

**Supplemental Table A3. Whole-rock major (wt%) and trace element (ppm) of the Jindong migmatite**

Sample	YK17 -053a	YK17 -054	YK17 -055a	YK17 -056	YK17 -058a	YK21 -2	YK21 -3	YK21 -4	YK21 -5
Type	M	M	M	M	M	M	M	M	M
Major element (wt%)									
SiO <sub>2</sub>	68.23	69.97	66.41	70.29	68.80	70.69	68.63	70.72	70.12
TiO <sub>2</sub>	0.55	0.48	0.88	0.50	0.62	0.48	0.54	0.45	0.54
Al <sub>2</sub> O <sub>3</sub>	14.38	14.12	14.32	14.01	14.46	14.78	14.65	14.24	13.82
Fe <sub>2</sub> O <sub>3</sub>	4.68	3.83	6.59	4.47	4.96	3.71	4.59	3.88	4.52
MnO	0.07	0.06	0.10	0.06	0.07	0.05	0.07	0.06	0.07
MgO	1.24	1.02	1.82	1.17	1.44	1.10	1.13	0.97	1.29
CaO	2.15	2.35	2.85	2.42	3.18	2.83	2.80	2.54	2.63
Na <sub>2</sub> O	2.80	3.08	3.12	3.56	3.15	2.98	3.55	3.42	3.29
K <sub>2</sub> O	4.02	3.48	2.41	2.49	2.18	2.92	2.62	2.61	2.31
P <sub>2</sub> O <sub>5</sub>	0.19	0.16	0.22	0.07	0.20	0.16	0.17	0.10	0.19
LOI	1.01	0.67	0.56	0.50	0.44	0.43	0.47	0.46	0.68
Total	99.31	99.22	99.29	99.54	99.50	100.13	99.23	99.45	99.46
A/CNK	1.12	1.08	1.11	1.08	1.09	1.12	1.06	1.09	1.09
A/NK	1.61	1.60	1.85	1.64	1.92	1.83	1.69	1.69	1.75
Trace element (ppm)									
Sc	11.3	9.14	16.3	11.1	10.9	8.45	9.01	8.50	10.5
Ti	2930	2470	4670	2720	3380	2600	2930	2440	2800
V	73.6	61.4	103	76.5	89.5	72.4	77.4	65.5	85.5
Cr	238	226	283	311	267	295	319	311	351
Mn	516	431	719	483	524	385	510	438	536
Co	8.43	6.98	12.4	8.64	9.77	7.25	6.58	5.52	8.10
Ni	12.7	11.5	17.7	19.2	14.7	13.2	15.1	13.3	15.7
Cu	24.8	23.1	21.1	22.9	13.8	4.87	5.91	4.83	12.8
Zn	59.4	49.7	94.2	62.5	68.3	52.4	63.0	53.9	69.0
Ga	21.8	20.4	25.4	20.9	22.3	20.5	23.0	21.2	21.4
Rb	182	181	243	196	138	153	154	131	77.8
Sr	110	106	86.0	92.3	105	109	91.5	95.3	70.2
Y	51.0	34.4	40.9	84.2	29.5	23.4	37.4	43.2	52.8
Zr	184	124	226	252	132	105	131	135	190
Nb	19.9	16.2	28.2	21.5	18.7	14.9	21.2	18.3	23.2
Cs	5.78	6.10	13.6	10.7	10.5	7.57	12.5	9.99	7.51
Ba	741	626	173	370	261	542	322	376	273
La	79.2	41.4	61.6	38.2	44.3	41.8	39.0	32.4	41.4
Ce	173	85.1	127	76.6	91.2	85.1	80.3	67.4	90.3
Pr	19.4	9.74	14.3	8.85	10.4	9.65	9.28	7.59	10.2
Nd	72.9	36.7	54.0	33.1	39.5	36.3	35.3	28.5	39.3
Sm	15.0	7.88	11.3	7.29	8.29	7.50	7.80	6.29	9.37
Eu	1.19	1.04	0.97	1.00	1.12	1.16	1.01	0.99	0.89
Gd	13.0	7.35	10.4	8.08	7.45	6.59	7.29	6.28	9.13
Tb	1.98	1.19	1.58	1.60	1.17	1.00	1.20	1.12	1.56
Dy	10.2	6.52	8.33	11.5	6.13	5.10	6.82	6.90	8.91
Ho	1.75	1.17	1.43	2.76	1.04	0.84	1.28	1.43	1.72
Er	4.23	3.01	3.44	8.65	2.44	2.01	3.49	4.16	4.69
Tm	0.60	0.44	0.47	1.39	0.34	0.29	0.55	0.68	0.73
Yb	3.64	2.73	2.84	8.66	2.05	1.80	3.60	4.48	4.57
Lu	0.52	0.40	0.41	1.25	0.29	0.26	0.53	0.66	0.66

