2002048

GSA Data Repository

Item 1. Electron microprobe analyses of the relevant mineral phases used in thermobarometric calculations.

Item 2. Major element zoning profiles for a garnet in GM-3 (a) and GM-2 (b).

Item 3. Light Rare Element concentrations.

Item 4. Tabulated $^{40}Ar/^{39}Ar$ analytical results from rocks in the footwall of the Gurla Mandhata detachment system.

Mineral analyses used for GARB thermometry sample GM-3

	bioitite		garnet						
analysis #	49	124	78	76	65	50	64	79	63
SiO2	34.61	33.76	34.38	34.32	36.97	36.75	36.88	36.97	37.21
TiO2	2.86	2.89	2.87	2.63	0	0.07	0.01	0.06	0.06
Al2O3	18.38	18.42	18.94	19.11	20.45	20.21	20.76	20.44	20.2
Cr2O3	0.02	0	0.05	0.06	0	0	0	0.07	0
Fe2O3	0	0	0	0	0.2	0.57	0	0	0
FeO	24.68	23.52	24.14	23.44	34.79	34.92	34.09	31.71	34.83
MnO	0.61	0.36	0.47	0.39	5.65	5.3	5.89	8.17	5.23
MgO	4.06	4.83	4.74	5.15	1.41	1.33	1.44	1.39	1.5
CaO	0	0.04	0	0	0.86	0.86	0.8	1.19	0.89
Na2O	0.14	0.2	0.1	0.14	0.02	0	0.01	0	0
K2O	10.55	10.91	9.46	9.16	0	0.08	0.01	0.05	0
Totals	95.93	94.96	95.16	94.41	100.36	100.07	99.89	100.05	99.92
Cations per 11 oxgens					Cations per 12 oxygens				
Si	2.717	2.675	2.693	2.696	3.013	3.008	3.01	3.016	3.038
Ti	0.169	0.172	0.169	0.155	0	0.004	0.001	0.004	0.003
Al	1.701	1.72	1.749	1.769	1.965	1.95	1.998	1.966	1.944
Cr	0.001	0	0.003	0.004	0	0	0	0.005	0
Fe3	0	0	0	0	0.012	0.035	0	0	0
Fe2	1.62	1.558	1.581	1.54	2.371	2.39	2.327	2.164	2.378
Mn	0.041	0.024	0.031	0.026	0.39	0.367	0.407	0.564	0.362
Mg	0.475	0.571	0.553	0.603	0.171	0.162	0.176	0.17	0.183
Ca	0	0.004	0	0	0.075	0.075	0.07	0.104	0.078
Na	0.022	0.03	0.015	0.022	0.003	0	0.001	0	0
K	1.058	1.104	0.946	0.918	0	0.009	0.001	0.005	0
Sum	7.803	7.86	7.742	7.733	8	8	7.991	7.997	7.986
X_{Fe}	0.7584	0.722	0.7303	0.71	0.7885	0.79826	0.7809	0.72085	0.7924
X_{Mg}	0.2224	0.265	0.2554	0.278	0.0569	0.05411	0.0591	0.05663	0.061
X_{Mn}					0.1297	0.12258	0.1366	0.18787	0.1206
X_{Ca}					0.0249	0.02505	0.0235	0.03464	0.026

Note: for garnet and biotite: X_i = i/(Fe+Mg+Ca+Mn)

