

Appendix Table 1 Analytical results of reference materials.

a) Major elements (wt%).

	RGM-1	
	M.V.	R.V.
SiO ₂	74.17	74.06
TiO ₂	0.27	0.27
Al ₂ O ₃	13.93	13.90
Fe ₂ O ₃ *	1.88	1.88
MnO	0.04	0.04
MgO	0.25	0.26
CaO	1.20	1.21
Na ₂ O	4.23	4.21
K ₂ O	4.42	4.41
P ₂ O ₅	0.05	0.05
Total	100.44	100.29

M.V. and R.V. denote measured value (analytical result of this study) and reference values (Gladney and Roelandts, 1988), respectively.

Fe₂O₃* denotes total Fe as Fe₂O₃.

b) Trace elements (ppm).

	JA-1		JB-2		JR-1	
	M.V.	R.V.	M.V.	R.V.	M.V.	R.V.
Sc	28.74	28.5	54.83	53.5	5.38	5.1
Ti	5115.37	5132	7044.37	7097	608.67	669
V	105.13	105	569.08	575	8.39	7
Cr	8.01	7.83	18.17	28.1	7.13	2.8
Mn	1231.57	1224	1728.14	1679	821.30	777
Ni	6.47	3.49	15.58	16.6	3.99	1.67
Cu	43.36	43	214.25	225	4.10	3
Zn	99.38	90.9	109.83	108	29.93	30.6
Ga	18.17	16.7	17.44	17	16.68	16.1
Ge	1.47	1.33	1.22	1.35	2.73	1.88
As	2.23	2.78	2.46	2.87	15.88	16.30
Rb	11.22	12.3	6.33	7.37	240.09	257.00
Sr	262.92	263	181.92	178	29.10	29
Y	24.88	30.6	21.32	24.9	33.20	45.1
Zr	78.38	88.3	46.38	51.2	81.21	99.9
Nb	1.12	1.85	0.50	1.58	13.06	15.20
Mo	1.74	1.59	1.15	1.08	2.61	3.25
Cd	0.10	0.11	0.15	0.14	0.01	0.03
Sn	1.17	1.16	0.79	0.95	2.57	2.86
Sb	0.13	0.22	0.27	0.25	1.24	1.190
Cs	0.59	0.62	1.06	0.85	22.51	20.800
Ba	309.94	311	225.26	222	51.78	50
La	4.88	5.24	2.22	2.35	16.82	19.70
Ce	13.14	13.3	6.20	6.76	42.05	47.2
Pr	2.04	1.71	1.07	1.01	5.40	5.58
Nd	11.09	10.9	6.57	6.63	21.76	23.3
Sm	3.51	3.52	2.58	2.31	5.44	6.03
Eu	1.02	1.2	0.83	0.86	0.27	0.3
Gd	4.06	4.36	3.21	3.28	5.29	5.06
Tb	0.76	0.75	0.62	0.6	0.88	1.010
Dy	4.66	4.55	3.98	3.73	5.67	5.69
Ho	1.00	0.95	0.82	0.75	1.14	1.11
Er	3.09	3.04	2.49	2.6	3.52	3.61
Tm	0.46	0.47	0.36	0.41	0.58	0.67
Yb	3.02	3.03	2.59	2.62	4.69	4.55
Lu	0.43	0.47	0.38	0.4	0.71	0.710
Hf	2.31	2.42	1.22	1.49	4.19	4.51
Ta	0.10	0.13	0.09	0.13	2.12	1.860
Tl	0.16	0.13	0.16	0.042	0.54	1.560
Pb	6.17	6.55	5.38	5.36	18.15	19.30
Bi	0.00	0.091	0.16	0.033	1.77	0.560
Th	0.73	0.82	0.29	0.35	26.99	26.70
U	0.35	0.34	0.17	0.18	9.25	8.88

M.V. and R.V. denote measured value (analytical result of this study), reference values (Imai *et al.*, 1995), respectively.