Hf	5.13	3.70	6.02	6.91	3.66	2.97	3.67	3.88	5.09
Ta	1.90	1.70	2.06	1.80	1.72	1.48	2.49	2.23	1.51
Pb	29.0	27.4	14.3	21.9	16.6	24.1	20.7	23.2	18.5
Th	46.1	22.0	30.6	20.4	20.1	18.8	18.4	16.5	23.2
U	6.27	5.53	3.47	5.61	2.08	3.54	4.55	9.57	5.29
LREE	360	181	268	164	194	180	172	142	191
T <sup>LREE</sup> (°C)	813	747	784	739	754	747	743	726	752
[La/Yb] <sub>N</sub>	15.8	11.0	15.8	3.20	15.7	16.9	7.87	5.25	6.58
Eu/Eu*	0.25	0.41	0.27	0.40	0.43	0.49	0.40	0.47	0.29

---

Sample	YK21	YK17	YK17	YK21	YK21	YK21	YK21	YK21	YK21
	-6	-059	-060	-7	-8	-9	-10	-11	-12
Type	M	N-L	N-L	N-L	N-L	N-L	N-L	N-L	N-L

---

Major element (wt%)									
SiO <sub>2</sub>	71.06	75.14	75.33	74.98	76.29	75.17	75.23	74.49	75.65
TiO <sub>2</sub>	0.42	0.16	0.05	0.13	0.16	0.12	0.11	0.13	0.19
Al <sub>2</sub> O <sub>3</sub>	14.48	13.54	13.53	12.71	13.07	13.08	12.91	13.57	12.36
Fe <sub>2</sub> O <sub>3</sub>	3.32	1.11	1.22	1.32	0.89	1.15	0.84	0.70	1.23
MnO	0.05	0.03	0.04	0.02	0.01	0.02	0.01	0.01	0.02
MgO	0.91	0.15	0.11	0.26	0.19	0.25	0.15	0.13	0.26
CaO	3.21	0.66	0.69	0.68	1.51	1.31	0.97	1.10	0.83
Na <sub>2</sub> O	3.29	3.11	3.15	2.04	3.02	2.53	2.18	2.68	2.42
K <sub>2</sub> O	2.06	4.95	4.96	6.99	4.33	5.42	6.59	6.13	5.95
P <sub>2</sub> O <sub>5</sub>	0.13	0.08	0.09	0.06	0.05	0.07	0.05	0.06	0.07
LOI	0.46	0.49	0.47	0.35	0.21	0.22	0.25	0.20	0.36
Total	99.39	99.42	99.64	99.53	99.73	99.34	99.29	99.20	99.33
A/CNK	1.07	1.16	1.15	1.05	1.05	1.05	1.03	1.04	1.04
A/NK	1.90	1.29	1.28	1.16	1.35	1.30	1.20	1.23	1.19

