

附表 1 姚安正长斑岩和粗面岩主量 (%) 和微量 (ppm) 元素分析结果

Appendix table 1 Major oxide (%) and trace element (ppm) compositions of the syenite porphyry

and trachyte at the Yao'andeosit

样品号	YA16-2-1	LT16-1-1	YA16-3-1-4	YA16-5-1-2	YA16-5-2-1	YA16-5-3-3	YA16-5-5-1
	正长斑岩						
	%						
SiO ₂	66.07	65.03	68.03	68.24	67.56	65.55	66.84
Al ₂ O ₃	15.81	15.12	14.81	15.05	15.21	15.25	15.14
TFe ₂ O ₃	3.74	4.95	3.44	2.12	2.28	3.00	2.64
CaO	1.08	1.55	1.06	0.45	1.06	2.57	0.54
MgO	0.41	1.63	0.43	0.32	0.38	0.98	0.32
K ₂ O	6.28	5.90	6.14	8.00	7.79	5.65	7.53
Na ₂ O	4.24	2.96	4.19	3.31	3.37	3.81	3.55
MnO	0.03	0.02	0.07	0.02	0.03	0.04	0.01
TiO ₂	0.51	0.68	0.39	0.31	0.34	0.36	0.34
P ₂ O ₅	0.27	0.78	0.22	0.08	0.09	0.21	0.09
LOI	1.10	0.96	0.75	1.43	1.56	2.29	2.03
Total	99.53	99.57	99.51	99.34	99.67	99.72	99.04
K ₂ O+Na ₂ O	10.53	8.86	10.33	11.31	11.16	9.47	11.08
A/CNK	1.00	1.07	0.96	1.01	0.96	0.89	1.01
Mg#	4.30	34.82	5.03	4.72	5.86	24.39	3.84
	Mg#=100*Mg ²⁺ /(Mg ²⁺ +Fe ²⁺);FeO=0.8998*Fe ₂ O ₃						
	ppm						
Li	22.811	27.714	27.991	6.393	6.306	23.031	6.260
Be	5.132	14.417	7.308	2.932	3.169	5.133	7.326
Sc	3.954	2.192	4.784	7.997	2.349	34.781	3.965
V	45.579	30.120	30.431	22.056	23.313	37.179	24.452
Cr	18.809	22.684	9.836	2.727	3.276	12.788	3.664
Co	4.405	4.693	5.273	2.849	0.447	5.186	3.315
Ni	11.526	6.280	10.641	1.824	1.534	7.710	4.349
Cu	10.745	13.192	11.035	14.388	56.064	14.727	4.068
Zn	110.245	47.357	86.718	21.862	16.719	21.080	45.459
Ga	25.652	20.316	24.818	22.672	24.768	21.603	24.117
Rb	205.731	205.630	199.959	303.678	285.911	259.800	327.802
Sr	2038.405	1648.196	2003.524	332.838	346.523	913.179	361.437
Y	24.584	19.535	24.104	22.867	27.071	18.615	26.535
Zr	523.153	203.223	160.940	233.909	253.812	68.217	234.268
Nb	36.331	34.481	36.865	38.133	39.513	16.062	39.190
Mo	1.032	0.296	0.602	1.000	0.005	2.254	1.983
Sn	2.593	2.572	2.299	3.478	3.575	2.222	4.250
Cs	2.552	2.538	2.209	2.381	2.478	5.464	2.845

Ba	3168.499	3259.197	3607.943	2531.664	2364.113	2083.246	2221.409
La	177.395	167.707	188.776	149.044	144.176	116.508	137.052
Ce	334.977	275.188	315.967	275.249	269.236	219.255	257.575
Pr	34.893	27.569	31.731	28.100	27.757	23.194	26.744
Nd	117.908	84.797	100.892	93.400	91.966	81.460	87.968
Sm	23.540	16.765	20.745	18.311	18.785	15.813	17.826
Eu	4.872	3.169	4.152	3.439	3.744	3.163	3.432
Gd	13.965	9.059	11.587	10.920	11.758	9.612	11.058
Tb	1.446	0.954	1.165	1.163	1.310	1.011	1.251
Dy	5.791	3.961	4.703	4.823	5.619	4.155	5.471
Ho	0.957	0.686	0.821	0.844	0.987	0.702	0.988
Er	2.339	1.760	2.086	2.213	2.566	1.767	2.605
Tm	0.323	0.252	0.294	0.328	0.374	0.230	0.383
Yb	2.030	1.641	1.836	2.152	2.415	1.396	2.447
Lu	0.303	0.250	0.272	0.331	0.363	0.197	0.366
Hf	15.160	6.451	6.391	8.605	8.968	2.765	8.553
Ta	0.362	3.386	0.604	0.816	0.794	0.748	0.823
Au	0.003	0.063	0.004	0.003	0.003	0.004	0.003
Tl	1.405	0.913	0.859	2.045	2.063	1.615	1.924
Pb	105.713	39.680	56.669	13.606	26.693	22.708	11.421
Th	55.336	67.453	67.413	60.538	60.385	49.986	61.917
U	8.247	6.632	13.758	13.832	11.283	13.041	14.576
δEu	0.757	0.711	0.746	0.686	0.717	0.727	0.695
δCe	0.981	0.901	0.913	0.973	0.977	0.974	0.979

