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Re-recognition of Tieshan "Syenite" and its Geological Significance in Zhenghe, Fujian Province

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1 Introduction

Tieshan Syenite crosses between Dongfeng and Zhangyuan'an in Zhenghe of Fujian province, occurs in the direction of 42°, Total length 8500m, width 600-800m and its Area of about 39km^2. Outcrops of the mass are located in the northeast and the southwest which is called Shizigang(Fig.1). Tieshan Syenite is important for us to study the indosinian tectonics and magmatism, and also Tieshan Cu-Pb-Zn deposit, phosphorus deposit, pyrite deposit, Dongfeng Copper deposit and Dongshan Pb-Zn deposit are scattered around the mass (Wang Qiang et al., 2005; He Zhenyu et al., 2010). Our study shows that Tieshan mass at Shizigang is an alkali feldspar metasomatic rock (Hu Shouxi, et al., 2004). The mass wrapped up many kinds of breccia which is composed of pyroxene diorite, tuff sandstone, granodiorite and granite. All the breccias and their cement rocks were metasomatized.

2 Characteristics of Alkali Feldspar Metasomatic Rock

The mass were experienced strongly alkali metasomatism and propylitization, and pyritization alone faults. There are two stages of feldspar metasomatism in veins, which is light and dark feldspar respectively. Pyroxenes have three kinds of forms: some in breccias, some in feldspar and some accompanied with amphiboles. Amphiboles have two kinds of forms: in breccias and in feldspars veins, their mineral compositions are composed of basaltic hornblende, ferrous pargasite, actinolite and ferroactinolite, all belong to calcic amphibole subgroup. Biotites are also scattered in breccias and in veins, their compositions show low-Ti, Fe, high-Mg, which were hydrothermal products at a higher oxygen fugacity. Melanites occurred as layers and belts, which were metasomatised by feldspars and epidotes and amphiboles and carbonates and sericites and diopsides, their ingredients are solid solution series between andradite and grossular, which reflect the melanites were formed in the relative oxidative, alkaline environment.

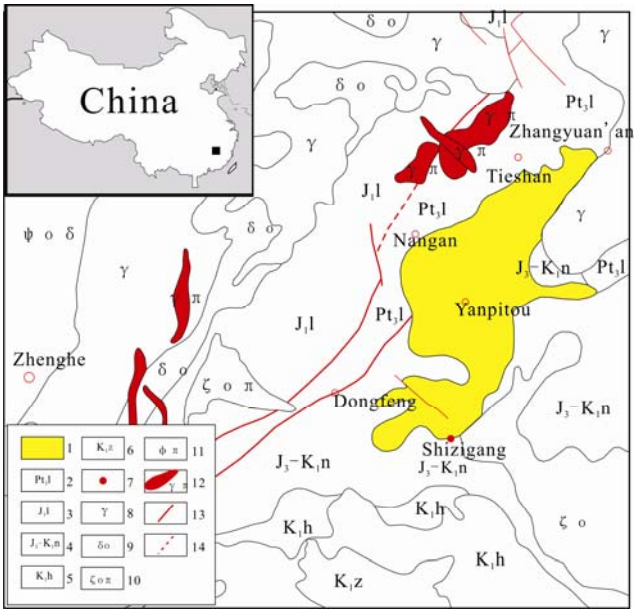

Fig. 1. Sketch geologic map of Tieshan "syenite" in Zhenghe in Fujian province.
1, Tieshan "syenite"; 2, Longbeixi Formation of late proterozoic; 3, Lishan Formation of early Jurassic; 4, Nanyuan Formation; 5, Huangkeng Formation of early Cretaceous; 6, Zaixia Formation of early Cretaceous; 7, study area; 8, granite; 9, quartz diorite; 10, quartz syenite porphyry; 11, quartz porphyry; 12, granite porphyry; 13, fault; 14, deduce fault.

Potassic feldspars in metamotic rock have four kinds of forms: one in facial alkali alteration, one in light alkali feldspar veins, one in dark alkali feldspar veins and one in facial alkali alteration with melanites. Or molecular content of alkali feldspar in the first is from 77.9% to 94.3%, Ab from 5.2% to 21.3%, An from 0% to 0.8%; Or molecular content of alkali feldspar in the second is from

81.5% to 91.3%, Ab from 8.2% to 17.4%, An from 0.5% to 4.1%; Or molecular content of alkali feldspar in the thirst is from 91.8% to 96.8%, Ab from 3.2% to 9.3%, An from 0.1% to 0.4%; Or molecular content of alkali feldspar in the forth is from 85.2% to 90.0%, Ab from 10.8% to 14.6%, An from 0.2% to 0.6%.

