Highly retentive core domains in K-feldspar and their implications for $^{40}Ar/^{39}Ar$ thermochronology illustrated by determining the cooling curve for the Capoas Granite, Palawan, The Philippines

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SUPPLEMENTARY PAPERS

Appendix 1 $^{40}Ar/^{39}Ar$ Geochronology analytical procedures (Capoas Granite).

Appendix 2 $^{40}Ar/^{39}Ar$ geochronology data: Sample 11, PAL33a, K-Feldspar.

Appendix 3 Scanning Electron Microprobe data: on the Hitachi 4300 FESEM.

APPENDIX 1 $^{40}Ar/^{39}Ar$ geochronology analytical procedures (Capoas Granite)

Sample PAL33

Two K-feldspar samples from sample PAL33 (PAL33a with 107.8 mg and PAL33b with 71.9 mg) have been analysed using the furnace step-heating diffusional experiments technique at the ANU RSES Argon Laboratory (argon.anu.edu.au).

Large feldspar phenocrysts were cut out of PAL33 and processed separately from the feldspars in the groundmass. Mineral separates were done at RSES, preparing samples PAL33a and PAL33b. Both samples were then crushed, sieved to a specific size split (150–350 *μ*m) and separated using heavy liquid to purify the grains and then hand-picked to ~99.9% purity.

Irradiation of samples for $^{40}Ar/^{39}Ar$ analysis was undertaken at the McMaster Nuclear Reactor, Ontario, Canada. Irradiation was for 3 hours and 12 minutes in position 5C at 2.5 MW; A Cadmium liner was used to minimize interference from thermal neutrons. K-feldspar (Sanidine 92-176) was used as the Flux Monitor (Spell & McDougall 2003). Samples and flux monitors were wrapped in aluminium for irradiation. Aluminium foil was removed from samples and they were rewrapped in tin for analysis in the mass spectrometer, so as to be able to melt the tin wrap and pump away the contaminated gases prior to the analysis of a sample. The $^{40}Ar/^{39}Ar$ analysis procedures are as described by McDougall & Brown (2006). Grains were analysed using the step-heating method using the furnace technique with temperature control monitored via a thermocouple at the base of a tantalum crucible within a double-vacuum resistance furnace. Analysis was done with liquid nitrogen Cold Trap to reduce contamination into the line and mass spectrometer.

The K-feldspars were analysed on a VG1200 gas source mass spectrometer with a Multiplier. Machine discrimination was determined and used in the data reduction process. Line blanks were measured at different temperatures prior to analysis and backgrounds measured for every step; these were subtracted from final analysis.

Samples were heated prior to analysis with heating up to ~400°C then reduced to 380°C overnight. This is done to outgas contaminants at lower temperatures to minimize mixing contaminants with radiogenic argon released from low retentivity sites into the initial analytical steps. This contaminated gas was pumped away prior to analysis.

K-feldspars were then analysed as diffusion experiments with 35–36 steps, with two or more isothermal steps throughout most of the schedule, and with temperatures of the overall schedule rising from 450ºC to 1450ºC (Lovera *et al.* 1989). The furnace was decontaminated prior to each sample at 1450ºC for 15 minutes three times. The gases from the cleaning process were pumped away and not exposed to the extraction line.

Flux monitors were analysed using a continuous wave laser and the VG1200 Mass Spectrometer, with backgrounds subtracted. Gas released from each step is exposed to Zr–Al getters to remove active gases for 10 minutes, the purified gas then being isotopically analysed in the mass spectrometer.

^{40}K abundances and decay constants are taken from standard values recommended by the IUGS subcommission on Geochronology (Steiger & Jaeger 1977). Stated precisions for $^{40}Ar/^{39}Ar$ ages include all uncertainties in the measurement of isotope ratios and are quoted at the 1-sigma level. The method of asymptotes and limits was used in analysis of the data from this study (Forster & Lister 2004) due to the complex character of the apparent age spectra and the inadequacies of traditional plateau methods when mixing ages are present. The method of asymptotes and limits has been automated using a MacOS *eArgon* (written by G. Lister @ RSES).

