附表 1　扎兰屯市头道沟斜长角闪岩锆石 LA-ICP-MS U-Pb 年龄测试结果

Appendix table 1　LA-ICP-MS U-Pb data of zircons of the amphibolite from Toudaogou in Zhalantun

点号	同位素比值及误差						同位素年龄及误差(Ma)						Th	U	Pb	Th/U
	$^{207}Pb/^{206}Pb$		$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		$^{207}Pb/^{206}Pb$		$^{206}Pb/^{238}U$		$^{207}Pb/^{235}U$		(10^{-6})			
	比值	1σ	比值	1σ	比值	1σ	年龄	1σ	年龄	1σ	年龄	1σ				
1	0.0536	0.0008	0.0611	0.0023	0.4522	0.0192	353.8	33.3	382.3	14.0	378.8	13.5	333.0	792.9	182	0.42
2	0.0534	0.0007	0.0587	0.0009	0.4322	0.0078	346.4	13.9	367.6	5.4	364.8	5.6	301.8	669.7	153	0.45
3	0.0534	0.0008	0.0602	0.0011	0.4431	0.0096	342.7	52.8	376.6	6.4	372.5	6.8	250.3	383.1	126	0.65
4	0.0532	0.0007	0.0591	0.0012	0.4344	0.0092	338.9	33.3	370.3	7.0	366.3	6.6	272.3	653.9	142	0.42
5	0.0544	0.0011	0.0574	0.0014	0.4310	0.0123	387.1	141.7	360.1	8.5	363.9	8.8	85.9	193.1	44.1	0.44
6	0.0528	0.0010	0.0535	0.0010	0.3900	0.0088	320.4	58.3	336.1	5.9	334.4	6.4	336.5	357.4	144	0.94
7	0.0535	0.0012	0.0570	0.0012	0.4206	0.0113	346.4	50.0	357.4	7.1	356.5	8.1	120.9	195.0	58	0.62
8	0.0569	0.0015	0.0579	0.0013	0.4558	0.0153	487.1	41.7	363.1	7.7	381.4	10.7	119.4	193.1	61	0.62
9	0.0536	0.0010	0.0579	0.0014	0.4285	0.0108	353.8	44.4	362.9	8.8	362.1	7.7	314.7	546.8	152	0.58
10	0.0643	0.0042	0.0574	0.0019	0.5157	0.0477	751.6	138.9	359.8	11.8	422.3	32.0	170.4	320.8	95	0.53
11	0.0527	0.0010	0.0375	0.0010	0.2732	0.0072	316.7	44.4	237.5	6.4	245.3	5.8	0.0	1102.1	20.26	0.00
12	0.0531	0.0009	0.0586	0.0012	0.4297	0.0088	344.5	38.9	367.1	7.3	362.9	6.3	285.5	636.5	142	0.45
13	0.0592	0.0014	0.0622	0.0014	0.5087	0.0182	572.3	55.5	388.8	8.7	417.6	12.3	257.8	372.2	140	0.69
14	0.0557	0.0012	0.0596	0.0014	0.4582	0.0115	442.6	36.1	373.2	8.8	383.0	8.1	146.1	270.8	77	0.54
15	0.0531	0.0007	0.0583	0.0011	0.4271	0.0080	331.5	33.3	365.1	7.0	361.1	5.7	587.8	1086.8	285	0.54
16	0.0530	0.0007	0.0628	0.0019	0.4594	0.0134	327.8	33.3	392.5	11.3	383.8	9.4	486.0	931.4	261	0.52
17	0.0752	0.0038	0.0344	0.0007	0.3573	0.0195	1073.2	102.3	217.9	4.5	310.2	14.6	131.6	121.6	43.1	1.08
18	0.0533	0.0008	0.0607	0.0014	0.4464	0.0115	338.9	33.3	379.8	8.8	374.7	8.1	456.9	560.1	225	0.82
19	0.0550	0.0015	0.0608	0.0017	0.4615	0.0160	413.0	61.1	380.5	10.6	385.3	11.1	101.5	106.1	49.4	0.96
20	0.0551	0.0012	0.0601	0.0014	0.4575	0.0109	416.7	-52.8	376.4	8.3	382.6	7.6	213.9	398.2	110	0.54
21	0.0542	0.0010	0.0617	0.0018	0.4610	0.0126	388.9	38.9	385.9	11.1	384.9	8.8	282.6	436.2	148	0.65
22	0.0874	0.0091	0.0525	0.0017	0.6452	0.0821	1370.1	200.5	329.7	10.3	505.5	50.7	232.6	666.9	207	0.35
23	0.0535	0.0011	0.0613	0.0014	0.4531	0.0133	350.1	30.6	383.6	8.4	379.5	9.4	203.9	217.9	101	0.94
