	0.001	0.000	0.005	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.001	0.001	0.000
TOTAL	14.237	14.136	14.130	14.109	14.175	14.142	14.139	14.157	14.186	14.160	14.141	14.127	14.308	14.189	14.178	14.074	13.131	14.097	14.000	13.988

SAMP	YR.14B			KYR.15				KYR.18								801.1				
ANAL	8'	9'	10'	6	7	15	20	8'	9'	21	22	23	24	25	45	9	16	17	30	36
MIN	Phg			Parag						Phg						Parag	Phg			
WT(%)																				
SiO2	55.506	55.199	55.533	45.458	45.901	45.791	46.707	47.908	48.969	48.829	49.971	50.178	48.114	48.808	49.185	47.269	52.092	52.125	52.441	52.030
TiO2	0.303	0.352	0.386	0.008	0.071	0.002	0.035	0.008	0.059	0.228	0.166	0.155	0.202	0.172	0.165	0.008	0.225	0.215	0.196	0.201
Al2O3	20.868	21.031	21.062	41.312	41.069	41.698	41.114	39.057	34.593	26.825	26.590	25.847	25.996	26.716	25.835	41.642	29.122	28.997	29.208	29.244
FeO	3.675	3.525	3.646	0.696	0.588	0.917	0.575	0.367	1.337	1.855	1.849	1.903	1.950	1.860	1.816	0.655	1.253	1.078	1.129	1.048
MnO	0.000	0.000	0.000	0.007	0.000	0.069	0.003	0.036	0.023	0.000	0.003	0.000	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.015
MgO	5.205	5.283	5.398	0.093	0.098	0.107	0.122	0.288	1.328	3.294	3.521	3.623	3.366	3.247	3.636	0.210	3.974	3.990	4.114	4.061
CaO	0.000	0.006	0.011	0.174	0.230	0.868	0.222	0.191	2.048	0.000	0.034	0.002	0.036	0.014	0.038	0.160	0.017	0.016	0.000	0.000
Na2O	0.063	0.030	0.031	7.830	8.032	7.497	7.759	7.024	6.919	0.485	0.448	0.321	0.447	0.436	0.400	7.648	0.786	0.738	0.819	0.788
K2O	9.481	9.775	9.195	0.105	0.150	0.093	0.192	0.166	0.088	10.822	11.019	11.110	11.020	11.056	11.202	0.530	10.923	10.836	10.865	10.946
Cr2O3	0.000	0.000	0.011	0.022	0.043	0.150	0.043	0.093	0.065	0.007	0.000	0.023	0.000	0.000	0.001	0.007	0.024	0.000	0.000	0.043
TOTAL	95.101	95.201	95.273	95.705	96.182	97.192	96.772	95.138	95.429	92.345	93.601	93.162	91.131	92.309	92.278	98.134	98.416	97.995	98.772	98.376
Cations on the basis of 22 oxygens																				
Si	7.387	7.351	7.364	5.795	5.826	5.766	5.880	6.097	6.288	6.745	6.807	6.869	6.757	6.754	6.814	5.876	6.711	6.732	6.725	6.702
Ti	0.030	0.035	0.039	0.001	0.007	0.000	0.003	0.001	0.006	0.024	0.017	0.016	0.021	0.018	0.017	0.001	0.022	0.021	0.019	0.019
Al	3.274	3.301	3.292	6.208	6.144	6.188	6.101	5.858	5.235	4.368	4.269	4.171	4.303	4.357	4.219	6.102	4.422	4.414	4.413	4.440
Fe	0.409	0.393	0.404	0.074	0.062	0.097	0.061	0.039	0.144	0.214	0.211	0.218	0.229	0.215	0.210	0.068	0.135	0.116	0.121	0.113
Mn	0.000	0.000	0.000	0.001	0.000	0.007	0.000	0.004	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.002
Mg	1.033	1.049	1.067	0.018	0.019	0.020	0.023	0.055	0.254	0.678	0.715	0.739	0.705	0.670	0.751	0.039	0.763	0.768	0.786	0.780
Ca	0.000	0.001	0.002	0.024	0.031	0.117	0.030	0.028	0.282	0.000	0.005	0.000	0.005	0.002	0.006	0.021	0.002	0.002	0.000	0.000
Na	0.016	0.008	0.008	1.936	1.977	1.830	1.894	1.733	1.723	0.130	0.118	0.085	0.122	0.117	0.107	1.843	0.196	0.185	0.204	0.197
K	1.610	1.661	1.556	0.017	0.024	0.015	0.031	0.027	0.015	1.907	1.915	1.940	1.975	1.952	1.980	0.084	1.795	1.786	1.777	1.799
Cr	0.000	0.000	0.001	0.002	0.004	0.015	0.004	0.009	0.007	0.001	0.000	0.003	0.000	0.000	0.000	0.001	0.002	0.000	0.000	0.004
TOTAL	13.759	13.798	13.733	14.075	14.094	14.055	14.027	13.851	13.954	14.066	14.058	14.041	14.118	14.084	14.104	14.035	14.050	14.025	14.045	14.055

Table 3. (Continued)

SAMP	801.1							802		804.2				805					807.1	
ANAL	1'	2'	3'	4'	5'	6'	7'	23	24	5	6	33	34	12	21	22	23	24	51	78
MIN				Phg			Parag	Phg		Phg				Phg				Phg	Parag	
WT(%)																				
SiO2	52.856	53.325	52.841	52.723	53.612	53.433	49.170	50.851	49.742	52.729	52.781	51.496	51.068	51.189	51.414	50.319	49.542	49.656	44.128	45.150
TiO2	0.242	0.224	0.241	0.229	0.204	0.224	0.032	0.247	0.216	0.234	0.239	0.187	0.239	0.233	0.298	0.236	0.195	0.198	0.081	0.007
Al2O3	27.541	27.147	27.512	27.571	28.301	27.614	38.907	26.037	24.760	29.478	29.099	29.398	29.605	26.257	25.467	25.603	25.941	25.876	39.205	37.125
FeO	1.283	1.175	1.183	1.162	1.156	1.154	0.826	1.344	2.773	2.092	2.092	1.633	2.113	1.688	2.089	1.722	1.765	1.595	0.637	0.648
MnO	0.000	0.000	0.030	0.000	0.000	0.000	0.004	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.073	0.035	0.028	0.003	0.014
MgO	3.955	4.093	3.969	3.938	3.940	4.039	0.461	3.906	4.037	3.734	3.614	3.853	3.711	4.040	3.862	3.984	3.788	3.831	0.249	0.413
CaO	0.000	0.017	0.000	0.041	0.000	0.001	0.078	0.000	0.048	0.067	0.029	0.011	0.009	0.000	0.047	0.000	0.030	0.030	0.232	0.240
Na2O	0.748	0.679	0.724	0.700	0.758	0.727	6.490	0.623	0.502	0.702	0.688	0.689	0.782	0.601	0.662	0.682	0.758	0.707	6.803	7.198
K2O	9.253	9.459	9.488	9.405	8.557	9.083	1.587	10.369	10.117	9.499	9.370	10.104	10.130	10.597	10.496	10.572	10.427	10.593	0.771	0.479
Cr2O3	0.022	0.000	0.000	0.042	0.017	0.021	0.085	0.161	0.128	0.136	0.076	0.071	0.073	0.076	0.078	0.000	0.196	0.109	0.056	0.034
TOTAL	95.900	96.119	95.988	95.811	96.545	96.296	97.640	93.552	92.323	98.671	97.988	97.442	97.730	94.681	94.413	93.191	92.677	92.623	92.165	91.308
Cations on the basis of 22 oxygens																				
Si	6.906	6.951	6.904	6.898	6.913	6.934	6.145	6.885	6.880	6.736	6.780	6.681	6.630	6.866	6.927	6.871	6.810	6.826	5.848	6.031
Ti	0.024	0.022	0.024	0.023	0.020	0.022	0.003	0.025	0.023	0.023	0.023	0.018	0.023	0.024	0.030	0.024	0.020	0.020	0.008	0.001
Al	4.241	4.171	4.237	4.252	4.301	4.224	5.731	4.156	4.037	4.439	4.406	4.496	4.531	4.151	4.044	4.121	4.209	4.193	6.124	5.845
Fe	0.140	0.128	0.129	0.128	0.125	0.125	0.086	0.152	0.321	0.224	0.225	0.177	0.230	0.189	0.235	0.197	0.203	0.183	0.071	0.072
Mn	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.004	0.003	0.000	0.002
Mg	0.770	0.795	0.773	0.768	0.757	0.781	0.086	0.788	0.832	0.711	0.692	0.745	0.718	0.808	0.776	0.811	0.776	0.785	0.049	0.082
Ca	0.000	0.002	0.000	0.006	0.000	0.000	0.010	0.000	0.007	0.009	0.004	0.002	0.001	0.000	0.007	0.000	0.005	0.004	0.033	0.034
Na	0.190	0.172	0.184	0.178	0.190	0.183	1.573	0.164	0.135	0.174	0.171	0.173	0.197	0.156	0.173	0.181	0.202	0.188	1.748	1.864
K	1.542	1.573	1.582	1.570	1.408	1.504	0.253	1.791	1.785	1.548	1.536	1.672	1.678	1.813	1.804	1.842	1.829	1.858	0.130	0.082
Cr	0.002	0.000	0.000	0.004	0.002	0.002	0.008	0.017	0.014	0.014	0.008	0.007	0.008	0.008	0.008	0.000	0.021	0.012	0.006	0.004
TOTAL	13.815	13.814	13.836	13.826	13.715	13.775	13.896	13.980	14.033	13.877	13.844	13.972	14.015	14.016	14.005	14.055	14.079	14.074	14.018	14.017

Phg: Phengite; Parag: Paragonite

SAMP				807.2		808								812						
ANAL	79	80	4	7	15	10	11	12	15	16	17	20	21	27	30	31	42	43	44	19
MIN	Phg		Phg	Phg		Phg								Parag	Phg	Parag	Phg			
WT(%)																				
SiO2	48.957	48.619	52.923	52.607	50.546	51.954	51.457	51.891	52.425	53.262	51.954	52.232	51.512	46.901	48.436	46.718	52.138	52.899	52.053	51.040
TiO2	0.104	0.158	0.282	0.238	0.256	0.259	0.255	0.268	0.292	0.304	0.217	0.235	0.280	0.125	0.115	0.016	0.219	0.231	0.189	0.202
Al2O3	27.850	28.613	27.074	24.570	25.741	26.350	26.128	26.457	26.784	26.882	27.195	26.412	26.088	41.858	30.907	42.011	27.773	27.695	29.086	26.371
FeO	2.416	1.593	1.272	1.682	1.418	1.284	1.358	1.323	1.318	1.289	1.493	1.268	1.288	0.360	3.224	0.346	1.587	1.439	1.748	3.528
MnO	0.003	0.014	0.051	0.029	0.044	0.003	0.057	0.000	0.030	0.020	0.000	0.057	0.000	0.015	0.028	0.000	0.000	0.007	0.002	0.043
MgO	3.287	2.815	4.493	4.915	4.829	4.432	4.446	4.390	4.517	4.630	4.222	4.440	4.512	0.123	2.782	0.151	4.686	4.416	3.983	3.580
CaO	0.028	0.027	0.023	0.000	0.045	0.025	0.067	0.017	0.024	0.038	0.053	0.000	0.000	0.400	0.089	0.300	0.015	0.000	0.045	0.014
Na2O	0.748	1.138	0.645	0.333	0.375	0.493	0.470	0.413	0.505	0.492	0.451	0.415	0.455	7.473	0.349	7.035	0.615	0.505	0.522	0.573
K2O	10.291	9.535	10.502	11.094	10.283	11.430	11.580	11.407	11.513	11.313	11.652	11.604	11.565	0.927	11.503	1.366	10.756	11.416	10.933	11.129
Cr2O3	0.013	0.035	0.040	0.000	0.023	0.027	0.028	0.040	0.023	0.000	0.000	0.053	0.048	0.044	0.010	0.068	0.009	0.000	0.000	0.091
TOTAL	93.697	92.547	97.305	95.468	93.560	96.257	95.846	96.206	97.431	98.230	97.237	96.716	95.748	98.226	97.443	98.011	97.798	98.608	98.561	96.571
Cations on the basis of 22 oxygens																				
Si	6.666	6.649	6.876	7.007	6.847	6.869	6.851	6.862	6.849	6.883	6.812	6.876	6.858	5.836	6.697	5.773	6.767	6.819	6.707	6.801
Ti	0.011	0.016	0.028	0.024	0.026	0.026	0.026	0.027	0.029	0.030	0.021	0.023	0.028	0.012	0.012	0.002	0.021	0.022	0.018	0.020
Al	4.470	4.613	4.146	3.857	4.110	4.106	4.100	4.124	4.125	4.095	4.203	4.099	4.094	6.139	5.037	6.119	4.249	4.208	4.417	4.142
Fe	0.275	0.182	0.138	0.187	0.161	0.142	0.151	0.146	0.144	0.139	0.164	0.140	0.143	0.038	0.373	0.036	0.172	0.155	0.188	0.393
Mn	0.000	0.002	0.006	0.003	0.005	0.000	0.006	0.000	0.003	0.002	0.000	0.006	0.000	0.002	0.003	0.000	0.000	0.001	0.000	0.005
Mg	0.667	0.574	0.870	0.976	0.975	0.874	0.882	0.865	0.880	0.892	0.825	0.871	0.896	0.023	0.573	0.028	0.907	0.849	0.765	0.711
Ca	0.004	0.004	0.003	0.000	0.007	0.004	0.010	0.003	0.003	0.005	0.007	0.000	0.000	0.053	0.013	0.040	0.002	0.000	0.006	0.002
Na	0.198	0.302	0.163	0.086	0.098	0.126	0.121	0.106	0.128	0.123	0.115	0.106	0.118	1.803	0.094	1.686	0.155	0.126	0.131	0.148
K	1.788	1.664	1.741	1.885	1.777	1.928	1.967	1.925	1.919	1.865	1.949	1.949	1.964	0.147	2.029	0.215	1.781	1.877	1.797	1.892
Cr	0.001	0.004	0.004	0.000	0.003	0.003	0.003	0.004	0.002	0.000	0.000	0.006	0.005	0.004	0.001	0.007	0.001	0.000	0.000	0.010
TOTAL	14.080	14.009	13.974	14.026	14.009	14.078	14.117	14.062	14.082	14.034	14.097	14.076	14.106	14.056	14.833	13.905	14.055	14.057	14.030	14.123

