

表5 紫荆关基性岩体的主量(%)和微量($\mu\text{g/g}$)元素分析数据

Table 5 Major and trace elements of the Zijingguan mafic rocks

样品号	ZJ001	ZJ003	ZJ005	ZJ006	ZJ007	ZJ024	ZJ025	ZJ009	ZJ013	ZJ014	ZJ015	JZJ003	ZJ021	ZJ012	ZJ017	ZJ019	ZJ020	ZJ023	ZJ022
岩石类型	闪长岩					辉长岩							二辉石岩						
SiO ₂	56.01	54.45	54.22	54.14	52.55	54.23	53.75	47.88	48.48	49.29	47.2	49.34	40.27	47	47.86	45.71	45.72	46.89	46.82
TiO ₂	1.08	1.16	1.2	1.14	1.18	1.23	1.12	1.63	2.26	1.49	1.65	1.63	1.93	0.47	0.44	0.56	0.31	0.45	0.6
Al ₂ O ₃	16.36	15.52	16.32	15.95	15.78	16.1	15.94	19.23	15.07	18.46	18.17	19.28	12.93	5.94	5.34	8.37	7.6	10.7	7.01
Fe ₂ O ₃	7.13	8.37	8.14	8.22	8.91	8.37	8.56	6.54	8.6	7.09	7.23	6.82	20.28	12.52	11.43	14	12.86	12.06	13.1
MnO	0.11	0.12	0.12	0.12	0.12	0.12	0.13	0.08	0.09	0.07	0.08	0.07	0.13	0.15	0.15	0.17	0.16	0.14	0.16
MgO	4.67	6.52	5.76	6.47	7.13	5.88	6.61	7.43	9.86	7.61	9.61	7.21	10.19	21.91	22.72	20.96	19.93	17.54	22.53
CaO	6.48	7.74	7.62	7.9	8.11	7.64	8.18	11.28	9.14	8.4	10.13	9.8	12.19	7.94	9.49	7.09	9.86	8.79	6.17
Na ₂ O	4.29	3.66	3.83	3.72	3.62	3.78	3.77	2.93	2.96	3.78	2.8	2.97	1.44	1.46	1.07	1.52	1.25	1.64	1.63
K ₂ O	2.15	1.94	2.12	1.89	1.51	2.18	1.69	1.08	1.67	1.48	1.34	1.5	0.35	0.73	0.56	0.65	0.46	0.81	0.86
P ₂ O ₅	0.44	0.42	0.46	0.34	0.42	0.44	0.39	0.1	0.1	0.09	0.06	0.12	0.04	0.1	0.09	0.1	0.06	0.08	0.11
LOI	1.19	0.09	0.19	0.1	0.61	0.01	<0.001	1.69	1.65	2.08	1.62	1.15	0.21	1.65	0.79	0.82	1.67	0.83	0.93
Total	99.9	99.99	99.98	99.99	99.95	100	100.01	99.85	99.86	99.85	99.88	99.9	99.98	99.88	99.94	99.94	99.88	99.94	99.94
Mg [#]	59	63	61	63	64	61	63	71	72	70	75	70	53	79	81	77	77	76	79
Rb	39.87	43.73	39.66	38.02	14.7	41.57	24.82	19.71	35.01	27.6	29.72	42.27	4.1	14.04	14.44	14.94	11.7	17.94	18.62
Sr	1592	1362	1584	1536	1435	1486	1496	1581	1076	1682	1244	1592	921.2	390.4	359.2	593.6	590.2	793.5	400.8
Ba	1217	1261	1220	1212	1131	1367	1227	574.1	886.9	940.9	807.4	929	508.5	399.6	300.5	373.4	290.4	392.6	461
Zr	154.8	180.8	181.7	179	97.6	163.9	112.2	87.5	98.47	62.6	58.72	83.39	40.26	57.16	44.98	50.4	40.44	64.45	66.04
Hf	4.11	4.23	4.66	4.13	2.48	3.85	2.74	2.27	2.97	1.9	1.88	2.26	1.32	1.46	1.32	1.3	1.04	1.73	1.72
U	0.9	1.17	0.92	0.99	0.26	0.84	0.46	0.49	0.66	0.22	0.12	0.34	0.1	0.26	0.14	0.34	0.24	0.28	0.34
Th	4.01	4.72	4.08	4.05	1.04	3.37	1.8	2.15	3.23	1.14	0.76	1.44	0.42	1.2	0.8	1.58	1.66	1.24	1.56
Pb	8.76	9.54	8.12	10.26	8.89	10.44	8.02	6.88	6.81	8.06	3.82	5.79	118.8	3	2.62	4.08	3	4.22	5.04
Nb	8.72	8.34	8.76	9.41	6.47	10.06	5.8	4.38	7.41	4.87	5.12	5.75	2.4	2.58	2.26	2.84	1.42	3.13	3.78
Ta	0.56	0.64	0.56	0.56	0.4	0.56	0.34	0.29	0.45	0.28	0.29	0.34	0.16	0.18	0.18	0.2	0.14	0.2	0.26
V	133.3	198.4	134.2	173.9	192.3	191.5	188	238.5	345.2	257.8	294.8	265.1	696.1	117.9	104.7	123.4	111.9	122.2	123.4
Y	15.88	14.38	15.98	13.24	13.2	15.83	14.08	12.93	16.05	11.51	15.62	12.24	11.03	6.11	7.05	6.3	5.24	6.78	7.56
Cr	123.2	173.2	368.2	173.9	322.9	144.1	170.7	30.92	23.02	71.16	358.8	51.51	37.2	1374	888.1	625.4	856.4	370.7	900.6
Co	32.23	29.26	35.14	29.15	30.85	27.6	29.68	41.78	41.28	39.61	39.94	30.88	74.92	92.64	79.2	96.2	90.26	82.68	97.76
Ni	43.21	71.8	155.4	76.32	90.06	58.72	66.56	64.13	113.2	105	176.8	83.57	50.39	414.6	281.5	315.6	301	294.1	493.4
La	44.62	37.33	44.5	35.4	31.57	43.57	33.62	16.35	20.26	18.88	12.96	19.08	7.39	12.58	10.18	11.28	8.34	13.45	13.5
Ce	100.4	76.64	99.46	72.43	65.32	89.44	68.4	38.95	48.07	38.68	33.24	41.79	18.74	26.18	23.96	23.36	17.02	29.09	29.48
Pr	12.29	9.45	12.28	8.87	8.23	10.82	8.5	5.53	6.85	5.27	5.02	5.69	2.98	3.36	3.27	3.04	2.2	3.71	3.86
Nd	51.44	37.71	51.74	35.03	33.69	42.41	34.44	26.02	31.78	23.71	24.04	24.59	14.88	14.06	14.32	12.98	9.52	15.09	16.32
Sm	8.74	6.53	8.72	6.07	5.83	7.15	6	5.59	6.79	4.89	5.46	5.07	3.6	2.66	2.9	2.56	1.98	2.77	3.1
Eu	2.41	1.92	2.38	1.91	1.88	2.08	1.94	1.68	2.16	1.7	1.72	1.6	1.18	0.8	0.82	0.8	0.66	0.86	0.92

