

AM-13-1002, Seddio et al.: Petrology and geochemistry of lunar granite 12032,366-19, American Mineralogist 2013

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Appendix 1. Bulk compositions of selected lunar granites and felsites.

Sample	12032, 366-19A	12032, 366-19B	12001, 909-14	12003, 254	12013, 10,12a	12013, 10,16b	12013, 10,28	12013, 10A	12023, 147-10	12032, 367-04	12033, 517	12033, 634-30	12033, 634-34
Method	CMR	INAA	INAA	INAA	INAA	INAA	INAA	INAA*	INAA	INAA	INAA, RNAA	INAA	INAA
SiO₂	70.1	-	-	-	-	-	-	60.8	-	-	65.0	-	-
TiO₂	1.07	-	-	0.8	0.30	0.75	0.86	1.50	-	-	1.50	-	-
Al₂O₃	13.5	-	-	11.6	10.1	11.1	9.8	12.8	-	-	12.9	-	-
FeO	4.98	4.99	8.45	10.7	14.0	9.60	6.00	10.68	3.11	8.62	7.60	9.00	12.5
MnO	0.07	-	-	0.14	0.15	0.12	0.08	0.15	-	-	0.04	-	-
MgO	0.14	-	-	5.5	8.50	6.30	5.50	-	-	-	2.40	-	-
CaO	3.04	2.9	6.9	5.4	4.6	4.1	3.8	7.1	3.0	9.1	4.9	9.2	6.4
BaO	0.68	0.68	0.22	0.40	0.42	0.46	0.46	-	0.44	0.19	0.51	0.48	0.51
Na₂O	2.47	2.10	1.37	1.3	1.12	1.28	1.17	1.25	1.22	1.27	1.47	1.66	1.04
K₂O	4.58	4.8	2.9	2.4	2.60	3.74	3.03	1.65	5.60	2.20	2.96	3.40	3.90
P₂O₅	0.052	-	-	-	-	-	-	-	-	-	-	-	-
Total	100.7	-	-	-	-	-	-	-	-	-	-	-	-
Mass	Section	21.28	7.01	8.10	5.25	1.21	0.98	Mass weighted	2.67	7.39	88	7.50	6.96

Oxides are in wt%; elements are in ppm except for Ir and Au which are in ppb. “-” means “not reported.” “n.d.” means “not detected.” “EPMA” implies a defocused beam analysis. “RNAA” stands for radiochemical neutron activation analysis. “Mass” refers to the mass of the sample analyzed in mg. 12032,366-19 A (CMR from EPMA, this study). 12032,366-19 B; 12001,909-14 (INAA data, this study). 12003,254 (Laul 1986). 12013,10,12a; 12013,10,16b; 12013,10,28 (Quick et al. 1977). 12013,10 A (12013,10 weighted mean; Wakita and Schmitt 1970). 12023,147-10; 12032,367-04 (INAA data, this study). 12033, 517 (Warren et al. 1987). 12033,634-30; 12032,634-34 (INAA data, this study). 12070,102-5 (Marvin et al. 1971). 14001,28.2, 14001,28.3, and 14001,28.4 (Morris et al. 1990). 14004,94 and 14004,96 (Snyder et al. 1992). 14161,7269 (Jolliff et al. 1991). 14303,204, 14321,1027 (Warren et al. 1983c). 15405,12 (Ryder 1976). 15434,10 (Ryder and Martinez 1991). 73215,43,3 (Blanchard et al. 1977). 73255,27,3 (Blanchard and Budahn 1979).

*SiO₂ was calculated.

Appendix 1 continued.

Sample	12070, 102-5	14001, 28.2	14001, 28.3	14001, 28.4	14004, 94	14004, 96	14161, 7269	14303, 204	14321, 1027	15405, 12	15434, 10	73215, 43,3	73255, 27,3
Methods	EPMA	INAA	INAA	INAA	INAA	INAA	INAA EPMA	INAA	INAA	EPMA	FB	INAA	INAA*
SiO₂	70.80	-	-	-	-	-	71.9	-	74.20	68.08	56.9	-	75.5
TiO₂	0.60	1.80	1.40	1.00	1.35	1.14	0.54	0.75	0.33	0.90	1.13	-	0.26
Al₂O₃	12.70	9.6	8.8	11.3	12.3	13.2	12.6	18.5	12.50	10.15	6.4	-	12.30
FeO	6.30	9.10	12.2	11.0	7.70	6.30	2.26	5.57	2.32	6.99	18.6	2.98	3.10
MnO	0.10	0.11	0.13	0.13	0.11	0.08	0.02	0.06	0.02	-	0.28	-	0.04
MgO	0.40	<1.2	<0.83	<0.99	-	-	0.03	3.30	0.07	1.53	4.7	-	0.20
CaO	1.00	3.9	5.5	5.7	5.1	5.1	0.93	8.8	1.25	4.89	8.3	-	0.50
BaO	-	0.40	0.26	0.35	0.29	0.31	0.11	0.23	0.24	-	0.20	-	0.61
Na₂O	1.10	1.70	1.40	1.90	1.56	1.54	0.56	1.25	0.52	0.79	0.56	0.19	0.53
K₂O	7.40	3.40	2.10	2.50	3.10	3.20	10.06	3.60	8.60	3.39	2.17	7.00	7.55
P₂O₅	0.70	-	-	-	-	-	0.13	-	-	-	1.33	-	-
Total	101.1	-	-	-	-	-	99.3	-	100.1	96.7	100.6	-	100.6
Mass	Section	34.2	15.3	15.0	133.3	97.1	36.4	70	149	Section	27	20	2.0

Appendix 1 continued.