Mineral analyses used for GASP barometry sample GM-3

	garnet						Plagioclase					
analysis #	68	16	15	27	28	48	26	11	12	24	23	45
SiO2	37.28	37.01	36.42	37.16	36.41	36.94	64.06	63.48	63.85	65.06	64.97	64.48
TiO2	0.06	0.02	0	0.01	0.05	0.05	0	0.01	0.01	0	0	0
Al2O3	20.32	20.89	20.86	20.74	20.84	20.12	22.87	22.53	23.09	23.26	22.95	22.93
Cr2O3	0.05	0.04	0.01	0	0.05	0.02	0	0.07	0	0	0	0
Fe2O3	0	0	0.3	0	0.57	0.15	0.34	0.41	0.46	0.38	0.5	0.54
FeO	31.6	33.17	32.66	33.08	33.11	34.85	0	0	0	0	0	0
MnO	7.01	6.89	7.15	6.34	6.7	5.48	0.02	0.09	0.07	0.04	0	0.11
MgO	1.68	1.39	1.33	1.4	1.45	1.49	0	0	0	0	0	0
CaO	0.98	0.87	0.86	0.82	0.83	0.9	3.75	3.82	3.77	3.66	3.68	3.62
Na2O	0	0	0.04	0	0	0	9.33	9.1	9.01	7.24	8.51	9.24
K2O	0	0	0	0	0.01	0	0.23	0.57	0.31	0.19	0.22	0.15
Totals	98.98	100.3	99.63	99.57	100.02	99.99	100.6	100.09	100.57	99.84	100.82	101.08
Cations per	Cations per 12 oxygens						Cations per 8 oxygens					
Si	3.052	3.009	2.985	3.032	2.975	3.022	2.813	2.81	2.805	2.847	2.834	2.816
Ti	0.003	0.001	0	0.001	0.003	0.003	0	0	0	0	0	0
Al	1.961	2.002	2.016	1.996	2.007	1.94	1.184	1.176	1.196	1.2	1.18	1.181
Cr	0.003	0.002	0.001	0	0.003	0.001	0	0.003	0	0	0	0
Fe3	0	0	0.019	0	0.035	0.009	0.011	0.014	0.015	0.013	0.016	0.018
Fe2	2.164	2.255	2.239	2.258	2.263	2.384	0	0	0	0	0	0
Mn	0.486	0.474	0.497	0.439	0.464	0.38	0.001	0.004	0.002	0.002	0	0.004
Mg	0.206	0.168	0.163	0.171	0.176	0.182	0	0	0	0	0	0
Ca	0.086	0.076	0.075	0.072	0.073	0.079	0.177	0.181	0.177	0.172	0.172	0.17
Na	0	0	0.006	0.001	0	0	0.795	0.781	0.767	0.614	0.72	0.782
K	0	0	0	0	0.001	0	0.013	0.032	0.018	0.01	0.012	0.008
Sum	7.962	7.988	8	7.969	8	8	4.993	5	4.981	4.858	4.934	4.979
X_{Fe}	0.7356	0.758	0.7529	0.768	0.7604	0.7881						
X_{Mg}	0.07	0.057	0.0548	0.0582	0.0591	0.06017						
X_{Mn}	0.1652	0.159	0.1671	0.1493	0.1559	0.12562						
X_{Ca}	0.0292	0.026	0.0252	0.0245	0.0245	0.02612	0.1821	0.18815	0.1875	0.2188	0.19283	0.1786

Note: for garnet: X_i = i/(Fe+Mg+Ca+Mn); for plagioclase: X_{Ca} = Ca/Na + Ca

Mineral analyses used for GARB thermometry sample GM-2

	garnet							biotite							
analysis #	21	24	31	33	54	79	71	72	22	23	25	26	34	36	78
SiO2	36.71	36.69	36.66	36.73	36.56	36.97	36.94	33.7	34.34	33.69	32.87	33.11	32.91	33.52	34.38
TiO2	0	0.12	0.02	0	0.1	0.06	0	2.75	3.09	2.61	0.66	1.12	0.47	2.74	2.87
Al2O3	20.74	20.96	20.78	20.77	20.63	20.44	20.52	18.44	19.02	18.65	18.67	19.32	19.74	18.37	18.94
Cr2O3	0	0.07	0	0.08	0.01	0.07	0.04	0.05	0.11	0.04	0.02	0.03	0.02	0.06	0.05
Fe2O3	0	0	0	0	0	0	0	0	0	0	3.23	0	3.18	0	0
FeO	31.65	31.62	31.45	31.03	31.15	31.71	31.74	23.78	23.61	25.6	22.72	24.99	22.89	24.4	24.14
MnO	7.62	7.99	7.29	8.23	7.38	8.17	6.92	0.38	0.58	0.61	0.58	0.47	0.46	0.42	0.47
MgO	1.45	1.37	1.65	1.4	1.58	1.39	1.7	5.34	4.33	4.43	5.99	5.32	5.81	5.21	4.74
CaO	0.92	0.97	1.11	1.18	0.99	1.19	1.37	0.02	0	0	0.01	0.01	0.05	0	0
Na2O	0.03	0	0	0	0.01	0	0.01	0.09	0.06	0.06	0.05	0	0.05	0.12	0.1
K2O	0.02	0	0.03	0.03	0.03	0.05	0	9.56	9.91	9.84	8.77	9.44	8.72	9.57	9.46
Totals	99.14	99.8	98.99	99.45	98.46	100.05	99.23	94.11	95.05	95.54	93.58	93.84	94.29	94.43	95.16