续表

样品号	YA16-6-3-1	BMJ16-1-1	YAB15-1-12	YA15-2	YAB15-1-1	YAB15-1-3
	正长斑岩 (%)					
SiO ₂	68.66	67.96	67.23	68.65	66.98	67.05
Al ₂ O ₃	15.00	14.80	16.00	15.89	15.97	15.97
TFe ₂ O ₃	3.04	3.11	1.86	1.38	2.08	2.02
CaO	0.84	1.32	0.76	0.71	0.82	0.83
MgO	0.46	0.74	0.63	0.54	0.58	0.58
K ₂ O	5.96	5.97	5.35	5.72	5.40	5.44
Na ₂ O	4.08	4.23	3.18	3.12	3.16	3.04
MnO	0.03	0.02	0.01	0.01	0.01	0.01
TiO ₂	0.36	0.37	0.39	0.39	0.37	0.39
P ₂ O ₅	0.19	0.19	0.22	0.27	0.21	0.22
LOI	1.04	0.87	3.77	2.72	3.84	3.85
Total	99.66	99.58	99.37	99.38	99.42	99.40
K ₂ O+Na ₂ O	10.03	10.20	8.52	8.83	8.56	8.49
A/CNK	1.02	0.94	1.29	1.26	1.27	1.29

Mg#	6.49	14.87	17.57	17.61	14.01	14.47
$Mg\# = 100 * Mg^{2+} / (Mg^{2+} + Fe^{2+}); FeO = 0.8998 * Fe_2O_3$ (ppm)						
Li	28.400	32.215	15.866	18.583	15.297	14.593
Be	6.497	17.137	4.870	4.606	5.640	5.249
Sc	3.743	2.249	4.126	4.564	4.341	4.905
V	29.548	25.864	44.805	50.879	57.993	56.412
Cr	7.040	8.137	9.362	2.698	22.590	17.841
Co	3.904	5.108	0.932	0.734	1.448	1.125
Ni	5.719	5.670	15.782	8.513	13.841	8.116
Cu	17.657	9.423	5.838	3.108	1.860	7.485
Zn	50.655	85.900	51.746	51.969	77.808	64.229
Ga	23.480	20.387	26.815	27.733	28.167	27.357
Rb	195.376	236.222	229.179	234.020	243.408	231.724
Sr	1679.493	1610.915	1659.760	1721.732	1657.000	1856.908
Y	15.713	19.111	13.026	22.392	13.769	12.015
Zr	191.868	246.994	214.873	205.377	197.787	206.675
Nb	38.188	34.754	40.744	39.724	41.719	41.859
Mo	0.033	0.826	0.298	0.821	0.522	0.394
Sn	2.484	2.482	2.120	2.109	2.010	1.948
Cs	2.298	2.558	4.692	4.982	4.773	4.511
Ba	3003.641	3222.548	2852.118	2965.001	2802.229	3055.991
La	101.816	164.140	62.268	145.001	63.035	51.739
Ce	179.588	268.477	117.802	276.075	126.092	92.160
Pr	19.754	27.661	12.583	29.530	14.557	9.815
Nd	66.066	86.740	41.900	90.449	46.665	33.044
Sm	13.837	17.131	8.001	16.548	8.886	6.112
Eu	3.271	3.211	2.358	4.131	2.506	2.283
Gd	7.722	9.241	4.469	10.738	4.885	3.743
Tb	0.805	0.974	0.486	1.129	0.531	0.418
Dy	3.262	3.988	2.137	4.423	2.287	1.914
Ho	0.560	0.684	0.401	0.718	0.419	0.372
Er	1.424	1.717	1.116	1.678	1.142	1.048
Tm	0.207	0.246	0.177	0.225	0.178	0.168
Yb	1.351	1.573	1.199	1.383	1.207	1.150
Lu	0.207	0.245	0.186	0.197	0.189	0.181
Hf	7.350	7.205	6.307	6.009	5.976	6.011
Ta	0.795	3.445	1.942	1.958	1.912	1.932
Au	0.003	0.066	0.001	0.002	0.001	0.003
Tl	0.870	1.142	1.241	1.433	1.259	1.183
Pb	67.069	101.455	37.057	39.902	45.609	35.526
Th	68.077	68.073	56.606	53.468	56.897	57.265
U	10.859	12.232	7.947	8.363	10.195	7.715
δEu	0.881	0.705	1.098	0.888	1.056	1.353
δCe	0.921	0.892	0.974	0.978	0.983	0.936

