

	Al2O3	SiO2	TiO2	Fe2O3	MnO	MgO	CaO	Na2O	K2O	P2O5	Ba	Cr	S	Sc	Sr
	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(wt %)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
Al2O3 (wt %)	1														
SiO2 (wt %)	0.89	1													
TiO2 (wt %)	0.96	0.95	1												
Fe2O3 (wt %)	0.58	0.36	0.43	1											
MnO (wt %)	-0.05	-0.16	-0.16	0.379	1										
MgO (wt %)	-0.43	-0.46	-0.47	0.132	0.41	1									
CaO (wt %)	-0.88	-0.88	-0.91	-0.46	0.07	0.23	1								
Na2O (wt %)	0.77	0.93	0.89	0.152	-0.2	-0.51	-0.8	1							
K2O (wt %)	0.97	0.83	0.9	0.639	-0.03	-0.39	-0.85	0.67	1						
P2O5 (wt %)	-0.61	-0.63	-0.63	-0.45	-0.11	-0.29	0.85	-0.53	-0.58	1					
Ba (ppm)	0.68	0.7	0.67	0.54	0.1	-0.24	-0.55	0.6	0.66	-0.4	1				
Cr (ppm)	0.72	0.61	0.66	0.329	-0.21	-0.63	-0.43	0.43	0.74	-0.1	0.55	1			
S (ppm)	0.35	0.29	0.27	0.729	0.34	0.2	-0.25	0.12	0.4	-0.3	0.39	0.21	1		
Sc (ppm)	0.91	0.74	0.83	0.586	-0.07	-0.4	-0.75	0.6	0.9	-0.5	0.58	0.75	0.332	1	
Sr (ppm)	-0.65	-0.66	-0.67	-0.44	-0.05	-0.19	0.89	-0.56	-0.63	0.98	-0.36	-0.12	-0.26	-0.54	1
Zn (ppm)	0.18	0.21	0.18	-0.07	-0.13	-0.25	-0.13	0.12	0.2	-0	0.17	0.46	-0.09	0.41	-0
Zr (ppm)	0.52	0.78	0.71	0.066	-0.24	-0.31	-0.64	0.82	0.42	-0.5	0.46	0.28	0.191	0.35	-0.5
Be (ppm)	0.87	0.65	0.76	0.664	-0.05	-0.22	-0.73	0.47	0.89	-0.5	0.52	0.67	0.465	0.83	-0.6
V (ppm)	0.3	0.31	0.31	-0.02	-0.27	-0.35	-0.15	0.18	0.25	-0	0.23	0.64	0.076	0.32	-0
Co (ppm)	0.39	0.58	0.47	0.111	-0.1	-0.25	-0.37	0.57	0.32	-0.3	0.4	0.26	0.217	0.3	-0.2
Ni (ppm)	0.06	0.08	0.05	-0.05	-0.24	0.02	0	-0.11	0.07	-0.1	-0.05	0.44	0.054	0.13	-0
Cu (ppm)	0.57	0.55	0.55	0.273	-0.12	-0.34	-0.48	0.37	0.58	-0.3	0.51	0.72	0.037	0.56	-0.3
Ga (ppm)	0.98	0.81	0.91	0.603	-0.01	-0.4	-0.86	0.69	0.96	-0.6	0.63	0.7	0.334	0.92	-0.6
Rb (ppm)	0.97	0.77	0.88	0.64	0.04	-0.35	-0.83	0.62	0.95	-0.6	0.61	0.71	0.362	0.9	-0.6
Y (ppm)	-0.17	-0.24	-0.22	-0.23	-0.18	-0.34	0.38	-0.25	-0.11	0.59	-0.01	0.39	-0.051	-0.09	0.54
Nb (ppm)	0.93	0.95	0.98	0.376	-0.17	-0.47	-0.92	0.91	0.85	-0.7	0.63	0.59	0.224	0.8	-0.7
Mo (ppm)	0.07	0.06	0.07	0.214	-0.16	0.16	-0.1	-0.04	0.09	-0.2	-0.11	0.01	0.285	0.1	-0.2
