2007007

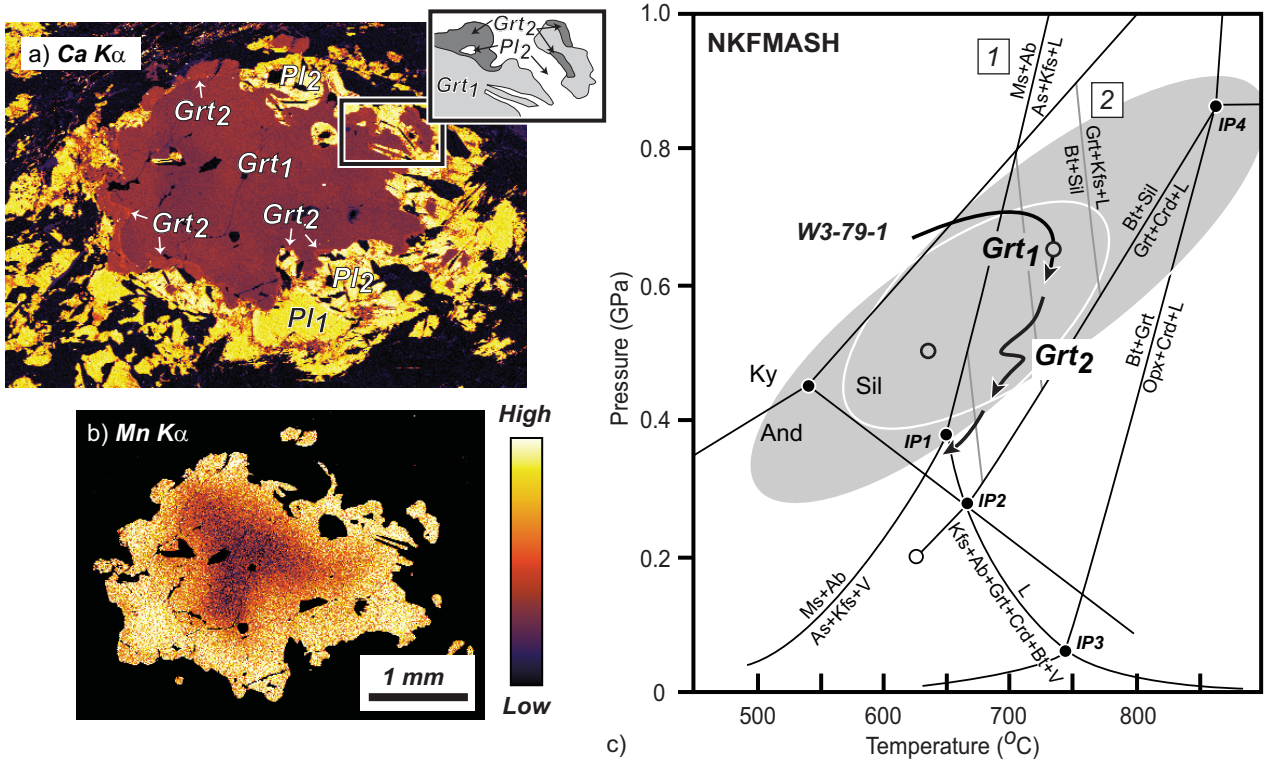

Figure DR1. Color version of Figure 5 in Dumond et al.

