

Supplementary material. First listed are bulk rock compositions of potential protoliths (Jolliff, 1991; James et al., 1987; Warren and Wasson, 1978, respectively) used for rhyolite-MELTS simulations, and the predicted residual melt compositions and phase assemblages at conditions of IW -1 fO_2 , anhydrous, and 1 bar, at various temperatures. Next are lunar granite bulk rock compositions (Warren et al., 1983a; Synder et al., 1992; Seddio et al., 2013, respectively), which were used to model estimated liquidus temperatures. Lastly, bulk rock compositions for other tested rocks (Jolliff et al., 1993; Ryder and Martinez, 1991; Warren, 1981; Laul, 1986; Blanchard et al., 1975; Blanchard and McKay, 1981; Ryder and Sherman, 1979, respectively) that were not incorporated into the experimental study, and their estimated residual melt compositions of various temperatures based on rhyolite-MELTS simulations under the previously mentioned conditions.

Sample	T (°C)	Phase (vol%)	SiO ₂	TiO ₂	Al ₂ O ₃	Cr ₂ O ₃	FeO	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	Total
Monzogabbro 14161, 7069			53.6	2.40	12.60	0.05	13.99	0.20	2.68	9.0	1.41	1.6	1.72	99.25
	1100	Gl (97.7)	54.9	2.52	13.19	0.05	13.61	0.20	2.33	8.54	1.48	1.68	1.09	100.5
		Pig (2.3)	50.4	0.10	2.58	-	27.5	-	16.1	3.20	0.03	-	-	
	1000	Gl (48.4)	66.6	1.94	11.3	0.01	5.97	0.39	0.40	7.19	1.07	3.69	1.25	100.0
		Plag (26.5)	52.2	-	30.5	-	-	-	-	13.0	4.0	0.31	-	
		Pig (23)	48.4	0.07	1.80	-	35.5	-	8.71	5.31	0.03	-	-	
		Ox (1.8)	-	51.6	3.12	-	0.51	1.39	2.08	-	-	-	-	
		Sp (0.3)	-	29.32	2.40	8.54	56.2	-	1.74	-	-	-	-	
	900	Gl (3.2)	70.08	1.10	12.81	0.01	1.77	0.23	0.14	4.56	0.34	7.38	1.58	100.0
		Plag (37.6)	52.0	-	30.5	-	-	-	-	13.1	3.68	0.7	-	
		Pig (18.2)	48.3	0.04	1.56	-	37.5	-	8.15	4.39	0.02	-	-	
		Qz (16.3)	100											
		K-spar (11)	64.8	-	19.1	-	-	-	-	0.64	2.18	13.3	-	
		Cpx (8.1)	49.2	0.43	2.31	-	22.3	-	7.24	18.4	0.1	-	-	
		Ox (3)	-	51.8	2.62	-	41.8	1.54	1.78	-	-	-	-	
		Ol (2.5)	30.9	-	-	-	59.0	3.70	5.99	0.36	-	-	-	
		Sp (0.1)-	8.1	6.1	44.3	38.5	-	1.21	-	-	-	-	-	
Alkali Gabbro 67975, 117			51.18	0.64	16.5	0.09	11.8	0.18	8.30	9.10	0.31	1.90	-	99.97
	1100	Gl (39.6)	58.2	1.78	17.7	0.05	7.08	0.32	2.14	6.89	0.22	5.45	-	99.97
		Pig (30.2)	51.5	0.09	2.84	-	21.7	-	18.7	5.13	0.01	-	-	
		Plag (30.1)	45.3	-	35.2	-	-	-	-	18.4	0.85	0.22	-	
		Sp (0.1)	-	4.91	15.6	41.1	30.7	-	5.38	-	-	-	-	
	1000	Gl (24.1)	63.3	2.67	17.9	0.02	2.24	0.47	0.72	3.56	0.07	8.97	-	99.99