SAMP	813.1			813.1			815.1					816.1			816.3	816.3				
ANAL	20	24	25	26	27	28	6	16	17	18	19	23	24	25	12	15	16	18	19	20
MIN	Phg			Phg			Parag			Phg		Phg	Parag	Phg	Phg	Phg				
WT(%)																				
SiO2	51.919	51.863	52.658	51.667	52.943	51.555	45.262	44.100	50.318	49.326	50.139	47.598	44.412	47.764	51.392	52.338	51.627	51.338	51.877	51.472
TiO2	0.236	0.189	0.248	0.254	0.180	0.192	0.040	0.001	0.000	0.236	0.184	0.194	0.081	0.094	0.242	0.267	0.253	0.270	0.209	0.263
Al2O3	26.963	26.830	26.295	26.619	26.625	27.558	38.967	38.698	32.945	26.092	24.907	28.125	37.962	27.793	27.391	27.658	27.726	26.990	26.603	27.240
FeO	3.254	3.031	2.687	3.541	2.473	2.328	0.699	0.530	0.706	1.427	1.383	1.973	0.597	1.586	1.293	1.173	1.085	1.168	1.182	1.308
MnO	0.033	0.000	0.000	0.010	0.063	0.000	0.024	0.010	0.049	0.000	0.000	0.000	0.000	0.007	0.000	0.000	0.060	0.011	0.000	0.000
MgO	3.792	3.652	4.164	3.541	3.820	3.384	0.170	0.075	0.591	4.027	4.252	3.464	0.450	3.264	4.162	4.294	4.016	4.007	4.234	4.078
CaO	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.203	0.102	0.007	0.028	0.000	0.169	0.000	0.019	0.030	0.022	0.000	0.046	0.045
Na2O	0.608	0.552	0.543	0.502	0.658	0.864	8.179	7.681	8.290	0.721	0.450	0.811	7.098	0.852	0.562	0.449	0.487	0.436	0.427	0.439
K2O	11.078	9.779	9.650	10.018	9.299	9.588	0.057	0.256	0.634	10.271	10.805	10.704	1.665	10.459	11.471	11.169	11.302	11.261	11.012	11.331
Cr2O3	0.061	0.211	0.015	0.081	0.069	0.035	0.000	0.029	0.000	0.075	0.024	0.083	0.152	0.114	0.056	0.038	0.039	0.008	0.000	0.050
TOTAL	97.944	96.107	96.260	96.233	96.130	95.504	93.492	91.583	93.635	92.182	92.172	92.952	92.586	91.933	96.588	97.416	96.617	95.489	95.590	96.226
Cations on the basis of 22 oxygens																				
Si	6.799	6.855	6.923	6.847	6.946	6.828	5.913	5.878	6.552	6.796	6.917	6.555	5.902	6.624	6.778	6.813	6.787	6.830	6.880	6.804
Ti	0.023	0.019	0.025	0.025	0.018	0.019	0.004	0.000	0.000	0.025	0.019	0.020	0.008	0.010	0.024	0.026	0.025	0.027	0.021	0.026
Al	4.162	4.180	4.075	4.158	4.117	4.302	6.000	6.080	5.057	4.237	4.050	4.566	5.947	4.543	4.258	4.244	4.296	4.232	4.159	4.244
Fe	0.356	0.335	0.295	0.392	0.271	0.258	0.076	0.062	0.077	0.165	0.160	0.227	0.066	0.184	0.143	0.128	0.119	0.130	0.131	0.145
Mn	0.004	0.000	0.000	0.001	0.007	0.000	0.003	0.001	0.006	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.007	0.001	0.000	0.000
Mg	0.740	0.720	0.816	0.700	0.747	0.668	0.033	0.015	0.115	0.827	0.875	0.711	0.089	0.675	0.818	0.833	0.787	0.795	0.837	0.804
Ca	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.029	0.014	0.001	0.004	0.000	0.024	0.000	0.003	0.004	0.003	0.000	0.007	0.006
Na	0.155	0.142	0.138	0.129	0.168	0.222	2.072	1.985	2.093	0.193	0.120	0.217	1.829	0.229	0.144	0.113	0.124	0.113	0.110	0.113
K	1.851	1.649	1.619	1.694	1.556	1.620	0.010	0.044	0.105	1.806	1.902	1.881	0.282	1.850	1.930	1.855	1.896	1.911	1.863	1.911
Cr	0.006	0.022	0.002	0.009	0.007	0.004	0.000	0.003	0.000	0.008	0.003	0.009	0.016	0.012	0.006	0.004	0.004	0.001	0.000	0.005
TOTAL	14.096	13.921	13.893	13.955	13.837	13.921	14.124	14.097	14.019	14.057	14.049	14.186	14.164	14.128	14.103	14.021	14.048	14.039	14.007	14.057

Table 3. (Continued)

SAMP	818.2							821						906.2B						907	
ANAL	23	24	25	11	12	15	16	7	8	12	13	14	15	6	10	13	21	23	17	18
MIN				Phg				Parag	Phg					Phg		Parag		Phg	Phg	
WT(%)																				
SiO2	52.058	51.632	51.005	49.060	50.679	51.213	50.966	46.890	47.043	48.319	49.139	48.607	48.750	49.552	49.661	45.240	46.169	49.910	49.446	45.871
TiO2	0.254	0.294	0.280	0.267	0.242	0.255	0.208	37.110	27.699	26.461	25.908	26.639	26.896	0.176	0.238	0.027	0.038	0.178	0.244	0.012
Al2O3	27.405	27.325	27.072	27.675	27.652	27.081	27.002	0.043	0.103	0.240	0.149	0.164	0.216	26.965	26.587	36.677	35.743	23.998	25.349	37.843
FeO	1.039	1.210	1.161	3.445	2.431	2.475	2.549	0.993	3.195	2.797	2.718	2.665	2.567	1.771	1.487	1.020	0.710	1.580	1.717	0.208
MnO	0.014	0.000	0.000	0.054	0.016	0.000	0.000	0.000	0.003	0.044	0.037	0.027	0.017	0.000	0.000	0.007	0.024	0.010	0.003	0.030
MgO	4.233	4.073	4.247	3.071	3.596	3.309	3.282	0.555	2.657	2.898	3.241	3.287	3.147	3.706	3.712	1.058	0.949	4.409	3.802	0.199
CaO	0.027	0.000	0.002	0.000	0.015	0.031	0.000	0.165	0.000	0.000	0.007	0.002	0.000	0.005	0.000	0.143	0.159	0.025	0.000	0.130
Na2O	0.418	0.466	0.464	0.568	0.753	0.845	0.866	6.406	0.344	0.659	0.716	0.742	0.775	0.520	0.561	6.699	6.085	0.290	0.474	7.245
K2O	10.902	11.397	11.331	10.737	10.567	10.527	10.438	1.163	11.235	10.747	10.623	10.455	10.421	10.301	10.546	1.466	2.344	10.836	10.574	0.778
Cr2O3	0.000	0.000	0.000	0.083	0.097	0.082	0.093	0.126	0.100	0.176	0.116	0.097	0.032	0.049	0.032	0.037	0.074	0.011	0.013	0.031
TOTAL	96.350	96.397	95.562	94.960	96.048	95.818	95.404	93.451	92.379	92.341	92.654	92.685	92.821	93.045	92.824	92.374	92.295	91.247	91.622	92.347
Cations on the basis of 22 oxygens																				
Si	6.836	6.809	6.789	6.644	6.732	6.814	6.811	6.126	6.574	6.720	6.797	6.716	6.717	6.763	6.796	6.016	6.146	6.965	6.867	6.048
Ti	0.025	0.029	0.028	0.027	0.024	0.026	0.021	5.715	4.561	4.338	4.224	4.339	4.368	0.018	0.025	0.003	0.004	0.019	0.025	0.001
Al	4.242	4.248	4.247	4.418	4.330	4.247	4.254	0.004	0.011	0.025	0.016	0.017	0.022	4.338	4.288	5.749	5.608	3.947	4.150	5.881
Fe	0.114	0.134	0.129	0.390	0.270	0.275	0.285	0.109	0.373	0.325	0.314	0.308	0.296	0.202	0.170	0.113	0.079	0.184	0.199	0.023
Mn	0.002	0.000	0.000	0.006	0.002	0.000	0.000	0.000	0.000	0.005	0.004	0.003	0.002	0.000	0.000	0.001	0.003	0.001	0.000	0.003
Mg	0.829	0.801	0.843	0.620	0.712	0.656	0.654	0.108	0.553	0.601	0.668	0.677	0.646	0.754	0.757	0.210	0.188	0.917	0.787	0.039
Ca	0.004	0.000	0.000	0.000	0.002	0.005	0.000	0.023	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.020	0.023	0.004	0.000	0.018
Na	0.107	0.119	0.120	0.149	0.194	0.218	0.224	1.623	0.093	0.178	0.192	0.199	0.207	0.138	0.149	1.727	1.571	0.079	0.128	1.852
K	1.827	1.918	1.924	1.855	1.791	1.787	1.780	0.194	2.006	1.907	1.874	1.843	1.832	1.794	1.841	0.249	0.398	1.929	1.874	0.131
Cr	0.000	0.000	0.000	0.009	0.010	0.009	0.010	0.013	0.011	0.019	0.013	0.011	0.004	0.005	0.003	0.004	0.008	0.001	0.002	0.003
TOTAL	13.984	14.057	14.081	14.118	14.067	14.035	14.038	13.914	14.182	14.119	14.103	14.113	14.094	14.013	14.029	14.093	14.027	14.046	14.032	14.000

Phg: Phengite; Parag: Paragonite

SAMP	KYR.6											KYR.9A								
ANAL	33	34	35	37	51	52	71	72	73	74	70	85	15	16	17	18	16'	17'	18'	19'
MIN	Phg	Phg	Phg	Phg							Par		Phg							
WT(%)																				
SiO2	47.663	47.386	49.577	46.825	47.525	48.108	48.447	48.452	48.713	46.578	46.321	46.036	52.425	52.218	51.704	51.735	50.017	49.704	49.505	50.683
TiO2	0.264	0.170	0.169	0.168	0.264	0.108	0.170	0.266	0.192	0.243	0.018	0.025	0.292	0.187	0.198	0.201	0.231	0.170	0.264	0.222
Al2O3	25.828	25.845	25.775	27.024	25.580	26.735	26.405	26.291	25.815	26.155	37.873	37.786	26.784	29.506	29.575	29.116	29.076	28.960	29.049	29.178
FeO	5.110	4.274	2.675	2.650	5.313	4.369	5.215	4.605	2.701	4.862	0.824	1.611	1.318	1.130	1.439	1.152	1.162	1.084	1.145	1.263
MnO	0.013	0.000	0.007	0.033	0.000	0.000	0.007	0.023	0.040	0.000	0.053	0.057	0.030	0.008	0.048	0.005	0.013	0.000	0.050	0.003
MgO	2.441	2.582	3.349	3.105	2.470	2.595	2.448	2.555	3.378	2.452	0.207	0.213	4.517	3.715	3.809	3.890	3.638	3.484	3.682	3.821
CaO	0.020	0.000	0.030	0.037	0.011	0.013	0.007	0.024	0.034	0.011	0.124	0.128	0.024	0.002	0.007	0.000	0.000	0.008	0.000	0.000
Na2O	0.753	0.708	0.726	0.889	0.716	0.757	0.677	0.731	0.793	0.716	7.308	7.198	0.505	0.816	0.834	0.702	0.810	0.862	0.806	0.795
K2O	10.804	10.847	10.666	10.848	10.825	10.956	10.957	11.105	10.960	10.884	0.728	0.657	11.513	10.684	10.796	10.876	10.884	10.511	10.617	10.615
Cr2O3	0.052	0.066	0.022	0.082	0.129	0.081	0.086	0.046	0.110	0.063	0.061	0.055	0.023	0.050	0.020	0.023	0.000	0.015	0.018	0.030
TOTAL	92.948	91.878	92.996	91.661	93.103	93.722	94.419	94.098	92.736	91.964	93.517	93.766	97.431	98.316	98.430	97.700	95.831	94.798	95.136	96.610
Cations on the basis of 22 oxygens																				
Si	6.678	6.690	6.826	6.584	6.658	6.656	6.678	6.690	6.757	6.602	6.050	6.020	6.849	6.716	6.666	6.708	6.632	6.646	6.608	6.652
Ti	0.028	0.018	0.018	0.018	0.028	0.011	0.018	0.028	0.020	0.026	0.002	0.003	0.029	0.018	0.019	0.020	0.023	0.017	0.027	0.022
Al	4.266	4.301	4.183	4.479	4.269	4.360	4.290	4.279	4.221	4.370	5.831	5.824	4.125	4.473	4.494	4.450	4.544	4.564	4.570	4.514
Fe	0.599	0.505	0.308	0.312	0.623	0.506	0.601	0.532	0.313	0.576	0.090	0.176	0.144	0.122	0.155	0.125	0.129	0.121	0.128	0.139
Mn	0.002	0.000	0.001	0.004	0.000	0.000	0.001	0.003	0.005	0.000	0.006	0.006	0.003	0.001	0.005	0.001	0.002	0.000	0.006	0.000
Mg	0.510	0.543	0.688	0.651	0.516	0.535	0.503	0.526	0.699	0.518	0.040	0.041	0.880	0.712	0.732	0.752	0.719	0.695	0.733	0.748
Ca	0.003	0.000	0.004	0.006	0.002	0.002	0.001	0.004	0.005	0.002	0.017	0.018	0.003	0.001	0.001	0.000	0.000	0.001	0.000	0.000
Na	0.205	0.194	0.194	0.242	0.195	0.203	0.181	0.196	0.213	0.197	1.851	1.825	0.128	0.204	0.209	0.177	0.208	0.224	0.209	0.202
K	1.931	1.954	1.874	1.946	1.935	1.934	1.927	1.956	1.939	1.968	0.121	0.110	1.919	1.753	1.776	1.799	1.841	1.793	1.808	1.777
Cr	0.006	0.007	0.002	0.009	0.014	0.009	0.009	0.005	0.012	0.007	0.006	0.006	0.002	0.005	0.002	0.002	0.000	0.002	0.002	0.003
TOTAL	14.226	14.212	14.097	14.249	14.238	14.217	14.209	14.217	14.183	14.266	14.015	14.030	14.082	14.006	14.059	14.034	14.098	14.062	14.089	14.057

SAMP	KYR.9A			KYR.9B								KYR.10								
ANAL	16"	17"	1'	7	8	14	15	20	21	23	24	4	9	12	16	17	14'	15'	16'	17'
MIN			Parag	Phg								Phg								
WT(%)																				
SiO2	53.262	51.954	46.881	50.959	51.840	51.940	51.196	51.812	51.768	51.465	51.096	54.752	49.965	52.993	52.697	51.322	53.674	51.426	50.922	53.562
TiO2	0.304	0.217	0.034	0.241	0.247	0.382	0.374	0.220	0.177	0.333	0.335	0.130	0.082	0.158	0.163	0.149	0.139	0.132	0.169	0.152
Al2O3	26.882	27.195	41.304	26.425	27.039	26.009	25.894	27.204	26.325	26.122	25.267	25.414	32.373	26.730	24.702	27.360	24.269	28.774	28.168	24.272
FeO	1.289	1.493	0.656	2.038	1.358	1.725	1.330	1.403	1.537	1.357	1.638	3.362	2.504	2.954	2.797	2.363	3.594	2.221	3.069	3.304
MnO	0.020	0.000	0.037	0.000	0.007	0.007	0.000	0.004	0.000	0.025	0.000	0.007	0.056	0.007	0.033	0.010	0.003	0.054	0.003	0.000
MgO	4.630	4.222	0.219	3.790	4.207	4.495	4.545	4.233	4.431	4.485	4.437	3.774	2.069	3.566	3.511	2.926	3.787	3.053	2.885	3.856
CaO	0.038	0.053	0.269	0.017	0.012	0.016	0.023	0.002	0.036	0.000	0.010	0.000	0.002	0.012	0.012	0.000	0.000	0.013	0.015	0.000
Na2O	0.492	0.451	7.156	0.352	0.456	0.319	0.337	0.436	0.338	0.380	0.325	0.125	0.343	0.297	0.180	0.499	0.149	0.614	0.498	0.094
K2O	11.313	11.652	0.868	11.374	11.409	11.278	11.591	11.403	11.437	11.397	11.493	11.336	11.159	10.729	10.831	10.638	8.370	8.302	8.132	8.493
Cr2O3	0.000	0.000	0.053	0.038	0.029	0.015	0.014	0.043	0.024	0.034	0.024	0.022	0.000	0.050	0.014	0.054	0.015	0.014	0.064	0.000
TOTAL	98.230	97.237	97.477	95.234	96.604	96.186	95.304	96.760	96.073	95.598	94.625	98.922	98.553	97.496	94.940	95.321	94.000	94.603	93.925	93.733
Cations on the basis of 22 oxygens																				
Si	6.883	6.812	5.874	6.835	6.828	6.878	6.852	6.814	6.864	6.856	6.895	7.067	6.467	6.920	6.993	6.846	7.173	6.803	6.809	7.173
Ti	0.030	0.021	0.003	0.024	0.024	0.038	0.038	0.022	0.018	0.033	0.034	0.013	0.008	0.016	0.016	0.149	0.014	0.013	0.017	0.015
Al	4.095	4.203	6.100	4.178	4.198	4.060	4.085	4.217	4.114	4.102	4.019	3.866	4.939	4.114	4.020	4.302	3.823	4.487	4.439	3.831
Fe	0.139	0.164	0.069	0.229	0.150	0.191	0.149	0.154	0.170	0.151	0.185	0.363	0.271	0.323	0.310	0.264	0.402	0.246	0.343	0.370
Mn	0.002	0.000	0.004	0.000	0.001	0.001	0.000	0.000	0.000	0.003	0.000	0.001	0.006	0.001	0.004	0.001	0.000	0.001	0.000	0.000
Mg	0.892	0.825	0.041	0.758	0.826	0.887	0.907	0.830	0.876	0.891	0.893	0.726	0.399	0.694	0.695	0.582	0.754	0.602	0.575	0.770
Ca	0.005	0.007	0.036	0.002	0.002	0.002	0.003	0.000	0.005	0.000	0.001	0.000	0.000	0.002	0.002	0.000	0.000	0.002	0.002	0.000
Na	0.123	0.115	1.738	0.091	0.116	0.082	0.088	0.111	0.087	0.098	0.085	0.031	0.086	0.075	0.046	0.129	0.039	0.157	0.129	0.024
K	1.865	1.949	0.139	1.946	1.917	1.905	1.979	1.913	1.935	1.937	1.979	1.867	1.843	1.787	1.834	1.810	1.427	1.401	1.387	1.451
Cr	0.000	0.000	0.005	0.004	0.003	0.002	0.002	0.005	0.003	0.004	0.003	0.002	0.000	0.005	0.002	0.006	0.002	0.001	0.007	0.000
TOTAL	14.034	14.097	14.009	14.068	14.064	14.047	14.101	14.066	14.071	14.075	14.092	13.936	14.020	13.936	13.920	14.089	13.634	13.713	13.709	13.634