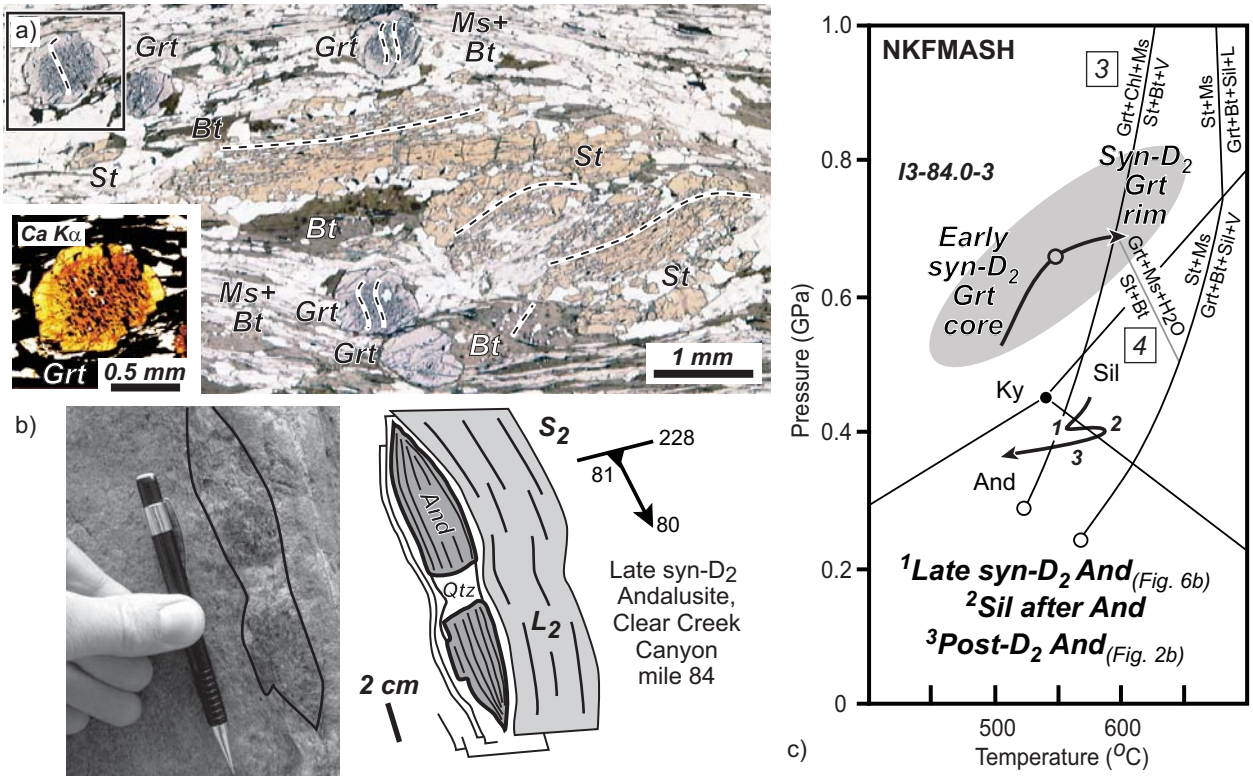

Figure DR2. Color version of Figure 6 in Dumond et al.

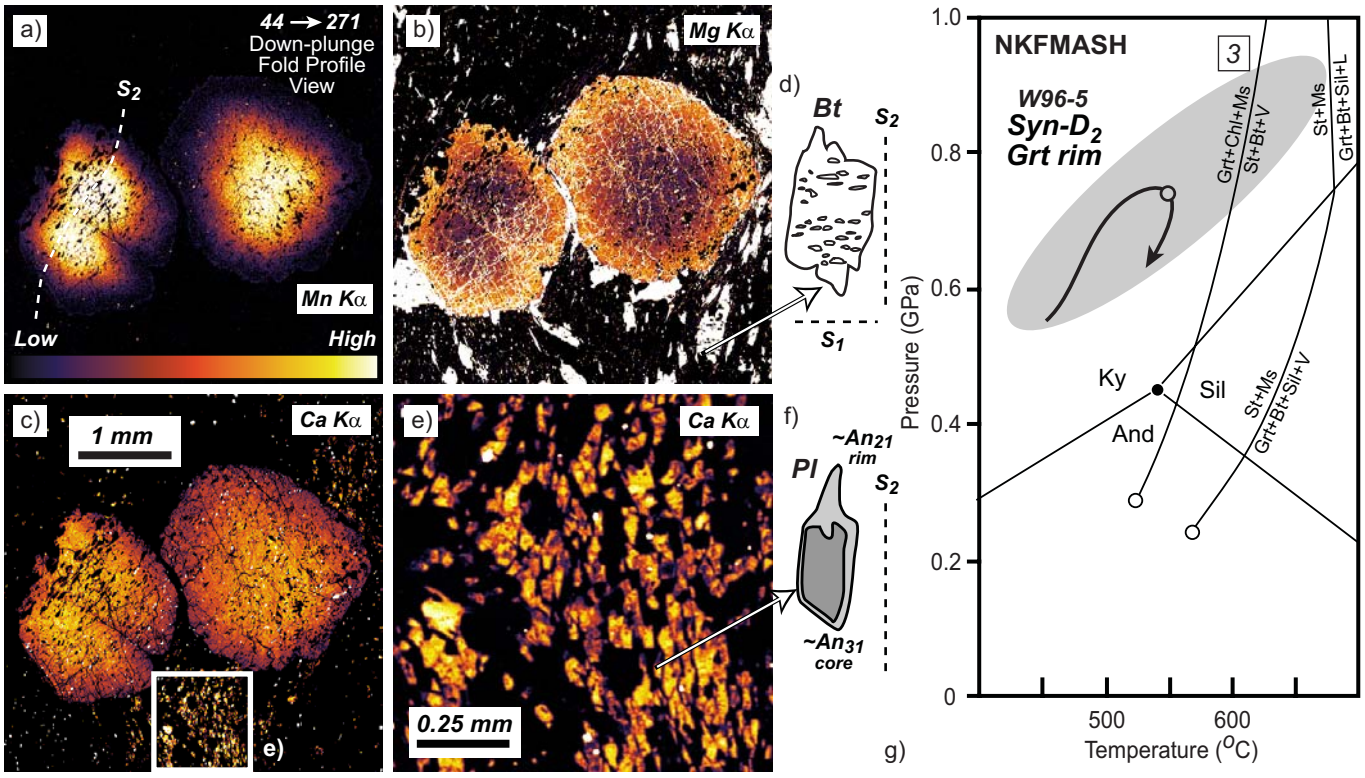

Figure DR3. Color version of Figure 8 in Dumond et al.