24	0.0560	0.0009	0.0600	0.0015	0.4637	0.0124	450.0	33.3	375.8	9.1	386.8	8.6	291.4	552.6	149	0.53
25	0.0540	0.0009	0.0625	0.0017	0.4659	0.0138	372.3	25.0	390.7	10.1	388.4	9.6	292.1	486.4	155	0.60
26	0.0550	0.0007	0.0612	0.0019	0.4644	0.0145	413.0	-69.4	382.9	11.4	387.3	10.1	410.1	856.9	217	0.48
27	0.0533	0.0009	0.0614	0.0019	0.4516	0.0148	342.7	38.9	384.1	11.5	378.4	10.4	192.0	337.9	97	0.57
28	0.0532	0.0009	0.0603	0.0014	0.4427	0.0113	338.9	38.9	377.4	8.8	372.2	8.0	335.8	271.9	160	1.23
29	0.0530	0.0012	0.0595	0.0016	0.4346	0.0144	327.8	50.0	372.4	9.9	366.4	10.2	170.6	190.8	79	0.89
30	0.0636	0.0015	0.0604	0.0015	0.5313	0.0197	729.3	36.1	378.2	9.1	432.7	13.1	195.8	279.6	110	0.70
31	0.0546	0.0012	0.0609	0.0021	0.4590	0.0178	394.5	36.1	381.4	12.6	383.5	12.4	99.4	152.7	49.5	0.65
32	0.0534	0.0010	0.0597	0.0014	0.4398	0.0122	346.4	44.4	373.7	8.5	370.1	8.6	140.1	257.2	71	0.54
33	0.0801	0.0031	0.0603	0.0017	0.6702	0.0399	1199.7	76.8	377.5	10.1	520.8	24.3	253.0	322.5	148	0.78
34	0.0533	0.0008	0.0620	0.0015	0.4564	0.0120	342.7	33.3	387.9	9.2	381.8	8.4	244.2	525.7	128	0.46
35	0.0500	0.0006	0.0391	0.0012	0.2693	0.0085	194.5	36.1	247.0	7.5	242.1	6.8	843.0	5287.4	332	0.16
36	0.0530	0.0008	0.0598	0.0012	0.4374	0.0105	327.8	33.3	374.5	7.4	368.4	7.5	214.5	521.5	111	0.41
37	0.0671	0.0040	0.0601	0.0011	0.5582	0.0390	838.9	122.2	376.3	7.0	450.4	25.4	99.8	141.6	58	0.71
38	0.0546	0.0010	0.0592	0.0014	0.4462	0.0126	394.5	38.9	371.0	8.3	374.6	8.9	323.1	336.5	152	0.96
39	0.0535	0.0009	0.0625	0.0018	0.4614	0.0165	350.1	30.6	390.6	10.8	385.2	11.5	458.4	693.3	234	0.66
40	0.0562	0.0009	0.0590	0.0011	0.4573	0.0118	457.5	25.0	369.6	6.5	382.4	8.2	590.3	1099.5	310	0.54
41	0.0534	0.0008	0.0590	0.0013	0.4346	0.0103	346.4	33.3	369.4	7.7	366.4	7.4	245.5	553.4	124	0.44
42	0.0538	0.0009	0.0613	0.0015	0.4546	0.0128	364.9	38.9	383.3	9.2	380.5	9.0	309.1	356.6	155	0.87
43	0.0560	0.0027	0.0588	0.0012	0.4561	0.0293	453.8	105.5	368.3	7.4	381.5	20.5	159.6	516.5	92	0.31
44	0.0538	0.0006	0.0591	0.0013	0.4386	0.0116	361.2	27.8	370.2	8.2	369.3	8.2	733.6	1280.0	367	0.57
45	0.0544	0.0008	0.0593	0.0020	0.4455	0.0176	387.1	33.3	371.7	12.3	374.1	12.4	264.9	703.1	146	0.38
46	0.0541	0.0011	0.0581	0.0008	0.4333	0.0114	372.3	30.6	364.1	5.1	365.5	8.1	163.4	145.3	76	1.12
47	0.0534	0.0007	0.0593	0.0013	0.4366	0.0100	346.4	13.9	371.5	7.8	367.9	7.1	223.1	436.1	113	0.51
48	0.0536	0.0008	0.0607	0.0010	0.4485	0.0097	353.8	33.3	379.6	6.2	376.2	6.9	123.9	463.2	74	0.27
49	0.0544	0.0007	0.0609	0.0019	0.4569	0.0137	390.8	13.9	380.9	11.4	382.1	9.5	474.0	880.6	244	0.54