	Pig (38.6)	51.2	0.14	2.47	-	23.5	-	17.6	5.02	0.01	-	-	
	Plag (37.1)	45.5	-	35.0	-	-	-	-	18.3	0.86	0.35	-	
	Sp (0.2)	-	15.7	8.81	1.71	28.6	40.7	-	4.47	-	-	-	
900	Gl (33.2)	70.1	1.31	15.9	0.02	0.84	0.60	0.32	2.24	0.03	8.67	-	100.0
	Plag (40.6)	45.2	-	35.2	-	-	-	-	18.5	0.72	0.36	-	
	Opx (33.2)	51.7	0.02	1.46	-	26.4	-	18.8	1.56	-	-	-	
	K-spar (6.7)	64.5	-	18.8	-	-	-	-	0.49	0.67	15.6	-	
	Pig (6.1)	50.9	0.65	2.95	-	11.9	-	12.9	20.7	0.04	-	-	
	Ox (0.5)	-	52.3	3.58	0.32	-	35.4	4.22	4.15	-	-	-	
	Sp (0.1)	-	5.11	7.99	1.31	49.1	33.6	-	2.83	-	-	-	
KREEP basalt 15386, 19		50.80	2.23	14.8	0.31	10.55	0.16	8.17	9.70	0.73	0.67	0.70	98.82
1100	Gl (45.6)	54.04	4.80	14.15	0.11	8.60	0.38	3.47	10.08	0.55	1.51	1.59	98.28
	Cpx (28.3)	52.1	0.20	2.57	-	20.6	-	20.6	3.87	0.02	-	-	
	Plag (26.0)	47.8	-	33.5	-	-	-	-	16.5	2.07	0.1	-	
	Whit (0.1)								54.2			45.8	
1000	Gl (24.2)	66.38	3.52	12.69	0.07	2.76	0.67	1.31	7.84	0.31	2.93	1.54	100.0
	Plag (37.4)	47.6	-	33.7	-	-	-	-	16.7	1.94	0.15	-	
	Cpx (35.6)	52.1	0.12	1.78	-	21.7	-	19.1	5.16	0.02	-	-	
	Ox (2.0)	-	52.8	3.83	-	35.1	2.25	5.71	-	-	-	-	
	Whit (0.8)								54.2			45.8	
900	Gl (9.0)	69.13	1.49	13.65	0.03	0.74	0.90	0.38	4.85	0.08	7.01	1.75	100.0
	Plag (43.6)	47.7	-	33.5	-	-	-	-	16.5	1.84	0.39	-	
	Opx (29.4)	52.5	0.03	1.21	-	24.2	-	20.5	1.67	-	-	-	
	Cpx (7.6)	51.4	0.65	2.70	-	10.4	-	12.7	20.9	0.07	-	-	
	Qz (6.7)	100											
	Ox (2.6)	-	52.7	3.31	-	35.6	3.31	4.72					
	Whit (1.2)								54.2			45.8	
Granite 14321,1027		74.2	0.33	12.5	0.002	2.32	0.02	0.07	1.3	0.52	8.6	-	99.86
Granite 14004.94		69	1.35	12.3	0.013	7.7	0.106	-	5.1	1.56	3.1	-	100.1
Granite 12032,366-19A		70.1	1.07	13.5	-	4.98	0.07	0.14	3.04	2.47	4.58	0.05	100.0
Monzogabbro 14161, 7264		46.3	2.49	12.5	0.37	12.98	0.21	8.64	10.2	1.13	1.08	2.16	98.06