续表 5

样品号	ZJ001	ZJ003	ZJ005	ZJ006	ZJ007	ZJ024	ZJ025	ZJ009	ZJ013	ZJ014	ZJ015	JZJ003	ZJ021	ZJ012	ZJ017	ZJ019	ZJ020	ZJ023	ZJ022
岩石类型	闪长岩				辉长岩							二辉石岩							
Gd	6.2	4.89	6.2	4.62	4.49	5.37	4.56	4.59	5.63	4.09	4.68	4.15	3.24	2.08	2.32	2.06	1.62	2.17	2.44
Tb	0.72	0.66	0.72	0.65	0.62	0.71	0.62	0.57	0.78	0.55	0.69	0.55	0.46	0.25	0.3	0.25	0.21	0.28	0.3
Dy	3.69	3.12	3.74	2.94	2.9	3.43	3.02	3.09	3.73	2.61	3.52	2.8	2.5	1.4	1.6	1.42	1.18	1.47	1.64
Ho	0.64	0.58	0.66	0.54	0.54	0.62	0.56	0.55	0.68	0.48	0.66	0.5	0.46	0.26	0.28	0.26	0.22	0.28	0.32
Er	1.72	1.54	1.76	1.41	1.44	1.7	1.5	1.45	1.7	1.2	1.7	1.3	1.26	0.66	0.76	0.68	0.58	0.74	0.86
Tm	0.22	0.21	0.22	0.2	0.2	0.24	0.2	0.18	0.22	0.15	0.22	0.16	0.16	0.09	0.1	0.1	0.08	0.1	0.12
Yb	1.38	1.24	1.44	1.17	1.14	1.42	1.22	1.09	1.24	0.86	1.26	0.96	0.92	0.54	0.62	0.56	0.49	0.62	0.7
Lu	0.2	0.19	0.2	0.18	0.18	0.2	0.18	0.14	0.18	0.12	0.18	0.14	0.14	0.08	0.1	0.08	0.08	0.1	0.1
Eu/Eu*	0.95	1.00	0.94	1.06	1.08	0.98	1.09	0.98	1.04	1.13	1.01	1.03	1.04	1.00	0.93	1.03	1.09	1.03	0.99
∑REE	234.67	182.01	234.02	171.42	158.03	209.16	164.76	105.78	130.07	103.19	95.35	108.38	57.91	65	61.53	59.43	44.18	70.73	73.66
Sr/Y	100.25	94.71	99.12	116.01	108.71	93.87	106.25	122.27	67.04	146.13	79.64	130.07	83.52	63.90	50.95	94.22	112.63	117.04	53.02
(La/Nd) _N	1.95	1.98	1.99	1.85	2.02	1.92	1.85	1.26	1.57	1.71	1.53	0.98	1.88	1.05	1.66	1.73	1.76	1.06	1.25
(La/Yb) _N	23.13	21.59	22.17	21.70	19.86	22.01	19.77	10.80	11.72	15.75	7.38	14.26	5.76	16.71	11.78	14.45	12.21	15.56	13.83

