G22809 DATA REPOSITORY ITEM 2007

Supplemental Data Table DR1. Composition of melt inclusions from Mount St Helens samples SH 304-2A, SH 305-1, SH-315.

	SH 304-2A					SH 305-1			SH 315		
	1-1	2-1	4-1	4-2	4-3	a1-1	a3-1	c6-1	a11-1	a9-1	d4-1
Host[a]	Amph	Opx	Plag	Plag	Plag	Amph	Amph	Amph	Opx	Opx	Plag
SiO_2 (wt%)[b]	72.70	69.70	77.14	77.34	77.14	72.08	76.56	72.82	76.48	69.65	73.94
TiO_2	0.29	0.09	0.06	0.05	0.06	0.44	0.27	0.42	0.22	0.10	0.19
Al_2O_3	13.84	19.05	9.98	10.32	9.98	13.56	12.07	14.22	12.46	16.31	13.44
MgO	0.84	0.27	0.12	0.07	0.12	0.08	0.08	0.06	0.46	0.37	0.25
FeO	2.24	0.89	0.80	0.73	0.80	1.78	1.27	1.36	2.27	1.91	1.17
MnO	0.09	0.01	0.02	0.06	0.02	0.16	0.00	0.03	0.15	0.07	0.05
CaO	0.82	3.65	0.08	0.15	0.08	0.06	0.38	0.48	0.15	0.19	1.79
Na_2O	2.83	6.63	3.94	4.68	3.94	5.27	3.75	4.29	2.73	4.53	3.91
K_2O	5.65	0.68	3.09	2.62	3.09	6.04	5.47	5.88	4.64	6.07	4.27
P_2O_5	0.08	0.09	0.00	0.05	0.00	0.07	0.01	0.03	0.05	0.15	0.07
Cl	0.10	0.03	0.06	0.04	0.06	0.19	0.12	0.10	0.08	0.11	0.12
F	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.33	0.23	0.15
SO_2	0.00	0.01	0.01	0.01	0.01	0.04	0.02	0.01	bd[d]	0.01	0.04
H_2O[c]	0.15	0.06	3.22	2.99	3.19	0.18	0.20	0.12	0.03	bd	0.09
Total	99.83	101.15	98.52	99.12	98.49	99.96	100.17	99.97	100.05	99.71	99.47
TiO_2 (wt%)[c]	0.203	0.135	0.054	0.044	0.054	0.413	0.285	0.327	0.183	0.081	0.149
Li (µg/g)	60	11	207	169	199	120	159	103	18	15	28
Be	1.9	1.6	2.0	1.6	1.9	2.6	2.0	1.8	2.3	1.5	1.9
B	24	6	42	28	37	38	27	30	29	15	34
Sc	1.5	5.6	2.5	3.0	2.6	4.6	11.8	11.1	3.5	1.5	3.4

Analyses of melt inclusions in three samples of the current eruption of Mount St. Helens.

a. Host phase of the melt inclusion: Amph (amphibole); Opx (orthopyroxene); Plag (plagioclase).
b. Major elements, F, Cl and SO_2 measured by electron microprobe and reported as wt%, using the techniques of Blundy & Cashman (2005).
c. H_2O and TiO_2 (in wt%) and trace elements (in µg/g) measured by ion-microprobe using techniques described in Berlo et al. (2004) and Blundy & Cashman (2005). Note good agreement between ion-microprobe and electron microprobe TiO_2 concentrations. Uncertainties on H_2O concentrations are ≤0.02 wt%.
d. *bd* denotes below detection.

Supplemental Data Table DR2. Li, Ba and An contents of analyzed plagioclase.