	1100	51.55	4.66	13.76	0.06	10.16	0.35	3.44	10.55	1.21	2.64	1.61	100.0
	1000	61.48	2.58	16.21	0.02	2.44	0.40	0.77	5.31	0.55	8.64	1.60	100.0
	900	68.78	1.30	13.93	0.02	0.96	0.69	0.36	4.36	0.22	7.68	1.70	100.0
Monzogabbro 15343, 10/178a		56.9	1.13	6.4	0.16	18.6	0.2	4.7	8.3	0.52	2.17	1.3	100.4
	1100	59.91	1.54	8.47	0.69	13.84	0.28	1.55	9.30	0.72	3.0	1.30	110.6
	1000	66.78	1.76	11.17	0.02	5.76	0.40	0.43	6.98	1.0	4.38	1.31	100.0
	900	70.06	1.11	12.85	0.01	1.69	0.27	0.16	4.54	0.35	7.38	1.59	100.0
Alkali Norite 14316, 6		46.9	1.5	10.6	0.24	10.40	0.14	15.9	8.40	0.78	0.43	-	95.29
	1100	54.86	6.20	16.52	0.07	4.99	0.27	3.43	8.11	0.96	4.58	-	100.0
	1000	60.2	3.43	19.70	0.02	1.17	0.10	0.88	2.62	0.36	11.52	-	100.0
	900	-	-	-	-	-	-	-	-	-	-	-	-
Alkali Norite 12033, 534		49.59	2.0	16.20	0.13	11.20	0.12	9.50	9.40	0.89	0.98	-	100.0
	1100	53.03	5.66	15.94	0.43	8.82	0.31	3.25	8.63	0.67	3.64	-	100.0
	1000	62.81	2.74	18.07	0.02	2.02	0.39	0.78	3.23	0.28	9.65	-	100.0
	900	71.36	1.43	15.12	0.02	0.76	0.33	0.38	2.27	0.12	8.21	-	100.0
Alkali Norite 12042, 280		49.90	2.30	14.80	0.20	12.40	0.14	9.30	9.40	0.82	0.75	-	100.0
	1100	52.34	5.77	14.64	0.06	10.59	0.48	3.44	9.53	0.64	2.51	-	100.0
	1000	67.32	2.59	15.20	0.03	2.44	0.43	0.89	4.47	0.33	6.30	-	100.0
	900	72.01	1.37	14.70	0.02	0.86	0.32	0.36	2.38	0.13	7.85	-	100.0
Norite 72255, c2		52.0	0.30	15.5	0.16	7.40	0.12	15.9	9.10	0.33	0.08	-	100.9
	1100	60.89	3.42	14.99	0.19	3.76	1.73	4.03	9.93	0.14	0.91	-	100.0
	1000	69.14	3.24	13.29	0.16	1.32	2.46	2.04	6.91	0.08	1.37	-	100.0
	900	-	-	-	-	-	-	-	-	-	-	-	100.0
Norite 78236, 3		50.2	0.18	17.70	0.31	6.49	0.12	14.28	10.10	0.31	0.04	0.08	99.81

	1100	58.77	2.54	14.79	0.20	3.62	2.36	4.29	11.2	0.10	0.56	1.58	100.0
	1000	63.71	3.42	12.77	0.20	1.41	3.74	2.42	9.45	0.05	0.80	2.03	100.0
	900	-	-	-	-	-	-	-	-	-	-	-	-
Gabbronorite 14161, 7044		46.4	2.35	17.8	0.17	8.99	0.12	8.77	12.0	0.77	0.42	0.98	98.77
	1100	47.20	7.12	13.92	0.10	9.11	0.60	4.47	12.66	0.31	2.34	2.16	99.99
	1000	63.45	2.85	15.58	0.04	2.02	0.42	1.0	6.04	0.19	6.84	1.58	100.0
	900	68.38	1.59	14.77	0.03	0.62	0.26	0.46	4.23	0.08	7.92	1.68	100.0
Alkali Gabbronorite 67975, 42		52.20	4.0	7.20	0.39	17.2	0.26	5.10	12.80	0.49	0.35	-	100
	1100	53.46	4.71	8.70	0.13	16.93	0.34	2.92	11.70	0.62	0.46	-	99.97
	1000	69.86	2.06	10.45	0.03	6.87	0.65	0.57	7.32	0.74	1.45	-	100.0
	900	-	-	-	-	-	-	-	-	-	-	-	-
KREEP basalt 72275, 91		48.0	1.40	13.50	0.46	15.0	0.16	10.0	10.50	0.29	0.25	-	99.56
	1100	49.26	5.18	12.99	0.13	15.07	0.88	3.77	11.29	0.15	1.27	-	100.0
	1000	66.82	2.47	14.69	0.04	3.34	1.40	0.94	5.43	0.09	4.77	-	100.0
	900	71.68	1.26	14.85	0.02	1.06	0.72	0.34	2.55	0.04	7.49	-	100.0
KREEP basalt 15434, 18/, 199-A		52.80	2.14	15.20	0.29	10.10	0.15	7.40	9.40	0.89	0.65	0.62	99.64
	1100	56.42	4.13	14.32	0.11	8.23	0.31	3.22	9.95	0.72	1.30	1.28	99.98
	1000	68.85	2.60	12.13	0.06	2.85	0.39	1.22	7.64	0.43	2.42	1.40	100.0
	900	69.47	1.39	13.96	0.02	0.86	0.42	0.40	4.39	0.14	7.30	1.65	100.0