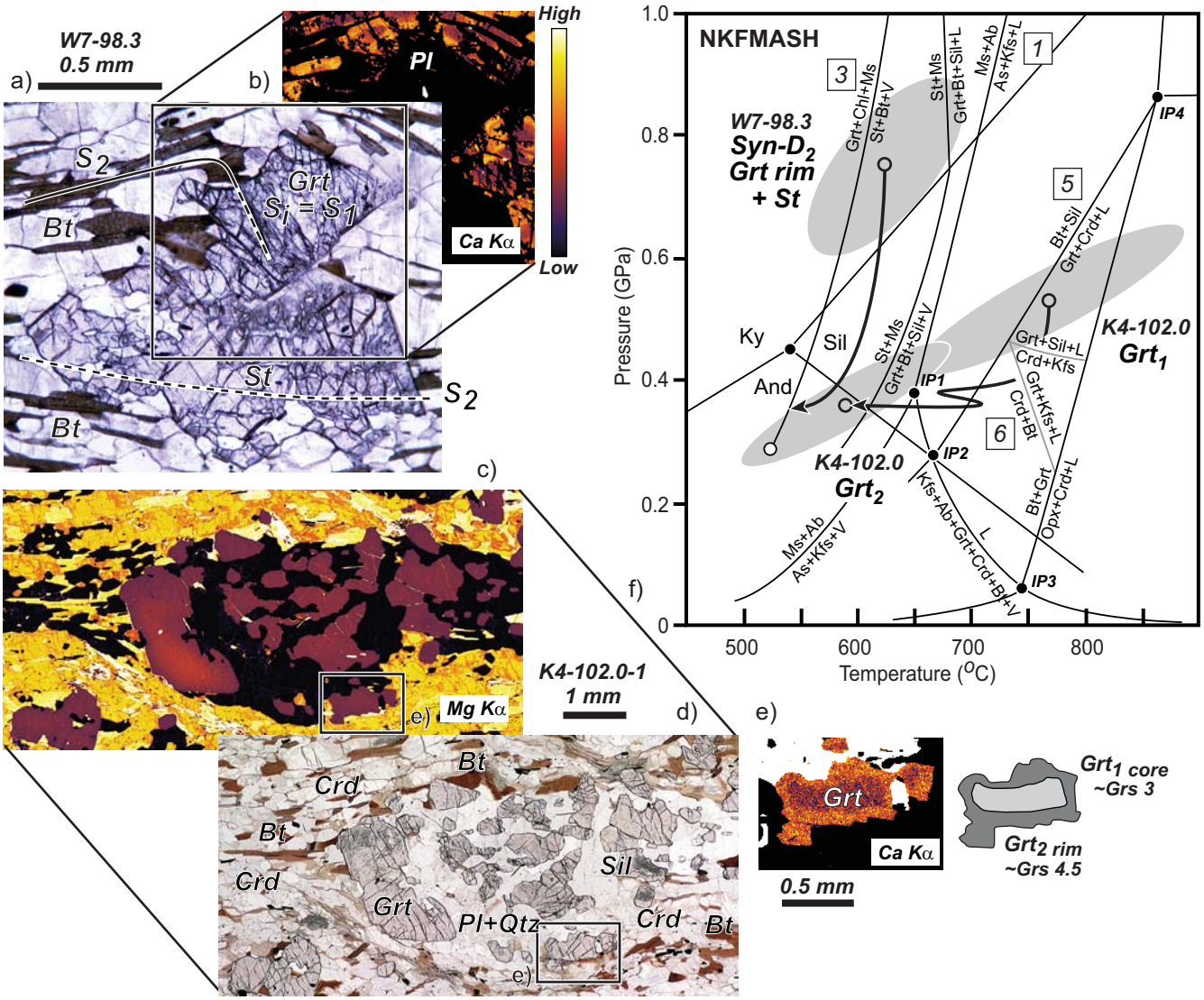

Figure DR4. Color version of Figure 9 in Dumond et al.