Table 3. (Continued)

SAMP	KYR.10	KYR.12A			
ANAL	18'	28	31	36	37
MIN		Phg	Parag	Parag	
WT(%)					
SiO2	53.591	50.170	47.053	47.370	48.025
TiO2	0.146	0.160	0.000	0.024	0.053
Al2O3	24.842	28.959	40.244	41.293	40.810
FeO	3.185	1.545	0.312	0.208	0.271
MnO	0.000	0.052	0.003	0.000	0.000
MgO	3.773	3.397	0.394	0.110	0.349
CaO	0.006	0.010	0.199	0.183	0.183
Na2O	0.146	0.736	7.362	7.400	6.889
K2O	8.697	10.630	0.947	0.455	1.083
Cr2O3	0.020	0.029	0.041	0.004	0.055
TOTAL	94.406	95.688	96.555	97.047	97.718
Cations on the basis of 22 oxygens					
Si	7.131	6.660	5.945	5.928	5.981
Ti	0.015	0.016	0.000	0.002	0.005
Al	3.896	4.531	5.994	6.091	5.990
Fe	0.354	0.172	0.033	0.022	0.028
Mn	0.000	0.006	0.000	0.000	0.000
Mg	0.748	0.672	0.074	0.021	0.065
Ca	0.001	0.001	0.027	0.025	0.024
Na	0.038	0.190	1.804	1.796	1.664
K	1.476	1.800	0.153	0.073	0.172
Cr	0.002	0.003	0.004	0.000	0.005
TOTAL	13.662	14.052	14.034	13.958	13.934

Phg: Phengite; Parag: Paragonite

Table 4. Chemical compositions of amphiboles.

SAMP	KYR.1																				
ANAL	1	2	8	10	11	14	15	16	17	18	20	22	13'	14'	19'	13"	14"	8"'	9"'	10"'	
MIN	Fe Parg	MgHbl	Act		Fe Parg		Act	Mg Hbl	Fe Parg	Act Hbl		Act Mg Has				Eden		Inc-Parg			
WT(%)																					
SiO2	43.430	45.940	53.940	54.410	55.150	38.810	54.910	46.290	36.900	50.970	53.040	54.390	39.370	39.860	41.380	44.370	46.650	41.790	39.580	42.190	
TiO2	0.100	0.340	0.040	0.060	0.010	0.250	0.010	0.130	0.270	0.070	0.020	0.030	0.600	0.720	0.980	0.840	0.560	0.640	0.730	0.660	
Al2O3	15.220	9.120	4.820	4.160	4.040	17.220	4.170	10.590	19.570	5.010	4.990	3.220	13.740	13.250	10.270	8.610	6.770	14.790	17.210	13.510	
FeO	17.930	18.580	9.050	8.320	8.460	20.780	8.120	15.900	19.500	9.580	9.090	7.990	19.660	18.770	21.070	20.170	18.640	19.780	19.260	18.740	
MnO	0.170	0.350	0.120	0.050	0.050	0.230	0.010	0.190	0.130	0.080	0.060	0.090	0.320	0.200	0.140	0.140	0.200	0.240	0.170	0.100	
MgO	8.210	10.340	17.120	17.480	17.830	5.560	18.320	10.110	4.920	16.410	17.030	18.350	7.920	9.030	8.560	9.450	10.690	7.100	6.830	7.510	
CaO	9.440	10.010	10.440	10.680	10.660	9.740	10.520	8.880	10.290	10.320	10.440	11.210	10.190	10.300	10.780	10.880	11.120	8.310	9.060	8.450	
Na2O	3.870	2.450	2.060	1.830	1.860	4.100	1.930	3.590	3.650	2.120	2.180	1.460	3.440	3.330	2.740	2.220	1.710	4.040	3.800	4.100	
K2O	0.070	0.040	0.070	0.090	0.110	0.070	0.100	0.060	0.130	0.050	0.080	0.010	0.490	0.700	0.450	0.400	0.280	0.680	0.760	0.890	
Cr2O3	0.020	0.000	0.000	0.000	0.010	0.000	0.000	0.020	0.000	0.010	0.010	0.040	0.000	0.000	0.000	0.000	0.010	0.020	0.010	0.000	
TOTAL	98.440	97.170	97.670	97.080	98.190	96.760	98.080	95.780	95.360	94.630	96.940	96.790	95.730	96.160	96.360	97.070	96.620	97.390	97.410	96.140	
Cations on the basis of 23 oxygens																					
Si	6.357	6.772	7.554	7.655	7.660	5.926	7.601	6.885	5.717	7.407	7.498	7.658	6.050	6.070	6.350	6.690	6.990	6.240	5.930	6.410	
Al-4	1.643	1.228	0.446	0.345	0.340	2.074	0.399	1.115	2.283	0.593	0.502	0.342	1.950	1.930	1.650	1.310	1.010	1.760	2.070	1.590	
Al-6	0.983	0.358	0.349	0.344	0.321	1.024	0.281	0.743	1.290	0.265	0.329	0.192	0.550	0.450	0.210	0.220	0.190	0.850	0.960	0.830	
Ti	0.011	0.038	0.005	0.007	0.001	0.029	0.001	0.014	0.032	0.008	0.002	0.003	0.070	0.080	0.110	0.100	0.060	0.070	0.080	0.070	
Fe-3	0.564	0.924	0.385	0.253	0.322	0.579	0.462	0.459	0.390	0.490	0.392	0.357	0.780	0.830	0.760	0.650	0.570	0.810	0.790	0.470	
Fe-2	1.630	1.367	0.675	0.727	0.661	2.075	0.478	1.518	2.136	0.674	0.683	0.583	1.750	1.570	1.940	1.890	1.770	1.660	1.620	1.910	
Mn	0.021	0.044	0.015	0.005	0.006	0.030	0.001	0.023	0.017	0.010	0.007	0.011	0.040	0.030	0.020	0.020	0.020	0.030	0.020	0.010	
Mg	1.789	2.270	3.571	3.664	3.688	1.264	3.777	2.241	1.135	3.553	3.586	3.849	1.810	2.050	1.960	2.120	2.390	1.580	1.520	1.700	
Ca	1.481	1.581	1.566	1.610	1.586	1.593	1.560	1.416	1.709	1.607	1.582	1.691	1.680	1.680	1.770	1.760	1.790	1.330	1.450	1.380	
Na(B)	0.519	0.419	0.434	0.390	0.414	0.407	0.440	0.584	0.291	0.393	0.418	0.309	0.320	0.320	0.230	0.240	0.210	0.670	0.550	0.620	
Na(A)	0.578	0.282	0.126	0.108	0.087	0.807	0.077	0.452	0.805	0.205	0.180	0.089	0.700	0.670	0.590	0.410	0.280	0.500	0.560	0.580	
K	0.013	0.008	0.012	0.016	0.020	0.014	0.017	0.016	0.025	0.009	0.014	0.002	0.100	0.140	0.090	0.080	0.050	0.130	0.150	0.170	
Cr	0.002	0.000	0.000	0.000	0.001	0.000	0.000	0.002	0.000	0.001	0.001	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
TOTAL	15.591	15.289	15.137	15.124	15.107	15.821	15.094	15.467	15.830	15.215	15.194	15.091	15.800	15.800	15.680	15.480	15.340	15.630	15.700	15.760	

SAMP	KYR.1	KYR.2												KYR.4A							
ANAL	11"'	7	8	11	13	14	16	17	18	19	21	22	24	19	20	21	22	23	24	25	
MIN	nc-Parg	Bar Tsch Hbl			Bar	Mg Hbl	Bar	Mg Hbl	incl: Bar		Bar		Bar Tsch Hbl		core					rim	
WT(%)																					
SiO2	37.520	45.110	42.680	45.590	47.930	47.330	47.250	44.410	43.330	42.420	44.150	42.290	43.780	43.410	43.210	42.730	42.720	42.620	42.660	42.410	
TiO2	0.400	0.520	0.560	0.380	0.310	0.310	0.430	0.410	0.650	0.590	0.620	0.510	0.660	1.140	1.110	1.100	1.090	1.090	1.090	1.050	
Al2O3	17.730	12.240	13.810	11.680	10.690	10.380	12.060	11.060	13.810	14.220	14.260	13.630	13.610	11.760	11.630	12.210	12.340	12.280	11.970	12.230	
FeO	19.610	15.140	17.620	18.220	14.210	14.000	12.490	15.870	14.770	16.330	15.000	17.300	15.330	19.120	18.940	19.300	19.260	19.290	19.580	19.590	
MnO	0.210	0.090	0.250	0.360	0.040	0.110	0.020	0.260	0.000	0.140	0.120	0.170	0.080	0.390	0.350	0.330	0.430	0.280	0.360	0.340	
MgO	5.700	12.760	9.270	10.900	13.860	14.170	13.260	10.910	11.480	10.920	11.510	9.410	10.820	8.350	8.410	8.380	8.350	8.130	8.160	8.250	
CaO	9.750	7.500	8.700	8.020	6.920	6.840	7.410	10.560	8.080	8.170	8.010	10.820	7.680	8.530	8.430	8.650	8.550	8.630	9.040	9.130	
Na2O	3.750	2.510	3.130	2.250	2.640	2.390	3.520	2.220	3.340	3.070	3.040	2.450	3.300	2.790	2.780	2.820	2.710	2.700	2.640	2.770	
K2O	0.650	0.370	0.240	0.190	0.530	0.540	0.450	0.230	0.380	0.360	0.310	0.370	0.400	1.080	1.100	1.010	1.030	1.080	0.970	1.030	
Cr2O3	0.000	0.030	0.060	0.000	0.000	0.030	0.050	0.020	0.010	0.000	0.010	0.000	0.010	0.000	0.010	0.000	0.000	0.000	0.000	0.000	
TOTAL	95.320	96.250	96.310	97.590	97.120	96.090	96.940	95.940	95.850	96.230	97.040	96.950	95.660	96.570	95.960	96.530	96.480	96.100	96.460	96.790	
Cations on the basis of 23 oxygens																					
Si	5.820	6.400	6.290	6.480	6.680	6.640	6.670	6.600	6.290	6.150	6.290	6.290	6.370	6.490	6.500	6.400	6.380	6.410	6.420	6.370	
Al-4	2.180	1.600	1.710	1.520	1.320	1.360	1.330	1.400	1.710	1.850	1.710	1.710	1.630	1.510	1.500	1.600	1.620	1.590	1.580	1.630	
Al-6	1.060	0.440	0.690	0.440	0.430	0.350	0.680	0.530	0.650	0.580	0.690	0.680	0.710	0.570	0.560	0.550	0.560	0.590	0.540	0.530	
Ti	0.050	0.050	0.060	0.040	0.030	0.030	0.050	0.050	0.070	0.060	0.070	0.060	0.070	0.130	0.130	0.120	0.120	0.120	0.120	0.120	
Fe-3	0.520	2.060	1.200	1.900	2.000	2.190	1.260	0.730	1.390	1.670	1.550	0.690	1.380	0.930	0.950	1.020	1.090	0.970	0.930	0.920	
Fe-2	2.020	0.000	0.970	0.270	0.000	0.000	0.220	1.240	0.400	0.310	0.240	1.470	0.490	1.460	1.440	1.400	1.310	1.460	1.540	1.540	
Mn	0.030	0.010	0.030	0.040	0.000	0.010	0.000	0.030	0.000	0.020	0.010	0.020	0.010	0.050	0.040	0.040	0.050	0.040	0.050	0.040	
Mg	1.320	2.690	2.040	2.310	2.880	2.960	2.790	2.410	2.480	2.360	2.440	2.090	2.350	1.860	1.880	1.870	1.860	1.820	1.830	1.840	
Ca	1.620	1.140	1.370	1.220	1.030	1.030	1.120	1.680	1.260	1.270	1.220	1.730	1.200	1.370	1.360	1.390	1.370	1.390	1.460	1.470	
Na(B)	0.380	0.690	0.630	0.620	0.710	0.650	0.880	0.320	0.740	0.730	0.780	0.270	0.800	0.630	0.640	0.610	0.630	0.610	0.540	0.530	
Na(A)	0.750	0.000	0.270	0.000	0.000	0.000	0.090	0.320	0.200	0.130	0.060	0.430	0.130	0.180	0.170	0.210	0.150	0.180	0.230	0.280	
K	0.130	0.070	0.050	0.030	0.090	0.100	0.080	0.040	0.070	0.070	0.060	0.070	0.070	0.210	0.210	0.190	0.200	0.210	0.190	0.200	
Cr	0.000	0.000	0.010	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
TOTAL	15.880	15.160	15.310	14.880	15.190	15.330	15.170	15.360	15.270	15.200	15.120	15.500	15.200	15.380	15.380	15.400	15.350	15.390	15.410	15.470	

Table 4. (Continued)