Irradiation times, flux monitor, correction factors:

The samples were irradiated at the McMaster Nuclear Reactor, Ontario, Canada, as CAN ANU #7. Irradiated position 5C for 8.0 MWh with cadmium shielding.

^{40}K abundances and decay constants are taken from Steiger & Jaeger (1977).

Flux monitor: Sanidine 92-176 @ 28.10 Ma ± 0.04 Ma (Spell & McDougall 2003).

Discrimination Factor: (1 amu) 1.01890 ± 0.41% (calculated using a linear equation).

Corrections factors were calculated by interaction of neutrons with K and Ca:

(Ar^{36}/Ar^{37}) Ca correction factor 4.39^{E-04} ($Ca\ F_2$)

(Ar^{39}/Ar^{37}) Ca correction factor 7.17^{E-04} ($Ca\ F_2$)

(Ar^{40}/Ar^{39}) K correction factor 5.94^{E-02} ($K_2\ SO_4$)

(Ar^{38}/Ar^{39}) K correction factor 1.20^{E-02} ($K_2\ SO_4$)

Average J = 9.8872^{E-4} (J/MWh) = 1.2359^{E-4}

Ca/K conversion factor 1.90

Lambda K^{40} 5.5430^{E-10}

Analysis of samples was done using a liquid nitrogen trap. Canister irradiated in position 5C at McMaster Reactor, Canada. Irradiation time was 8 MWh on 12 August 2011. Canister had cadmium shielding.

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Appendix 2 $^{40}Ar/^{39}Ar$ geochronology data: Sample 11, PAL33a, K-Feldspar