Sample/ Analysis Number	Grain Type	Anorthite (%)	Li (µg/g)	Ba (µg/g)
SH 300-1				
1020-1A_SM-1	Phenocryst	51.6	17.5	120.6
1020-1A_SM-2	Phenocryst	61.7	18.1	74.4
1020-1A_SM-4	Phenocryst	60.4	14.9	41.7
1020-1A_SM-5	Phenocryst	53.1	18.9	99.5
1020-1A_SM-6	Phenocryst	52.6	19.2	186.5
1020-1A_SM-7	Phenocryst	65.1	14.9	39.6
1020-1A_SM-14	Phenocryst	46.7	18.8	110.5
1020-1A_SM-21	Phenocryst	56.7	15.1	56.4
1020-1A_SM-25	Phenocryst	59.2	16.6	40.7
1020-1A_SM-26	Phenocryst	44.0	15.3	101.7
1020-1A_SM-29	Phenocryst	59.7	17.4	43.6
1020-1A_SM-30	Phenocryst	48.3	13.7	95.2
1020-1A_SM-31	Phenocryst	65.8	12.5	69.1
SH 304-2A				
04-065(11/42A)-rPt-1	Phenocryst	59.1	29.9	57.7
04-065(11/42A)-rPt-2	Phenocryst	54.6	35.5	68.1
04-065(11/42A)-rPt-3	Phenocryst	51.0	30.2	104.0
04-065(11/42A)-rPt-5	Phenocryst	55.2	32.7	80.3
04-065(11/42A)-rPt-6	Phenocryst	64.2	30.4	58.8
04-065(11/42A)-rPt-7	Phenocryst	56.0	36.6	52.4
04-065(11/42A)-rPt-9	Phenocryst	62.0	41.5	42.5
04-065(11/42A)-rPt-10	Phenocryst	55.3	40.1	68.1
04-065(11/42A)-rPt-11	Phenocryst	56.0	32.3	64.8
04-065(11/42A)-rPt-12	Phenocryst	57.1	30.7	80.3
04-065(11/42A)-rPt-14	Phenocryst	61.7	34.5	52.1
04-065(11/42A)-rPt-15	Phenocryst	49.7	37.8	75.7
04-065(11/42A)-rPt-16	Phenocryst	64.0	33.4	54.9
04-065(11/42A)-rPt-17	Phenocryst	64.9	33.5	46.8
04-065(11/42A)-rPt-18	Phenocryst	49.2	27.9	117.9
04-065(11/42A)-rPt-19	Phenocryst	42.3	36.2	105.9
04-065(11/42A)-rPt-20	Phenocryst	63.3	36.6	46.1
04-065(11/42A)-rPt-21	Phenocryst	63.8	36.2	56.9
04-065(11/42A)-rPt-22	Phenocryst	63.3	38.5	58.2
11/42A-1-Pl3	Phenocryst	42.5	34.3	122.8
11/42A-1-Pl5	Phenocryst	60.1	29.3	60.1
11/42A-1-Pl4	Phenocryst	63.9	35.4	63.8
11/42A-2-Pl1	Phenocryst	60.4	34.7	81.2
11/42A-3-Pl1	Phenocryst	66.6	35.6	46.9
11/42A-3-Pl2	Phenocryst	66.8	39.4	44.6
11/42A-3-Pl3	Phenocryst	49.2	34.3	131.7
11/42A-5-P-70-1	Phenocryst	51.6	35.0	63.5
11/42A-5-Pl2	Phenocryst	55.8	29.6	97.6
11/42A-5-Pl3	Phenocryst	63.5	31.7	59.3
11/42A-5-Pl4	Phenocryst	53.8	32.5	103.1