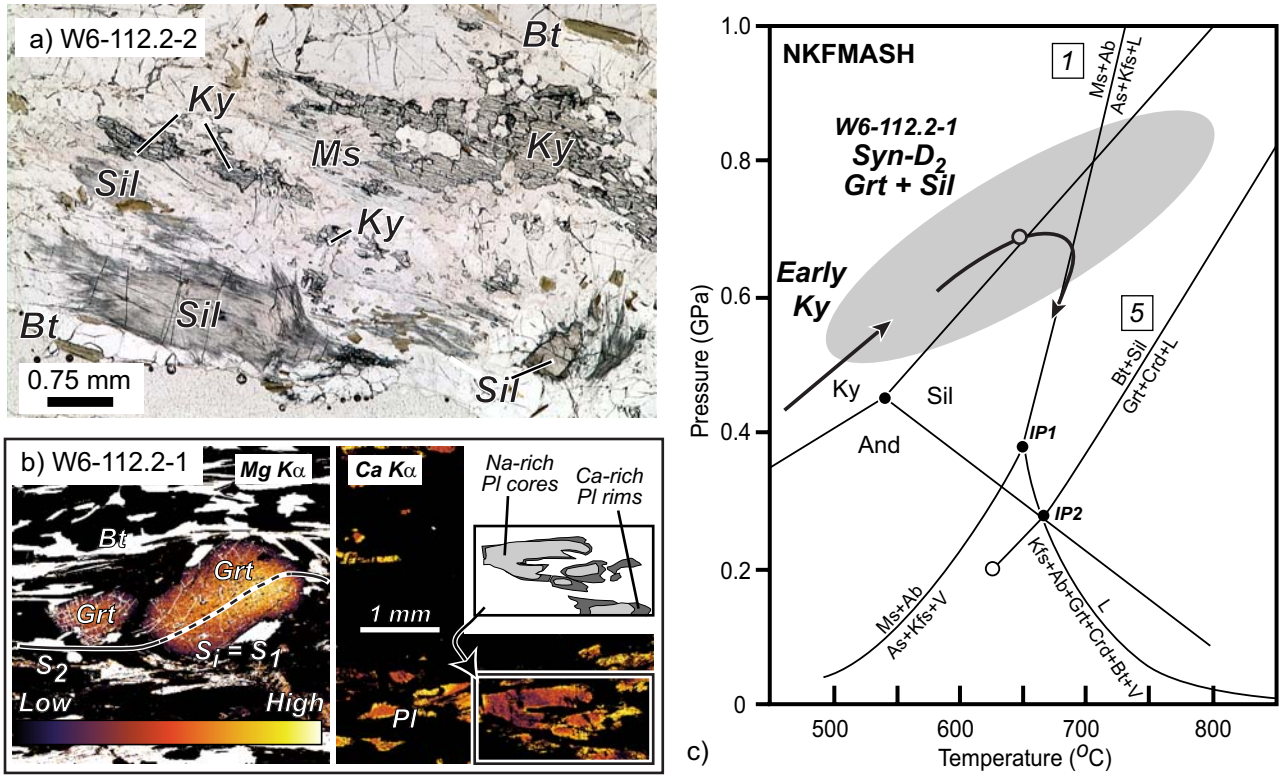

Figure DR5. Color version of Figure 10 in Dumond et al.

TABLE DR1. ELECTRON MICROPROBE ANALYSES FOR UPPER GRANITE GORGE, AZ, TRAVERSE SAMPLES

Oxide	W99-78-1			K3-78.9			W3-79-1				
(wt%)	Grt*	Pl*	Bt*	Grt	Pl	Bt*	Grt-core*	Grt-rim	Pl-core*	Pl-rim*	Bt*
FeO	31.27	0.12	22.73	35.46	0.15	21.35	35.04	34.13	0.05	0.06	22.02
MgO	2.61	n.a.	7.84	4.01	n.a.	8.32	3.00	2.33	n.a.	n.a.	7.69
MnO	8.16	n.a.	0.33	2.04	n.a.	0.08	2.98	4.60	n.a.	n.a.	0.08
CaO	0.61	3.50	b.d.	1.40	6.15	b.d.	1.48	1.60	5.88	6.86	b.d.
Na2O	n.a.	9.46	0.13	n.a.	8.29	0.19	n.a.	n.a.	8.41	7.78	0.08
K2O	n.a.	0.34	9.24	n.a.	0.07	9.17	n.a.	n.a.	0.17	0.10	9.15
TiO2	n.a.	n.a.	2.68	0.02	n.a.	2.43	n.a.	n.a.	n.a.	n.a.	2.43
Al2O3	21.47	22.61	18.15	21.33	24.84	19.23	21.57	21.48	25.14	25.86	18.60
SiO2	35.93	64.77	34.8	37.40	60.02	34.66	37.03	37.02	61.12	59.62	34.30
Total	100.05	100.81	95.89	100.61	99.52	95.43	101.09	101.17	100.77	100.29	94.34
				Number of oxygens							
Cations	12	8	11	12	8	11	12	12	8	8	11
Fe	2.129	0.004	1.465	2.365	0.006	1.370	2.343	2.289	0.002	0.002	1.431
Mg	0.316	n.a.	0.90	0.476	n.a.	0.952	0.357	0.278	n.a.	n.a.	0.890
Mn	0.563	n.a.	0.022	0.088	n.a.	0.005	0.202	0.202	n.a.	n.a.	0.005
Ca	0.054	0.164	b.d.	0.093	0.295	b.d.	0.127	0.127	0.278	0.327	b.d.
Na	n.a.	0.80	0.019	n.a.	0.719	0.028	n.a.	n.a.	0.719	0.671	0.011
K	n.a.	0.019	0.908	n.a.	0.004	0.898	n.a.	n.a.	0.010	0.006	0.906
Ti	n.a.	n.a.	0.155	0.001	n.a.	0.140	n.a.	n.a.	n.a.	n.a.	0.142
Al	2.060	1.167	1.649	2.005	1.310	1.740	2.033	2.031	1.308	1.355	1.706
Si	2.925	2.835	2.683	2.983	2.686	2.660	2.961	2.968	2.697	2.650	2.661