SAMP	YR.14A							KYR.15												
ANAL	1	2	3	4	5	6	7	8	8	9	10	11	12	13	26	27	28	30	31	32
MIN	ncl: Bar		Cros-core		Win		Bar	rim	Fe Parag	Fe Parag	Mg Hbl	Act Hbl	Mg Hbl		Glp		Act	Glp		Glp-core
WT(%)																				
SiO2	42.750	42.780	55.320	54.190	53.590	52.530	49.350	42.170	35.380	37.190	49.500	53.720	44.800	47.320	57.830	57.580	57.740	56.910	58.720	57.010
TiO2	0.410	0.400	0.020	0.030	0.060	0.050	0.120	0.370	0.020	0.080	0.070	0.090	0.180	0.080	0.010	0.020	0.040	0.040	0.030	0.020
Al2O3	14.480	13.840	7.190	8.550	4.240	3.940	6.990	12.090	20.400	19.440	8.300	5.650	12.770	9.800	11.260	11.560	5.460	11.470	11.470	11.740
FeO	21.420	21.100	14.840	12.280	15.010	15.580	17.140	20.430	22.550	22.730	16.390	9.110	18.780	18.210	7.560	6.860	10.020	6.700	6.940	7.630
MnO	0.270	0.190	0.020	0.130	0.050	0.120	0.080	0.060	0.120	0.100	0.190	0.040	0.000	0.120	0.050	0.030	0.030	0.060	0.010	0.000
MgO	6.590	6.610	10.570	10.750	13.190	13.140	11.170	7.730	4.600	4.180	11.140	16.960	8.850	9.920	12.550	12.420	14.180	12.650	12.620	12.600
CaO	7.100	6.930	2.180	0.680	7.110	7.650	7.230	7.760	9.830	9.660	8.930	9.660	8.720	8.980	1.640	1.330	8.290	1.630	1.340	1.530
Na2O	3.670	3.490	5.950	7.070	3.460	2.920	3.570	3.890	3.620	3.710	2.680	2.410	3.710	3.130	6.880	7.100	2.270	6.610	7.020	6.850
K2O	0.890	0.650	0.070	0.070	0.170	0.200	0.340	0.720	0.100	0.080	0.050	0.060	0.030	0.020	0.020	0.060	0.050	0.040	0.050	0.060
Cr2O3	0.000	0.010	0.030	0.010	0.000	0.000	0.000	0.000	0.030	0.010	0.010	0.000	0.040	0.030	0.040	0.000	0.030	0.000	0.010	0.070
TOTAL	97.580	95.980	96.190	93.750	96.870	96.140	96.000	94.930	96.650	97.170	97.250	97.690	97.890	97.600	97.840	96.950	98.100	96.110	98.200	97.510
Cations on the basis of 23 oxygens																				
Si	6.310	6.390	7.820	7.770	7.670	7.590	7.230	6.420	5.390	5.660	7.170	7.480	6.550	6.910	7.810	7.840	8.010	7.790	7.880	7.720
Al-4	1.690	1.610	0.180	0.230	0.330	0.410	0.770	1.580	2.610	2.340	0.830	0.520	1.450	1.090	0.190	0.160	0.010	0.210	0.120	0.280
Al-6	0.830	0.830	1.010	1.210	0.380	0.270	0.440	0.590	1.060	1.140	0.580	0.410	0.750	0.590	1.610	1.690	0.900	1.640	1.690	1.590
Ti	0.050	0.040	0.000	0.000	0.010	0.010	0.010	0.040	0.000	0.010	0.010	0.010	0.020	0.010	0.000	0.000	0.000	0.000	0.000	0.000
Fe-3	1.310	1.340	0.860	0.820	0.770	0.900	0.950	1.080	1.240	0.930	0.710	0.550	0.860	0.780	0.290	0.190	0.000	0.320	0.200	0.440
Fe-2	1.340	1.290	0.890	0.650	1.020	0.980	1.150	1.520	1.640	1.960	1.280	0.510	1.430	1.440	0.570	0.590	1.160	0.450	0.580	0.430
Mn	0.030	0.020	0.000	0.020	0.010	0.020	0.010	0.010	0.020	0.010	0.020	0.000	0.000	0.010	0.010	0.000	0.000	0.010	0.000	0.000
Mg	1.450	1.470	2.220	2.290	2.810	2.830	2.440	1.750	1.050	0.950	2.400	3.520	1.930	2.160	2.530	2.520	2.930	2.580	2.520	2.540
Ca	1.120	1.110	0.330	0.100	1.090	1.190	1.140	1.270	1.610	1.570	1.380	1.440	1.370	1.400	0.240	0.190	1.230	0.240	0.190	0.220
Na(B)	0.880	0.890	1.630	1.900	0.910	0.810	0.860	0.730	0.390	0.430	0.620	0.560	0.630	0.600	1.760	1.810	0.610	1.750	1.810	1.780
Na(A)	0.170	0.120	0.000	0.070	0.050	0.000	0.150	0.410	0.680	0.670	0.140	0.090	0.420	0.290	0.040	0.070	0.000	0.000	0.020	0.020
K	0.170	0.120	0.010	0.010	0.030	0.040	0.060	0.140	0.020	0.020	0.010	0.010	0.010	0.000	0.000	0.010	0.010	0.010	0.010	0.010
Cr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.010
TOTAL	15.340	15.240	14.970	15.080	15.080	15.040	15.210	15.560	15.700	15.680	15.140	15.100	15.430	15.290	15.040	15.080	14.860	15.000	15.030	15.030

Parg:Pargasite; Hbl:Hornblende; Act:Actinolite; Has:Hastingsite; Eden:Edenite; Trem:Tremolite; Glp:Glaucophane; Cros:Crossite; Tsch:Tschermakite; Bar:Barroisite; Win:Winchite

SAMP	KYR.15									801.1	801.1								802		
ANAL	2	11	12	13	14	15	17	18	20	18	19	20	21	22	23	26	33	12	13	15
MIN	Mg Has	Trem Hbl	Mg Hbl	Trem	Act Hbl		Act	Trem	Act	Glp	Glp							Glp		
WT(%)																				
SiO2	39.530	51.510	48.250	54.120	52.510	51.060	54.730	54.660	54.880	57.690	57.830	58.590	57.910	57.120	57.950	58.820	58.180	58.040	58.980	57.790
TiO2	0.100	0.040	0.040	0.030	0.020	0.070	0.050	0.080	0.040	0.040	0.050	0.030	0.020	0.040	0.030	0.000	0.060	0.030	0.000	0.040
Al2O3	13.380	4.810	5.400	4.120	5.070	4.740	4.190	4.110	4.190	12.010	11.770	11.930	11.800	11.560	11.740	12.010	11.900	11.440	11.740	11.470
FeO	20.230	7.400	15.960	8.800	8.640	10.020	7.390	8.190	7.340	5.230	5.560	6.190	6.660	7.180	6.850	5.410	4.650	5.640	5.520	6.780
MnO	0.080	0.010	0.100	0.140	0.080	0.140	0.090	0.070	0.020	0.000	0.000	0.070	0.000	0.030	0.050	0.060	0.040	0.040	0.060	0.070
MgO	7.800	18.380	13.340	18.110	17.790	16.780	18.610	18.290	18.290	13.070	13.040	12.470	12.080	12.450	12.360	12.680	13.300	13.060	13.350	11.970
CaO	10.040	10.200	9.370	10.430	10.590	10.060	10.740	10.320	10.760	1.400	1.210	0.760	0.950	1.680	1.530	0.550	1.140	0.700	0.900	1.190
Na2O	3.150	2.120	1.900	1.540	1.980	2.040	1.820	1.710	1.810	6.930	6.900	7.200	7.100	6.590	6.640	7.260	6.770	7.270	7.330	6.950
K2O	0.030	0.160	0.070	0.060	0.080	0.090	0.120	0.070	0.060	0.050	0.050	0.040	0.030	0.030	0.060	0.060	0.030	0.060	0.060	0.050
Cr2O3	0.110	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.010	0.000	0.020	0.030	0.060	0.020	0.020	0.110	0.070	0.070
TOTAL	94.460	94.630	94.430	97.350	96.770	94.990	97.730	97.500	97.400	96.430	96.410	97.270	96.560	96.710	97.270	96.860	96.110	96.380	98.000	96.380
Cations on the basis of 23 oxygens																				
Si	6.113	7.375	7.132	7.529	7.396	7.360	7.595	7.583	7.652	7.830	7.850	7.890	7.890	7.790	7.840	7.930	7.880	7.873	7.871	7.912
Al-4	1.887	0.625	0.868	0.471	0.604	0.640	0.405	0.417	0.348	0.170	0.150	0.110	0.110	0.210	0.160	0.070	0.120	0.127	0.129	0.088
Al-6	0.551	0.187	0.073	0.204	0.238	0.165	0.281	0.255	0.339	1.760	1.730	1.790	1.790	1.640	1.720	1.840	1.780	1.701	1.717	1.763
Ti	0.012	0.004	0.004	0.003	0.002	0.007	0.005	0.008	0.004	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.010	0.003	0.000	0.004
Fe-3	1.022	0.683	1.262	0.726	0.611	0.764	0.411	0.606	0.283	0.160	0.240	0.200	0.160	0.320	0.230	0.170	0.220	0.282	0.241	0.105
Fe-2	1.594	0.203	0.711	0.298	0.407	0.443	0.447	0.344	0.572	0.430	0.390	0.490	0.600	0.500	0.550	0.440	0.310	0.358	0.375	0.671
Mn	0.011	0.002	0.013	0.017	0.010	0.016	0.011	0.009	0.003	0.000	0.000	0.010	0.000	0.000	0.010	0.010	0.010	0.005	0.006	0.008
Mg	1.797	3.919	2.938	3.753	3.732	3.604	3.846	3.778	3.798	2.640	2.630	2.500	2.450	2.530	2.490	2.550	2.680	2.639	2.654	2.440
Ca	1.663	1.565	1.484	1.555	1.598	1.554	1.596	1.534	1.608	0.200	0.180	0.110	0.140	0.250	0.220	0.080	0.170	0.101	0.128	0.175
Na(B)	0.337	0.435	0.516	0.415	0.402	0.446	0.404	0.460	0.392	1.800	1.810	1.880	1.860	1.740	1.740	1.900	1.780	1.899	1.872	1.825
Na(A)	0.607	0.152	0.028	0.000	0.138	0.125	0.086	0.000	0.098	0.030	0.000	0.000	0.020	0.000	0.000	0.000	0.000	0.015	0.025	0.021
K	0.007	0.028	0.013	0.010	0.014	0.016	0.021	0.013	0.011	0.010	0.010	0.010	0.000	0.010	0.010	0.010	0.010	0.010	0.011	0.008
Cr	0.014	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.012	0.007	0.008
TOTAL	15.614	15.181	15.041	14.981	15.152	15.141	15.107	15.006	15.109	15.040	15.000	15.000	15.020	14.990	14.970	14.990	14.950	15.025	15.036	15.029

SAMP	802	807.1														808				
ANAL	28	62	63	64	65	66	67	68	69	75	76	52	54	72	73	22	23	24	25	26
MIN	Glp	Glp														Glp-core		Glp-rim	Glp-rim	
WT(%)																				
SiO2	56.490	55.720	57.020	57.210	57.750	55.880	56.330	55.759	56.885	55.903	56.119	57.594	56.529	57.146	55.029	57.340	56.490	57.650	56.400	56.610
TiO2	0.000	0.000	0.000	0.010	0.000	0.000	0.010	0.000	0.023	0.000	0.035	0.027	0.010	0.006	0.021	0.000	0.080	0.050	0.010	0.010
Al2O3	11.270	11.440	11.810	11.880	11.950	11.730	11.840	10.063	10.530	11.664	11.659	11.768	11.039	10.902	8.727	11.440	11.950	11.270	11.660	12.730
FeO	6.030	7.990	6.510	6.280	5.990	6.320	6.050	6.421	6.399	7.372	7.218	6.394	7.682	6.595	7.396	6.930	7.580	7.650	7.020	6.830
MnO	0.030	0.070	0.040	0.040	0.020	0.060	0.040	0.024	0.055	0.054	0.027	0.003	0.007	0.085	0.017	0.000	0.050	0.080	0.080	0.030
MgO	12.690	11.220	12.560	12.780	12.850	12.370	12.710	12.884	12.710	12.361	12.167	12.417	12.284	12.438	12.448	11.850	11.640	11.490	11.300	10.980
CaO	0.740	1.320	0.940	1.050	0.800	0.770	0.780	0.840	0.823	1.144	1.146	0.880	1.534	0.857	1.261	1.180	1.510	0.840	1.120	1.120
Na2O	7.460	6.500	6.740	6.730	6.700	6.680	7.000	7.106	6.985	6.892	6.903	6.874	6.259	6.738	6.741	6.220	6.250	6.400	6.510	5.800
K2O	0.030	0.040	0.060	0.050	0.050	0.050	0.040	0.042	0.036	0.068	0.049	0.068	0.087	0.052	0.049	0.050	0.350	0.060	0.050	0.620
Cr2O3	0.050	0.030	0.010	0.010	0.010	0.010	0.020	0.022	0.024	0.010	0.000	0.030	0.002	0.000	0.038	0.000	0.050	0.020	0.070	0.000
TOTAL	94.930	94.340	95.690	96.050	96.100	93.870	94.810	93.160	94.470	95.470	95.320	96.055	95.433	94.819	91.727	95.000	95.940	95.490	94.230	94.730
Cations on the basis of 23 oxygens																				
Si	7.829	7.815	7.791	7.783	7.819	7.771	7.763	7.860	7.895	7.708	7.755	7.852	7.795	7.893	7.939	7.910	7.780	7.930	7.890	7.850
Al-4	0.171	0.185	0.209	0.217	0.181	0.229	0.237	0.140	0.105	0.292	0.245	0.148	0.205	0.107	0.061	0.090	0.220	0.070	0.110	0.150
Al-6	1.671	1.706	1.694	1.688	1.726	1.695	1.687	1.532	1.618	1.604	1.654	1.743	1.589	1.668	1.424	1.770	1.720	1.750	1.810	1.930
Ti	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.002	0.000	0.004	0.003	0.001	0.001	0.002	0.000	0.010	0.000	0.000	0.000
Fe-3	0.266	0.304	0.441	0.436	0.456	0.491	0.440	0.401	0.348	0.495	0.385	0.310	0.472	0.369	0.343	0.310	0.300	0.350	0.190	0.210
Fe-2	0.433	0.634	0.303	0.279	0.221	0.244	0.257	0.356	0.394	0.356	0.449	0.419	0.414	0.392	0.549	0.490	0.570	0.530	0.640	0.580
Mn	0.004	0.008	0.004	0.004	0.002	0.006	0.005	0.003	0.006	0.006	0.003	0.000	0.001	0.010	0.002	0.000	0.010	0.010	0.010	0.000
Mg	2.621	2.344	2.557	2.590	2.593	2.562	2.609	2.705	2.628	2.539	2.505	2.522	2.523	2.559	2.675	2.430	2.390	2.350	2.350	2.270
Ca	0.109	0.198	0.138	0.153	0.115	0.115	0.115	0.127	0.122	0.169	0.170	0.129	0.227	0.127	0.195	0.170	0.220	0.120	0.170	0.170
Na(B)	1.891	1.768	1.786	1.774	1.758	1.802	1.871	1.873	1.878	1.831	1.830	1.817	1.673	1.805	1.805	1.660	1.670	1.710	1.770	1.560
Na(A)	0.115	0.000	0.000	0.000	0.000	0.000	0.000	0.069	0.002	0.012	0.019	0.000	0.000	0.000	0.081	0.000	0.000	0.000	0.000	0.000
K	0.005	0.007	0.010	0.009	0.008	0.009	0.007	0.008	0.006	0.012	0.009	0.012	0.015	0.009	0.009	0.010	0.060	0.010	0.010	0.110
Cr	0.005	0.003	0.001	0.001	0.001	0.001	0.002	0.002	0.003	0.001	0.000	0.003	0.000	0.000	0.004	0.000	0.010	0.000	0.010	0.000
TOTAL	15.119	14.973	14.935	14.936	14.882	14.927	14.992	15.077	15.009	15.024	15.028	14.958	14.915	14.941	15.090	14.840	14.950	14.840	14.940	14.840

Table 4. (Continued)