Sn (ppm)	0.75	0.81	0.76	0.332	0.17	-0.4	-0.64	0.77	0.68	-0.4	0.7	0.57	0.264	0.67	-0.4
Cs (ppm)	0.81	0.53	0.67	0.744	0.08	-0.19	-0.6	0.29	0.83	-0.4	0.55	0.71	0.442	0.8	-0.5
La (ppm)	0.05	-0.05	-0.01	-0.08	-0.16	-0.35	0.15	-0.1	0.11	0.39	0.14	0.52	0.016	0.1	0.32
Ce (ppm)	0.24	0.14	0.17	0.051	-0.11	-0.25	-0.11	0.05	0.29	0.08	0.27	0.56	0.121	0.24	0.02
Pr (ppm)	0.16	0.05	0.08	0.048	-0.13	-0.25	0.01	-0.05	0.23	0.17	0.2	0.57	0.138	0.22	0.13
Nd (ppm)	0.13	0.02	0.05	0.007	-0.14	-0.26	0.04	-0.07	0.19	0.21	0.19	0.56	0.114	0.18	0.16
Sm (ppm)	0.09	0.01	0.03	-0.04	-0.12	-0.23	0.05	-0.07	0.15	0.21	0.17	0.5	0.083	0.12	0.16
Eu (ppm)	0.06	-0.03	-0.01	-0.07	-0.13	-0.24	0.09	-0.1	0.11	0.27	0.15	0.48	0.067	0.09	0.21
Gd (ppm)	0.04	-0.06	-0.02	-0.09	-0.14	-0.24	0.1	-0.12	0.1	0.27	0.12	0.47	0.041	0.08	0.21
Tb (ppm)	0.08	-0.01	0.01	-0.05	-0.15	-0.26	0.08	-0.08	0.14	0.26	0.16	0.52	0.076	0.12	0.2
Dy (ppm)	0.07	-0.02	0.01	-0.06	-0.15	-0.29	0.1	-0.09	0.13	0.29	0.16	0.52	0.066	0.12	0.23
Ho (ppm)	0.02	-0.06	-0.03	-0.11	-0.16	-0.32	0.15	-0.11	0.08	0.36	0.13	0.49	0.026	0.07	0.3

Er (ppm)	0.03	-0.05	-0.02	-0.12	-0.19	-0.36	0.16	-0.09	0.08	0.4	0.13	0.51	0.011	0.07	0.33
Tm (ppm)	0.08	0.02	0.04	-0.1	-0.22	-0.43	0.13	-0.02	0.12	0.4	0.18	0.56	0.033	0.12	0.33
Yb (ppm)	0.14	0.1	0.12	-0.09	-0.26	-0.5	0.07	0.07	0.17	0.38	0.24	0.6	0.048	0.17	0.31
Lu (ppm)	0.21	0.19	0.22	-0.08	-0.3	-0.57	-0.01	0.18	0.23	0.33	0.27	0.63	0.049	0.23	0.25
Hf (ppm)	0.52	0.78	0.72	0.044	-0.22	-0.32	-0.66	0.84	0.42	-0.5	0.47	0.26	0.158	0.35	-0.5
Ta (ppm)	0.58	0.81	0.7	0.113	-0.2	-0.39	-0.59	0.82	0.46	-0.4	0.56	0.37	0.152	0.45	-0.4
W (ppm)	0.47	0.73	0.59	0.076	-0.21	-0.34	-0.48	0.72	0.36	-0.4	0.5	0.32	0.146	0.37	-0.3
Tl (ppm)	0.21	0.32	0.27	-0.11	-0.29	-0.22	-0.2	0.21	0.14	-0.2	0.08	0.38	-0.041	0.18	-0.2
Pb (ppm)	0.3	0.47	0.41	-0.14	0.04	-0.18	-0.32	0.59	0.17	-0.3	0.22	0.1	-0.013	0.18	-0.2
Th (ppm)	0.92	0.91	0.97	0.398	-0.18	-0.51	-0.89	0.85	0.86	-0.6	0.62	0.67	0.226	0.79	-0.6
U (ppm)	-0.37	-0.46	-0.43	-0.07	-0.21	0.01	0.55	-0.52	-0.31	0.56	-0.35	0.09	0.109	-0.23	0.55