Cations per 12 oxgens								Cations per 11 oxygens							
Si	3.013	2.995	3.008	3.007	3.015	3.016	3.023	2.675	2.695	2.662	2.63	2.651	2.607	2.663	2.693
Ti	0	0.008	0.001	0	0.006	0.004	0	0.164	0.182	0.155	0.04	0.068	0.028	0.164	0.169
Al	2.007	2.017	2.011	2.004	2.005	1.966	1.98	1.725	1.76	1.737	1.76	1.824	1.843	1.72	1.749
Cr	0	0.005	0	0.005	0.001	0.005	0.002	0.003	0.007	0.002	0.002	0.002	0.001	0.004	0.003
Fe3	0	0	0	0	0	0	0	0	0	0	0.195	0	0.189	0	0
Fe2	2.173	2.158	2.158	2.125	2.148	2.164	2.172	1.578	1.55	1.692	1.52	1.674	1.516	1.621	1.581
Mn	0.53	0.552	0.507	0.571	0.516	0.564	0.48	0.026	0.039	0.041	0.039	0.032	0.031	0.028	0.031
Mg	0.177	0.167	0.202	0.171	0.194	0.17	0.208	0.632	0.506	0.522	0.714	0.635	0.685	0.617	0.553
Ca	0.081	0.085	0.097	0.103	0.088	0.104	0.12	0.002	0	0	0	0.001	0.004	0	0
Na	0.005	0.001	0	0	0.002	0	0.001	0.014	0.009	0.01	0.008	0	0.008	0.018	0.015
K	0.002	0	0.004	0.004	0.004	0.005	0	0.969	0.993	0.993	0.896	0.965	0.882	0.971	0.946
Sum	7.987	7.987	7.987	7.99	7.979	7.997	7.986	7.788	7.74	7.814	7.804	7.851	7.794	7.806	7.742
X_{Fe}	0.7339	0.729	0.7281	0.7155	0.7291	0.72085	0.7289	0.70509	0.7399	0.7503	0.66872	0.7148	0.678	0.7154	0.73025
X_{Mg}	0.0598	0.056	0.0682	0.0576	0.0659	0.05663	0.0698	0.28239	0.2415	0.2315	0.31412	0.2711	0.3064	0.2723	0.25543
X_{Mn}	0.179	0.186	0.1711	0.1923	0.1752	0.18787	0.1611								
X_{Ca}	0.0274	0.029	0.0327	0.0347	0.0299	0.03464	0.0403								

Note: for garnet and biotite: X_i = i/(Fe+Mg+Ca+Mn)

Mineral analyses used for GARB thermometry sample GM-2

	garnet						plagioclase						
analysis #	41	53	54	66	68	75	42	49	51	52	62	64	65
SiO2	36.83	36.82	36.56	37.02	37.28	37.38	65.62	65.77	65.21	64.7	66.45	65.9	65.81
TiO2	0.05	0.03	0.1	0.07	0.06	0.05	0.01	0	0	0.06	0	0.04	0
Al2O3	21.19	20.75	20.63	20.4	20.32	20.43	22.01	22.12	21.51	21.61	21.57	21.53	21.72
Cr2O3	0	0.02	0.01	0.02	0.05	0.05	0.01	0	0.01	0	0	0	0
Fe2O3	0	0	0	0	0	0	0.34	0.24	0.25	0.24	0.37	0.25	0.2
FeO	31	31.34	31.15	31.68	31.6	31.64	0	0	0	0	0	0	0
MnO	7.47	7.75	7.38	7.74	7.01	8.24	0.08	0.04	0.04	0.09	0.06	0.08	0.09
MgO	1.41	1.6	1.58	1.47	1.68	1.27	0	0	0	0	0	0	0
CaO	1.24	1.05	0.99	0.83	0.98	1.1	2.51	2.47	2.42	2.53	2.52	2.45	2.57
Na2O	0	0.01	0.01	0.04	0	0	8.41	9.2	10.08	9.73	9.42	10.01	10.24
K2O	0.03	0.01	0.03	0.02	0	0	0.19	0.12	0.21	0	0.17	0.14	0.22
Totals	99.22	99.39	98.46	99.3	98.98	100.16	99.18	99.96	99.72	98.97	100.56	100.4	100.86
Cations per 12 oxygens							Cations per 8 oxygens						
Si	3.009	3.011	3.015	3.034	3.052	3.04	2.891	2.882	2.878	2.872	2.898	2.886	2.874
Ti	0.003	0.002	0.006	0.005	0.003	0.003	0	0	0	0.002	0	0.001	0
Al	2.04	2.001	2.005	1.971	1.961	1.959	1.143	1.142	1.119	1.131	1.109	1.111	1.119
Cr	0	0.002	0.001	0.001	0.003	0.003	0.001	0	0.001	0	0	0	0
Fe3	0	0	0	0	0	0	0.011	0.008	0.008	0.008	0.012	0.008	0.007
Fe2	2.118	2.144	2.148	2.171	2.164	2.153	0	0	0	0	0	0	0
Mn	0.517	0.537	0.516	0.537	0.486	0.567	0.003	0.002	0.001	0.003	0.002	0.003	0.003
Mg	0.171	0.195	0.194	0.179	0.206	0.154	0	0	0	0	0	0	0
Ca	0.108	0.092	0.088	0.073	0.086	0.096	0.119	0.116	0.114	0.12	0.118	0.115	0.12
Na	0	0.001	0.002	0.007	0	0	0.718	0.782	0.862	0.838	0.797	0.85	0.867
K	0.004	0.001	0.004	0.002	0	0	0.011	0.007	0.012	0	0.009	0.008	0.012
Sum	7.97	7.987	7.979	7.98	7.962	7.976	4.896	4.938	4.995	4.975	4.945	4.982	5.003
X_{Fe}	0.7268	0.722	0.7291	0.7334	0.7356	0.72492							
X_{Mg}	0.0587	0.066	0.0659	0.0605	0.07	0.05185							
X_{Mn}	0.1774	0.181	0.1752	0.1814	0.1652	0.19091							
X_{Ca}	0.0371	0.031	0.0299	0.0247	0.0292	0.03232	0.1422	0.12918	0.1168	0.1253	0.12896	0.1192	0.1216