SAMP	808						812							813.1							
ANAL	27	28	31	32	33	34	45	46	47	48	49	50	51	1	2	17	18	19	20	21
MIN	Glp-core						Act-rim		Act-core	Act	Glp		Act	Glp		Glp-rim	Glp			
WT(%)																				
SiO2	56.580	57.130	57.810	57.930	57.990	57.960	54.480	54.040	54.110	54.580	56.290	56.950	54.620	57.880	56.010	57.720	57.960	58.130	57.570	57.640
TiO2	0.010	0.020	0.020	0.060	0.030	0.000	0.070	0.050	0.030	0.040	0.020	0.000	0.030	0.030	0.000	0.010	0.030	0.010	0.000	0.060
Al2O3	12.280	11.360	11.730	11.610	11.710	11.390	3.890	4.360	4.000	3.770	13.370	11.200	3.150	10.770	9.880	9.410	9.470	9.920	9.960	10.170
FeO	6.240	7.710	5.440	5.270	4.870	5.180	7.400	7.980	7.520	7.740	6.610	6.620	7.880	7.250	7.820	11.160	9.450	8.750	8.170	8.200
MnO	0.020	0.080	0.040	0.060	0.070	0.030	0.040	0.090	0.100	0.090	0.030	0.000	0.130	0.120	0.120	0.100	0.120	0.110	0.090	0.160
MgO	11.440	11.250	12.490	12.820	12.700	12.770	18.020	17.370	17.620	18.000	12.080	12.600	17.830	13.180	12.780	11.610	12.230	12.830	13.190	12.580
CaO	1.260	1.040	0.900	1.020	0.840	1.070	11.220	10.830	10.880	10.590	1.680	1.460	11.160	1.060	1.180	1.260	1.180	1.230	1.310	1.260
Na2O	5.670	6.310	6.630	6.350	6.520	6.360	1.500	1.760	1.560	1.730	5.590	6.080	1.460	7.040	6.890	6.600	6.600	6.600	6.520	6.300
K2O	0.810	0.030	0.090	0.070	0.020	0.040	0.100	0.130	0.120	0.120	1.500	0.030	0.090	0.100	0.060	0.080	0.030	0.060	0.080	0.070
Cr2O3	0.050	0.020	0.000	0.020	0.010	0.030	0.000	0.010	0.020	0.020	0.030	0.010	0.000	0.010	0.070	0.040	0.070	0.120	0.050	0.060
TOTAL	94.350	94.950	95.150	95.210	94.760	94.840	96.720	96.610	95.950	96.690	97.190	94.950	96.360	97.420	94.800	97.990	97.130	97.750	96.950	96.500
Cations on the basis of 23 oxygens																				
Si	7.880	7.920	7.920	7.910	7.950	7.950	7.680	7.650	7.690	7.680	7.650	7.840	7.750	7.810	7.800	7.850	7.900	7.840	7.800	7.850
Al-4	0.120	0.080	0.080	0.090	0.050	0.050	0.320	0.350	0.310	0.320	0.350	0.160	0.250	0.190	0.200	0.150	0.100	0.160	0.200	0.150
Al-6	1.890	1.770	1.820	1.780	1.840	1.790	0.330	0.380	0.360	0.300	1.790	1.650	0.280	1.520	1.420	1.360	1.420	1.410	1.390	1.480
Ti	0.000	0.000	0.000	0.010	0.000	0.000	0.010	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010
Fe-3	0.170	0.300	0.210	0.310	0.230	0.240	0.150	0.170	0.180	0.330	0.330	0.450	0.150	0.510	0.560	0.660	0.580	0.650	0.690	0.610
Fe-2	0.560	0.600	0.410	0.290	0.330	0.350	0.720	0.780	0.720	0.590	0.430	0.310	0.780	0.310	0.350	0.610	0.500	0.340	0.240	0.330
Mn	0.000	0.010	0.010	0.010	0.010	0.000	0.010	0.010	0.010	0.010	0.000	0.000	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.020
Mg	2.370	2.320	2.550	2.610	2.590	2.610	3.790	3.660	3.730	3.770	2.450	2.580	3.770	2.650	2.650	2.350	2.480	2.580	2.660	2.550
Ca	0.190	0.150	0.130	0.150	0.120	0.160	1.700	1.640	1.660	1.600	0.240	0.220	1.700	0.150	0.180	0.180	0.170	0.180	0.190	0.180
Na(B)	1.530	1.700	1.760	1.680	1.730	1.690	0.300	0.360	0.340	0.400	1.470	1.620	0.300	1.840	1.820	1.740	1.740	1.730	1.710	1.660
Na(A)	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.130	0.090	0.070	0.000	0.000	0.100	0.000	0.030	0.000	0.000	0.000	0.000	0.000
K	0.140	0.010	0.020	0.010	0.000	0.010	0.020	0.020	0.020	0.020	0.260	0.010	0.020	0.020	0.010	0.010	0.010	0.010	0.010	0.010
Cr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.010	0.010	0.010	0.010
TOTAL	14.860	14.850	14.910	14.840	14.860	14.860	15.120	15.150	15.110	15.090	14.980	14.840	15.110	15.010	15.040	14.940	14.920	14.910	14.920	14.860

Parg:Pargasite; Hbl:Hornblende; Act:Actinolite; Has:Hastingsite; Eden:Edenite; Trem:Tremolite; Glp:Glaucophane; Cros:Crossite; Tsch:Tschermakite; Bar:Barroisite; Win:Winchite

SAMP	813.1		815.1		816.1					817											
ANAL	22	23	13	14	14	15	16	17	32	1	2	3	5	6	14	15	16	17	21	23
MIN	Glp	Glp-core	Glp	Glp	Glp-core			Glp-rim		Glp-core		Act	Trem	Act-rim	Glp			Trem	Glp	
WT(%)																				
SiO2	57.870	57.560	55.610	55.230	55.910	55.610	55.700	52.540	57.390	57.640	57.630	54.420	56.500	55.810	59.350	58.280	58.300	55.050	55.090	58.380
TiO2	0.020	0.050	0.010	0.000	0.010	0.000	0.000	0.000	0.050	0.020	0.000	0.040	0.000	0.060	0.010	0.070	0.040	0.060	0.030	0.050
Al2O3	10.250	10.040	11.440	11.650	10.880	10.740	10.700	5.090	11.320	10.180	9.990	4.190	1.860	3.100	10.920	11.070	10.330	4.120	11.580	11.890
FeO	7.200	7.470	6.980	6.790	7.080	7.060	7.370	11.010	6.690	6.810	8.040	9.330	7.960	10.100	6.950	7.110	7.010	7.250	5.530	4.780
MnO	0.060	0.030	0.050	0.090	0.120	0.060	0.000	0.190	0.010	0.080	0.050	0.190	0.250	0.150	0.070	0.050	0.000	0.110	0.000	0.050
MgO	13.410	13.430	12.750	12.220	13.520	13.290	13.000	15.270	13.090	13.450	13.040	17.340	19.370	17.040	12.740	13.190	13.560	18.710	13.750	14.120
CaO	1.160	1.570	1.400	1.230	1.800	1.550	1.370	7.840	1.210	1.160	1.980	9.560	11.090	9.440	1.730	1.340	2.170	10.350	1.410	1.290
Na2O	6.350	6.370	7.110	7.340	6.840	7.100	7.150	3.630	6.950	6.860	6.290	2.340	1.300	2.270	6.440	7.100	6.260	1.900	6.840	7.140
K2O	0.040	0.060	0.060	0.030	0.070	0.060	0.040	0.130	0.060	0.050	0.050	0.130	0.090	0.110	0.040	0.020	0.030	0.100	0.050	0.030
Cr2O3	0.050	0.060	0.030	0.060	0.000	0.000	0.000	0.000	0.060	0.070	0.150	0.000	0.000	0.010	0.000	0.020	0.040	0.000	0.020	0.020
TOTAL	96.410	96.650	95.440	94.640	96.220	95.480	95.350	95.690	94.930	96.320	97.220	97.530	98.410	98.080	98.240	98.230	97.730	97.660	94.300	97.730
Cations on the basis of 23 oxygens																				
Si	7.830	7.810	7.691	7.722	7.659	7.689	7.716	7.535	7.779	7.850	7.830	7.590	7.780	7.760	7.950	7.810	7.850	7.610	7.630	7.780
Al-4	0.170	0.190	0.309	0.278	0.341	0.311	0.284	0.465	0.221	0.150	0.170	0.410	0.220	0.240	0.050	0.190	0.150	0.390	0.370	0.220
Al-6	1.470	1.420	1.556	1.643	1.415	1.438	1.463	0.395	1.587	1.480	1.430	0.280	0.080	0.270	1.670	1.560	1.480	0.290	1.520	1.650
Ti	0.000	0.010	0.001	0.000	0.001	0.000	0.000	0.000	0.005	0.000	0.000	0.000	0.000	0.010	0.000	0.010	0.000	0.010	0.000	0.000
Fe-3	0.680	0.600	0.414	0.266	0.570	0.500	0.484	0.627	0.429	0.500	0.490	0.600	0.500	0.510	0.200	0.390	0.400	0.490	0.580	0.330
Fe-2	0.130	0.250	0.393	0.528	0.242	0.316	0.370	0.694	0.329	0.270	0.430	0.480	0.410	0.670	0.580	0.410	0.390	0.350	0.060	0.200
Mn	0.010	0.000	0.006	0.011	0.014	0.007	0.000	0.023	0.001	0.010	0.010	0.020	0.030	0.020	0.010	0.010	0.000	0.010	0.000	0.010
Mg	2.700	2.710	2.627	2.546	2.759	2.738	2.683	3.261	2.643	2.730	2.640	3.600	3.970	3.530	2.540	2.630	2.720	3.860	2.840	2.800
Ca	0.170	0.230	0.207	0.184	0.264	0.229	0.204	1.205	0.176	0.170	0.290	1.430	1.640	1.410	0.250	0.190	0.310	1.530	0.210	0.180
Na(B)	1.670	1.680	1.793	1.816	1.736	1.771	1.796	0.795	1.824	1.810	1.660	0.570	0.350	0.590	1.670	1.810	1.630	0.470	1.790	1.820
Na(A)	0.000	0.000	0.114	0.174	0.080	0.133	0.125	0.213	0.002	0.000	0.000	0.060	0.000	0.020	0.000	0.040	0.000	0.040	0.050	0.030
K	0.010	0.010	0.011	0.005	0.012	0.010	0.008	0.024	0.010	0.010	0.010	0.020	0.020	0.020	0.010	0.000	0.010	0.020	0.010	0.010
Cr	0.010	0.010	0.003	0.007	0.000	0.000	0.000	0.000	0.006	0.010	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	14.840	14.920	15.125	15.178	15.092	15.144	15.133	15.238	15.013	14.990	14.950	15.090	15.000	15.040	14.930	15.040	14.950	15.060	15.050	15.030

SAMP	817	818.2					821									906.2B					
ANAL	24	8	9	10	17	18	1	2	3	6	11	16	17	18	19	7	9	11	12	16
MIN	Glp	Glp-core		Glp-rim			Glp-core	Glp	Glp-rim	Glp	Glp-core				Glp-rim	Act				Glp
WT(%)																				
SiO2	58.700	56.410	55.260	54.270	57.500	57.180	56.410	56.120	56.350	57.040	57.680	56.160	56.170	56.140	56.030	55.870	56.120	52.860	55.150	55.700
TiO2	0.020	0.010	0.000	0.050	0.000	0.040	0.010	0.000	0.000	0.010	0.020	0.110	0.020	0.030	0.000	0.020	0.040	0.070	0.020	0.000
Al2O3	10.570	11.040	10.220	9.620	9.410	10.300	10.370	10.390	10.430	10.430	10.350	10.190	10.240	10.320	10.170	2.960	2.830	4.780	3.200	10.760
FeO	7.140	8.300	11.260	13.530	9.220	9.590	9.040	9.080	8.130	7.910	8.080	9.680	9.510	9.670	10.500	6.490	6.420	8.710	6.660	7.920
MnO	0.030	0.030	0.030	0.050	0.010	0.000	0.010	0.060	0.020	0.000	0.000	0.040	0.030	0.010	0.080	0.050	0.040	0.160	0.020	0.050
MgO	12.900	11.980	10.530	9.080	11.710	11.480	11.850	11.740	11.950	12.210	12.110	11.180	11.250	11.360	10.440	19.130	19.020	16.430	18.570	12.170
CaO	0.770	0.560	0.460	0.910	0.820	0.730	0.870	1.100	0.590	0.510	0.510	0.580	0.720	0.660	0.480	10.940	11.270	9.770	10.930	2.290
Na2O	7.070	7.220	7.160	6.890	7.090	7.380	6.660	6.500	6.890	6.690	6.780	6.710	6.730	6.800	6.810	1.390	1.410	2.290	1.620	6.200
K2O	0.090	0.050	0.070	0.050	0.050	0.060	0.040	0.070	0.040	0.050	0.050	0.050	0.040	0.040	0.040	0.190	0.130	0.120	0.110	0.060
Cr2O3	0.020	0.060	0.040	0.080	0.050	0.100	0.050	0.050	0.080	0.050	0.050	0.070	0.090	0.070	0.090	0.000	0.040	0.000	0.000	0.000
TOTAL	97.290	95.650	95.020	94.530	95.850	96.840	95.300	95.120	94.460	94.890	95.620	94.750	94.800	95.100	94.620	97.030	97.310	95.180	96.280	95.150
Cations on the basis of 23 oxygens																				
Si	7.920	7.780	7.770	7.790	7.970	7.860	7.810	7.800	7.850	7.870	7.920	7.840	7.850	7.810	7.880	7.782	7.824	7.599	7.777	7.771
Al-4	0.080	0.220	0.230	0.210	0.030	0.140	0.190	0.200	0.150	0.130	0.080	0.160	0.150	0.190	0.120	0.218	0.176	0.401	0.223	0.229
Al-6	1.600	1.570	1.460	1.410	1.510	1.530	1.500	1.500	1.560	1.570	1.590	1.520	1.530	1.510	1.560	0.268	0.289	0.409	0.308	1.540
Ti	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.002	0.004	0.007	0.002	0.000
Fe-3	0.390	0.540	0.660	0.570	0.360	0.390	0.630	0.600	0.540	0.600	0.520	0.610	0.560	0.630	0.550	0.272	0.104	0.307	0.144	0.317
Fe-2	0.410	0.420	0.660	1.050	0.710	0.710	0.420	0.450	0.410	0.310	0.410	0.520	0.550	0.500	0.690	0.484	0.645	0.740	0.641	0.608
Mn	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.006	0.004	0.020	0.002	0.006
Mg	2.590	2.460	2.210	1.940	2.420	2.350	2.440	2.430	2.480	2.510	2.480	2.330	2.340	2.360	2.190	3.968	3.949	3.518	3.902	2.529
Ca	0.110	0.080	0.070	0.140	0.120	0.110	0.130	0.160	0.090	0.080	0.070	0.090	0.110	0.100	0.070	1.632	1.683	1.505	1.652	0.342
Na(B)	1.850	1.920	1.930	1.860	1.880	1.890	1.790	1.750	1.860	1.790	1.800	1.820	1.820	1.830	1.860	0.368	0.317	0.495	0.348	1.658
Na(A)	0.000	0.010	0.020	0.060	0.030	0.080	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.065	0.143	0.095	0.019
K	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.033	0.023	0.023	0.020	0.010
Cr	0.000	0.010	0.000	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.000	0.010	0.010	0.010	0.010	0.000	0.004	0.000	0.000	0.000
TOTAL	14.980	15.020	15.030	15.070	15.040	15.090	14.920	14.930	14.960	14.870	14.890	14.910	14.940	14.940	14.930	15.042	15.088	15.166	15.115	15.030