	Zn	Zr	Be	V	Co	Ni	Cu	Ga	Rb	Y	Nb	Mo	Sn	Cs	La
	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
Zn (ppm)	1														
Zr (ppm)	0.1	1													
Be (ppm)	0.12	0.31	1												
V (ppm)	0.32	0.17	0.3	1											
Co (ppm)	0.19	0.57	0.19	0.18	1										
Ni (ppm)	0.29	0.03	0.28	0.68	-0.02	1									
Cu (ppm)	0.49	0.39	0.57	0.49	0.27	0.47	1								
Ga (ppm)	0.2	0.41	0.9	0.29	0.31	0.06	0.55	1							
Rb (ppm)	0.17	0.36	0.92	0.33	0.27	0.13	0.57	0.99	1						
Y (ppm)	0.1	-0.27	-0.02	0.37	-0.2	0.31	0.17	-0.1	-0.13	1					
Nb (ppm)	0.17	0.73	0.73	0.28	0.51	0.02	0.5	0.89	0.85	-0.26	1				
Mo (ppm)	-0.11	0.05	0.29	0.18	-0.09	0.49	-0.01	0.07	0.1	-0.17	0.05	1			
Sn (ppm)	0.32	0.52	0.45	0.33	0.53	0.02	0.5	0.68	0.64	-0.18	0.74	-0.1	1		
Cs (ppm)	0.13	0.12	0.9	0.38	0.15	0.28	0.57	0.86	0.91	-0	0.61	0.2	0.43	1	
La (ppm)	0.13	-0.17	0.19	0.41	-0.15	0.32	0.3	0.09	0.09	0.96	-0.06	-0.17	-0	0.18	1
Ce (ppm)	0.13	-0.04	0.37	0.44	-0.09	0.37	0.41	0.27	0.28	0.84	0.13	-0.12	0.1	0.33	0.95
Pr (ppm)	0.14	-0.11	0.28	0.5	-0.05	0.4	0.31	0.19	0.21	0.76	0.04	-0.14	0.12	0.3	0.82
Nd (ppm)	0.14	-0.13	0.27	0.49	-0.1	0.42	0.33	0.16	0.18	0.86	0	-0.14	0.06	0.27	0.92
Sm (ppm)	0.13	-0.12	0.25	0.44	-0.15	0.4	0.34	0.13	0.14	0.91	-0.02	-0.11	-0	0.22	0.97
Eu (ppm)	0.1	-0.15	0.21	0.44	-0.15	0.39	0.3	0.09	0.11	0.93	-0.05	-0.13	-0	0.19	0.98
Gd (ppm)	0.11	-0.16	0.21	0.43	-0.18	0.39	0.3	0.08	0.09	0.93	-0.06	-0.13	-0.1	0.18	0.97
Tb (ppm)	0.13	-0.13	0.23	0.46	-0.13	0.41	0.32	0.11	0.13	0.92	-0.03	-0.13	-0	0.21	0.97
Dy (ppm)	0.13	-0.14	0.22	0.47	-0.13	0.4	0.32	0.11	0.12	0.94	-0.04	-0.13	-0	0.21	0.98
Ho (ppm)	0.12	-0.15	0.17	0.44	-0.15	0.37	0.3	0.06	0.07	0.96	-0.07	-0.14	-0	0.15	0.99
Er (ppm)	0.13	-0.14	0.16	0.44	-0.14	0.36	0.3	0.06	0.06	0.97	-0.07	-0.15	-0	0.15	0.99
Tm (ppm)	0.14	-0.07	0.19	0.46	-0.08	0.34	0.33	0.1	0.1	0.96	-0	-0.15	0.02	0.17	0.98
Yb (ppm)	0.16	0.03	0.22	0.48	-0.02	0.32	0.35	0.15	0.14	0.93	0.09	-0.14	0.08	0.19	0.96

Lu (ppm)	0.17	0.14	0.25	0.5	0.05	0.3	0.39	0.21	0.19	0.88	0.19	-0.15	0.15	0.2	0.92