续表

样品号	FL16-1-10	FL16-1-11	FL16-1-12	FL17-3-1	FL17-3-2	FL17-4-1	FL17-4-2
	粗面岩						
	%						
SiO ₂	65.16	65.78	66.88	64.34	63.50	68.58	69.44
Al ₂ O ₃	15.17	15.45	13.96	14.30	14.29	14.18	14.40
TFe ₂ O ₃	1.72	1.77	2.01	2.94	2.86	1.35	1.36
CaO	0.16	0.17	0.08	0.06	0.06	0.19	0.20
MgO	0.42	0.44	0.20	0.14	0.14	0.07	0.07
K ₂ O	9.08	9.24	10.95	9.74	9.63	10.10	10.20
Na ₂ O	0.99	0.98	0.70	0.60	0.59	0.82	0.83
MnO	0.02	0.02	0.05	0.02	0.02	0.01	0.01
TiO ₂	0.86	0.88	0.53	0.67	0.66	0.35	0.35
P ₂ O ₅	0.28	0.29	0.13	0.36	0.35	0.20	0.20
LOI	3.51	2.21	2.32	4.45	4.73	2.26	2.04
Total	97.39	97.21	97.80	97.62	96.83	98.11	99.10
K ₂ O+Na ₂ O	10.07	10.21	11.65	10.34	10.22	10.92	11.03
A/CNK	1.29	1.30	1.06	1.23	1.24	1.12	1.13
Mg#	9.43	9.80	1.97	0.66	0.68	0.36	0.36
Mg#=100*Mg ²⁺ /(Mg ²⁺ +Fe ²⁺); FeO=0.8998*Fe ₂ O ₃							
	ppm						
Li	9.851	7.942	7.949	10.200	10.200	9.000	8.900
Be	8.172	3.990	3.959	4.820	4.760	3.630	3.780
Sc	6.837	1.552	1.577	7.200	6.800	2.200	2.700
V	59.818	47.950	43.496	176.000	175.000	38.000	39.000
Cr	29.073	42.653	27.438	28.000	26.000	10.000	10.000
Co	15.207	21.802	22.077	8.800	8.800	16.800	17.300
Ni	18.415	19.582	15.964	17.800	18.400	36.100	36.300
Cu	121.953	231.408	231.780	129.500	128.000	1300.000	1280.000
Zn	3084.152	642.850	645.926	204.000	199.000	363.000	360.000
Ga	20.450	24.015	24.381	25.200	24.900	24.600	25.300
Rb	276.255	243.338	244.491	349.000	348.000	395.000	387.000
Sr	809.051	572.584	587.011	2110.000	2100.000	1080.000	1070.000
Y	29.452	15.714	16.177	48.800	48.500	22.000	21.800
Zr	581.120	213.098	233.121	700.000	719.000	469.000	470.000
Nb	39.021	37.978	36.138	79.100	79.000	47.700	47.300
Mo	9.418	200.277	205.377	180.500	182.500	34.200	35.900
Sn	3.193	3.837	3.584	7.000	7.100	3.700	3.800
Cs	7.995	2.222	2.148	3.440	3.470	5.390	5.530
Ba	>10000	2291.134	2287.104	>10000	>10000	3740.000	3720.000
La	190.848	426.951	422.516	256.000	256.000	154.500	151.500
Ce	323.832	540.505	531.266	446.000	448.000	235.000	232.000
Pr	33.653	45.469	45.117	47.100	47.200	23.300	23.200

Nd	108.822	121.814	119.927	161.500	160.500	77.000	77.300
Sm	23.151	17.690	17.693	23.800	24.000	11.150	11.350
Eu	5.907	3.339	3.344	6.350	6.560	3.010	3.060
Gd	13.060	8.965	8.972	15.200	15.000	6.710	6.830
Tb	1.481	0.905	0.911	1.900	1.860	0.820	0.850
Dy	6.596	3.397	3.743	9.320	9.300	4.110	4.110
Ho	1.147	0.585	0.597	1.610	1.560	0.690	0.700
Er	2.847	1.450	1.490	4.130	4.010	1.900	1.960
Tm	0.397	0.196	0.200	0.540	0.540	0.260	0.280
Yb	2.479	1.238	1.257	3.290	3.280	1.870	1.820
Lu	0.374	0.196	0.195	0.480	0.480	0.290	0.290
Hf	14.610	6.537	6.996	17.600	18.200	12.800	13.000
Ta	3.098	2.765	2.590	2.500	2.500	2.200	2.200
Au							
Tl	6.675	2.908	2.828	2.550	2.590	3.350	3.400
Pb	3101.808	4819.394	4720.753	5310.000	5170.000	2680.000	2560.000
Th	59.404	43.781	42.951	60.500	60.000	44.700	45.700
U	11.847	7.625	7.586	13.850	13.850	8.820	9.020
δ Eu	0.948	0.723	0.724	0.954	0.984	0.984	0.982
δ Ce	0.913	0.775	0.769	0.925	0.928	0.856	0.858