Table 4. (Continued)

SAMP	906.2B	907								907.2			KYR.6							
ANAL	20	2	3	4	5	19	20	21	22	3	6	8	9	10	11	12	13	14	15	16
MIN	Trem	Act	Trem	Act					Tsch	Glp			Glp	Cros		Win	Cros			
WT(%)																				
SiO2	55.730	55.320	55.340	54.300	55.590	54.500	55.360	55.260	41.390	56.780	57.130	57.290	56.900	54.640	55.050	54.120	55.770	56.190	53.900	52.390
TiO2	0.020	0.010	0.030	0.010	0.020	0.030	0.030	0.020	0.000	0.000	0.020	0.020	0.040	0.060	0.040	0.020	0.040	0.030	0.070	0.040
Al2O3	1.510	3.650	2.790	3.410	2.760	3.530	2.880	2.680	10.990	10.840	10.880	11.450	8.840	9.240	7.880	7.800	8.940	8.550	8.280	8.300
FeO	6.600	7.080	6.630	7.110	6.440	7.640	6.580	6.710	12.580	7.500	7.030	6.690	11.330	14.270	14.800	17.170	11.510	12.280	14.100	14.340
MnO	0.000	0.060	0.000	0.040	0.000	0.050	0.030	0.000	0.120	0.050	0.000	0.000	0.100	0.140	0.160	0.150	0.090	0.130	0.130	0.130
MgO	19.800	18.250	19.640	18.300	19.270	18.580	19.510	18.680	19.890	12.740	12.050	12.680	10.740	9.870	10.050	8.080	10.860	10.750	10.040	9.960
CaO	11.030	10.610	11.020	11.430	11.360	10.840	11.390	11.040	5.440	1.010	1.350	0.900	0.520	1.110	0.980	1.110	0.690	0.680	0.900	0.780
Na2O	0.960	1.730	1.340	1.390	1.260	1.710	1.350	1.300	0.790	7.110	6.980	7.230	7.210	7.150	6.890	6.830	6.920	7.070	7.080	6.930
K2O	0.070	0.120	0.140	0.090	0.090	0.130	0.130	0.160	0.050	0.060	0.040	0.040	0.060	0.070	0.060	0.070	0.060	0.070	0.020	0.060
Cr2O3	0.000	0.020	0.000	0.060	0.020	0.060	0.020	0.020	0.000	0.000	0.020	0.020	0.110	0.000	0.120	0.070	0.050	0.010	0.000	0.000
TOTAL	95.700	96.830	96.930	96.130	96.810	97.070	97.260	95.850	91.240	96.090	95.490	96.310	95.840	96.540	96.020	95.400	94.930	95.750	94.510	92.940
Cations on the basis of 23 oxygens																				
Si	7.830	7.750	7.699	7.706	7.773	7.632	7.707	7.819	5.689	7.780	7.920	7.810	7.950	7.690	7.780	7.830	7.860	7.880	7.740	7.640
Al-4	0.170	0.250	0.301	0.294	0.227	0.368	0.293	0.181	1.781	0.220	0.080	0.190	0.050	0.310	0.220	0.170	0.140	0.120	0.260	0.360
Al-6	0.080	0.352	0.155	0.276	0.228	0.215	0.179	0.265	0.000	1.530	1.690	1.660	1.410	1.230	1.100	1.150	1.340	1.300	1.140	1.070
Ti	0.002	0.001	0.003	0.001	0.002	0.003	0.003	0.002	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.010	0.000
Fe-3	0.493	0.219	0.467	0.136	0.233	0.402	0.320	0.179	5.126	0.490	0.100	0.340	0.490	0.770	0.900	0.740	0.670	0.680	0.860	1.070
Fe-2	0.282	0.610	0.304	0.707	0.520	0.493	0.446	0.614	0.000	0.370	0.710	0.420	0.830	0.910	0.850	1.340	0.680	0.760	0.830	0.680
Mn	0.000	0.007	0.000	0.004	0.000	0.006	0.003	0.000	0.014	0.010	0.000	0.000	0.010	0.020	0.020	0.020	0.010	0.020	0.020	0.020
Mg	4.143	3.808	4.070	3.869	4.014	3.875	4.047	3.938	4.071	2.600	2.490	2.580	2.240	2.070	2.120	1.740	2.280	2.250	2.150	2.160
Ca	1.660	1.592	1.643	1.738	1.701	1.626	1.698	1.673	0.801	0.150	0.200	0.130	0.080	0.170	0.150	0.170	0.100	0.100	0.140	0.120
Na(B)	0.262	0.408	0.357	0.262	0.299	0.374	0.302	0.327	0.209	1.850	1.800	1.870	1.920	1.830	1.850	1.830	1.890	1.900	1.860	1.880
Na(A)	0.000	0.062	0.005	0.120	0.041	0.089	0.063	0.030	0.000	0.040	0.080	0.040	0.030	0.120	0.040	0.090	0.000	0.020	0.110	0.080
K	0.012	0.021	0.024	0.016	0.016	0.023	0.023	0.029	0.008	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.000	0.010
Cr	0.000	0.002	0.000	0.006	0.003	0.006	0.002	0.002	0.000	0.000	0.000	0.000	0.010	0.000	0.010	0.010	0.010	0.000	0.000	0.000
TOTAL	14.934	15.082	15.029	15.136	15.058	15.112	15.086	15.059	17.698	15.050	15.080	15.050	15.040	15.130	15.050	15.100	15.010	15.040	15.110	15.090

Parg:Pargasite; Hbl:Hornblende; Act:Actinolite; Has:Hastingsite; Eden:Edenite; Trem:Tremolite; Glp:Glaucophane; Cros:Crossite; Tsch:Tschermakite; Bar:Barroisite; Win:Winchite

SAMP	KYR.6															KYR.9B				
ANAL	17	18	19	54	55	56	57	62	63	64	65	66	67	68	69	9	10	12	13	17
MIN	Cros	Glp	Cros	Glp			Cros					Glp				Glp		Glp-core	Glp-rim	Glp-core
WT(%)																				
SiO2	56.230	54.740	52.870	56.220	57.060	56.320	56.390	48.530	53.940	54.990	55.450	56.870	56.980	56.570	56.700	58.210	57.960	58.080	57.740	57.270
TiO2	0.020	0.010	0.040	0.000	0.020	0.020	0.000	0.090	0.040	0.060	0.010	0.010	0.030	0.000	0.000	0.010	0.020	0.000	0.010	0.040
Al2O3	8.610	10.390	8.380	9.570	9.690	9.210	8.520	7.300	8.260	8.950	9.160	9.860	10.550	10.110	10.250	11.690	11.850	11.480	11.620	11.420
FeO	13.950	13.510	17.690	9.800	9.580	10.610	12.830	17.310	16.550	15.890	13.670	11.300	8.980	9.160	9.490	5.550	5.780	6.140	6.620	5.430
MnO	0.040	0.100	0.110	0.030	0.000	0.050	0.110	0.180	0.110	0.120	0.130	0.140	0.020	0.040	0.110	0.000	0.010	0.000	0.000	0.010
MgO	10.030	8.660	7.990	11.390	11.850	11.360	10.530	8.060	8.510	8.520	9.760	10.590	11.640	11.510	11.500	12.510	12.420	11.890	12.030	12.680
CaO	0.630	0.560	1.540	0.610	0.680	0.700	0.600	1.430	1.220	0.720	0.650	0.660	0.720	0.690	0.680	0.960	0.810	0.530	0.560	1.130
Na2O	6.930	7.200	6.900	6.960	7.030	7.120	7.070	6.610	6.830	7.130	7.130	7.450	7.280	7.180	7.280	6.700	7.120	6.990	6.790	6.740
K2O	0.060	0.070	0.080	0.070	0.050	0.050	0.050	0.100	0.090	0.060	0.040	0.050	0.030	0.040	0.060	0.060	0.050	0.060	0.030	0.070
Cr2O3	0.060	0.000	0.040	0.100	0.020	0.030	0.080	0.110	0.130	0.120	0.130	0.040	0.100	0.040	0.000	0.050	0.010	0.040	0.060	0.000
TOTAL	96.550	95.230	95.640	94.730	95.980	95.480	96.160	89.720	95.670	96.550	96.130	96.980	96.330	95.350	96.070	95.740	96.030	95.220	95.460	94.790
Cations on the basis of 23 oxygens																				
Si	7.850	7.800	7.670	7.880	7.880	7.870	7.880	7.520	7.760	7.790	7.800	7.870	7.850	7.880	7.850	7.940	7.910	7.990	7.910	7.900
Al-4	0.150	0.200	0.330	0.120	0.120	0.130	0.120	0.480	0.240	0.210	0.200	0.130	0.150	0.120	0.150	0.060	0.090	0.010	0.090	0.100
Al-6	1.270	1.540	1.100	1.460	1.450	1.380	1.290	0.850	1.160	1.290	1.320	1.480	1.560	1.540	1.520	1.820	1.810	1.850	1.780	1.760
Ti	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.000	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Fe-3	0.790	0.490	0.780	0.560	0.570	0.590	0.720	1.120	0.770	0.710	0.720	0.430	0.410	0.430	0.470	0.170	0.140	0.120	0.330	0.180
Fe-2	0.840	1.120	1.370	0.580	0.540	0.650	0.780	1.120	1.220	1.170	0.890	0.880	0.620	0.640	0.630	0.460	0.510	0.580	0.430	0.450
Mn	0.000	0.010	0.010	0.000	0.000	0.010	0.010	0.020	0.010	0.010	0.020	0.020	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.000
Mg	2.090	1.840	1.730	2.380	2.440	2.360	2.190	1.860	1.820	1.800	2.040	2.180	2.390	2.390	2.370	2.540	2.520	2.440	2.450	2.610
Ca	0.090	0.090	0.240	0.090	0.100	0.110	0.090	0.240	0.190	0.110	0.100	0.100	0.110	0.100	0.100	0.140	0.120	0.080	0.080	0.170
Na(B)	1.880	1.910	1.760	1.890	1.880	1.890	1.910	1.760	1.810	1.890	1.900	1.900	1.890	1.900	1.900	1.770	1.880	1.860	1.800	1.800
Na(A)	0.000	0.070	0.180	0.000	0.000	0.000	0.030	0.010	0.220	0.090	0.070	0.040	0.100	0.050	0.040	0.050	0.000	0.000	0.000	0.000
K	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.020	0.020	0.010	0.010	0.010	0.000	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Cr	0.010	0.000	0.000	0.010	0.000	0.000	0.010	0.010	0.020	0.010	0.010	0.000	0.010	0.000	0.000	0.010	0.000	0.000	0.010	0.000
TOTAL	14.980	15.090	15.190	14.990	14.990	15.040	15.010	15.240	15.110	15.080	15.050	15.110	15.060	15.050	15.060	14.920	15.010	14.950	14.890	14.980

SAMP	KYR.9B		KYR.12A									
ANAL	18	19	22	23	24	25	26	27	29	33	38	39
MIN	Glp	Glp-rim	Glp-core	Glp		Act		Act-rim	Glp	Act	Glp-core	Act-rim
WT(%)												
SiO2	57.860	58.360	58.710	58.870	57.710	54.790	54.400	54.130	58.630	54.770	58.170	54.380
TiO2	0.040	0.010	0.000	0.000	0.000	0.030	0.070	0.070	0.000	0.040	0.010	0.030
Al2O3	11.520	11.680	11.670	12.040	11.290	3.640	3.900	3.700	11.830	3.650	11.640	2.930
FeO	5.810	5.590	6.720	6.710	7.470	7.830	7.830	8.730	6.560	8.090	6.520	7.940
MnO	0.020	0.020	0.020	0.020	0.100	0.090	0.090	0.140	0.000	0.160	0.010	0.140
MgO	12.330	12.170	11.960	12.080	11.770	17.370	17.450	16.750	11.880	17.300	11.660	17.580
CaO	1.030	0.690	0.830	0.740	1.460	10.720	10.610	11.380	0.640	11.010	0.640	11.500
Na2O	6.700	6.910	6.940	6.960	6.610	1.700	1.720	1.430	6.890	1.640	6.830	1.270
K2O	0.050	0.040	0.040	0.070	0.060	0.090	0.160	0.080	0.040	0.110	0.050	0.070
Cr2O3	0.020	0.040	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.040	0.020	0.000
TOTAL	95.370	95.500	96.920	97.480	96.460	96.260	96.210	96.410	96.470	96.810	95.560	95.830
Cations on the basis of 23 oxygens												
Si	7.940	7.990	7.950	7.920	7.910	7.770	7.720	7.740	7.960	7.760	7.980	7.790
Al-4	0.060	0.010	0.050	0.080	0.090	0.230	0.280	0.260	0.040	0.240	0.020	0.210
Al-6	1.800	1.870	1.820	1.820	1.730	0.380	0.370	0.360	1.850	0.360	1.860	0.280
Ti	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010	0.000	0.000	0.000	0.000
Fe-3	0.150	0.100	0.150	0.220	0.160	0.090	0.180	-0.020	0.180	0.050	0.140	0.030
Fe-2	0.520	0.540	0.610	0.530	0.690	0.840	0.750	1.060	0.570	0.900	0.610	0.920
Mn	0.000	0.000	0.000	0.000	0.010	0.010	0.010	0.020	0.000	0.020	0.000	0.020
Mg	2.520	2.480	2.410	2.420	2.400	3.670	3.690	3.570	2.400	3.650	2.380	3.750
Ca	0.150	0.100	0.120	0.110	0.210	1.630	1.610	1.740	0.090	1.670	0.090	1.760
Na(B)	1.780	1.830	1.820	1.810	1.760	0.370	0.390	0.260	1.810	0.330	1.820	0.240
Na(A)	0.000	0.000	0.000	0.000	0.000	0.100	0.080	0.140	0.000	0.120	0.000	0.120
K	0.010	0.010	0.010	0.010	0.010	0.020	0.030	0.010	0.010	0.020	0.010	0.010
Cr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	14.940	14.940	14.950	14.930	14.980	15.110	15.110	15.150	14.920	15.140	14.920	15.130

Parg:Pargasite; Hbl:Hornblende; Act:Actinolite; Has:Hastingsite; Eden:Edenite; Trem:Tremolite; Glp:Glaucophane; Cros:Crossite; Tsch:Tschermakite; Bar:Barroisite; Win:Winchite

Table 5. Chemical compositions of plagioclase, epidote, talc and chloritoid.