Temp	Ar36	err	Ar37	err	Ar38	err	Ar39	err	Ar40	err	%	Ar40*/	Cumulative	Calculated Age			Ca/K	Cl/K
(C)	(mol)	(%)	(mol)	(%)	(mol)	(%)	(mol)	(%)	(mol)	(%)	Ar40*	Ar39(K)	Ar39(%)	Ma	±	1 s.d.		
450	1.17E-15	1.29	2.29E-16	3.35	2.44E-16	0.74	1.05E-15	0.21	3.76E-13	0.48	8.30	29.83	0.02	52.58	±	7.98	4.16E-01	4.28E-01
450	2.57E-16	1.52	3.04E-16	3.21	6.51E-17	1.57	3.15E-16	0.73	7.49E-14	0.84	-1.50	0.00	0.03	0.00	±	7.48	1.85E+00	1.53E+00
500	1.09E-15	1.26	7.17E-17	18.07	2.84E-16	1.20	4.48E-15	0.16	4.59E-13	0.46	29.80	30.50	0.13	53.75	±	1.77	3.04E-02	2.10E-01
500	1.78E-16	1.61	3.26E-16	6.12	5.89E-17	1.51	1.09E-15	0.12	5.60E-14	0.54	6.20	3.19	0.16	5.69	±	1.46	5.69E-01	4.22E-01
550	1.08E-15	1.26	2.19E-17	14.74	3.72E-16	0.66	1.12E-14	0.07	5.25E-13	0.44	39.00	18.24	0.41	32.33	±	0.73	3.70E-03	1.11E-01
550	4.23E-16	1.53	2.94E-16	4.71	2.07E-16	0.79	9.44E-15	0.15	1.86E-13	0.45	32.60	6.42	0.63	11.45	±	0.39	5.91E-02	5.39E-02
600	7.02E-16	1.25	1.45E-16	5.06	3.86E-16	0.50	1.91E-14	0.13	4.06E-13	0.44	48.90	10.41	1.07	18.53	±	0.29	1.44E-02	4.81E-02
600	2.62E-16	1.50	2.65E-16	9.13	3.40E-16	0.80	2.20E-14	0.13	2.29E-13	0.44	66.10	6.88	1.57	12.26	±	0.12	2.29E-02	4.41E-02
650	5.05E-16	1.25	1.23E-16	2.40	5.72E-16	0.43	3.78E-14	0.12	4.63E-13	0.45	67.60	8.27	2.43	14.74	±	0.13	6.16E-03	2.23E-02
650	1.43E-16	1.32	1.80E-16	3.52	6.00E-16	0.51	4.59E-14	0.06	3.71E-13	0.44	88.40	7.14	3.48	12.73	±	0.07	7.43E-03	1.80E-02
700	2.93E-16	1.24	1.48E-15	1.52	8.34E-16	0.70	6.23E-14	0.17	5.62E-13	0.46	84.40	7.62	4.91	13.58	±	0.08	4.50E-02	1.91E-02
700	5.45E-16	1.26	8.05E-15	0.93	2.62E-15	0.49	2.00E-13	0.11	1.63E-12	0.43	90.00	7.35	9.47	13.09	±	0.07	7.66E-02	2.28E-02
750	3.56E-17	1.43	3.88E-16	0.97	3.74E-16	0.43	2.96E-14	0.13	2.26E-13	0.45	95.20	7.26	10.15	12.94	±	0.06	2.49E-02	1.53E-02
750	8.45E-17	1.85	1.92E-15	1.22	6.45E-16	0.52	4.88E-14	0.21	3.71E-13	0.46	93.10	7.09	11.26	12.64	±	0.06	7.48E-02	3.32E-02
800	8.98E-17	1.50	2.07E-15	1.82	6.56E-16	0.97	4.95E-14	0.09	3.80E-13	0.43	92.90	7.13	12.39	12.71	±	0.06	7.92E-02	3.33E-02
800	1.01E-16	1.82	7.93E-17	26.89	7.35E-16	0.44	5.73E-14	0.12	4.41E-13	0.43	93.00	7.16	13.70	12.77	±	0.06	2.63E-03	1.84E-02
850	7.85E-17	1.38	1.46E-15	1.47	6.19E-16	0.53	4.88E-14	0.06	3.80E-13	0.42	93.70	7.31	14.82	13.03	±	0.06	5.68E-02	1.42E-02
850	8.94E-17	1.27	5.34E-16	1.95	6.98E-16	0.43	5.61E-14	0.13	4.38E-13	0.45	93.80	7.32	16.10	13.04	±	0.06	1.81E-02	5.63E-03