Note: for garnet: X_i = i/(Fe+Mg+Ca+Mn); for plagioclase: X_{Ca} = Ca/Na + Ca

Mineral analyses in sample GM-1

	garnet					biotite				plagiocalse			amphibole		
analysis #	8	11	18	22	63	64	9	33	60	61	30	31	28	29	32
SiO2	38.95	38.61	37.58	37.58	37.81	38.79	35.41	35.31	35.52	34.88	61.3	62.38	47.75	52.12	50.71
TiO2	0.02	0.01	0	0	0.05	0.33	1.7	1	3.6	2.92	0.02	0	0.19	0.09	0.18
Al2O3	21.78	21.91	21.27	21.27	20.98	13.55	16.08	16.67	14.86	14.27	24.96	24.76	8.18	2.28	4.06
Cr2O3	0.09	0.01	0.07	0.07	0	0.07	0.04	0.02	0.01	0.01	0	0	0	0	0
Fe2O3	0.34	0.17	0.44	0.44	0.57	12.58	1.88	2.57	0	0	0.09	0.18	3.6	0.94	2.08
FeO	29.71	28.3	32.53	32.53	25.02	15.11	21.86	22.23	25.08	26.66	0	0	23.21	25.37	21.81
MnO	0.89	0.99	1.76	1.76	0.24	0.34	0.12	0.12	0.25	0.25	0.04	0	0.59	0.55	0.53
MgO	6.63	6.84	4.18	4.18	0.91	3.17	9.11	8.38	7.23	6.37	0	0	12.66	15.05	16
CaO	3.2	3.66	2.45	2.45	14.32	11.21	0.06	0	0.03	0.02	6.14	5.93	0.7	0.45	0.46
Na2O	0	0	0.01	0.01	0	1.21	0.11	0.12	0.05	0.04	7.17	7.48	0.93	0.19	0.43
K2O	0.03	0	0	0	0	1.83	9.16	9.11	9.54	9.5	0.11	0	0	0	0
Totals	101.63	100.51	100.28	100.28	99.92	98.2	95.56	95.54	96.18	94.92	99.82	100.74	97.81	97.04	96.27
Cations per 12 oxygens						Cations per 11 oxygens					Cations per 8 oxygens		Cations per 23 oxygens		
Si	2.999	2.993	2.988	2.988	2.999	3.138	2.744	2.742	2.774	2.79	2.717	2.737	7.097	7.771	7.541
Ti	0.001	0.001	0	0	0.003	0.02	0.099	0.058	0.212	0.176	0.001	0	0.021	0.01	0.02
Al	1.977	2.002	1.994	1.994	1.962	1.293	1.469	1.526	1.368	1.345	1.304	1.28	1.433	0.401	0.712
Cr	0.005	0	0.004	0.004	0	0.004	0.003	0.001	0.001	0.001	0	0	0	0	0
Fe3	0.02	0.01	0.026	0.026	0.034	0.766	0.11	0.15	0	0	0.003	0.006	0.403	0.106	0.233
Fe2	1.913	1.835	2.164	2.164	1.66	1.023	1.417	1.444	1.637	1.783	0	0	2.885	3.164	2.713
Mn	0.058	0.065	0.119	0.119	0.016	0.023	0.008	0.008	0.017	0.017	0.001	0	0.074	0.069	0.067
Mg	0.76	0.79	0.495	0.495	0.108	0.382	1.052	0.97	0.841	0.759	0	0	2.804	3.344	3.546
Ca	0.264	0.304	0.209	0.209	1.217	0.972	0.005	0	0.002	0.001	0.292	0.279	0.111	0.072	0.073
Na	0	0	0.001	0.001	0	0.19	0.017	0.019	0.007	0.006	0.616	0.637	0.268	0.055	0.124
K	0.002	0	0	0	0	0.189	0.907	0.904	0.951	0.971	0.006	0	0	0	0
Totals	8	8	8	8	8	8	7.828	7.822	7.81	7.849	4.94	4.938	15.098	14.993	15.029
X_{Fe}	0.63873	0.61289	0.7245	0.72447	0.55315	0.42625	0.57091	0.596201	0.65559	0.69648					
X_{Mg}	0.25376	0.26386	0.1657	0.16572	0.03599	0.159167	0.42385	0.400495	0.3368	0.29648			0.492881	0.513829	0.56654
X_{Mn}	0.01937	0.02171	0.0398	0.03984	0.00533	0.009583									
X_{Ca}	0.08815	0.10154	0.07	0.06997	0.40553	0.405					0.31878	0.3045852			

