

COMPOSITION OF SOME APOLLO 14, 15, AND 16 LUNAR  
BRECCIAS AND TWO APOLLO 15 FINES. Ralph P. Christian,  
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"Whole rock" analyses of six Apollo 14, five Apollo 15, and six Apollo 16 samples were determined by a combined technique of X-ray fluorescence, semimicro chemical, and emission spectrographic analysis. The analyses for the Apollo 14, 15, and 16 samples are given in Tables 1, 2, and 3, respectively. The highly variable mineralogical and textural character of breccias make it difficult to relate the composition of the sample split to that of the boulder.

Table 1  
Composition of some Apollo 14 breccias\*  
[oxides in weight percent]

	14041,1	14042,10	14045,4	14304,26	14314,6	14320,2
SiO <sub>2</sub>	47.35	47.52	47.40	45.91	48.48	47.78
Al <sub>2</sub> O <sub>3</sub>	18.45	18.25	18.22	13.44	16.77	17.11
FeO	10.35	10.41	10.65	16.56	9.89	10.04
MgO	9.23	9.30	9.33	9.62	10.69	10.46
CaO	10.90	10.94	10.80	10.36	9.78	9.96
Na <sub>2</sub> O	.73	.63	.64	.57	.75	.82
K <sub>2</sub> O	.50	.49	.49	.68	.94	.79
TiO <sub>2</sub>	1.70	1.70	1.69	2.08	1.57	2.05
P <sub>2</sub> O <sub>5</sub>	.46	.47	.48	.31	.62	.65
MnO	.14	.14	.14	.24	.13	.14
Cr <sub>2</sub> O <sub>3</sub>	.18	.19	.18	.44	.16	.16
Total	99.99	100.04	100.02	100.21	99.78	99.96
ΔRC†	+2.61	+2.63	+2.41	+0.99	+0.89	+0.80

\*Trace-element data for the Apollo 14 samples were not available at the deadline for this abstract but will be included in the Proc. of the 7th Lunar Sci. Conf.

†Total reducing capacity measured less the reducing capacity attributable to the FeO content.

## COMPOSITION OF LUNAR BRECCIAS

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Table 2  
Composition of some Apollo 15 lunar samples\*  
[oxides in weight percent, elements in ppm]

	15012,108 SESC <sup>1</sup> Fines	15013,70 SESC <sup>1</sup> Fines	15285,5 Breccia	15298,42 Breccia	15405,26 Breccia
SiO <sub>2</sub>	46.77	46.94	45.71	45.97	51.49
Al <sub>2</sub> O <sub>3</sub>	16.75	14.46	16.55	15.93	15.44
FeO	12.40	14.98	12.83	12.96	11.17
MgO	10.35	10.35	11.05	10.96	7.33
CaO	10.95	10.38	10.76	11.03	9.98
Na <sub>2</sub> O	.45	.44	.46	.80	.81
K <sub>2</sub> O	.21	.22	.27	.17	.82
TiO <sub>2</sub>	1.46	1.72	1.56	1.52	1.80
P <sub>2</sub> O <sub>5</sub>	.22	.22	.26	.15	.72
MnO	.17	.21	.18	.20	.19
Cr <sub>2</sub> O <sub>3</sub>	.30	.35	.30	.29	.22
Total	100.03	100.27	99.93	99.98	99.97
ΔRC <sup>†</sup>	+3.07	+2.28	+1.76	+2.18	+0.53
Pb			2.8	2.2	6.0
Zn			18	13	4.1
Cu			8.8	12	6.8
Ga			4.2	4.3	4.0
Li			8.0	7.7	24
Rb			4.8	5.3	29
Co			36	44	9.8
Ni			180	200	43
Ba			270	330	1200
Sr			120	140	190
V			68	62	22
Be			2.6	2.8	9.7
Nb			22	25	80
Sc			24	25	23
La			15	15	55
Y			84	90	360
Yb			11	12	32
Zr			390	440	1100

\* Trace-element data for 15012,108 and 15013,70 were not available at the deadline for this abstract, but will be included in the Proc. of the 7th Lunar Sci. Conf.

<sup>†</sup>Total reducing capacity measured less the reducing capacity attributable to the FeO content.

<sup>1</sup>Surface environmental sample container.

## COMPOSITION OF LUNAR BRECCIAS

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Table 3  
 Composition of some Apollo 16 lunar rocks  
 [oxides in weight percent, elements in ppm]

	60275,34 Breccia	61015,24 Breccia	61015,25 Breccia	65055,18 Anorthosite	67975,3 Breccia	67975,43 Breccia
SiO <sub>2</sub>	44.87	45.23	45.80	45.41	45.33	44.23
Al <sub>2</sub> O <sub>3</sub>	25.42	26.87	22.09	28.46	27.50	29.12
FeO	5.78	4.42	6.40	3.90	4.27	4.61
MgO	7.64	6.61	10.50	4.81	5.58	4.09
CaO	14.57	15.50	13.36	16.13	15.90	16.70
Na <sub>2</sub> O	.46	.42	.47	.44	.52	.42
K <sub>2</sub> O	.22	.09	.21	.13	.11	.13
TiO <sub>2</sub>	.62	.45	.79	.28	.49	.40
P <sub>2</sub> O <sub>5</sub>	.26	.09	.19	.13	.11	.20
MnO	.06	.07	.10	.05	.06	.06
Cr <sub>2</sub> O <sub>3</sub>	.10	.08	.13	.08	.08	.05
Total	100.00	99.83	100.04	99.82	99.95	100.01
ΔRC†	+1.97	+0.78	+1.65	+0.87	+1.18	+1.08
Pb	3.9	2.6	3.0	<1	1.2	1.0
Zn	10	<2	3.1	<2	4.1	5.3
Cu	5.4	3.8	5.9	2.4	3.2	2.4
Ga	3.6	2.3	3.1	1.4	2.2	2.5
Li	5.1	4.1	6.9	2.2	5.7	2.5
Rb	3.2	2.4	4.0	1.0	1.4	1.0
Co	18	14	30	12	5.9	4.6
Ni	250	250	540	150	110	22
Ba	220	130	280	57	67	54
Sr	150	130	140	140	150	130
V	16	13	18	16	10	10
Be	<2	2.0	3.8	<2	<2	<2
Nb	<10	<10	<10	<10	<10	<10
Sc	9.8	6.5	12	7.2	6.8	8.7
La	14	10	19	<10	11	<10
Y	71	50	100	19	23	34
Yb	6.8	3.9	9.5	1.4	1.5	2.3
Zr	240	200	330	72	76	110

†

Total reducing capacity measured less the reducing capacity to the FeO content.