900	1.20E-16	1.65	3.52E-16	2.47	6.30E-16	0.51	4.91E-14	0.13	3.93E-13	0.45	90.80	7.26	17.22	12.93	±	0.07	1.36E-02	1.37E-02
900	1.72E-16	1.30	1.26E-15	0.87	8.74E-16	0.56	6.66E-14	0.05	5.33E-13	0.42	90.30	7.23	18.74	12.89	±	0.06	3.59E-02	2.38E-02
950	2.99E-16	1.39	2.79E-16	1.57	8.68E-16	0.43	6.51E-14	0.02	5.71E-13	0.41	84.30	7.39	20.23	13.18	±	0.07	8.14E-03	1.74E-02
950	3.68E-16	1.26	4.35E-16	1.33	1.24E-15	0.45	9.34E-14	0.18	7.96E-13	0.47	86.20	7.35	22.36	13.10	±	0.08	8.85E-03	1.88E-02
1000	6.64E-16	1.24	7.43E-16	1.22	1.62E-15	0.42	1.21E-13	0.10	1.11E-12	0.44	82.10	7.55	25.12	13.45	±	0.08	1.17E-02	1.47E-02
1000	6.52E-16	1.43	2.46E-15	1.06	2.12E-15	0.55	1.62E-13	0.16	1.40E-12	0.46	86.10	7.46	28.81	13.29	±	0.08	2.90E-02	1.42E-02
1100	2.80E-15	1.26	5.38E-15	1.88	1.10E-14	0.44	8.46E-13	0.15	7.34E-12	0.45	88.50	7.68	48.15	13.68	±	0.07	1.21E-02	1.23E-02
1100	1.47E-15	1.28	2.08E-18	5.95	9.34E-15	0.81	7.46E-13	0.26	6.08E-12	0.51	92.70	7.55	65.20	13.45	±	0.08	5.29E-03	5.47E-03
1100	1.02E-15	1.66	4.96E-15	1.41	7.55E-15	0.62	5.94E-13	0.26	4.80E-12	0.50	93.50	7.57	78.77	13.49	±	0.07	1.59E-02	1.45E-02
1150	1.00E-15	1.37	4.22E-15	2.10	7.39E-15	0.46	5.83E-13	0.06	4.79E-12	0.48	93.60	7.69	92.10	13.70	±	0.07	1.37E-02	1.29E-02
1150	6.25E-16	1.27	1.37E-18	1.94	3.72E-15	0.43	2.86E-13	0.11	2.38E-12	0.49	92.00	7.64	98.64	13.62	±	0.07	9.12E-03	2.22E-02
1150	1.73E-16	1.69	7.85E-17	1.59	5.07E-16	1.99	3.83E-14	0.38	3.38E-13	0.61	84.70	7.47	99.52	13.31	±	0.10	3.89E-03	1.41E-02
1150	1.26E-16	1.35	8.84E-17	5.46	1.80E-16	0.54	1.27E-14	0.06	1.33E-13	0.44	71.80	7.53	99.81	13.41	±	0.11	1.33E-02	1.14E-02
1200	2.92E-17	1.83	1.87E-19	1.81	3.80E-17	5.09	1.06E-15	0.52	1.29E-14	1.38	33.10	4.02	99.83	7.17	±	0.40	3.34E-02	6.87E-01
1250	2.99E-17	5.61	1.87E-19	5.66	2.68E-17	9.25	8.27E-16	5.33	1.22E-14	6.03	27.70	4.10	99.85	7.32	±	1.92	4.30E-02	5.04E-01
1300	2.90E-17	2.63	2.51E-16	4.69	2.93E-17	5.74	5.76E-16	0.62	9.41E-15	1.40	9.20	1.52	99.86	2.71	±	0.81	8.31E-01	1.09E+00
1350	3.16E-17	3.05	1.87E-19	2.24	2.98E-17	6.01	5.53E-16	1.13	9.92E-15	1.34	5.90	1.05	99.88	1.89	±	1.01	6.43E-04	1.15E+00
1450	1.19E-16	1.26	1.87E-19	4.59	9.69E-17	1.82	5.42E-15	0.26	7.42E-14	0.50	52.60	7.19	100.00	12.82	±	0.19	6.56E-05	6.50E-02
Total	1.69E-14		3.84E-14		5.75E-14		4.38E-12		3.84E-11			7.61		13.56	±	0.08		