Note: for garnet: X_i = i/(Fe+Mg+Ca+Mn); for plagioclase: X_{Ca} = Ca/Na + Ca; for amphibole: X_{Mg} = Mg/Mg+Fe

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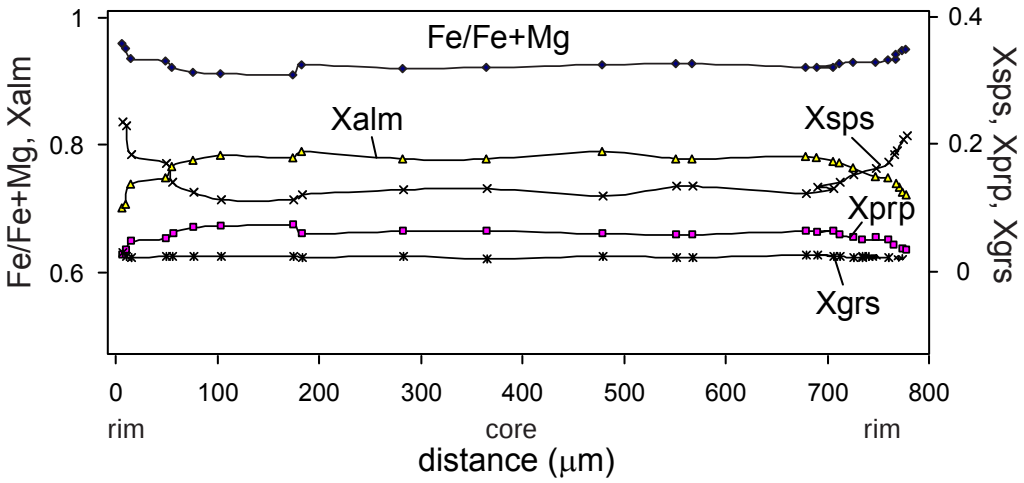
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Xsps, Xprp, Xgrs
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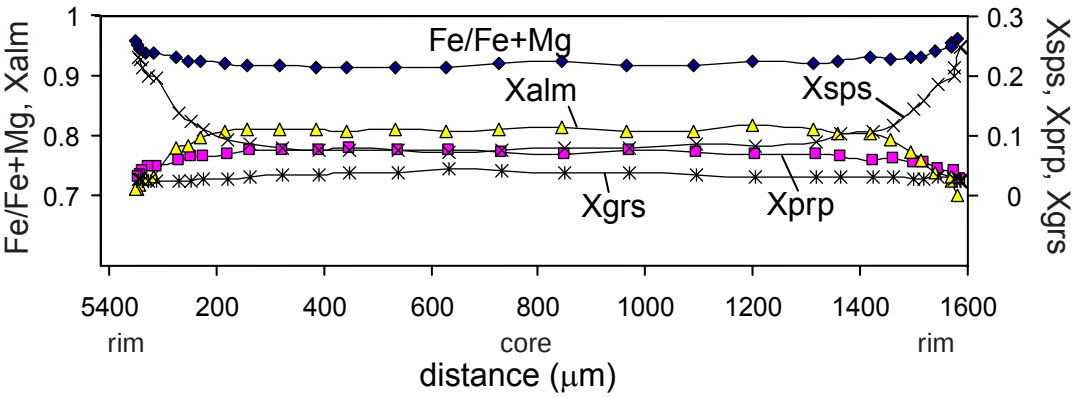
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0.8
0.7
0.3
0.2
0.1
0
5400
200
400
600
800
1000
1200
1400
1600
rim
core
rim
distance (μm)

