

**Table A-1.** Average composition of plagioclase from planetary basalt samples

Thin section Suite	KEW-1 Keweenawan N = 40		KEW-5 Keweenawan N = 47		OF-8 Ocean Floor N = 40		OF-16 Ocean Floor N = 40		IA-1 Island Arc N = 41		IA-7 Island Arc N = 37	
	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.
SiO <sub>2</sub> (wt.%)	51.0	2.6	52.4	1.5	49.3	0.8	49.3	0.6	46.7	1.8	46.7	2.8
Al <sub>2</sub> O <sub>3</sub>	31.6	1.9	29.9	1.0	31.6	0.7	31.6	0.4	33.2	1.5	33.3	2.0
Fe <sub>2</sub> O <sub>3</sub>	0.67	0.08	0.81	0.14	0.64	0.26	0.56	0.09	0.80	0.09	0.61	0.15
CaO	13.1	1.9	11.7	1.1	15.3	0.5	15.3	0.4	17.0	1.4	17.0	2.2
Na <sub>2</sub> O	3.60	1.10	4.18	0.56	2.89	0.31	2.88	0.20	1.79	0.71	1.93	1.19
K <sub>2</sub> O	0.14	0.08	0.31	0.10	0.04	0.01	0.03	0.01	<0.03	0.02	0.03	0.03
MgO	0.07	0.02	0.11	0.09	0.38	0.25	0.28	0.02	0.22	0.07	0.16	0.03
<b>Total</b>	<b>100.1</b>	<b>0.4</b>	<b>99.3</b>	<b>0.3</b>	<b>100.1</b>	<b>0.4</b>	<b>99.9</b>	<b>0.4</b>	<b>99.7</b>	<b>0.6</b>	<b>99.8</b>	<b>0.4</b>
<b>Formula proportions of cations based on 8 O atoms</b>												
Si	2.314		2.388		2.254		2.256		2.155		2.153	
Al	1.689		1.607		1.703		1.708		1.808		1.814	
Fe	0.023		0.028		0.022		0.019		0.028		0.021	
Ca	0.637		0.570		0.750		0.749		0.841		0.844	
Na	0.316		0.369		0.256		0.255		0.160		0.172	
K	0.008		0.018		0.002		0.002		0.001		0.002	
Mg	0.005		0.008		0.026		0.019		0.015		0.011	
<b>Total</b>	<b>4.992</b>		<b>4.988</b>		<b>5.013</b>		<b>5.009</b>		<b>5.008</b>		<b>5.017</b>	
Or	0.86		1.88		0.22		0.16		0.11		0.19	
Ab	32.9		38.6		25.4		25.4		16.0		17.0	
An	66.3		59.5		74.4		74.4		83.9		82.8	
<b>Trace element concentrations in ppm</b>												
	N = 5		N = 6		N = 8		N = 7		N = 6			
	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.
Sr	549	20	443	46	235	12	348	9	339	34		
Y	0.4	0.3	1.6	2.6	0.4	0.3	0.2	0.1	0.1	0.0		
Ba	29	5	52	18	6	1	13	3	8	2		
Ce	2.2	0.4	5.8	4.1	0.8	0.2	0.3	0.1	0.4	0.1		
Sm	0.4	0.1	0.3	0.1	0.2	0.1	0.1	0.0	0.2	0.0		
Eu	0.7	0.1	0.8	0.2	0.3	0.0	0.1	0.0	0.2	0.0		

Table A-1.