Lambda K40=5.5430E-10 J=9.9147E-4; %error J=0.794

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Appendix 2 - ^{40}Ar/^{3}9Ar geochronology data: Sample 12, PAL33b, K-Feldspar

Temp (C)	Ar36 (mol)	err (%)	Ar37 (mol)	err (%)	Ar38 (mol)	err (%)	Ar39 (mol)	err (%)	Ar40 (mol)	err (%)	% Ar40*	Ar40*/ Ar39(K)	Cumulative Ar39(%)	Calculated Age Ma	±	1 s.d.	Ca/K	Cl/K
450	9.76E-17	1.84	1.36E-16	16.08	2.27E-17	2.65	3.33E-16	1.26	3.39E-14	1.39	15.00	15.31	0.02	27.12	±	3.75	7.78E-01	3.58E-02
450	3.37E-17	1.86	9.54E-17	16.57	5.03E-18	17.18	8.02E-17	1.36	9.66E-15	1.42	-3.10	0.00	0.03	0.00	±	5.14	2.28E+00	-1.05E+00
500	2.04E-16	2.04	1.11E-19	135.12	6.53E-17	1.61	1.88E-15	0.41	1.03E-13	1.25	41.60	22.77	0.11	40.18	±	1.65	1.12E-02	8.72E-02
500	5.04E-17	1.90	1.08E-16	1.80	1.44E-17	86.92	3.83E-16	0.56	1.73E-14	0.73	14.00	6.33	0.12	11.26	±	1.43	5.36E-01	3.55E-02
550	3.86E-16	1.41	1.24E-16	4.78	1.85E-16	0.83	8.42E-15	0.26	2.23E-13	0.54	48.90	12.95	0.52	22.97	±	0.42	2.81E-02	5.16E-02
600	2.55E-16	1.35	2.21E-16	2.86	1.80E-16	2.02	1.01E-14	0.27	1.89E-13	0.51	60.20	11.32	0.98	20.09	±	0.25	4.17E-02	4.33E-02
600	1.14E-16	2.03	6.96E-17	214.69	1.40E-16	1.61	9.29E-15	1.27	9.23E-14	1.98	63.40	6.30	1.41	11.21	±	0.37	1.42E-02	2.75E-02
650	1.78E-16	1.36	7.78E-17	11.46	2.30E-16	0.54	1.56E-14	0.13	1.85E-13	0.46	71.40	8.50	2.12	15.10	±	0.13	9.49E-03	2.28E-02
650	8.62E-17	1.34	1.53E-16	9.51	2.56E-16	0.57	1.90E-14	0.22	1.52E-13	0.48	83.10	6.67	2.99	11.86	±	0.08	1.53E-02	2.32E-02
700	1.41E-16	1.62	1.18E-16	5.69	3.57E-16	1.45	2.58E-14	0.08	2.45E-13	0.46	82.90	7.87	4.18	13.99	±	0.09	8.70E-03	2.93E-02
700	5.65E-17	1.50	1.38E-16	7.23	3.69E-16	0.73	2.92E-14	0.12	2.21E-13	0.44	92.20	6.97	5.51	12.40	±	0.06	8.99E-03	1.06E-02
750	1.05E-16	1.35	1.51E-16	6.38	4.85E-16	0.48	3.74E-14	0.14	3.09E-13	0.44	89.80	7.41	7.23	13.18	±	0.07	7.65E-03	1.67E-02
750	4.52E-17	2.30	1.13E-16	8.14	5.46E-16	0.46	4.34E-14	0.15	3.24E-13	0.45	95.70	7.13	9.22	12.68	±	0.06	4.95E-03	1.41E-02
800	7.18E-17	1.29	1.65E-16	2.96	5.63E-16	0.47	4.36E-14	0.09	3.37E-13	0.42	93.50	7.21	11.22	12.83	±	0.06	7.18E-03	2.18E-02
800	4.02E-17	1.33	1.90E-16	1.22	5.53E-16	0.59	4.45E-14	0.39	3.30E-13	0.56	96.20	7.14	13.26	12.70	±	0.07	8.10E-03	1.01E-02
850	5.22E-17	1.41	1.48E-16	2.90	4.36E-16	0.45	3.45E-14	0.12	2.66E-13	0.43	94.00	7.24	14.84	12.87	±	0.06	8.16E-03	1.31E-02