Oxide	W3-80.6-3				
(wt%)	Grt-core	Grt-rim	Pl	Bt	Ms
FeO	34.72	35.66	0.05	22.51	1.32
MgO	2.31	1.93	n.a.	7.93	0.54
MnO	4.80	3.96	n.a.	n.a.	n.a.
CaO	0.95	0.94	3.43	b.d.	b.d.
Na2O	n.a.	n.a.	10.05	0.13	0.69
K2O	n.a.	n.a.	0.06	9.02	9.52
TiO2	0.01	0.01	n.a.	2.25	0.34
Al2O3	21.21	21.13	22.56	19.08	37.10
SiO2	37.48	37.53	66.01	35.33	47.23
Total	101.52	101.19	102.16	96.54	97.13
	Number of oxygens				
Cations	12	12	8	11	11
Fe	2.322	2.394	0.002	1.434	0.072
Mg	0.275	0.231	n.a.	0.901	0.052
Mn	0.325	0.269	n.a.	n.a.	n.a.
Ca	0.082	0.081	0.158	b.d.	b.d.
Na	n.a.	n.a.	0.841	0.019	0.087
K	n.a.	n.a.	0.003	0.877	0.788
Ti	0.001	0.001	n.a.	0.129	0.017
Al	1.998	1.999	1.147	1.713	2.840
Si	2.997	3.012	2.848	2.691	3.067

NOTE: All data collected using the Cameca SX50 electron microprobe at the University of Massachusetts-Amherst; Operating conditions were at 15 kV and 15 nA with a focused beam. Feldspars and micas were analyzed with a defocused beam set to ~5 µm diameter. Common natural and synthetic standards were used for calibration. X-ray maps were collected at 15 kV and 100-200 nA with a focused beam, 70-100 ms dwell time, and 1-10 µm step-size in stage-scanning mode. n.a. = not analyzed; b.d. = below detection. *indicates average composition from several analyses.

TABLE DR1. ELECTRON MICROPROBE ANALYSES FOR UPPER GRANITE GORGE, AZ, TRAVERSE SAMPLES

Oxide	W5-82.8-5				W83-1				K3-83.8			
(wt%)	Grt	Pl	Bt	Ms	Grt	Pl	Bt	Ms	Grt	Pl	Bt	Ms
FeO	35.40	0.14	21.77	1.01	34.08	0.06	20.76	0.95	38.83	0.40	22.42	1.27
MgO	2.12	n.a.	8.45	0.43	2.56	n.a.	8.99	0.40	2.30	n.a.	8.77	0.56
MnO	3.00	n.a.	0.12	b.d.	3.05	n.a.	0.05	b.d.	0.98	n.a.	0.02	b.d.
CaO	1.76	2.84	n.a.	n.a.	1.89	3.57	0.01	b.d.	1.61	3.10	n.a.	n.a.
Na2O	n.a.	9.83	0.07	1.25	n.a.	10.15	0.30	1.35	n.a.	10.02	0.23	0.87
K2O	n.a.	0.07	8.75	9.18	n.a.	0.08	8.63	8.98	n.a.	0.09	8.21	9.31
TiO2	n.a.	n.a.	1.62	0.41	n.a.	n.a.	1.47	0.31	n.a.	n.a.	1.53	0.23
Al2O3	20.97	22.47	18.70	36.31	21.56	23.08	19.52	37.19	21.52	22.61	19.79	35.68
SiO2	36.75	64.89	34.45	45.46	37.21	64.52	34.38	45.40	37.02	64.12	34.94	45.97
Total	100.00	100.24	93.93	94.05	100.35	101.46	94.11	94.58	102.26	100.34	95.91	93.89
					Number of oxygens							
Cations	12	8	11	11	12	8	11	11	12	8	11	11
Fe	2.404	0.005	1.421	0.057	2.288	0.002	1.344	0.053	2.589	0.015	1.428	0.071
Mg	0.257	n.a.	0.983	0.043	0.306	n.a.	1.038	0.040	0.273	n.a.	0.996	0.056
Mn	0.206	n.a.	0.008	b.d.	0.207	n.a.	0.004	b.d.	0.066	n.a.	0.002	b.d.
Ca	0.153	0.134	n.a.	n.a.	0.163	0.167	n.a.	n.a.	0.138	0.146	n.a.	n.a.
Na	n.a.	0.837	0.011	0.162	n.a.	0.857	0.045	0.174	n.a.	0.856	0.034	0.113
K	n.a.	0.004	0.871	0.783	n.a.	0.004	0.853	0.762	n.a.	0.005	0.798	0.797
Ti	n.a.	n.a.	0.085	0.021	n.a.	n.a.	0.086	0.016	n.a.	n.a.	0.088	0.012
Al	2.007	1.163	1.720	2.862	2.040	1.185	1.781	2.915	2.022	1.174	1.776	2.820
Si	2.984	2.849	2.687	3.047	2.988	2.811	2.662	3.019	2.951	2.824	2.661	3.083