Thin section Suite	CP-4 Columbia Plateau N =37		CP-8 Columbia Plateau N =39		HAW-17 Hawaiian N =37		HAW-22 Hawaiian N =35		TP-1 Taos Plateau N =35		TP-15 Taos Plateau N =41	
	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.
SiO <sub>2</sub> (wt.%)	53.5	1.0	49.6	1.1	47.3	1.2	51.3	1.0	52.4	1.7	55.2	0.9
Al <sub>2</sub> O <sub>3</sub>	28.8	0.6	31.6	0.8	32.5	0.8	30.3	0.7	29.4	1.2	27.9	0.5
Fe <sub>2</sub> O <sub>3</sub>	0.74	0.10	0.56	0.05	0.74	0.06	0.84	0.07	0.67	0.10	0.57	0.06
CaO	11.9	0.7	15.0	0.8	16.2	0.9	13.6	0.7	12.2	1.4	10.1	0.7
Na <sub>2</sub> O	4.58	0.38	2.97	0.43	2.27	0.50	3.68	0.36	4.41	0.77	5.49	0.32
K <sub>2</sub> O	0.27	0.06	0.09	0.03	0.10	0.03	0.12	0.02	0.16	0.08	0.58	0.08
MgO	0.18	0.02	0.22	0.02	0.13	0.02	0.17	0.02	0.14	0.03	0.06	0.01
<b>Total</b>	<b>100.0</b>	<b>0.5</b>	<b>100.0</b>	<b>0.8</b>	<b>99.2</b>	<b>0.5</b>	<b>100.0</b>	<b>0.4</b>	<b>99.4</b>	<b>0.3</b>	<b>99.8</b>	<b>0.5</b>
<b>Formula proportions of cations based on 8 O atoms</b>												
Si	2.425		2.267		2.191		2.336		2.392		2.496	
Al	1.540		1.701		1.775		1.628		1.584		1.487	
Fe	0.025		0.019		0.026		0.029		0.023		0.019	
Ca	0.581		0.737		0.802		0.665		0.596		0.487	
Na	0.402		0.263		0.203		0.325		0.390		0.481	
K	0.016		0.006		0.006		0.007		0.009		0.033	
Mg	0.012		0.015		0.009		0.011		0.009		0.004	
<b>Total</b>	<b>5.001</b>		<b>5.007</b>		<b>5.013</b>		<b>5.002</b>		<b>5.004</b>		<b>5.008</b>	
Or	1.59		0.55		0.56		0.72		0.95		3.31	
Ab	40.3		26.2		20.1		32.6		39.2		48.0	
An	58.1		73.3		79.3		66.7		59.9		48.7	
<b>Trace element concentrations in ppm</b>												
	N = 6		N = 6		N = 5		N = 3		N = 7			
	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.		
Sr	880	20	522	18	1249	97	974	26	761	65		
Y	0.2	0.1	0.1	0.0	0.2	0.1	0.2	0.0	0.9	1.1		
Ba	282	25	89	12	46	10	69	6	322	292		
Ce	2.6	0.2	1.7	0.1	2.7	0.5	2.1	0.0	3.4	2.1		
Sm	0.2	0.0	0.3	0.0	0.4	0.1	0.2	0.0	0.2	0.1		
Eu	0.6	0.0	0.5	0.0	0.3	0.0	0.4	0.0	0.8	0.5		

Table A-1.