850	4.22E-17	1.44	2.60E-16	1.48	4.20E-16	0.46	3.36E-14	0.04	2.55E-13	0.42	94.90	7.21	16.38	12.82	±	0.06	1.47E-02	9.71E-03
900	4.66E-17	1.37	2.56E-16	2.76	3.36E-16	0.68	2.58E-14	0.17	2.00E-13	0.46	92.90	7.19	17.57	12.78	±	0.06	1.88E-02	2.55E-02
900	4.86E-17	1.77	1.77E-16	7.13	3.62E-16	0.60	2.86E-14	0.08	2.18E-13	0.42	93.20	7.11	18.88	12.65	±	0.06	1.17E-02	1.30E-02
950	6.81E-17	1.53	2.39E-16	5.83	3.32E-16	0.84	2.54E-14	0.04	2.01E-13	0.41	89.80	7.10	20.04	12.62	±	0.06	1.79E-02	2.16E-02
950	8.26E-17	2.01	2.29E-16	1.37	4.36E-16	0.82	3.33E-14	0.07	2.62E-13	0.42	90.50	7.12	21.57	12.65	±	0.06	1.30E-02	2.27E-02
1000	1.35E-16	1.37	2.06E-16	5.91	4.47E-16	0.49	3.37E-14	0.10	2.84E-13	0.43	85.80	7.22	23.11	12.84	±	0.07	1.16E-02	1.89E-02
1000	1.77E-16	1.60	1.70E-16	3.74	6.20E-16	0.63	4.80E-14	0.06	4.03E-13	0.43	86.80	7.30	25.31	12.98	±	0.07	6.72E-03	9.04E-03
1100	9.10E-16	1.24	1.16E-19	1.99	2.20E-15	0.44	1.63E-13	0.13	1.51E-12	0.44	82.00	7.60	32.78	13.51	±	0.08	1.35E-03	1.80E-02
1100	6.50E-16	1.41	3.43E-16	4.65	2.03E-15	0.70	1.56E-13	0.11	1.36E-12	0.43	85.70	7.52	39.91	13.37	±	0.07	4.19E-03	9.72E-03
1100	5.05E-16	1.27	5.08E-16	4.01	1.86E-15	0.54	1.43E-13	0.19	1.22E-12	0.45	87.60	7.53	46.44	13.39	±	0.07	6.78E-03	1.34E-02
1150	5.24E-16	1.33	1.16E-19	1.86	2.25E-15	0.51	1.63E-13	0.11	1.42E-12	0.44	88.90	7.73	53.93	13.75	±	0.07	1.35E-03	2.37E-02
1150	6.38E-16	1.41	3.22E-17	14.40	3.48E-15	0.74	2.74E-13	0.23	2.33E-12	0.52	91.70	7.81	66.50	13.88	±	0.08	2.23E-03	9.04E-03
1150	5.14E-16	1.58	3.22E-19	22.00	3.58E-15	0.55	2.83E-13	0.23	2.33E-12	0.67	93.30	7.71	79.46	13.70	±	0.10	2.17E-03	1.18E-02
1150	3.44E-16	1.82	5.20E-17	35.59	2.64E-15	0.61	2.08E-13	0.13	1.68E-12	0.53	93.80	7.57	89.01	13.46	±	0.08	4.75E-03	1.34E-02
1200	1.97E-16	1.37	2.19E-16	7.91	1.55E-15	0.53	1.21E-13	0.07	9.92E-13	0.43	93.90	7.68	94.57	13.65	±	0.06	3.42E-03	1.71E-02
1250	1.23E-16	1.49	1.18E-17	17.47	1.26E-15	0.51	1.00E-13	0.18	8.15E-13	0.68	95.40	7.76	99.17	13.79	±	0.10	2.24E-04	1.16E-02
1300	2.43E-17	3.48	2.09E-16	4.98	9.82E-17	2.08	7.61E-15	0.23	6.34E-14	0.51	88.50	7.37	99.51	13.11	±	0.10	5.21E-02	1.14E-02
1350	3.51E-17	3.10	1.44E-16	8.36	1.05E-16	1.00	8.10E-15	0.25	6.89E-14	0.50	84.80	7.21	99.89	12.81	±	0.10	3.38E-02	5.98E-03
1450	2.73E-17	6.78	6.36E-16	6.74	3.63E-17	9.28	2.49E-15	0.67	2.62E-14	0.89	69.40	7.31	100.00	13.00	±	0.42	4.85E-01	1.89E-02
Total	7.04E-15		5.74E-15		2.85E-14		2.18E-12		1.87E-11			7.61		13.52	±	0.08		