Oxide	I3-84.0-3				P1-90			B91-2			
(wt%)	Grt	Pl	Bt	Ms	Grt	Pl	Bt	Grt	Pl	Bt	Crd
FeO	33.65	0.06	20.52	1.18	33.91	0.09	23.94	34.48	0.06	18.15	7.18
MgO	2.31	n.a.	9.83	0.52	2.52	n.a.	6.99	5.91	n.a.	11.68	9.02
MnO	3.25	n.a.	0.07	b.d.	4.78	n.a.	0.10	0.60	n.a.	0.03	0.07
CaO	3.51	6.32	0.02	b.d.	1.35	5.12	0.01	0.62	3.07	n.a.	n.a.
Na2O	0.01	7.89	0.22	1.09	n.a.	8.98	0.14	n.a.	9.57	0.30	0.20
K2O	n.a.	0.05	8.86	9.61	n.a.	0.14	9.19	n.a.	0.04	8.87	n.a.
TiO2	0.01	n.a.	1.57	0.45	b.d.	n.a.	2.89	n.a.	n.a.	2.74	n.a.
Al2O3	21.28	25.04	19.73	37.13	21.24	24.17	18.80	22.04	22.63	18.39	33.39
SiO2	37.15	60.92	35.50	46.87	37.55	62.26	34.18	37.46	66.03	36.45	49.23
Total	101.17	100.28	96.32	96.85	101.35	100.76	96.24	101.11	101.40	96.62	99.10
					Number of oxygens						
Cations	12	8	11	11	12	8	11	12	8	11	18
Fe	2.251	0.002	1.293	0.064	2.265	0.003	1.546	2.266	0.000	1.128	0.610
Mg	0.275	n.a.	1.104	0.051	0.300	n.a.	0.805	0.692	n.a.	1.293	1.365
Mn	0.220	n.a.	0.005	b.d.	0.323	n.a.	0.007	0.040	n.a.	0.002	0.006
Ca	0.301	0.300	0.002	b.d.	0.116	0.242	0.001	0.052	0.137	n.a.	n.a.
Na	0.002	0.678	0.064	0.138	n.a.	0.767	0.021	n.a.	0.805	0.043	0.039
K	n.a.	0.003	0.852	0.798	n.a.	0.008	0.905	n.a.	0.004	0.841	n.a.
Ti	0.001	n.a.	0.178	0.022	b.d.	n.a.	0.168	n.a.	n.a.	0.153	n.a.
Al	2.006	1.307	1.752	2.848	1.999	1.255	1.711	2.042	1.146	1.610	3.998
Si	2.971	2.698	2.675	3.051	2.999	2.743	2.639	2.944	2.870	2.707	5.001

NOTE: All data collected using the Cameca SX50 electron microprobe at the University of Massachusetts-Amherst;

n.a. = not analyzed; b.d. = below detection.