SAMP	KYR.1									KYR.2		KYR.4A						KYR.4B		
ANAL	8	9	15	24	26	12'	9'	20'	21'	5	20	10	12	13	8	9	13	17	12'	13'
MIN	Ab					Ol	Ab			Ab		Ab						Ab		
WT(%)																				
SiO2	66.478	65.922	64.711	66.569	67.069	63.479	65.922	68.043	68.297	64.294	65.247	66.382	66.189	65.221	66.660	67.100	68.780	64.723	68.122	68.265
TiO2	0.005	0.013	0.000	0.000	0.022	0.000	0.013	0.000	0.004	0.246	0.023	0.007	0.000	0.000	0.000	0.006	0.022	0.011	0.000	0.000
Al2O3	21.330	21.268	21.545	21.127	21.290	21.669	21.268	19.625	19.773	21.959	21.419	21.424	21.336	21.867	20.593	21.123	19.788	22.044	20.541	20.232
FeO	0.166	0.061	0.227	0.217	0.121	0.379	0.061	0.208	0.258	0.350	0.121	0.067	0.034	0.068	0.061	0.053	0.075	0.054	0.056	0.028
MnO	0.000	0.010	0.000	0.000	0.000	0.019	0.010	0.000	0.000	0.000	0.000	0.059	0.000	0.000	0.000	0.017	0.003	0.036	0.010	0.003
MgO	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.010	0.000	0.007	0.009	0.001	0.004	0.004	0.000	0.000
CaO	1.531	0.907	1.516	0.842	0.874	4.181	0.907	0.926	0.744	3.072	1.776	1.886	1.924	2.197	1.913	2.249	0.597	1.760	1.185	1.402
Na2O	11.283	11.436	11.558	11.560	11.691	9.355	11.436	10.867	10.834	10.243	10.777	10.940	11.003	10.821	10.009	9.831	10.852	11.236	9.933	10.162
K2O	0.076	0.060	0.105	0.067	0.078	0.080	0.060	0.064	0.103	0.094	0.086	0.085	0.096	0.101	0.106	0.099	0.107	0.246	0.875	0.155
Cr2O3	0.013	0.031	0.000	0.000	0.000	0.000	0.031	0.000	0.011	0.000	0.000	0.000	0.003	0.000	0.000	0.000	0.000	0.011	0.010	0.000
TOTAL	100.882	99.708	99.662	100.382	101.145	99.162	99.708	99.733	100.024	100.258	99.454	100.860	100.585	100.282	99.351	100.479	100.228	100.125	100.732	100.247
Cations on the basis of 8 oxygens																				
Si	2.899	2.903	2.867	2.913	2.912	2.834	2.903	2.982	2.983	2.836	2.885	2.895	2.895	2.866	2.936	2.923	2.992	2.853	2.960	2.972
Ti	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
Al	1.096	1.104	1.125	1.090	1.090	1.140	1.104	1.014	1.018	1.142	1.116	1.101	1.100	1.133	1.069	1.085	1.015	1.146	1.052	1.038
Fe	0.006	0.002	0.008	0.008	0.004	0.014	0.002	0.008	0.009	0.013	0.005	0.003	0.001	0.003	0.002	0.002	0.003	0.002	0.002	0.001
Mn	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000
Mg	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000
Ca	0.072	0.043	0.072	0.040	0.041	0.200	0.043	0.044	0.035	0.145	0.084	0.088	0.090	0.104	0.090	0.105	0.028	0.083	0.055	0.065
Na	0.954	0.977	0.993	0.981	0.984	0.810	0.977	0.924	0.918	0.876	0.924	0.925	0.933	0.922	0.855	0.831	0.916	0.961	0.837	0.858
K	0.004	0.003	0.006	0.004	0.004	0.005	0.003	0.004	0.006	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.014	0.049	0.009
Cr	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	5.032	5.034	5.070	5.035	5.036	5.003	5.034	4.974	4.969	5.026	5.020	5.019	5.025	5.032	4.960	4.952	4.960	5.061	4.956	4.943

SAMP	KYR.4B			818.2	KYR.10					KYR.12A
ANAL	15'	16'	17'	23	8	9	10	11	12	13	11
MIN	Ab			Ab	Ab						Ab
WT(%)											
SiO2	67.447	67.545	67.662	69.416	69.219	69.080	69.022	68.982	69.116	69.593	68.503
TiO2	0.000	0.000	0.000	0.000	0.000	0.002	0.002	0.021	0.002	0.000	0.000
Al2O3	20.751	20.152	20.091	19.245	18.986	19.103	19.446	19.435	19.180	19.620	20.357
FeO	0.042	0.033	0.000	0.110	0.022	0.053	0.067	0.022	0.011	0.028	0.260
MnO	0.024	0.000	0.000	0.000	0.024	0.038	0.000	0.010	0.017	0.041	0.000
MgO	0.000	0.007	0.004	0.000	0.010	0.001	0.000	0.001	0.006	0.016	0.015
CaO	1.705	1.476	1.555	0.063	0.161	0.356	0.157	0.226	0.205	0.077	0.563
Na2O	10.398	10.430	10.486	11.592	11.053	10.596	11.014	10.898	10.869	11.077	11.104
K2O	0.172	0.157	0.186	0.054	0.076	0.062	0.084	0.081	0.091	0.082	0.053
Cr2O3	0.002	0.000	0.000	0.013	0.021	0.000	0.000	0.000	0.018	0.000	0.000
TOTAL	100.541	99.800	99.984	100.493	99.572	99.291	99.792	99.676	99.515	100.534	100.855
Cations on the basis of 8 oxygens											
Si	2.938	2.960	2.961	3.013	3.026	3.025	3.011	3.012	3.021	3.012	2.968
Ti	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000
Al	1.065	1.041	1.036	0.985	0.798	0.986	1.000	1.000	0.988	1.001	1.040
Fe	0.002	0.001	0.000	0.004	0.001	0.002	0.002	0.001	0.000	0.001	0.007
Mn	0.001	0.000	0.000	0.000	0.001	0.001	0.000	0.000	0.001	0.002	0.000
Mg	0.000	0.001	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.001
Ca	0.080	0.069	0.073	0.003	0.008	0.017	0.007	0.011	0.010	0.004	0.026
Na	0.878	0.886	0.890	0.976	0.937	0.900	0.932	0.923	0.921	0.930	0.933
K	0.010	0.009	0.010	0.003	0.004	0.004	0.005	0.005	0.005	0.005	0.003
Cr	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.000	0.000
TOTAL	4.973	4.967	4.971	4.984	4.775	4.934	4.957	4.951	4.947	4.954	4.978

SAMP	KYR.4B												KYR.15							
ANAL	23	24	25	26	27	43	44	23												
MIN	Ep							Ep												
WT(%)																				
SiO2	37.979	37.681	37.817	37.919	37.813	36.145	36.303	37.156												
TiO2	0.099	0.017	0.016	0.023	0.034	0.134	0.080	0.214												
Al2O3	22.499	22.323	21.717	21.947	22.644	22.221	22.431	28.088												
FeO	12.781	13.114	13.411	13.083	12.517	12.333	12.615	7.717												
MnO	0.606	0.485	0.406	0.396	0.450	0.081	0.065	0.092												
MgO	0.031	0.013	0.008	0.028	0.025	0.238	0.013	0.197												
CaO	22.554	22.843	22.640	22.745	22.669	22.154	22.585	23.157												
Na2O	0.021	0.011	0.003	0.026	0.016	0.009	0.012	0.027												
K2O	0.088	0.188	0.093	0.109	0.169	0.034	0.042	0.024												
Cr2O3	0.000	0.000	0.000	0.033	0.035	0.000	0.036	0.278												
TOTAL	96.658	96.675	96.111	96.309	96.372	93.349	94.182	96.950												
Cations on the basis of 12.5 oxygens																				
Si	3.136	3.122	3.153	3.149	3.129	3.090	3.081	2.842												
Ti	0.006	0.001	0.001	0.002	0.002	0.010	0.005	0.012												
Al	2.190	2.180	2.134	2.149	2.209	2.240	2.244	2.533												
Fe	0.883	0.909	0.935	0.909	0.866	0.880	0.895	0.494												
Mn	0.042	0.034	0.029	0.028	0.032	0.010	0.005	0.006												
Mg	0.004	0.002	0.001	0.003	0.003	0.030	0.002	0.022												
Ca	1.996	2.028	2.022	2.024	2.010	2.030	2.054	1.898												
Na	0.003	0.002	0.001	0.004	0.003	0.000	0.002	0.004												
K	0.009	0.020	0.010	0.012	0.018	0.000	0.005	0.002												
Cr	0.000	0.000	0.000	0.002	0.002	0.000	0.002	0.017												
TOTAL	8.269	8.298	8.285	8.282	8.274	8.290	8.290	7.831												

SAMP	KYR.15			801.1	802				804.2				805	807.1				812	813.1	
ANAL	4'	22'	25'	35	25	32	2'	3'	7	8	18	19	14	46	47	50	77	28	15	16
MIN	Ep			Ep	Ep				Ep				Ep	Ep				Ep	Ep	
WT(%)																				
SiO2	37.043	39.242	39.170	38.426	38.207	37.248	37.165	37.651	38.024	38.149	37.060	37.621	37.534	37.378	37.951	37.168	38.025	38.337	38.786	38.785
TiO2	0.128	0.170	0.013	0.188	0.046	0.114	0.148	0.104	0.083	0.062	0.098	0.067	0.057	0.309	0.097	0.091	0.101	0.099	0.059	0.081
Al2O3	27.445	29.427	32.623	29.293	26.604	27.094	25.360	26.425	24.043	23.512	23.180	24.081	24.184	27.811	27.795	28.589	28.356	28.003	26.070	24.451
FeO	8.676	5.529	2.064	5.497	6.728	6.777	9.031	8.692	11.376	11.410	11.964	11.242	11.867	7.985	8.006	5.770	6.733	6.991	8.969	10.312
MnO	0.180	0.096	0.027	0.092	0.071	0.010	0.628	0.090	0.175	0.333	0.699	0.222	0.424	0.077	0.023	0.101	0.074	0.212	0.149	0.155
MgO	0.025	0.159	0.010	0.098	0.100	0.052	0.026	0.064	0.025	0.024	0.035	0.046	0.010	0.065	0.034	0.050	0.034	0.056	0.097	0.035
CaO	23.321	23.612	24.460	23.579	23.495	23.756	22.384	22.813	22.755	23.134	22.790	23.322	22.989	22.953	23.013	23.083	23.456	23.327	23.571	23.681
Na2O	0.021	0.054	0.098	0.000	0.000	0.010	0.033	0.019	0.003	0.000	0.008	0.000	0.006	0.021	0.019	0.159	0.082	0.030	0.007	0.013
K2O	0.000	0.025	0.028	0.025	0.053	0.035	0.049	0.051	0.053	0.036	0.053	0.011	0.036	0.010	0.032	0.049	0.023	0.032	0.026	0.015
Cr2O3	0.088	0.014	0.075	0.003	0.297	0.059	0.047	0.019	0.039	0.051	0.093	0.026	0.058	0.004	0.016	0.007	0.015	0.036	0.074	0.029
TOTAL	96.927	98.328	98.568	97.201	95.601	95.155	94.871	95.927	96.576	96.711	95.980	96.638	97.165	96.613	96.986	95.067	96.899	97.123	97.808	97.557
Cations on the basis of 12.5 oxygens																				
Si	2.980	3.050	2.980	3.020	3.080	3.030	3.060	3.050	3.110	3.123	3.079	3.082	3.070	3.000	3.030	2.999	3.021	3.042	3.090	3.125
Ti	0.010	0.010	0.000	0.011	0.001	0.010	0.010	0.010	0.005	0.004	0.006	0.004	0.000	0.020	0.010	0.006	0.006	0.006	0.004	0.005
Al	2.600	2.690	2.930	2.714	2.530	2.590	2.460	2.530	2.318	2.269	2.270	2.325	2.330	2.630	2.610	2.719	2.656	2.619	2.448	2.322
Fe	0.580	0.360	0.130	0.361	0.450	0.460	0.620	0.590	0.778	0.781	0.831	0.770	0.810	0.540	0.530	0.389	0.447	0.464	0.598	0.695
Mn	0.010	0.010	0.000	0.006	0.000	0.000	0.040	0.010	0.012	0.023	0.049	0.015	0.030	0.010	0.000	0.007	0.005	0.014	0.010	0.011
Mg	0.000	0.020	0.000	0.012	0.010	0.010	0.000	0.010	0.003	0.003	0.004	0.006	0.000	0.010	0.000	0.006	0.004	0.006	0.012	0.004
Ca	2.010	1.960	2.000	1.986	2.030	2.070	1.980	1.980	1.994	2.029	2.029	2.047	2.010	1.970	1.970	1.996	1.997	1.983	2.012	2.044
Na	0.000	0.010	0.010	0.000	0.000	0.000	0.010	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.025	0.013	0.005	0.001	0.002
K	0.000	0.000	0.000	0.003	0.120	0.000	0.010	0.010	0.006	0.004	0.006	0.001	0.000	0.000	0.000	0.005	0.002	0.003	0.003	0.002
Cr	0.010	0.000	0.000	0.000	0.540	0.000	0.000	0.000	0.003	0.003	0.006	0.002	0.000	0.000	0.000	0.000	0.001	0.002	0.005	0.002
TOTAL	8.210	8.210	8.210	8.113	8.140	8.170	8.200	8.180	8.228	8.239	8.281	8.252	8.260	8.170	8.160	8.151	8.152	8.145	8.182	8.211

Ab: Albite; Ol: Oligoclase; Ep: Epidote; Tlc: Talc; Chld: Chloritoid.

Table 5. (Continued)

SAMP	813.1				815.1			816.1					817				818.2		821	
ANAL	17	22	24	25	7	8	8'	9	10	11	26	28	19	22	26	27	14	22	1	4
MIN	Ep				Ep			Ep					Ep				Ep		Ep	
WT(%)																				
SiO2	38.323	39.339	37.925	38.312	38.163	38.327	37.998	36.425	36.498	36.748	36.873	36.720	38.064	38.064	37.874	36.667	37.502	36.482	37.662	37.349
TiO2	0.150	0.079	0.058	0.087	0.176	0.332	0.040	0.001	0.005	0.002	0.125	0.109	0.089	0.070	0.068	0.074	0.051	0.104	26.135	25.046
Al2O3	24.914	26.160	24.799	25.346	28.041	26.577	27.738	27.050	27.392	26.381	25.638	27.714	26.415	25.653	27.202	26.368	24.663	21.033	0.103	0.041
FeO	10.824	9.689	10.381	9.977	7.201	8.273	6.982	8.160	7.947	9.302	9.753	7.514	7.161	7.967	8.623	9.087	11.320	11.166	8.301	9.928
MnO	0.171	0.168	0.132	0.203	0.363	0.210	0.065	0.147	0.078	0.108	0.119	0.232	0.126	0.084	0.316	0.134	0.168	0.168	0.050	0.229
MgO	0.054	0.098	0.086	0.020	0.025	0.008	0.014	0.035	0.082	0.058	0.035	0.037	0.078	0.094	0.005	0.019	0.022	0.030	0.154	0.091
CaO	23.435	23.336	22.907	23.560	23.249	23.539	23.886	23.737	23.532	23.405	23.521	23.768	24.000	23.932	24.073	24.051	23.291	23.248	23.494	23.062
Na2O	0.077	0.038	0.472	0.071	0.006	0.001	0.009	0.067	0.030	0.048	0.000	0.030	0.000	0.000	0.028	0.029	0.040	0.000	0.045	0.038
K2O	0.083	0.041	0.098	0.066	0.051	0.049	0.030	0.046	0.023	0.043	0.028	0.033	0.059	0.017	0.035	0.042	0.010	0.038	0.026	0.059
Cr2O3	0.051	0.033	0.081	0.000	0.006	0.035	0.043	0.003	0.005	0.000	0.054	0.272	0.125	0.116	0.073	0.039	0.000	0.117	0.000	0.028
TOTAL	98.082	98.981	96.939	97.642	97.281	97.351	96.805	95.671	95.592	96.095	96.146	96.429	96.117	95.997	98.297	96.510	97.067	92.387	95.970	95.871
Cations on the basis of 12.5 oxygens																				
Si	3.081	3.102	3.081	3.080	3.030	3.060	3.030	2.970	2.972	2.997	3.015	2.960	3.068	3.085	3.009	2.982	3.060	3.150	3.054	3.062
Ti	0.009	0.005	0.004	0.010	0.010	0.020	0.000	0.000	0.000	0.000	0.008	0.010	0.005	0.004	0.004	0.005	0.000	0.010	2.498	2.420
Al	2.361	2.431	2.375	2.400	2.620	2.500	2.610	2.600	2.629	2.536	2.471	2.630	2.510	2.450	2.547	2.528	2.370	2.140	0.006	0.003
Fe	0.728	0.639	0.705	0.670	0.480	0.550	0.470	0.560	0.541	0.635	0.667	0.510	0.483	0.540	0.573	0.618	0.770	0.810	0.563	0.681
Mn	0.012	0.011	0.009	0.010	0.020	0.010	0.000	0.010	0.005	0.007	0.008	0.020	0.009	0.006	0.021	0.009	0.010	0.010	0.003	0.016
Mg	0.007	0.012	0.010	0.000	0.000	0.000	0.000	0.000	0.010	0.007	0.004	0.000	0.009	0.011	0.001	0.002	0.000	0.000	0.019	0.011
Ca	2.019	1.971	1.994	2.030	1.980	2.010	2.040	2.080	2.053	2.046	2.061	2.050	2.073	2.078	2.049	2.096	2.030	2.150	2.042	2.026
Na	0.012	0.006	0.074	0.010	0.000	0.000	0.000	0.010	0.005	0.008	0.000	0.000	0.000	0.000	0.004	0.005	0.010	0.000	0.007	0.006
K	0.009	0.004	0.010	0.010	0.010	0.010	0.000	0.000	0.002	0.004	0.003	0.000	0.006	0.002	0.004	0.004	0.000	0.000	0.003	0.006
Cr	0.003	0.002	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.020	0.008	0.007	0.005	0.003	0.000	0.010	0.000	0.002
TOTAL	8.239	8.182	8.268	8.220	8.150	8.170	8.160	8.240	8.217	8.240	8.241	8.210	8.171	8.183	8.216	8.252	8.260	8.280	8.195	8.231