Sample	97-8-7-2A	98-5-28-2A
La	7	6
Ce	13.6	12.2
Pr	1.43	1.36
Nd	5.2	5.2
Sm	1.3	1.5
Gd	1.5	1.8

Note: Trace element values are in ppm.

GM-11 Biotite 5.0 mg J=.007887

T (^{0}C)	Time (min)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	^{39}Ar (mol)	$\%^{39}Ar$ released	$\%^{40}Ar^*$	$^{40}Ar^*/^{39}Ar_K$	$\pm\sigma_{40/39}$	Age (Ma)	$\pm\sigma_{Age}$ (an)
700	10	1.739	-6.72E-04	3.67E-03	2.78E-14	30.03	36.00	0.6292	2.59E-02	8.930	0.3673
780	10	0.6977	8.60E-03	7.43E-04	1.44E-14	45.57	63.46	0.4538	3.32E-02	6.445	0.4701
850	10	0.8323	-1.49E-02	9.54E-04	6.06E-15	52.11	60.02	0.5242	7.31E-02	7.443	1.0362
950	10	0.6816	-2.12E-04	5.75E-04	2.43E-14	78.38	70.36	0.4868	1.58E-02	6.913	0.2237
1050	10	0.7273	0.0164	6.13E-04	1.71E-14	96.88	70.41	0.5223	2.54E-02	7.417	0.3596
1200	10	4.027	0.1400	8.32E-03	2.89E-15	99.99	37.78	1.554	0.1571102	21.97	2.208

GM-15 Biotite 5.0 mg J=.007886

T (^{0}C)	Time (min)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	^{39}Ar (mol)	$\%^{39}Ar$ released	$\%^{40}Ar^*$	$^{40}Ar^*/^{39}Ar_K$	$\pm\sigma_{40/39}$	Age (Ma)	$\pm\sigma_{Age}$ (an)
700	10	3.029	1.73E-02	8.00E-03	2.00E-14	20.13	21.12	0.6419	3.00E-02	9.109	0.4254
780	12	0.6996	1.94E-03	4.03E-04	2.23E-14	42.57	78.38	0.5557	2.28E-02	7.888	0.3236
850	10	0.8902	-1.77E-02	9.63E-04	7.15E-15	49.77	63.00	0.5793	0.094831	8.222	1.3430
950	10	0.8460	3.17E-02	1.16E-03	1.12E-14	61.04	55.68	0.4815	4.13E-02	6.837	0.5860
1050	10	0.7304	-5.58E-04	5.46E-04	2.89E-14	90.14	73.76	0.5441	1.85E-02	7.725	0.2623
1200	10	1.307	-4.10E-04	1.68E-03	9.80E-15	99.99	59.15	0.7860	5.41E-02	11.15	0.7646

GM-8 Muscovite 5.0 mg J=.007927

T (^{0}C)	Time (min)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	^{39}Ar (mol)	$\%^{39}Ar$ released	$\%^{40}Ar^*$	$^{40}Ar^*/^{39}Ar_K$	$\pm\sigma_{40/39}$	Age (Ma)	$\pm\sigma_{Age}$ (an)
700	10	10.58	-0.6211	2.98E-02	4.59E-15	3.687	15.98867	1.711	0.3419	24.30	4.824
780	10	1.294	-0.2075	1.24E-03	9.58E-15	11.39	65.59975	0.8876	0.1636	12.65	2.324
850	10	0.7624	-0.0612	3.12E-04	3.71E-14	41.24	82.36771	0.6406	4.07E-02	9.138	0.5787
950	10	0.7867	-0.0844	2.99E-04	3.22E-14	67.12	82.91225	0.6669	4.78E-02	9.513	0.6795
1050	10	0.7951	-0.1274	1.83E-04	2.30E-14	85.61	86.17741	0.7065	6.68E-02	10.08	0.9496
1200	10	1.304	-0.1464	1.43E-03	1.79E-14	99.99	63.36826	0.8466	8.32E-02	12.07	1.181