Thin section Suite	10020		10062		12051		12063		12021		12065	
	AP 11 Low-K		AP 11 Low-K		AP 12 Ilmenite		AP 12 Ilmenite		AP 12 Pigeonite		AP 12 Pigeonite	
	N = 31		N = 30		N = 36		N = 33		N = 34		N = 32	
	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.
SiO <sub>2</sub> (wt.%)	46.4	1.6	45.4	1.3	45.4	0.6	47.2	0.6	45.7	0.9	47.9	0.6
Al <sub>2</sub> O <sub>3</sub>	33.7	1.2	34.7	1.2	34.1	0.5	33.0	0.5	33.9	0.8	32.7	0.6
Fe <sub>2</sub> O <sub>3</sub>	0.63	0.24	0.40	0.25	0.58	0.11	0.78	0.15	0.58	0.14	1.18	0.24
CaO	17.6	0.9	18.0	0.7	18.2	0.4	17.4	0.3	17.9	0.5	17.1	0.3
Na <sub>2</sub> O	1.12	0.30	0.96	0.30	0.85	0.13	1.18	0.13	0.89	0.18	0.93	0.12
K <sub>2</sub> O	0.04	0.05	0.03	0.03	<0.03	0.01	<0.03	0.00	<0.03	0.02	0.07	0.12
MgO	0.25	0.06	0.25	0.05	0.25	0.06	0.27	0.07	0.24	0.09	0.26	0.12
<b>Total</b>	<b>99.8</b>	<b>0.4</b>	<b>99.7</b>	<b>0.3</b>	<b>99.4</b>	<b>0.5</b>	<b>99.8</b>	<b>0.4</b>	<b>99.2</b>	<b>0.3</b>	<b>100.3</b>	<b>0.3</b>
<b>Formula proportions of cations based on 8 O atoms</b>												
Si	2.143		2.098		2.110		2.174		2.123		2.199	
Al	1.834		1.890		1.866		1.789		1.857		1.770	
Fe	0.024		0.015		0.022		0.027		0.023		0.045	
Ca	0.869		0.892		0.903		0.857		0.889		0.840	
Na	0.100		0.086		0.077		0.105		0.080		0.083	
K	0.002		0.002		0.001		0.000		0.001		0.004	
Mg	0.017		0.017		0.017		0.019		0.017		0.018	
<b>Total</b>	<b>4.991</b>		<b>5.001</b>		<b>4.997</b>		<b>4.971</b>		<b>4.989</b>		<b>4.960</b>	
Or	0.25		0.21		0.12		0.00		0.06		0.45	
Ab	10.4		8.8		7.9		10.9		8.3		9.0	
An	89.4		91.0		92.0		89.1		91.7		90.6	
<b>Trace element concentrations in ppm</b>												
	N = 8		N = 5		N = 7		N = 9		N = 2			
	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.
Sr	416	9	480	89	527	72	326	59	339	0		
Y	0.3	0.1	0.3	0.1	0.4	0.2	0.3	0.1	1.1	0.1		
Ba	37	5	17	6	36	8	26	11	41	0		
Ce	1.2	0.1	0.8	0.2	1.1	0.2	0.8	0.2	1.5	0.1		
Sm	0.3	0.1	0.2	0.0	0.3	0.1	0.3	0.0	0.4	0.1		
Eu	1.4	0.1	1.4	0.3	1.9	0.3	1.4	0.3	1.3	0.0		

Table A-1.