SAMP	906.2B				907		KYR.6													
ANAL	8	15	17	19	11	16	20	21	22	23	24	25	26	27	28	29	30	47	48	49
MIN	Ep				Ep		Ep													
WT(%)																				
SiO2	38.266	38.122	38.223	36.879	37.741	37.696	36.921	37.143	37.704	37.645	37.219	37.150	37.596	36.970	36.640	37.117	36.686	36.968	36.721	37.031
TiO2	0.324	0.137	0.034	0.259	0.088	0.016	0.038	0.105	0.077	0.060	0.080	0.020	0.091	0.072	0.023	0.033	0.094	0.083	0.099	0.074
Al2O3	28.936	31.471	31.894	29.270	27.320	30.336	23.680	24.007	24.734	23.627	23.717	23.921	25.094	23.626	22.621	24.333	24.374	23.134	23.164	23.645
FeO	5.410	2.055	1.287	4.919	5.771	2.231	10.882	11.052	10.241	11.679	11.842	11.717	9.468	12.077	13.329	10.997	9.903	12.409	12.440	11.852
MnO	0.384	0.003	0.000	0.145	0.131	0.000	0.182	0.094	0.078	0.217	0.126	0.146	0.020	0.071	0.210	0.162	0.000	0.049	0.427	0.094
MgO	0.015	0.028	0.000	0.054	0.807	0.036	0.070	0.067	0.137	0.023	0.030	0.032	0.114	0.022	0.018	0.072	0.081	0.012	0.030	0.067
CaO	23.212	24.045	24.349	23.346	22.554	23.917	22.706	22.452	22.732	22.868	22.683	22.586	22.883	22.191	22.338	22.682	22.940	23.039	22.382	22.770
Na2O	0.000	0.031	0.018	0.015	0.037	0.045	0.084	0.000	0.000	0.007	0.000	0.012	0.031	0.000	0.027	0.000	0.004	0.004	0.011	0.000
K2O	0.054	0.062	0.024	0.009	0.018	0.027	0.112	0.059	0.048	0.057	0.027	0.010	0.008	0.033	0.010	0.024	0.063	0.034	0.020	0.058
Cr2O3	0.079	0.053	0.012	0.022	0.025	0.029	0.072	0.111	0.010	0.057	0.119	0.076	0.022	0.091	0.026	0.058	0.059	0.077	0.091	0.089
TOTAL	96.680	96.007	95.841	94.918	94.492	94.333	94.747	95.090	95.761	96.240	95.843	95.670	95.327	95.153	95.152	95.478	94.204	95.809	95.385	95.680
Cations on the basis of 12.5 oxygens																				
Si	3.030	2.983	2.980	2.969	3.057	3.010	3.083	3.084	3.091	3.101	3.081	3.077	3.084	3.082	3.082	3.070	3.063	3.077	3.071	3.073
Ti	0.020	0.008	0.000	0.016	0.005	0.000	0.002	0.007	0.005	0.004	0.005	0.001	0.006	0.005	0.001	0.002	0.006	0.005	0.006	0.005
Al	2.700	2.903	2.940	2.777	2.609	2.850	2.331	2.350	2.390	2.294	2.314	2.336	2.426	2.322	2.243	2.372	2.399	2.269	2.283	2.313
Fe	0.360	0.135	0.080	0.331	0.391	0.150	0.760	0.768	0.702	0.805	0.820	0.812	0.650	0.842	0.931	0.761	0.692	0.864	0.870	0.823
Mn	0.030	0.000	0.000	0.010	0.009	0.000	0.013	0.007	0.005	0.015	0.009	0.010	0.001	0.005	0.015	0.011	0.000	0.003	0.030	0.007
Mg	0.000	0.003	0.000	0.007	0.098	0.000	0.009	0.008	0.017	0.003	0.004	0.004	0.014	0.003	0.002	0.009	0.010	0.002	0.004	0.008
Ca	1.970	2.016	2.040	2.014	1.958	2.040	2.032	1.998	1.997	2.018	2.012	2.005	2.011	1.983	2.014	2.010	2.052	2.055	2.006	2.025
Na	0.000	0.005	0.000	0.002	0.006	0.010	0.014	0.000	0.000	0.001	0.000	0.002	0.005	0.000	0.004	0.000	0.001	0.001	0.002	0.000
K	0.010	0.006	0.000	0.001	0.002	0.000	0.012	0.006	0.005	0.006	0.003	0.001	0.001	0.035	0.001	0.003	0.007	0.004	0.002	0.006
Cr	0.000	0.003	0.000	0.001	0.002	0.000	0.005	0.007	0.001	0.004	0.008	0.005	0.001	0.006	0.002	0.004	0.004	0.005	0.006	0.006
TOTAL	8.110	8.062	8.050	8.128	8.136	8.070	8.260	8.234	8.212	8.250	8.255	8.253	8.199	8.251	8.297	8.241	8.233	8.283	8.280	8.266

SAMP	KYR.6	KYR.6			KYR.9A	KYR.10								KYR.12A				KYR.18	
ANAL	58	82	83	84	20	5	11	15	19	18'	19'	20'	21'	22'	9	16	30	16	17
MIN	Ep	Ep			Ep	Ep									Ep			Talc	
WT(%)																			
SiO2	36.761	37.284	36.464	37.287	38.241	39.165	39.094	39.326	37.788	38.581	38.540	38.238	38.885	38.502	38.452	39.132	39.118	59.609	59.916
TiO2	0.131	0.233	0.080	0.047	0.127	0.192	0.118	0.230	0.081	0.088	0.071	0.106	0.052	0.239	0.156	0.070	0.054	0.020	0.000
Al2O3	23.393	23.254	24.041	23.789	28.192	28.286	28.137	29.354	28.334	27.768	27.473	27.170	28.906	27.855	28.265	32.635	31.975	0.242	0.212
FeO	10.780	12.168	12.102	12.151	6.179	6.609	6.161	4.953	6.391	6.322	6.706	6.733	4.751	5.967	7.123	1.464	2.239	4.578	5.323
MnO	0.133	0.107	0.091	0.146	0.110	0.046	0.020	0.117	0.068	0.037	0.030	0.030	0.023	0.133	0.223	0.069	0.038	0.003	0.000
MgO	0.030	0.007	0.061	0.039	0.055	0.031	0.051	0.047	0.003	0.061	0.044	0.069	0.032	0.049	0.014	0.003	0.039	27.929	27.625
CaO	22.813	22.780	22.829	22.775	23.869	23.322	23.823	23.928	23.792	23.457	23.260	22.939	23.893	23.187	24.142	24.878	24.600	0.021	0.036
Na2O	0.021	0.009	0.021	0.021	0.017	0.013	0.033	0.000	0.018	0.027	0.024	0.000	0.012	0.009	0.031	0.000	0.047	0.039	0.000
K2O	0.043	0.016	0.025	0.043	0.034	0.036	0.041	0.048	0.053	0.016	0.016	0.007	0.026	0.014	0.057	0.029	0.031	0.010	0.024
Cr2O3	0.098	0.077	0.064	0.211	0.081	0.035	0.024	0.020	0.001	0.028	0.000	0.006	0.041	0.000	0.020	0.042	0.065	0.000	0.000
TOTAL	94.203	95.935	95.778	96.509	96.906	97.735	97.502	98.022	96.529	96.385	96.164	95.298	96.621	95.955	98.483	98.322	98.206	92.451	93.136
Cations on the basis of 12.5 oxygens																		O=22	
Si	3.087	3.090	3.030	3.071	3.034	3.073	3.074	3.055	3.014	3.072	3.080	3.083	3.063	3.072	3.019	2.980	2.994	7.938	7.946
Ti	0.008	0.015	0.005	0.003	0.008	0.011	0.007	0.013	0.005	0.005	0.004	0.006	0.003	0.014	0.009	0.000	0.003	0.002	0.000
Al	2.315	2.272	2.355	2.310	2.636	2.616	2.608	2.688	2.663	2.606	2.588	2.582	2.684	2.620	2.615	2.930	2.885	0.038	0.033
Fe	0.757	0.843	0.841	0.837	0.410	0.434	0.405	0.322	0.426	0.421	0.448	0.457	0.313	0.398	0.468	0.090	0.143	0.510	0.590
Mn	0.010	0.008	0.006	0.010	0.008	0.003	0.001	0.008	0.005	0.003	0.002	0.002	0.002	0.009	0.015	0.000	0.002	0.000	0.000
Mg	0.004	0.001	0.008	0.005	0.007	0.004	0.006	0.005	0.000	0.007	0.005	0.008	0.004	0.006	0.002	0.000	0.005	5.544	5.461
Ca	2.053	2.023	2.033	2.010	2.029	1.961	2.007	1.992	2.033	2.001	1.992	1.982	2.017	1.983	2.031	2.030	2.018	0.003	0.005
Na	0.003	0.002	0.003	0.003	0.003	0.002	0.005	0.000	0.003	0.004	0.004	0.000	0.002	0.001	0.005	0.000	0.007	0.010	0.000
K	0.005	0.002	0.003	0.005	0.004	0.004	0.004	0.005	0.005	0.002	0.002	0.001	0.003	0.001	0.006	0.000	0.003	0.002	0.004
Cr	0.007	0.005	0.004	0.014	0.005	0.002	0.002	0.001	0.000	0.002	0.000	0.000	0.003	0.000	0.001	0.000	0.004	0.000	0.000
TOTAL	8.248	8.259	8.288	8.268	8.141	8.109	8.119	8.089	8.154	8.122	8.125	8.120	8.093	8.105	8.169	8.050	8.064	14.047	14.040

Ab: Albite; Ol: Oligoclase; Ep: Epidote; Tlc: Talc; Chld: Chloritoid.

Table 5. (Continued)

SAMP	KYR.18												KYR.18						
ANAL	18	26	27	28	29	37	38	40	41	42	43	46	11	12	13	14	15	19	20
MIN	Talc												Chld						
WT (%)																			
SiO2	56.747	57.045	58.921	50.147	58.100	59.028	54.811	58.183	58.430	55.909	58.332	58.910	24.699	24.473	24.123	24.145	23.795	22.589	24.334
TiO2	0.000	0.000	0.000	0.000	0.037	0.014	0.000	0.000	0.021	0.000	0.000	0.000	0.005	0.000	0.006	0.000	0.020	0.011	0.000
Al2O3	0.202	0.233	0.215	6.249	0.222	0.214	0.419	0.384	0.673	2.460	0.604	0.233	40.345	40.126	39.761	39.360	39.474	39.584	39.733
FeO	5.134	5.495	5.125	9.104	5.154	5.543	5.478	5.176	5.629	7.218	5.817	5.416	18.837	19.006	17.593	18.124	18.596	19.174	19.191
MnO	0.000	0.010	0.000	0.026	0.007	0.000	0.010	0.013	0.000	0.017	0.000	0.000	0.051	0.026	0.077	0.013	0.051	0.048	0.035
MgO	27.457	25.334	26.641	24.502	26.556	37.341	26.125	26.776	25.908	25.574	26.299	26.084	6.382	6.264	7.014	6.822	6.174	6.288	6.101
CaO	0.011	0.020	0.026	0.028	0.035	0.035	0.046	0.052	0.030	0.032	0.055	0.032	0.012	0.010	0.048	0.000	0.059	0.011	0.043
Na2O	0.036	0.032	0.029	0.015	0.017	0.028	0.042	0.020	0.049	0.027	0.018	0.020	0.000	0.004	0.012	0.000	0.005	0.000	0.000
K2O	0.015	0.036	0.036	0.033	0.038	0.029	0.044	0.040	0.101	0.116	0.044	0.000	0.034	0.000	0.028	0.035	0.014	0.030	0.038
Cr2O3	0.000	0.003	0.000	0.000	0.002	0.000	0.000	0.022	0.000	0.000	0.000	0.014	0.000	0.018	0.000	0.000	0.000	0.005	0.030
TOTAL	89.602	88.208	90.993	90.104	90.168	92.232	86.975	90.666	90.841	91.416	91.169	90.717	90.365	89.987	88.662	88.499	88.188	87.740	89.505
Cations on the basis of 22 oxygens													Cations on the basis of 14 oxygens						
Si	7.845	7.996	7.987	7.092	7.957	7.922	7.829	7.929	7.957	7.662	7.926	8.015	2.029	2.022	2.012	2.023	2.007	1.927	2.025
Ti	0.000	0.000	0.000	0.000	0.004	0.001	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.000
Al	0.033	0.039	0.034	1.042	0.036	0.034	0.071	0.062	0.108	0.397	0.097	0.037	3.906	3.908	3.909	3.089	3.924	3.980	3.897
Fe	0.594	0.644	0.581	1.077	0.590	0.622	0.655	0.590	0.641	0.835	0.661	0.616	1.294	1.318	1.227	1.027	1.312	1.368	1.336
Mn	0.000	0.001	0.000	0.003	0.001	0.000	0.001	0.002	0.000	0.002	0.000	0.000	0.004	0.002	0.006	0.001	0.004	0.004	0.003
Mg	5.659	5.294	5.383	5.165	5.422	5.470	5.563	5.440	5.259	5.225	5.327	5.289	0.782	0.772	0.872	0.852	0.776	0.800	0.757
Ca	0.002	0.003	0.004	0.004	0.005	0.005	0.007	0.008	0.004	0.005	0.008	0.005	0.001	0.001	0.004	0.000	0.005	0.001	0.004
Na	0.010	0.009	0.008	0.004	0.005	0.007	0.012	0.005	0.013	0.007	0.005	0.005	0.000	0.001	0.002	0.000	0.001	0.000	0.000
K	0.003	0.006	0.006	0.006	0.007	0.005	0.008	0.007	0.018	0.020	0.008	0.000	0.004	0.000	0.003	0.004	0.002	0.003	0.004
Cr	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.000	0.000	0.000	0.002	0.000	0.001	0.000	0.000	0.000	0.000	0.002
TOTAL	14.144	13.992	14.003	14.393	14.026	14.066	14.145	14.045	14.002	14.153	14.032	13.969	8.019	8.024	8.036	8.036	8.031	8.084	8.027

Ab: Albite; Ol: Oligoclase; Ep: Epidote; Tlc: Talc; Chld: Chloritoid.