	12032, 366-19A	12032, 366-19B	12001, 909-14	12003, 254	12013, 10,12a	12013, 10,16b	12013, 10,28	12013, 10A	12023, 147-10	12032, 367-04	12033, 517	12033, 634-30	12033, 634-34
Cr	<200	11.3	610	1539	1723	1034	589.4	1410	31	8.62	479.5	66	19
Zr	1500	1500	1470	610	690	1130	720	-	970	9.1	1310	2500	3020
Hf	37.8	45.5	38.9	4.7	27	23	25	23.0	31.5	0.19	37	65.1	78.2
La	11.3	79.4	115.6	50	57	64	39	66	77.0	1.274	82	213.0	181.2
Ce	106	182	289	110	151	170	100	-	184	2.20	199	539	435
Nd	83.2	82	159	56	74	91	59	-	80		100	310	212
Sm	-	24.6	46.3	14.1	19	20	13	25.0	23.8		28	87.8	62.8
Eu	-	3.01	2.60	2.7	2.14	1.85	1.74	2.00	2.38	1119	3.10	5.03	3.84
Tb	-	6.56	9.84	4	5.2	4.9	3.7	-	6.06	900	6.8	18.29	15.22
Yb	-	51.8	45.90	32	30.0	35.0	25.0	30.0	43.7	22.8	36.7	68.10	90.20
Lu	-	7.44	6.17	4.8	4.2	5.2	3.0	4.1	6.19	80.5	5.8	9.29	12.48
Sc	-	8.7	16.7	23.2	25.0	21.0	17.0	27	6.3	203	14.9	26.0	23.6
Co	-	0.8	9.3	12	24.0	12.0	8.6	26	0.8	107	8.0	7.5	4.7
Ni	-	<25	<50.	<40	-	-	-	-	<50	32.90	22.0	<70	<160
Rb	-	96	74	-	87	124	101	-	172	2.84	79	63	77
Sr	-	167	145	180	-	-	-	-	134	6.90	156	227	180
Cs	-	3.67	3.22	-	3.1	4.0	4.3	-	4.98	28.90	3.0	2.10	2.26
Ta	-	10.4	6.9	7.7	-	-	-	-	8.8	4.020	-	9.1	9.4
W	-	8.7	4.5	-	-	-	-	-	3.7	21.0	-	4.0	7.5
Ir	-	<0.0013	<5.	-	-	-	-	-	<4.	17.2	1.27	<5.	<6.
Au	-	<0.005	<5.	-	-	-	-	-	<11.	81	0.51	<9.	<6.
Th	126	60.6	39.0	37	48	45	36	22	59.5	53	40	52.9	61.7
U	52.7	20.7	11.2	11.3	14	12	10	8	19.5	171	12	16.1	18.9

Appendix 1 continued.

	12070, 102-5	14001, 28.2	14001, 28.3	14001, 28.4	14004, 94	14004, 96	14161, 7269	14303, 204	14321, 1027	15405, 12	15434, 10	73215, 43,3	73255, 27,3
Cr	0.00	94.90	149.8	99.89	91.90	137.9	679.3	549.4	17.00	-	1129	103.0	70.00
Zr	-	-	-	-	-	-	890	1020	660	-	885	-	-
Hf	-	41	120	43	41	51	33	22	13.9	-	19.4	25.6	16
La	-	110	200	130	91	87	95	58	44.3	-	65	42.9	20.3
Ce	-	250	460	270	218	237	-	149	117	-	174	125	50
Nd	-	-	-	-	111	113	-	93	58	-	101	-	34
Sm	-	36	66	40	33	33	36	22	15.9	-	64.5	19	6.74
Eu	-	2.80	3.30	3.00	2.53	2.82	2.69	3.30	1.17	-	1.44	3.11	2.71
Tb	-	8.1	15.0	9.3	8.1	8.4	8.0	4.9	4.3	-	7.6	5.6	1.52
Yb	-	37.0	64.0	43.0	38.0	33.0	55.3	18.0	32.2	-	32.7	27.2	10.3
Lu	-	5.0	7.7	5.9	4.9	4.3	7.9	2.6	5.1	-	4.9	5.3	1.5
Sc	-	15.0	20.0	20.0	15.8	13.6	15.6	10.7	3	-	49	4.8	2.3
Co	-	2.7	3.8	3.9	2.4	2.7	15.1	14.1	0.94	-	52.35	2.1	1.5
Ni	-	-	-	-	-	-	110.0	<60	4.9	-	-	n.d.	-
Rb	-	110	87	89	87	92	107	114	210	-	52.5	-	-
Sr	-	170	170	190	150	110	190	210	55±16	-	118	-	215
Cs	-	2.3	2.0	2.2	2.0	2.9	5.0	2.2	5.7	-	0.47	-	-
Ta	-	-	-	-	-	-	-	-	8.3	-	4.4	5.4	2.4
W	-	-	-	-	-	-	-	-	-	-	-	-	-
Ir	-	<1.6	<5.7	<5.1	<1.4	<1.7	<6	<2.8	47	-	-	-	-
Au	-	-	-	-	10.00	<4	<4	-	35	-	<5	-	-
Th	-	35	42	28	29	30	66	-	65	-	19.7	39.9	9.5
U	-	9.1	13	8.2	8.2	9.9	20	-	23.4	-	5.7	-	-