11/42A-6-Pl1	Phenocryst	67.3	28.2	52.3
11/42A-7-Pl1	Phenocryst	66.5	36.8	33.6
11/42A-7-Pl2	Phenocryst	64.5	34.9	37.2
04-065(11/42A)-rPt-13	Disaggregated Inclusion	39.1	30.7	181.6
04-065(11/42A)-rPt-4	Disaggregated Inclusion	49.6	39.4	132.3
SH-304-2C				
SH304X-31	Inclusion	47.5	26.4	192.6
SH304X-32	Inclusion	65.6	28.7	141.9
SH304X-33	Inclusion	55.3	20.8	183.7
SH304X-34	Inclusion	50.8	21.3	207.2
SH304X-35	Inclusion	48.0	26.6	123.1
SH304X-36	Inclusion	49.9	20.5	151.0
SH304X-37	Inclusion	47.7	18.7	131.9
SH304X-38	Inclusion	46.4	21.5	154.8
SH304X-39	Inclusion	50.2	28.1	191.0
SH304X-40	Inclusion	51.6	32.3	181.7
SH304X-Pl26	Inclusion	47.2	22.7	101.1
SH304X-Pl27	Inclusion	49.3	21.8	118.3
SH304X-Pl29	Inclusion	51.5	23.6	149.2
SH304X-Pl30	Inclusion	50.5	25.9	133.7
SH304X-Pl1	Phenocryst	53.0	31.0	63.1
SH304X-Pl4	Phenocryst	42.7	32.6	60.7
SH304X-Pl6	Phenocryst	42.3	29.3	69.6
SH304X-Pl7	Phenocryst	38.5	40.2	110.7
SH304X-Pl8	Phenocryst	42.1	36.0	93.2
SH304X-Pl9	Phenocryst	50.0	33.4	90.4
SH304X-Pl10	Phenocryst	54.7	30.8	64.5
SH304X-Pl11	Phenocryst	62.5	26.0	43.2
SH304X-Pl14.1	Phenocryst	60.6	31.1	56.4
SH304X-Pl14.2	Phenocryst	49.2	35.8	80.9
SH304X-Pl14.3	Phenocryst	51.9	32.1	79.4
SH304X-15	Phenocryst	58.0	29.5	41.4
SH304X-16	Phenocryst	44.9	32.5	94.0
SH304X-17	Phenocryst	45.2	32.4	92.7
SH304X-18	Phenocryst	62.5	24.6	54.3
SH304X-19	Phenocryst	36.4	27.0	147.6
SH304X-21	Phenocryst	58.9	28.7	39.0
SH304X-Pl2	Phenocryst	34.5	33.8	121.1
SH 305-1				
04-066-Pl-1	Phenocryst	64.7	31.6	60.0
04-066-Pl-2	Phenocryst	55.2	25.9	115.1
04-066-Pl-3	Phenocryst	64.1	24.1	42.6
04-066-Pl-4	Phenocryst	58.9	27.9	53.3
04-066-Pl-5	Phenocryst	44.9	31.3	137.2
04-066-Pl-6	Phenocryst	60.1	32.2	63.8
04-066-Pl-7	Phenocryst	40.8	31.2	121.4
04-066-Pl-8	Phenocryst	47.5	30.8	144.9

04-066-Pl-9	Phenocryst	44.0	28.8	129.6
04-066-Pl-10	Phenocryst	55.2	24.6	55.6
04-066-Pl-11	Phenocryst	55.1	27.3	42.7
04-066-Pl-12	Phenocryst	56.4	27.0	49.5
04-066-Pl-13	Phenocryst	55.3	30.8	54.7
04-066-Pl-14	Phenocryst	58.6	31.0	42.4
04-066-Pl-15	Phenocryst	47.9	30.0	123.0
04-066-Pl-16	Phenocryst	53.8	29.7	100.1
04-066-Pl-17	Phenocryst	50.3	32.0	112.4
04-066-Pl-18	Phenocryst	55.4	27.2	72.0
04-066-Pl-19	Phenocryst	44.9	29.9	122.0
04-066-Pl-20	Phenocryst	57.8	26.5	75.2
04-066-Pl-21	Phenocryst	59.9	28.2	70.6
04-066-Pl-22	Phenocryst	58.2	29.4	50.5
04-066-Pl-23	Phenocryst	49.2	34.6	112.7
04-066-Pl-26	Phenocryst	63.5	27.0	72.1
04-066-Pl-27	Phenocryst	60.9	26.7	65.9
04-066-Pl-28	Phenocryst	61.1	34.1	44.4
04-066-Pl-29	Phenocryst	58.7	28.7	49.3
04-066-Pl-30	Phenocryst	55.1	25.7	54.8
SH 305-2				
SH305-2X-Pl1	Inclusion	52.3	18.9	162.7
SH305-2X-Pl2	Inclusion	52.1	17.8	153.7
SH305-2X-Pl3	Inclusion	51.1	20.4	158.9
SH305-2X-Pl4	Inclusion	50.9	17.4	151.0
SH305-2X-Pl5	Inclusion	49.6	22.8	151.8
SH305-2X-Pl6	Inclusion	56.1	19.0	138.3
SH305-2X-Pl7	Inclusion	52.1	23.1	155.5
SH305-2X-Pl8	Inclusion	52.6	18.1	148.7
SH305-2X-Pl9	Inclusion	52.4	16.1	151.1
SH305-2X-Pl10	Inclusion	55.9	18.3	120.3
SH305-2X-Pl11	Phenocryst	58.5	19.0	54.0
SH305-2X-Pl13	Phenocryst	48.3	18.5	109.8
SH305-2X-Pl14	Phenocryst	61.7	18.9	66.5
SH305-2X-Pl15	Phenocryst	33.1	21.7	124.4
SH305-2X-Pl16	Phenocryst	59.0	20.0	37.0
SH305-2X-Pl18	Phenocryst	44.4	18.2	97.2
SH305-2X-Pl20	Phenocryst	42.7	21.8	71.8
SH305-2X-Pl21	Phenocryst	46.5	18.2	95.0
SH305-2X-Pl22	Phenocryst	36.4	21.3	128.3
SH305-2X-Pl23	Phenocryst	45.7	18.8	74.1
SH-306-1				
SH306C-Pl19	Inclusion	53.5	19.9	119.6
SH306C-Pl20	Inclusion	53.9	18.4	107.1
SH306C-Pl21	Inclusion	50.5	17.9	143.8
SH306C-Pl22	Inclusion	49.7	19.5	137.5
SH306C-Pl23	Inclusion	53.0	16.5	138.4