---

Trace element (ppm)									
Sc	6.14	1.26	1.80	2.24	0.70	1.15	1.07	0.62	1.74
Ti	2280	234	259	687	383	556	361	271	600
V	67.2	19.0	16.6	28.9	29.0	29.9	28.9	23.8	27.0
Cr	303	255	221	279	288	262	309	253	257
Mn	344	200	266	103	63.9	89.9	53.7	37.8	92.5
Co	6.76	0.49	0.56	1.44	0.93	1.22	0.81	1.11	1.2
Ni	12.5	4.04	3.51	5.27	5.26	5.60	4.62	4.92	4.62
Cu	11.1	2.29	1.99	2.75	2.82	2.78	2.54	2.35	9.90
Zn	42.0	4.87	9.14	11.5	5.01	7.77	5.21	2.48	8.24
Ga	18.8	20.2	19.1	14.0	12.1	12.5	13.1	13.4	13.5
Rb	76.6	321	367	271	138	177	251	223	229
Sr	116	6.36	14.9	57.4	48.8	57.3	66.1	52.9	49.3
Y	33.7	19.7	31.1	68.7	45.9	43.8	32.4	70.1	59.1
Zr	234	72.2	81.1	138	105	129	75.7	135	114
Nb	11.2	15.6	16.0	7.34	3.60	5.09	3.62	3.02	6.77
Cs	6.18	11.4	11.4	4.31	2.86	3.80	4.51	4.13	3.60
Ba	393	56.3	110	460	871	1120	578	458	423
La	38.6	7.92	10.8	19.5	14.0	18.5	8.82	11.8	12.9
Ce	76.5	14.5	19.7	36.0	26.7	34.1	17.0	22.2	22.4
Pr	9.02	1.98	2.62	4.73	3.48	4.41	2.08	2.87	3.17
Nd	34.1	7.03	9.34	18.0	13.3	16.5	8.04	11.1	12.4
Sm	7.1	2.13	2.85	4.86	3.35	3.95	2.25	3.37	3.66
Eu	1.32	0.12	0.17	0.58	0.72	0.77	0.61	0.65	0.52

Gd	6.66	2.23	3.27	6.43	4.00	4.38	3.00	5.4	5.25
Tb	1.07	0.47	0.71	1.36	0.85	0.88	0.64	1.25	1.15
Dy	6.05	3.00	4.70	9.68	6.04	6.05	4.56	9.32	8.26
Ho	1.18	0.61	0.98	2.26	1.41	1.39	1.06	2.24	1.92
Er	3.21	1.82	2.91	6.84	4.42	4.30	3.22	6.90	5.83
Tm	0.49	0.31	0.48	1.08	0.74	0.71	0.51	1.09	0.93
Yb	3.03	2.12	3.09	6.55	4.89	4.72	3.16	6.55	5.67
Lu	0.44	0.32	0.44	0.96	0.73	0.71	0.46	0.96	0.83
Hf	6.09	3.10	3.45	4.77	3.71	4.05	2.63	4.79	3.95
Ta	1.18	1.11	1.83	0.91	0.46	0.63	0.51	0.42	0.89
Pb	20.5	20.6	24.2	38.0	31.1	36.9	35.0	30.6	30.9
Th	15.8	7.95	10.2	34.3	10.8	13.2	11.2	17.3	19.1
U	4.15	13.8	13.5	20.2	8.06	6.92	9.10	18.3	11.1
LREE	165	33.6	45.3	83.1	60.8	77.5	38.2	51.3	54.5
T <sup>LREE</sup> (°C)	739	615	636	682	658	676	624	645	650
[La/Yb] <sub>N</sub>	9.26	2.71	2.54	2.16	2.08	2.85	2.03	1.31	1.65
Eu/Eu*	0.58	0.17	0.17	0.31	0.60	0.56	0.71	0.46	0.36