GM-14 Muscovite 5.0 mg J=.007928

T (^{0}C)	Time (min)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	^{39}Ar (mol)	$\%^{39}Ar$ released	$\%^{40}Ar^*$	$^{40}Ar^*/^{39}Ar_K$	$\pm\sigma_{40/39}$	Age (Ma)	$\pm\sigma_{Age}$ (an)
700	10	11.49	-0.3569	3.37E-02	6.48E-15	5.517	12.88	1.491	0.2529	21.21	3.575
780	10	1.769	-0.2399	2.01E-03	7.60E-15	11.98	61.39	1.1323	0.2189	16.12	3.102
850	10	1.093	-0.0740	8.99E-04	2.91E-14	36.76	71.64	0.7972	0.0621	11.37	0.8820
950	10	0.9700	-0.0778	7.01E-04	2.60E-14	58.87	73.80	0.7321	0.0669	10.44	0.9508
1050	10	0.9943	-0.0825	4.81E-04	2.44E-14	79.67	80.68	0.8210	0.0637	11.70	0.9045
1200	10	1.134	-0.0736	2.38E-04	2.39E-14	99.99	89.22	1.033	0.0638	14.71	0.9046

GM-9 Biotite 5.0 mg J=.007931

^{0}C)	Time (min)	$^{40}Ar/^{39}Ar$	$^{37}Ar/^{39}Ar$	$^{36}Ar/^{39}Ar$	^{39}Ar (mol)	$\%^{39}Ar$ released	$\%^{40}Ar^*$	$^{40}Ar^*/^{39}Ar_K$	$\pm\sigma_{40/39}$	Age (Ma)	$\pm\sigma_{Age}$ (an)
700	20	5.54	1.03E-02	1.63E-02	6.43E-15	21.90	12.37	0.6901	0.1322	9.848	1.881
780	12	1.067	8.13E-02	1.62E-03	3.91E-15	35.22	50.11	0.5705	0.1262	8.144	1.798
850	24	1.014	8.91E-03	1.27E-03	5.71E-15	54.66	57.88	0.6151	0.1037	8.779	1.477
950	11	1.089	2.79E-02	2.22E-03	5.71E-15	74.11	36.11	0.4107	0.1632	5.867	2.327
1050	10	1.155	5.60E-02	1.65E-03	4.97E-15	91.03	53.34	0.6463	0.1605	9.224	2.285
1200	23	6.46	0.141393	1.58E-02	2.64E-15	99.99	26.80	1.759	0.2027	24.99	2.860

GM-12 Muscovite 5.0 mg J=.007931

T (^{0}C)	Time (min)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar (mol)	%^{39}Ar released	%^{40}Ar*	^{40}Ar*/^{39}Ar$_K$	$\pm\sigma_{40/39}$	Age (Ma)	$\pm\sigma_{Age}$ (an)
700	29	1.739	4.62E-03	3.58E-03	3.40E-14	31.25	37.54	0.6552	0.0225935	8.077	0.2779
780	22	0.8245	1.32E-02	7.47E-04	1.47E-14	44.74	69.05	0.5796	3.93E-02	7.148	0.4836
850	16	1.122	7.17E-02	1.26E-03	4.83E-15	49.17	62.50	0.7297	0.1614976	8.993	1.986
950	25	0.8179	1.01E-02	6.22E-04	2.46E-14	71.78	73.77	0.6100	1.92E-02	7.521	0.2360
1050	10	0.7427	0.126595	2.87E-04	2.55E-14	95.23	85.49	0.6423	1.64E-02	7.919	0.2020
1200	10	1.225	6.36E-02	2.12E-03	5.18E-15	99.99	45.60	0.5779	0.0789163	7.127	0.9713