Lambda K40=5.5430E-10 J=9.8928E-4; %error J=0.796

Appendix 3 Scanning Electron Microprobe data: on the Hitachi 4300 FESEM.

Spectrum	Weight % Na K_SERIES	Weight % Mg K_SERIES	Weight % Al K_SERIES	Weight % Si K_SERIES	Weight % K K_SERIES	Weight % Ca K_SERIES	Weight % Ti K_SERIES	Weight % Fe K_SERIES	Weight% O	Weight% Total	Number of ions O
Figure 3a											
Spot 1	6.1146	0.0000	9.9318	31.4323	2.0110	0.0695	0.0000	0.0000	47.2108	96.7700	8
Spot 2	2.7542	0.0000	9.6480	30.0049	8.3607	0.1136	0.0000	0.0000	45.4795	96.3608	8
Spot 1 repeat	6.0668	0.0000	10.1088	31.6861	1.9217	0.0000	0.0000	0.0000	47.5946	97.3779	8
Spot 2 repeat	1.5673	0.0000	9.5959	29.9824	11.1416	0.1374	0.0000	0.0000	45.5730	97.9977	8
Figure 3b											
Spot 7	7.5787	0.0000	10.8239	31.0721	1.4417	0.3098	0.0000	0.0000	48.0828	99.3090	8
Spot 8 (quartz)	0.0000	0.0000	1.2640	44.2783	1.7291	0.0000	0.0000	0.0000	51.9237	99.1951	8
Spot 7 repeat	7.3118	0.0000	12.0529	30.7321	0.0000	2.2536	0.0000	0.0000	49.1766	101.5270	8
High Na area	4.8828	0.0000	10.1469	31.5279	6.6335	0.0000	0.0000	0.0000	48.0004	101.1916	8
High K av. large area	1.8090	0.0000	10.0165	31.0767	11.0173	0.0000	0.0000	0.0000	47.1976	101.1170	8
High K av. small area	2.0456	0.0000	10.2587	31.3582	10.5062	0.0000	0.0000	0.0000	47.7114	101.8800	8
Figure 3c											
Spot 17	7.2716	0.0000	11.3691	30.5828	0.3605	2.0423	0.0000	0.0000	48.3737	100.0000	8
Spot 18	1.9242	0.0000	9.9225	30.8134	10.5759	0.0000	0.0000	0.0000	46.7639	100.0000	8
Spot 18 repeat	1.8245	0.0000	9.9031	30.4776	11.3144	0.0000	0.0000	0.0000	46.4804	100.0000	8
Spot 18 repeat	0.0000	0.0000	8.2658	33.6199	10.3438	0.0000	0.0000	0.0000	47.7706	100.0000	8
Spot 18 repeat	0.0000	0.0000	9.4583	30.5442	13.9355	0.0000	0.0000	0.0000	46.0620	100.0000	8
Spot 18 repeat	0.0000	0.0000	10.4501	31.7988	10.1517	0.0000	0.0000	0.0000	47.5994	100.0000	8
Spot 18 repeat	1.1646	0.0000	9.7414	30.6388	12.0203	0.0000	0.0000	0.0000	46.4349	100.0000	8
STANDARDS											
Albite	8.5658	0.0000	10.3036	32.1476	0.1767	0.0000	0.0000	0.0000	48.8063	100.0000	8
Albite	8.6436	0.0000	10.2385	32.0358	0.1577	0.0000	0.0000	0.1961	48.7284	100.0000	8
Sanidine	2.2433	0.0000	10.0735	30.4024	10.0579	0.0000	0.2073	0.3094	46.7063	100.0000	8
Garnet	0.0000	5.8176	11.3883	17.7870	0.0000	2.8193	0.0000	18.7733	43.4146	100.0000	8
Fe_2O_3	0.0000	0.0000	0.1253	0.0634	0.0000	0.0000	0.0000	69.6834	30.1279	100.0000	8
TiO_2	0.0000	0.0000	0.0636	0.0493	0.0000	0.0000	59.8162	0.0000	40.0709	100.0000	8
Diopside	0.0000	11.2057	0.0000	26.0322	0.0000	18.3892	0.0000	0.0000	44.3729	100.0000	8
MgO	0.0000	60.1632	0.0539	0.0671	0.0000	0.0000	0.0000	0.0000	39.7159	100.0000	8

Samples used for scanning electron microscopy and elemental analysis were prepared by mounting them in 25.4 mm resin discs followed by polishing to <0.5 μm finish, they were then coated with ~20 nm of carbon. Compositional analysis was performed using a Hitachi 4300 FESEM equipped with an Oxford Instruments XMax, 80 mm^2 Silicon Drift Detector (SDD) and Oxford INCA software. All analyses were carried out at 15 kV and 0.6 nA of probe current using well characterised minerals as reference standards (Astimex). Atomic number, absorption, and fluorescence corrections were applied throughout.