---

Sample	YK21-13	YK17-055b	YK17-057	YK17-058b	YK21-15	YK21-16	YK21-17	YK21-18	YK21-19
Type	N-L	L-L	L-L	L-L	L-L	L-L	L-L	L-L	L-L
Major element (wt%)									
SiO <sub>2</sub>	75.28	75.93	81.21	71.35	74.52	73.47	74.12	75.81	75.30
TiO <sub>2</sub>	0.08	0.16	0.15	0.18	0.13	0.06	0.09	0.10	0.06
Al <sub>2</sub> O <sub>3</sub>	13.09	12.04	9.43	14.35	13.15	14.03	13.61	12.75	12.96
Fe <sub>2</sub> O <sub>3</sub>	0.97	1.50	1.47	1.48	0.94	0.77	0.78	0.77	0.83
MnO	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01
MgO	0.20	0.36	0.33	0.43	0.22	0.16	0.16	0.18	0.15
CaO	1.15	0.88	0.83	1.19	0.73	0.99	0.95	0.64	0.93
Na <sub>2</sub> O	3.01	1.68	1.38	1.72	2.09	2.38	1.93	2.07	2.10
K <sub>2</sub> O	5.26	6.38	4.52	8.18	7.10	7.15	7.59	7.25	6.64
P <sub>2</sub> O <sub>5</sub>	0.06	0.07	0.07	0.13	0.06	0.06	0.07	0.05	0.05
LOI	0.31	0.36	0.17	0.33	0.43	0.31	0.21	0.39	0.33
Total	99.42	99.38	99.58	99.36	99.38	99.39	99.52	100.02	99.35
A/CNK	1.03	1.07	1.09	1.04	1.06	1.04	1.04	1.03	1.05
A/NK	1.23	1.25	1.32	1.23	1.18	1.20	1.20	1.13	1.22
Trace element (ppm)									
Sc	1.31	2.58	3.49	2.81	1.14	0.65	0.52	0.74	0.88
Ti	402	916	849	868	445	237	352	239	293
V	27.6	35.8	34.6	34.1	29.9	25.8	27.2	32.1	30.1
Cr	275	280	308	245	286	261	259	358	328
Mn	69.3	131	137	129	69.1	48.1	40.9	44.9	52.0
Co	1.13	2.34	2.67	2.48	1.01	0.92	0.59	0.68	0.86
Ni	5.08	6.47	7.53	6.43	5.04	4.34	3.9	5.61	5.07
Cu	6.21	3.96	3.70	3.94	2.56	8.56	2.46	3.00	6.73
Zn	7.05	12.7	18.0	14.4	5.65	5.18	2.77	3.94	3.84
Ga	14.1	13.1	11.1	13.4	12.3	11.9	12.0	11.4	12.7
Rb	207	207	166	256	232	243	228	258	212
Sr	57.0	84.4	74.6	131	67.3	50.7	50.4	63.1	55.2
Y	86.8	63.7	75.4	26.2	46.2	22.5	12.1	37.9	62.5
Zr	150	161	116	91.4	102	68.0	46.5	85.6	116
Nb	4.69	6.01	6.31	5.39	3.49	2.95	3.04	2.22	3.32

Cs	3.73	2.73	5.2	3.83	2.99	3.09	2.56	2.98	2.76
Ba	420	1170	727	2130	1020	1270	1170	1010	521
La	13.8	36.6	21.2	14.6	19.8	7.99	11.4	14.3	14.7
Ce	25.6	66.7	44.1	27.5	33.7	13.3	17.7	25.3	27.8
Pr	3.37	8.29	5.09	3.42	4.50	1.81	2.66	3.31	3.69
Nd	13.0	30.6	19.2	13.2	16.5	6.72	9.88	12.2	14.2
Sm	3.95	6.82	4.99	3.18	3.94	1.65	2.32	3.04	3.95
Eu	0.61	0.95	0.79	1.22	0.72	0.61	0.65	0.65	0.60
Gd	6.42	7.59	6.73	3.55	4.78	1.96	2.20	3.70	5.45
Tb	1.50	1.40	1.46	0.67	0.96	0.42	0.37	0.76	1.20
Dy	11.4	9.34	10.6	4.30	6.65	3.06	2.06	5.36	8.68
Ho	2.76	2.10	2.41	0.89	1.53	0.72	0.40	1.22	2.05
Er	8.60	6.10	7.27	2.46	4.64	2.22	1.13	3.81	6.33
Tm	1.36	0.92	1.16	0.37	0.74	0.36	0.18	0.62	1.01
Yb	8.29	5.47	7.20	2.33	4.59	2.25	1.18	3.96	6.21
Lu	1.21	0.80	1.06	0.35	0.68	0.33	0.18	0.59	0.92
Hf	5.02	5.06	4.13	2.68	3.45	2.18	1.40	2.87	4.09
Ta	0.63	0.71	1.00	0.66	0.52	0.32	0.33	0.28	0.41
Pb	32.3	37.1	28.0	49.3	39.1	41.2	37.0	40.4	35.5
Th	21.9	28.3	16.7	9.33	13.9	4.98	8.32	12.6	18.7
U	11.5	4.70	12.0	11.6	3.89	1.86	1.49	3.69	9.65
LREE	59.7	149	94.6	61.9	78.4	31.5	44.0	58.2	64.3
[La/Yb] <sub>N</sub>	1.21	4.86	2.14	4.55	3.13	2.58	7.02	2.62	1.72
Eu/Eu*	0.37	0.40	0.42	1.11	0.51	1.04	0.87	0.59	0.39

Note: LOI = loss of ignition. L-L = lenticular leucosome; N-L = net-structured leucosome; M = melanosome.