TABLE DR1. ELECTRON MICROPROBE ANALYSES FOR UPPER GRANITE GORGE, AZ, TRAVERSE SAMPLES

Oxide	G03-95.6-2				W96-5				K6-96.7			
(wt%)	Grt	Pl	Bt	Ms	Grt	Pl	Bt	Ms	Grt	Pl	Bt	Ms
FeO	22.69	b.d.	14.00	2.82	37.19	0.08	20.56	1.19	36.80	0.07	23.76	1.29
MgO	3.90	n.a.	13.84	0.95	2.16	n.a.	8.38	0.60	1.96	n.a.	7.62	0.50
MnO	12.97	n.a.	n.a.	n.a.	0.29	n.a.	n.a.	n.a.	0.37	n.a.	0.06	0.02
CaO	1.71	4.84	b.d.	b.d.	3.38	4.44	b.d.	0.01	2.91	4.20	n.a.	n.a.
Na2O	n.a.	8.94	0.26	1.27	n.a.	9.04	0.04	0.71	n.a.	9.46	0.07	0.89
K2O	n.a.	0.04	9.02	8.94	n.a.	0.35	9.21	9.81	n.a.	0.06	8.90	9.16
TiO2	0.16	n.a.	1.53	0.50	0.02	n.a.	1.40	0.28	0.15	n.a.	1.74	0.24
Al2O3	21.58	23.78	18.48	34.37	20.91	22.70	20.12	36.30	21.56	23.40	19.22	37.53
SiO2	36.87	62.84	36.97	45.82	35.96	62.60	34.89	45.79	37.71	63.44	34.50	47.55
Total	99.87	100.44	94.10	94.67	99.91	99.21	94.60	94.69	101.45	100.62	95.87	97.16
					Number of oxygens							
Cations	12	8	11	11	12	8	11	11	12	8	11	11
Fe	1.519	b.d.	0.875	0.158	2.537	0.003	1.322	0.066	2.448	0.002	1.533	0.069
Mg	0.465	n.a.	1.541	0.095	0.263	n.a.	0.960	0.059	0.232	n.a.	0.876	0.048
Mn	0.880	n.a.	n.a.	n.a.	0.020	n.a.	n.a.	n.a.	0.025	n.a.	0.004	0.001
Ca	0.147	0.229	b.d.	b.d.	0.296	0.212	b.d.	0.001	0.248	0.198	n.a.	n.a.
Na	n.a.	0.764	0.038	0.165	n.a.	0.783	0.005	0.092	n.a.	0.807	0.011	0.111
K	n.a.	0.002	0.859	0.765	n.a.	0.020	0.903	0.834	n.a.	0.003	0.875	0.755
Ti	0.010	n.a.	0.086	0.025	0.001	n.a.	0.081	0.014	0.009	n.a.	0.101	0.011
Al	2.036	1.235	1.627	2.717	2.010	1.195	1.823	2.850	2.021	1.212	1.747	2.857
Si	2.952	2.768	2.761	3.074	2.933	2.796	2.683	3.051	2.999	2.788	2.661	3.071

Oxide	W7-97.4-1				B98-2				W7-98.3				
(wt%)	Grt	Pl	Bt	Ms	Grt	Pl	Bt	Ms	Grt	Pl	Bt	Ms	St**
FeO	33.18	0.10	23.99	1.22	32.68	0.43	23.20	2.83	34.92	0.04	25.07	1.55	12.35
MgO	1.82	n.a.	8.51	0.47	1.49	n.a.	6.99	0.52	2.20	n.a.	8.01	0.47	1.10
MnO	4.90	n.a.	n.a.	n.a.	4.03	n.a.	0.15	0.02	1.72	n.a.	n.a.	n.a.	0.18
CaO	2.15	3.18	0.04	0.01	4.28	4.80	n.a.	n.a.	3.28	6.31	b.d.	b.d.	b.d.
Na2O	n.a.	10.28	0.06	1.01	n.a.	9.26	0.13	1.03	n.a.	7.93	0.12	1.20	0.06
K2O	n.a.	0.02	8.33	9.75	n.a.	0.07	9.11	9.61	n.a.	0.05	9.19	9.27	n.a.
TiO2	0.04	n.a.	1.65	0.37	n.a.	n.a.	1.74	0.25	n.a.	n.a.	1.38	0.39	0.57
Al2O3	21.17	22.77	18.86	36.74	21.09	23.40	19.34	35.29	21.09	24.88	19.46	35.57	55.23
SiO2	35.92	65.07	32.64	45.41	36.95	61.78	34.96	45.47	37.50	60.36	34.02	45.76	27.78
Total	99.18	101.42	94.08	94.98	100.51	99.74	95.65	95.03	100.71	99.57	97.25	94.21	98.29
					Number of oxygens								
Cations	12	8	11	11	12	8	11	11	12	8	11	11	23
Fe	2.277	0.004	1.584	0.068	2.205	0.016	1.495	0.159	2.266	0.001	1.609	0.087	1.422
Mg	0.222	n.a.	1.002	0.046	0.179	n.a.	0.802	0.052	0.339	n.a.	0.916	0.047	0.225
Mn	0.341	n.a.	n.a.	n.a.	0.275	n.a.	0.010	0.001	0.203	n.a.	n.a.	n.a.	0.021
Ca	0.189	0.148	0.004	0.001	0.370	0.229	n.a.	n.a.	0.212	0.282	b.d.	b.d.	b.d.
Na	n.a.	0.867	0.010	0.13	n.a.	0.800	0.020	0.133	n.a.	0.702	0.017	0.156	0.015
K	n.a.	0.001	0.839	0.827	n.a.	0.004	0.895	0.822	n.a.	0.005	0.899	0.793	n.a.
Ti	0.003	n.a.	0.098	0.019	n.a.	n.a.	0.101	0.013	n.a.	n.a.	0.080	0.019	0.059
Al	2.048	1.168	1.755	2.881	2.006	1.230	1.756	2.786	2.042	1.279	1.759	2.811	8.966
Si	2.947	2.831	2.576	3.021	2.981	2.754	2.694	3.047	2.959	2.722	2.610	3.068	3.826

** = Staurolite in W7-98.3 has no detectable zoning; ZnO = 1.03 wt.%; Zn = 0.105 based on 23 oxygens.

n.a. = not analyzed; b.d. = below detection.