GM-12 Biotite 5.0 mg J=.007925

T (^{0}C)	Time (min)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar (mol)	%^{39}Ar released	%^{40}Ar*	^{40}Ar*/^{39}Ar$_K$	$\pm\sigma_{40/39}$	Age (Ma)	$\pm\sigma_{Age}$ (an)
700	11	3.018	-0.11259	7.88E-03	2.38E-14	22.90	21.57952	0.6564	7.57E-02	9.360	1.076
780	10	1.275	-0.12563	1.92E-03	1.98E-14	41.99	51.63098	0.6731	7.52E-02	9.598	1.070
850	10	0.645	-0.16412	-4.39E-04	1.48E-14	56.26	107.9307	0.7371	9.98E-02	10.51	1.418
950	10	0.662	-0.10246	9.73E-05	2.49E-14	80.21	87.68639	0.6001	6.30E-02	8.560	0.896
1050	10	0.705	-0.11726	4.34E-05	2.06E-14	99.99	89.86526	0.6585	7.19E-02	9.391	1.022

GM-13 Biotite 5.0 mg J=.007922

T (^{0}C)	Time (min)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar (mol)	%^{39}Ar released	%^{40}Ar*	^{40}Ar*/^{39}Ar$_K$	$\pm\sigma_{40/39}$	Age (Ma)	$\pm\sigma_{Age}$ (an)
700	10	3.451	0.1698	2.86E-03	3.32E-15	5.640	73.26	2.593	0.2583	36.69	3.617
780	10	0.8184	0.0392	7.48E-04	7.41E-15	18.23	67.05	0.5753	0.1130	8.203	1.608
850	10	0.9353	0.0607	1.02E-03	6.87E-15	29.91	62.59	0.6122	0.1183	8.728	1.683
950	42	0.9282	0.0319	8.05E-04	3.71E-14	92.90	71.34	0.6679	0.0221	9.520	0.3144
1050	10	3.451	0.1698	2.86E-03	3.32E-15	98.54	73.26	2.593	0.2583	36.69	3.617
1200	10	8.554	0.6562	9.58E-03	8.62E-16	99.99	64.62	5.751	0.9518	80.37	13.010

GM-5 Muscovite 5.0 mg J=.007906

T (^{0}C)	Time (min)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar (mol)	%^{39}Ar released	%^{40}Ar*	^{40}Ar*/^{39}Ar$_K$	$\pm\sigma_{40/39}$	Age (Ma)	$\pm\sigma_{Age}$ (an)
670	69	4.123	1.09E-02	1.12E-02	1E-14	2.762	19.36	0.8022	7.65E-02	11.41	1.084
750	15	4.308	-7.86E-03	8.91E-03	2E-14	7.491	38.22	1.651	6.39E-02	23.39	0.9003
820	12	0.9646	-4.95E-04	7.58E-04	1E-13	32.72	74.01	0.7155	6.52E-03	10.18	0.0925
900	19	0.8065	-1.45E-03	3.59E-04	2E-13	69.71	83.60	0.6755	3.70E-03	9.608	0.0525
1000	13	0.9614	3.47E-03	6.87E-04	7E-14	83.23	76.02	0.7338	8.14E-03	10.44	0.1154
1150	13	0.7818	1.50E-03	4.84E-04	9E-14	99.99	78.20	0.6138	9.84E-03	8.734	0.1397

GM-10 Muscovite 5.0 mg J=.007922

^{0}C)	Time (min)	^{40}Ar/^{39}Ar	^{37}Ar/^{39}Ar	^{36}Ar/^{39}Ar	^{39}Ar (mol)	%^{39}Ar released	%^{40}Ar*	^{40}Ar*/^{39}Ar$_K$	$\pm\sigma_{40/39}$	Age (Ma)	$\pm\sigma_{Age}$ (an)
700	13	13.01	-0.0598	3.96E-02	2.99E-15	6.498	9.830	1.287	0.2370	18.30	3.353
800	17	1.066	-0.0092	1.73E-03	1.61E-14	41.40	48.95	0.5300	0.0413	7.559	0.5878
850	12	0.9626	0.0081	1.30E-03	1.06E-14	64.51	56.27	0.5555	0.0545	7.922	0.7756
900	10	1.298	-0.0522	2.62E-03	4.49E-15	74.27	36.43	0.4941	0.1649	7.048	2.347
1000	14	1.449	-0.0330	2.88E-03	6.02E-15	87.36	38.23	0.5708	0.1056	8.139	1.502
1150	15	1.579	-0.0613	2.79E-03	5.81E-15	99.99	44.59	0.7241	0.1016	10.32	1.443