附表 2　扎兰屯市头道沟斜长角闪岩主量元素(%)和微量元素（10^{-6}）含量及特征参数

Appendix table 2　Major (%) and trace elements (10^{-6}) compositions of the amphibolite from Toudaogou in Zhalantun

送样号	D705bGs1	D705Gs2	D705Gs3	D705Gs4	D705Gs5	D705Gs6	D705Gs7	D705Gs8
SiO_2	52.30	53.64	50.40	50.75	52.20	53.45	51.10	50.55
Al_2O_3	15.34	15.77	15.72	16.21	15.22	15.60	15.92	16.10
Fe_2O_3	2.43	2.66	2.55	2.51	2.61	2.97	2.96	2.87
FeO	5.84	5.30	6.11	5.75	5.80	5.42	5.84	5.59
CaO	8.78	7.98	9.10	10.88	8.87	8.19	9.15	11.03
MgO	5.86	5.01	6.15	5.39	5.73	4.95	5.85	5.15
K_2O	1.78	1.64	1.63	1.60	1.88	1.75	1.73	1.68
Na_2O	3.98	4.49	3.89	3.62	3.83	4.37	3.86	3.44
TiO_2	1.03	0.98	1.05	1.03	1.06	1.03	1.08	1.05
P_2O_5	0.64	0.63	0.66	0.65	0.63	0.63	0.65	0.64
MnO	0.18	0.16	0.18	0.16	0.19	0.18	0.19	0.17
LOI	1.77	1.51	1.85	1.43	1.44	1.35	1.66	1.26
SUM	99.92	99.76	99.27	99.98	99.47	99.88	99.98	99.53
FeO^T	8.03	7.69	8.40	8.01	8.16	8.09	8.50	8.17
Mg#	56.53	53.71	56.60	54.54	55.62	52.16	55.12	52.89
Na_2O/K_2O	2.23	2.74	2.39	2.27	2.04	2.50	2.23	2.04
Na_2O+K_2O	5.76	6.13	5.51	5.22	5.71	6.11	5.58	5.13
m/f	0.76	0.85	0.76	0.83	0.79	0.91	0.81	0.88
σ	3.35	3.37	3.68	3.3	3.32	3.43	3.6	3.23
Y	29.02	30.21	34.32	35.93	34.5	32.6	25.7	30.1
La	34.78	35.68	56.57	46.69	39.5	36.1	38.7	37.0
Ce	68.45	73.89	137.26	113.31	88.2	85.5	89.4	86.1
Pr	11.04	11.77	18.08	15.31	12.9	12.4	13.0	12.6
Nd	50.52	54.37	81.37	70.82	59.7	57.4	60.7	58.5
Sm	10.37	10.90	16.24	13.99	11.9	11.3	11.7	11.5
Eu	2.28	2.58	2.94	3.40	2.71	2.78	3.09	2.95
Gd	7.96	8.16	11.46	10.46	8.90	8.24	8.44	8.40
Tb	0.98	1.01	1.33	1.27	1.26	1.16	1.12	1.16
Dy	6.18	6.26	8.24	7.88	6.54	5.90	5.26	5.83
Ho	1.03	1.06	1.20	1.32	1.22	1.11	0.95	1.08
Er	2.86	2.98	3.26	3.59	3.30	3.09	2.70	2.97
Tm	0.41	0.46	0.48	0.53	0.47	0.46	0.36	0.44
Yb	2.61	3.02	2.87	3.43	3.05	3.13	2.27	2.87
Lu	0.42	0.51	0.48	0.56	0.45	0.47	0.33	0.43
ΣREE	199.90	212.64	341.78	292.56	240.03	229.11	238.04	231.73
LREE	177.44	189.19	312.45	263.53	214.82	205.55	216.61	208.55
HREE	22.46	23.45	29.32	29.03	25.20	23.57	21.43	23.18
L/H	7.90	8.07	10.66	9.08	8.52	8.72	10.11	9.00
La_N/Yb_N	9.55	8.48	14.12	9.77	9.29	8.27	12.25	9.26
δCe	0.85	0.88	1.05	1.03	0.95	0.99	0.97	0.98
δEu	0.74	0.80	0.63	0.82	0.77	0.84	0.91	0.87
Li	13.46	10.21	22.90	17.58	18.5	13.4	19.2	16.9
Be	3.52	4.47	5.46	5.13	4.04	4.61	3.84	4.08
Sc	28.16	28.60	24.66	38.86	37.6	33.9	36.9	36.0
V	239.68	253.96	279.84	302.66	226	230	254	273
Cr	68.08	65.36	71.76	67.79	58.0	50.2	59.9	55.5
Co	24.34	24.82	36.77	32.76	32.2	29.4	32.2	30.8
Ni	33.91	33.18	54.44	44.67	35.7	30.8	36.1	33.2
Ga	17.73	17.14	19.34	21.11	20.5	20.3	20.8	24.4
Rb	90.29	66.09	87.17	63.02	88.6	65.4	85.4	62.7

Sr	706.99	700.08	802.61	807.42	705	700	801	807
Zr	165.16	160.88	171.00	162.61	157	152	159	155
Nb	10.51	10.03	6.97	7.84	9.94	9.73	6.79	7.91
Ba	445.46	481.47	464.93	407.76	472	503	479	449
Hf	0.99	1.40	1.74	1.46	4.19	4.22	4.48	4.18
Ta	0.50	0.80	0.59	0.84	0.38	0.60	0.27	0.44
Th	4.76	4.16	5.12	4.08	4.10	4.45	4.13	3.60
U	1.62	2.46	2.96	2.98	1.84	2.51	2.04	2.37

注：FeO^T= FeO+0.8998*Fe_2O_3；$Mg^{\#}$= 100*(MgO)/(MgO+FeO^T)(mol)；m/f= (FeO^T/72)/(MgO/40)；组合指数(σ)=(Na_2O+K_2O)^2/(SiO_2-43)；L/H 为 LREE/HREE。