表 6 紫荆关基性岩体的 Sr-Nd 同位素数据

Table 6 Sr-Nd isotopic data of the Zijingguan mafic rocks

样品号	岩石类型	Rb(10 ⁻⁶)	Sr(10 ⁻⁶)	⁸⁷ Rb/ ⁸⁶ Sr	⁸⁷ Sr/ ⁸⁶ Sr	2σ	I _{Sr}	Sm(10 ⁻⁶)	Nd(10 ⁻⁶)	¹⁴⁷ Sm/ ¹⁴⁴ Nd	¹⁴³ Nd/ ¹⁴⁴ Nd	2σ	ε _{Nd} (0)	ε _{Nd} (t)
ZJ003	闪长岩	42.61	1353	0.0911	0.706263	0.000011	0.706084	6.480	38.77	0.1011	0.511801	0.000012	-16.32	-14.63
ZJ024	闪长岩	39.69	1454	0.0790	0.706236	0.000011	0.706081	6.966	42.26	0.0997	0.511842	0.000012	-15.53	-13.82
ZJ025	闪长岩	24.13	1489	0.0469	0.706061	0.000011	0.705969	5.990	34.92	0.1037	0.511809	0.000011	-16.17	-14.53
ZJ009	辉长岩	29.68	1637	0.0525	0.705942	0.000011	0.705839	4.856	23.06	0.1273	0.511802	0.000014	-16.30	-15.08
ZJ013	辉长岩	34.44	1084	0.0919	0.705966	0.000011	0.705786	6.905	32.77	0.1274	0.511787	0.000011	-16.61	-15.39
ZJ014	辉长岩	26.78	1695	0.0457	0.705922	0.000012	0.705832	5.083	24.79	0.1240	0.511772	0.000012	-16.88	-15.60
ZJ015	辉长岩	29.76	1320	0.0652	0.706770	0.000012	0.706642	5.767	25.84	0.1349	0.511647	0.000013	-19.32	-18.24
ZJ021	辉长岩	4.050	972.2	0.0121	0.706099	0.000012	0.706075	2.920	15.72	0.1123	0.511707	0.000013	-18.17	-16.68
ZJ017	二辉石岩	16.32	394.0	0.1199	0.706300	0.000009	0.706065	3.433	17.32	0.1198	0.511748	0.000016	-17.36	-16.01
ZJ019	二辉石岩	14.80	644.5	0.0664	0.706255	0.000012	0.706125	3.018	15.57	0.1172	0.511715	0.000012	-18.00	-16.60
ZJ023	二辉石岩	17.80	873.2	0.0590	0.706435	0.000014	0.706319	3.154	17.60	0.1083	0.511708	0.000011	-18.14	-16.58
ZJ022	二辉石岩	18.27	396.5	0.1333	0.706488	0.000011	0.706226	3.863	16.14	0.1447	0.511820	0.000017	-15.95	-15.04