TABLE DR1. ELECTRON MICROPROBE ANALYSES FOR UPPER GRANITE GORGE, AZ, TRAVERSE SAMPLES

Oxide	K4-102.0-1b						G03-108-1			
(wt%)	Grt-core	Grt-rim	Pl-core	Pl-rim	Bt	Crd	Grt	Pl	Bt	Ms
FeO	36.22	37.21	0.09	0.2	23.74	9.19	32.62	0.05	22.64	1.50
MgO	4.13	2.36	n.a.	n.a.	7.65	6.84	2.13	b.d.	7.57	0.61
MnO	0.47	0.89	n.a.	n.a.	n.a.	0.13	5.87	n.a.	n.a.	n.a.
CaO	1.29	1.66	9.87	6.92	0.01	0.02	1.79	4.42	0.01	0.01
Na2O	n.a.	n.a.	6.21	7.56	0.18	0.51	n.a.	9.21	0.22	0.92
K2O	n.a.	n.a.	0.04	0.06	8.44	0.01	n.a.	0.07	8.98	9.06
TiO2	n.a.	0.01	n.a.	n.a.	1.54	n.a.	0.04	n.a.	1.92	0.53
Al2O3	21.52	21.19	28.05	26.04	19.38	32.71	20.92	23.44	19.10	35.63
SiO2	36.63	36.02	56.39	59.33	33.84	48.54	36.10	62.77	34.91	46.03
Total	100.26	99.34	100.65	100.11	94.78	97.95	99.47	99.95	95.35	94.29
							Number of oxygens			
Cations	12	12	8	8	11	18	12	8	11	11
Fe	2.431	2.544	0.003	0.007	1.548	0.798	2.232	0.002	1.460	0.084
Mg	0.494	0.288	n.a.	n.a.	0.889	1.058	0.260	b.d.	0.869	0.061
Mn	0.032	0.062	n.a.	n.a.	n.a.	0.011	0.407	n.a.	n.a.	n.a.
Ca	0.111	0.145	0.472	0.330	0.001	0.002	0.157	0.210	0.001	0.001
Na	n.a.	n.a.	0.538	0.653	0.028	0.103	n.a.	0.79	0.033	0.119
K	n.a.	n.a.	0.002	0.003	0.839	0.001	n.a.	0.004	0.884	0.771
Ti	n.a.	0.001	n.a.	n.a.	0.090	n.a.	0.003	n.a.	0.112	0.026
Al	2.035	2.042	1.477	1.367	1.781	4.002	2.018	1.223	1.736	2.803
Si	2.940	2.945	2.519	2.642	2.639	5.038	2.955	2.779	2.691	3.073

Oxide	W112.2-1b				B119-2			
(wt%)	Grt	Pl	Bt	Ms	Grt	Pl	Bt	Ms
FeO	35.25	b.d.	20.73	1.07	35.74	0.05	22.36	1.69
MgO	3.06	n.a.	8.24	0.51	2.38	n.a.	7.22	0.43
MnO	2.50	n.a.	n.a.	n.a.	2.16	n.a.	n.a.	n.a.
CaO	1.72	4.30	0.01	b.d.	2.06	5.37	b.d.	b.d.
Na2O	n.a.	8.87	0.30	1.04	n.a.	8.96	0.39	0.98
K2O	n.a.	0.09	8.95	9.58	n.a.	0.08	8.46	8.72
TiO2	0.15	n.a.	2.13	0.69	0.01	n.a.	2.11	0.38
Al2O3	21.14	23.54	19.50	35.35	20.92	24.32	19.60	35.34
SiO2	37.38	64.18	34.70	44.81	37.35	62.89	35.49	46.32
Total	101.19	100.98	94.56	93.05	100.61	101.66	95.74	94.37
	Number of oxygens				Number of oxygens			
Cations	12	8	11	11	12	8	11	11
Fe	2.353	b.d.	1.336	0.061	2.404	0.002	1.428	0.094
Mg	0.363	n.a.	0.947	0.052	0.286	n.a.	0.821	0.043
Mn	0.169	n.a.	n.a.	n.a.	0.147	n.a.	n.a.	n.a.
Ca	0.147	0.201	0.001	b.d.	0.177	0.251	b.d.	b.d.
Na	n.a.	0.751	0.044	0.137	n.a.	0.758	0.058	0.128
K	n.a.	0.005	0.880	0.831	n.a.	0.004	0.824	0.743
Ti	0.009	n.a.	0.124	0.035	0.001	n.a.	0.121	0.019
Al	1.989	1.211	1.771	2.830	1.983	1.251	1.763	2.784
Si	2.983	2.802	2.675	3.044	3.004	2.745	2.710	3.096

n.a. = not analyzed; b.d. = below detection.