**1 Introduction**

Alkali granite is well known not only for the generation at great depth in the extensional regime (Petro et al., 1979), but also for the association with abundant metallic resources including rare earth element (Yuan zhongxin, 1997), Cu, Mo, Pb, Au and Ag (Tan renli et al., 1995; Zhang yuquan, 1997), and so forth. Alkali granite is at times referred to as the protolith of alkali-granitic gneiss in ancient and present orogens, for both appear similar or identical in geochemistry and rock-forming minerals. Some of such gneiss displays a wide spread of U-Pb ages in zircons that may or may not be homogeneously distributed at outcrop (Zhang yuquan et al., 2004; Xiabin et al., 2008). This evidence makes us believe that this alkali-granitic gneiss should have been generated in the solidus state by high-grade metamorphism from sedimentary rocks, in no relation to magmatism.

The Dabie-Sulu ultrahigh pressure metamorphic (UHPM) terrain in eastern China provides an excellent example of alkali-granitic gneiss (Fig.1), upon which this study is based. Alkali-granitic gneiss constitutes about half volume of the UHP metamorphic terrain (Chen daogong et al., 2000). It is regarded as garnet-bearing granite or A-type granite that intruded in the late of Proterozoic, and suffered from UHP metamorphism during the collision between the North China and South China plates in early Mesozoic (Zhong zhenqiu et al., 1999; Zhang hongfei et al., 2001; Suo shutian et al., 2005). Despite the similarity in geochemistry and mineralogy (Xu shutong et al., 1998), it has an exceptionally larger volume than any alkaline granite in other orogens.

This communication focuses on the geochronology and petrology of alkali-granitic gneiss from Tuofeng and Niushan in Donghai county, Jiangsu province, eastern China (Fig.1), where the UHPM rocks are well preserved. The study work support that the protolith of alkali granite genesis is sedimentary and, the age of the protolith is not earlier than the Paleozoic.

**2 Geological Setting**

The study area at Donghai county situates in the eastern segment of the Dabie-Sulu UHPM terrain between the South China plate on the south and the North China plate on the north (Fig. 1). The terrain is dexterously displaced by the north-northeast trending Danlu fault into two segments, Dabie in the west and Sulu in the east. Exposed in the area are high-grade metamorphosed rocks abundant in gneiss (Xu huifeng, 1998). These rocks were primarily considered as the upper interval of the Zhubian Formation of the presumably pre-cambrian Taishan Group (Regional Geological Survey brigade of Jiangsu Geological Bureau, 1965). They consist in the upper of gray biotite-hornblende-plagioclase gneiss interlayered with hornblende-biotitic schist and dolomite marble, in the middle part of grayish biotite-plagioclase gneiss interlayered with sillimanite-bearing hornblende-plagioclase gneiss, and in the lower part of biotite-plagioclase gneiss interlayered with thin-layered leptite. Later, these metamorphosed rocks are renamed the Donghai metamorphic complex (Jiangsu Geological and Mineral Resource Bureau, 1986).

Alkali-granitic gneiss at Tuofeng and Niushan (Fig.1) is in the upper part of the lower interval of the Zhubian Formation. It has a dip direction and a dip angle $110^\circ \angle 30^\circ$ at Tuofeng and $140^\circ \angle 34^\circ$ at Niushan, almost parallel to...
the trend of the eastern segment. It is characterized by a black and white banding structure. Each individual band often has a thickness of several centimeters to tens centimeters or occasionally several meters, and seems to remain constant throughout the quarries of several ten meters or a little larger in dimension. The rocks are grayish-white with gneissic structure, medium-isogranular texture, granoblastic texture and granoblastic texture. Rock-forming minerals are predominantly composed of microcline with tartan-twin (40%~45%), plagioclase (20%~25%), quartz (30%~35%), aegirine (4%~6%) and a minor amount of biotite.

3 Genesis Analysis - Insight from Whole Rock and Zircon U-Pb Dating

Genesis of granitic gneisses in the Dabie-Sulu ultrahigh-pressure belt is still in argument: 1) derived from metamorphism of ancient rock masses (Li et al., 1993; Ames et al., 1996; Rowley et al., 1997; Hacker et al., 1998; Zheng Yongfei et al., 2003; Tang Jun et al., 2004; Liu Fulai et al., 2004); 2) derived from metamorphism of sedimentary rocks (Rolfo et al., 2004; Xia Bin et al., 2008); 3) derived from partial melting of the parent rocks–gneisses derived from retrograde metamorphism of ultrahigh-pressure rocks (Zhong et al., 1999; Zhang et al., 2001).

Zircons in the Tuofeng gneissic alkali granite are mainly metamorphic zircon with irregular rhythmic girdle textures, which are different in shape and white/black jointed, most of them displaying patching patterns. As for the seven measuring points, Th vary between 289μg/g and 806μg/g and U vary between 344μg/g and 719μg/g, and Th/U ratios are all less than 0.1. the average 206Pb/238U age is 215.3±2.3Ma, reflecting the time of metamorphism.