Hf (ppm)	0.1	0.99	0.31	0.17	0.57	0	0.36	0.43	0.38	-0.27	0.75	0.02	0.54	0.11	-0.2
Ta (ppm)	0.16	0.78	0.32	0.29	0.77	0.08	0.39	0.48	0.44	-0.29	0.76	-0.01	0.68	0.24	-0.2
W (ppm)	0.19	0.73	0.23	0.28	0.82	0.1	0.38	0.36	0.33	-0.28	0.65	-0.03	0.61	0.17	-0.2
Tl (ppm)	0.31	0.27	0.18	0.8	0.21	0.62	0.48	0.18	0.21	0	0.27	0.37	0.29	0.2	0.04
Pb (ppm)	0.11	0.46	0.02	0.23	0.36	0.03	0.2	0.23	0.18	-0.25	0.4	-0.03	0.66	-0.1	-0.2
Th (ppm)	0.2	0.74	0.76	0.33	0.44	0.07	0.6	0.89	0.86	-0.13	0.97	0.02	0.68	0.66	0.07
U (ppm)	-0.07	-0.36	-0.01	0.19	-0.26	0.55	-0.04	-0.3	-0.3	0.57	-0.47	0.5	-0.5	-0	0.44

	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta
	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
Ce (ppm)	1														
Pr (ppm)	0.83	1													
Nd (ppm)	0.93	0.97	1												
Sm (ppm)	0.98	0.84	0.94	1											
Eu (ppm)	0.97	0.84	0.94	1	1										
Gd (ppm)	0.97	0.85	0.95	1	1	1									
Tb (ppm)	0.97	0.89	0.97	0.99	0.99	1	1								
Dy (ppm)	0.97	0.89	0.97	0.99	0.99	0.99	1	1							
Ho (ppm)	0.95	0.83	0.93	0.99	0.99	0.99	0.99	0.99	1						
Er (ppm)	0.94	0.83	0.92	0.97	0.98	0.98	0.98	0.99	1	1					
Tm (ppm)	0.93	0.81	0.91	0.96	0.97	0.96	0.96	0.97	0.99	0.99	1				
Yb (ppm)	0.9	0.79	0.88	0.92	0.93	0.93	0.93	0.94	0.96	0.97	0.99	1			
Lu (ppm)	0.87	0.76	0.84	0.88	0.89	0.88	0.89	0.9	0.92	0.94	0.97	0.99	1		
Hf (ppm)	-0	-0.1	-0.1	-0.12	-0.14	-0.2	-0.13	-0.1	-0.15	-0.13	-0.06	0.04	0.15	1	
Ta (ppm)	-0.1	-0.1	-0.1	-0.17	-0.19	-0.2	-0.17	-0.2	-0.19	-0.18	-0.1	-0.01	0.09	0.8	1
W (ppm)	-0.1	-0.1	-0.2	-0.2	-0.21	-0.2	-0.19	-0.2	-0.21	-0.19	-0.12	-0.04	0.05	0.74	0.98
Tl (ppm)	0.09	0.12	0.1	0.07	0.06	0.06	0.08	0.08	0.06	0.06	0.08	0.09	0.13	0.26	0.34
Pb (ppm)	-0.1	-0.1	-0.1	-0.18	-0.19	-0.2	-0.17	-0.2	-0.2	-0.19	-0.16	-0.13	-0.1	0.47	0.51
Th (ppm)	0.25	0.15	0.13	0.11	0.07	0.06	0.1	0.09	0.06	0.07	0.13	0.22	0.31	0.75	0.68
U (ppm)	0.29	0.32	0.37	0.4	0.42	0.43	0.42	0.43	0.46	0.47	0.46	0.42	0.36	-0.4	-0.4

	W	Tl	Pb	Th	U
	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
W (ppm)	1				
Tl (ppm)	0.35	1			
Pb (ppm)	0.45	0.36	1		
Th (ppm)	0.57	0.28	0.33	1	
U (ppm)	-0.31	0.06	-0.38	-0.39	1