X-ray powder diffraction and infrared spectrum analyses of K-feldspar from early alkali feldspar (Table1) provide degrees of ordering of 0.71 -0.80, structural parameters of 1.27 - 1.61, triclinicities of 0. 23- 0.29, T1 (o) + T1 (m) of 0. 86 - 0. 90; degrees of ordering of 0. 67 - 0.88 from late K-feldspar, its structural parameters of 1.10 - 1.91, triclinicities of 0.30 - 0.70, T1 (o) + T1(m) of 0.84 - 0.93. Both of the two kinds of alkali feldspars are microclines, most of them are highly microclines, their structure temperatures vary from 200 to 370℃, which are the highest temperatures at which k-feldspar was formed（Ma Hongwen, 1988; Hu P, et al., 2005）.

Thus it is concluded the k-feldspar in Tieshan is not the outcome of magmatic crystallization but of hydrothermal metasomatism, and the fluid at the later stage is more sodium than the earlier. Metasomatism of the Tieshan complex rock mass reflected that complex history of the region. It is obvious that an original granite and its skarns were formed at about 250 to 255Ma, but all the rocks were considered that there was strongly metasomatised by alkali fluid later, most occurred in Yanshanism. And also the metasomatism was acompanied with copper mineralization.

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References

Qiang, Wang, ZhenHua, Zhao, Ping, Jian, Xiaolin, Xiong, Zhiwei,Bao, Tongmo, Dai, Jifeng, Xu and Jinlong, Ma. 2005. Geochronology of Cretaceous A-type granitoids or alkaline intrusive rocks in the hinterland, South China: constraints for late-Mesozoic tectonic evolution. *Acta Petrologica Sinica*, 21(3): 795-808.

He Zhenyu, 2010, Petrogenesis and Geologic Significance of the Mesozoic Syenites and Related Rocks from SE China. *doctoral dissertation*. School of Earth Sciences and Engineering, Nanjing University(in Chinese).

Ma Hongwen,1988. Comparison of K-feldspar ordering by X-ray powder diffraction and infrared spectroscopy and its relations to Al occupancy and equilibrium temperature. *Acta Mineralogical Sinica*, 8(2):143-150(in Chinese).

Hu P., Zhao L H, Bian Q J., 2005. Chemical and structural characteristics of K-feldspars and their constrains to formation conditions of the Wulashan gold deposit, China［J］. Acta Petrologica et Mineralogica, 24(3) : 221－230.

Hu Shouxi, Ye Ying and Fang Changquan, 2004. Petrology of the metasomatically altered rocks and tts significance in prospecting. Geological Publishing House(Beijing)(in Chinese).

Table 1 Cell parameters and Crystal structure parameters of alkali feldspars of Tieshan metasomatic rock

No		1	2	3	4	5	6	7	8	9	10	11
Sample		ZH-4-1	ZH-4-2	ZH-5	801-7	801-12	ZH-2	ZH-3-2	801-6	ZH-3-1	ZH-9	801-1
2θ	060	41.64	41.65	41.74	41.71	41.66	41.64	41.70	41.68	41.72	41.70	41.66
	-204	50.50	50.56	50.55	50.63	50.59	50.56	50.63	50.58	50.60	50.70	50.62
	-201	20.89	20.87	20.91	20.96	20.92	20.92	20.92	20.93	20.93	20.99	20.93
d	131	3.02	3.03	3.03	2.99	3.03	3.00	3.03	3.02	3.02	2.99	3.00
d	1-31	3.00	3.00	2.98	2.99	3.00	3.00	3.00	3.00	3.00	2.99	3.00
2θ	131	29.73	29.72	30.01	29.82	29.77	29.76	29.76	29.75	29.75	29.82	29.75
	1-31	29.55	29.49	29.44	29.82	29.48	29.76	29.48	29.51	29.51	29.82	29.75
degrees of ordering(Sm)		0.80	0.71	0.88	0.67	0.68	0.67	0.67	0.72	0.75	0.51	0.60
Triclinicities(Δ)		0.23	0.29	0.70	0.00	0.36	0.00	0.35	0.33	0.30	0.00	0.00
structural parameters(η)		1.61	1.27	1.91	1.11	1.15	1.12	1.10	1.31	1.39	0.50	0.82
Or Number		106	108	104	100	103	103	104	102	103	97	102
Al Occupancy ratio	T1(o)+T1(m)	0.90	0.86	0.93	0.84	0.85	0.84	0.84	0.86	0.87	0.77	0.81
	T2(o)+T2(m)	0.10	0.14	0.07	0.16	0.15	0.16	0.16	0.14	0.13	0.23	0.19