SH306C-Pl9	Inclusion	51.6	11.2	91.6
SH306C-Pl24	Inclusion	49.4	18.2	114.4
SH306B-1	Inclusion	49.8	17.5	192.6
SH306B-2	Inclusion	60.6	21.0	122.9
SH306B-3	Inclusion	57.9	21.7	144.9
SH306B-4	Inclusion	53.0	12.4	152.9
SH306B-5	Inclusion	55.8	15.3	147.8
SH306B-6	Inclusion	60.1	18.5	127.3
SH306B-7	Inclusion	59.9	16.5	121.6
SH306B-8	Inclusion	60.8	16.7	148.3
SH306B-9	Inclusion	57.1	15.4	81.0
SH306B-10	Inclusion	57.8	18.6	174.1
SH306C-Pl1	Phenocryst	55.4	17.4	72.8
SH306C-Pl2	Phenocryst	51.4	13.5	62.9
SH306C-Pl3	Phenocryst	49.2	17.4	67.3
SH306C-Pl4	Phenocryst	65.1	15.0	37.5
SH306C-Pl5	Phenocryst	57.9	14.7	65.5
SH306C-Pl6	Phenocryst	46.4	16.7	121.0
SH306C-Pl7	Phenocryst	57.9	13.0	44.1
SH306C-Pl8	Phenocryst	57.9	13.0	68.3
SH306C-Pl10	Phenocryst	58.5	12.4	48.0
SH306C-Pl11	Phenocryst	51.5	15.7	68.7
SH306C-Pl12	Phenocryst	55.5	12.4	52.6
SH306C-Pl13	Phenocryst	29.2	17.7	107.5
SH306C-Pl15	Disaggregated inclusion	57.0	13.8	125.7
SH306C-Pl16	Phenocryst	42.8	13.8	103.6
SH306C-Pl17	Phenocryst	57.8	10.8	51.6
SH306C-Pl18	Phenocryst	48.2	13.5	90.3
SH306B-11	Phenocryst	62.9	17.0	54.5
SH306B-13	Phenocryst	58.2	16.6	53.0
SH306B-14	Phenocryst	60.9	13.2	63.1
SH-311-1				
SH311-1B-1	Phenocryst	55.9	18.9	63.0
SH311-1B-2	Phenocryst	57.2	15.8	47.0
SH311-1B-4	Phenocryst	44.4	19.8	89.4
SH311-1B-5	Phenocryst	58.1	15.7	62.5
SH311-1B-6	Phenocryst	60.3	15.6	51.0
SH311-1B-7	Phenocryst	43.8	18.3	139.5
SH311-1B-8	Phenocryst	60.2	19.4	71.2
SH311-1B-9	Phenocryst	60.6	15.5	40.8
SH311-1B-10	Phenocryst	53.7	20.2	71.8
SH311-1B-12	Phenocryst	46.7	18.7	93.5
SH311-1B-13	Phenocryst	61.1	13.3	71.7
SH311-1B-14	Phenocryst	49.9	19.8	110.8
SH311-1B-15	Phenocryst	59.7	18.4	66.1
SH311-1B-17	Phenocryst	58.3	16.5	50.0
SH311-1B-18	Phenocryst	60.0	17.0	52.9
SH311-1B-19	Phenocryst	54.6	14.9	88.1