Thin section Suite	15016		15545		15382		15386		12020		12075	
	AP 15 Olivine		AP 15 Olivine		AP 15 KREEP		AP 15 KREEP		AP 12 Olivine		AP 12 Olivine	
	N = 37		N = 37		N = 33		N = 33		N = 26		N = 36	
	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.				
SiO <sub>2</sub> (wt.%)	46.1	0.8	46.0	1.2	47.3	0.9	47.4	0.6	46.3	1.0	47.4	0.7
Al <sub>2</sub> O <sub>3</sub>	33.4	0.7	33.7	0.9	33.9	0.8	33.2	0.5	33.5	0.8	32.6	0.7
Fe <sub>2</sub> O <sub>3</sub>	0.63	0.09	0.55	0.15	0.30	0.13	0.23	0.06	0.69	0.11	0.94	0.13
CaO	18.0	0.4	17.8	0.8	17.2	0.7	16.7	0.4	17.6	0.5	17.8	0.4
Na <sub>2</sub> O	1.03	0.15	1.11	0.31	1.52	0.30	1.51	0.13	0.98	0.16	1.01	0.11
K <sub>2</sub> O	0.04	0.04	0.06	0.06	0.13	0.05	0.13	0.03	0.05	0.02	0.03	0.02
MgO	0.27	0.08	0.20	0.07	0.25	0.05	0.28	0.03	0.32	0.08	0.36	0.09
<b>Total</b>	<b>99.5</b>	<b>0.3</b>	<b>99.4</b>	<b>0.4</b>	<b>100.7</b>	<b>0.3</b>	<b>99.5</b>	<b>0.5</b>	<b>99.5</b>	<b>0.6</b>	<b>100.3</b>	<b>0.3</b>
<b>Formula proportions of cations based on 8 O atoms</b>												
Si	2.140		2.134		2.161		2.186		2.146		2.181	
Al	1.825		1.841		1.824		1.801		1.827		1.769	
Fe	0.025		0.021		0.011		0.009		0.027		0.036	
Ca	0.892		0.883		0.843		0.826		0.874		0.877	
Na	0.092		0.100		0.135		0.135		0.088		0.090	
K	0.002		0.004		0.007		0.008		0.003		0.002	
Mg	0.018		0.014		0.017		0.020		0.022		0.025	
<b>Total</b>	<b>4.995</b>		<b>4.997</b>		<b>4.998</b>		<b>4.985</b>		<b>4.986</b>		<b>4.980</b>	
Or	0.24		0.36		0.76		0.78		0.31		0.20	
Ab	9.4		10.1		13.7		14.0		9.1		9.3	
An	90.4		89.5		85.6		85.3		90.6		90.5	
<b>Trace element concentrations in ppm</b>												
	N = 9		N = 6		N = 6		N = 7					
	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.				
Sr	336	91	295	41	355	6	319	17				
Y	0.2	0.1	0.2	0.0	1.5	0.2	1.8	0.1				
Ba	22	9	9	3	150	22	189	36				
Ce	1.0	0.2	0.6	0.1	9.1	0.8	10.4	0.2				
Sm	0.3	0.0	0.2	0.0	0.8	0.1	1.3	0.3				
Eu	1.4	0.4	0.8	0.1	2.3	0.1	2.3	0.2				

Table A-1.

Thin section Suite	15476 AP 15 Pigeonite N = 35		Shergotty Mars N = 39		QUE 94201 Mars N = 31		Pasamonte Eucrite N = 28	
	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.
SiO <sub>2</sub> (wt.%)	47.6	1.0	55.7	1.3	53.6	0.8	47.1	0.8
Al <sub>2</sub> O <sub>3</sub>	33.0	0.9	27.5	0.8	29.6	0.5	33.9	0.8
Fe <sub>2</sub> O <sub>3</sub>	0.77	0.20	0.65	0.11	0.42	0.07	0.65	0.23
CaO	17.1	0.5	9.8	0.9	11.9	0.6	16.9	0.5
Na <sub>2</sub> O	1.21	0.17	5.48	0.43	4.40	0.31	1.36	0.21
K <sub>2</sub> O	0.05	0.12	0.33	0.12	0.04	0.02	0.09	0.03
MgO	0.31	0.11	0.06	0.02	0.13	0.04	0.07	0.05
Total	100.1	0.3	99.5	0.4	100.1	0.3	100.1	0.4
<b>Formula proportions of cations based on 8 O atoms</b>								
Si	2.186		2.521		2.420		2.162	
Al	1.786		1.464		1.573		1.835	
Fe	0.030		0.022		0.014		0.025	
Ca	0.843		0.474		0.578		0.830	
Na	0.108		0.481		0.385		0.121	
K	0.003		0.019		0.002		0.005	
Mg	0.021		0.004		0.009		0.005	
Total	4.976		4.986		4.980		4.983	
Or	0.29		0.52		0.23		0.57	
Ab	11.3		38.5		39.9		12.7	
An	88.4		61.0		59.9		86.8	
<b>Trace element concentrations in ppm</b>								
	N = 11		N = 7		N = 11			
	avg.	s.d.	avg.	s.d.	avg.	s.d.	avg.	s.d.
Sr	269	79	133	6	244	23		
Y	0.1	0.0	0.2	0.0	0.2	0.0		
Ba	66	80	3	1	107	20		
Ce	0.4	0.1	0.3	0.0	0.5	0.1		
Sm	0.2	0.1	0.3	0.0	0.2	0.0		
Eu	0.6	0.1	0.7	0.1	1.2	0.2		