Inherited zircons in the Tuofeng gneissic alkali granite are mostly derived from magmatic- clastic rocks of various ages (Fig.2), implying that the zircons of different ages and once underwent such processes as transport, crushing and re-accumulation, indicating their host rocks are not magmatic rocks, but “sedimentary rocks” and their characteristics are consistent with those of allopatric zircons derived from inherited zircons in the Moshan.
Hushan, Fangshan and other gneissic alkali granites in the Donghai region (Xia Bin et al., 2008). Moreover, zircons exhibit wide (Figs. 2-D, E), narrow (Figs. 2-C), microfine (Figs. 2-F, G) and schistose-like girdle textures, and some zircons are high in U and Th (grayish-black) and low in U and Th (grayish-white), implying that they are not the product of one-time magmatism, but the product of repeated magmatism as evidenced by SHRIMP dating.

4 Timing of Gneissic Alkali Granites in Tuofeng and Niushan

Studies have discovered that in the processes of magmatism and ultra-high-pressure metamorphism zircons can preserve the information about their ages (Liu Fulai et al., 2006), and in the process of metamorphism, though Pb loss occurs, the cores of zircons can still preserve the information about their pre-metamorphic ages (Harrison et al., 1987; Williams, 1992; Lanyon et al., 1993; Chen Daogong et al., 2001). The gathering of magmatic-clastic zircons differing in texture and age (inherited zircons) implies that the zircons are not autochthonous origin, and it also indicates their protoliths are sedimentary rocks. Therefore, the time of their metamorphism is also the time of their petrogenesis. In this study the newly developed crusts of the metamorphic composite zircons were determined to give a U-Pb age of 215±3 Ma, belonging to the Indosinian, corresponding to the Late Triassic. This result is consistent with the SHRIMP and microzone dating made by our predecessors (Li Shuguang et al., 1997; Rowley et al., 1997; Zhang Hongfei et al., 2001; Chen Daogong et al., 2005). As for the age of the protoliths, SHRIMP U-Pb dating yielded the ages of “inherited zircons” from the Tuofeng gneissic alkaline granite to be 814, 798, 799, 643, 602, 382 and 287Ma. This result is consistent with the SHRIMP U-Pb ages determined by Liu fulai et al. (2003) on “inherited zircons” from the gneissies in this region. The consistency indicates that the sedimentation age of the protolith of the Tuofeng gneissic alkaline granite should not be earlier than the Paleozoic.

5 Make up the Possibility Analysis of Background of the Protoliths

Xu Shutong et al. (1998) considered that granitoid rocks occurring in the Dabieshan high- and ultra-high-pressure metamorphic belt are all alkali granites. Gneissic alkali granites have consistent characteristics, i.e., they all are alkali-rich with Na2O/K2O. Associated are also jadeite quartzites derived from metamorphism of quartz sandstones (Zai Mingguo et al., 1992; Su Wen et al., 1995; Wu Weiping et al., 1998; Zhuang Yuxun, 1998), and diabase marbles derived from metamorphism of limestones (Liu Xiaochun et al., 1995) and so on. Their common properties are presented as follows: 1) SHRIMP dating show the protoliths of the previously described rocks are all controlled by the Paleozoic Dabi-Sulu Basin; 2) the rocks are rich in sodium and usually contain alkaline ferromagnesian minerals (pyroxene and amphibole); 3) sedimentation types vary from clastic sedimentary rocks (quartz sandstone, felsic sandstone) to chemical sedimentary rocks (limestone) and then to neritic facies rocks, corresponding to the continental-slope sedimentary environment; 4) the Dabie-Sulu ocean basin does not represent a mature ocean, because of the lack of such deep-water sedimentary rocks as turbidite and siliceous rock, as well as ophiolite-suite rock assemblages such as contemporary pillow lavas and cumulates. That is why there has not been found any relict ophiolitic mélange till now (Wang qinceng et al., 1998); and 5) as the ocean basin in which the Dabie-Sulu high- and ultra-high-pressure metamorphic belt lies is an abortive ocean basin. As the reducing of the ocean basin scope and the increasing of the seawater salinity, finally sediments in this ocean basin are rich in alkal and high in sodium, thus providing the material basis for the formation of alkaline ferromagnesian minerals in different types of metamorphic rocks during Middle-Late Triassic metamorphism.

Acknowledgements

Prof. Liu Dunyi, Wan Yusheng and Wang Yanbin are thanked for their assistance in age determination. This research project is financially supported jointly by the National Key Basic Research and Development Program (973) (No. 2009CB219401) and the Frontier Subject of the Knowledge Innovation Engineering Field (No. 0734021).

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