SH311-1B-20	Phenocryst	63.9	17.7	59.5
SH-315-1				
SH315-1-1	Phenocryst	61.5	21.8	61.7
SH315-1-2	Phenocryst	59.9	22.2	100.3
SH315-1-3	Phenocryst	65.8	22.9	52.2
SH315-1-4	Phenocryst	70.2	17.2	52.3
SH315-1-5	Phenocryst	63.4	17.1	73.4
SH315-1-6	Phenocryst	59.6	19.3	57.7
SH315-1-7	Phenocryst	60.4	18.3	51.5
SH315-1-8	Phenocryst	60.0	20.1	77.0
SH315-1-9	Phenocryst	60.6	22.0	62.2
SH315-1-10	Phenocryst	73.4	15.9	57.2
SH315-1-11	Phenocryst	55.6	17.5	75.6
SH315-1-12	Phenocryst	63.4	17.6	57.8
SH315-1-13	Phenocryst	49.6	19.7	112.7
SH315-1-14	Phenocryst	68.2	20.3	47.1
SH315-1-15	Phenocryst	66.7	18.6	51.2
SH315-1-17	Phenocryst	65.5	22.6	70.5
SH315-1-18	Phenocryst	51.5	17.8	106.6
SH315-1-19	Phenocryst	70.0	18.6	54.4
SH315-1-20	Phenocryst	37.1	20.9	137.4

ANALYTICAL METHODS

Lithium, Ba and anorthite contents in plagioclase crystals were measured in-situ using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) at Oregon State University, Corvallis, Oregon. General analysis conditions are described in Kent et al. (2004) and Kent and Ungerer (2006). For analysis small chips of rock mounted in epoxy and polished to reveal plagioclase grain interiors. Selected locations on individual grains were analyzed using a 193 nm ArF Excimer laser to ablate spots between 50-70 μm in diameter for 30 seconds with a pulse rate of 3-4 Hz, producing craters between ~10-15 μm deep. For grain margin traverses a 20 μm spot was used. Ablated particulate was transferred into a VG PQ ExCell quadrupole ICP mass spectrometer using a He sweep gas flow of 0.75 l/min.

Li and Ba concentrations were calculated with reference to NIST 612 glass using ^{29}Si as the internal standardizing isotope. Calculation of trace element abundances required independent knowledge of the average SiO_2 content of each ablated volume, although in zoned plagioclase this may vary on spatial scales smaller than the laser spot size. For this reason SiO_2 contents were determined by calculation of CaO/SiO_2 for each plagioclase analysis from $^{43}Ca/^{29}Si$ measured during ablation (and corrected for instrumental fractionation by reference to $^{43}Ca/^{29}Si$ measured in NIST 612) and then comparing this to the stoichiometric correlation between SiO_2 and CaO/SiO_2 observed in a electron probe measurements of plagioclase from these rocks ($SiO_2 = 36.02 \times CaO/SiO_2 + 67.82$). Comparison of Li contents measured in unzoned plagioclase and calibrated by the electron-probe measured SiO_2 are within ~5-10% of those calibrated by the above technique. Repeat measurement of standard glasses BCR-2G and BHVO-2G suggest that the uncertainty on Li measurements is less than ± 10-15% (2σ) at the Li concentrations found in plagioclase. Analysis of USGS glasses BCR-2G and BHVO-2G gave measured Li concentrations of 10.5 ± 0.8 and 4.5 ± 0.5 μg/g.

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