Studies on P-T-t of mafic granulites from north Tongbai, central China

L. ZHANG, Z. ZHONG*, H.XIANG, H. ZHANG, J. ZHENG AND L. LIU

State Key Laboratory of Geological Processes and Mineral Resources, Faculty of Earth Sciences, China University of Geosciences (Wuhan), Wuhan 430074, P.R. China (*correspondence: zqzhong@cug.edu.cn)

Detailed studies on petrology and mineralogy of the mafic granulites from north Tongbai area indicate that the peak metamorphic condition was at 880~900°C and ca. 1.1GPa. LA-ICP-MS U-Pb metamorphic zircon dating of the mafic granulite yielded weighted mean $^{206}Pb/^{238}U$ concordia age of 418.7±3.2Ma. According to the Zr saturation model, Zr was not saturated in melts at peak metamorphic condition and would be saturated when cooling to 750~800°C, calculated by partial melting modeling. Additionally, Ti-in-Zircon geothermometer also gives the crystallization temperature of ca. 750°C. These suggested that the age of 418.7Ma is not the age of peak metamorphic condition, and probably is a record for the time when cooling to 750~800 °C. The age of peak metamorphism could be around 430~445Ma. LA-ICP-MS U-Pb zircon dating of the acidic granulite also yielded the peak metamorphic age of 430~445Ma. Some zircon grains have obvious overgrown rims, with stronger Cathodoluminescence and higher common Pb than the core. The rims and high common Pb zircons domain yield a age of 404.7± 6.5Ma, indicating that the mafic granulite suffered a retrograde metamorphism at about 404 Ma. We suggest that the high-temperature mafic granulites from north Tongbai area were probably formed in residual overthickened crustal basement in continental subduction–collision zones or arc–continent collision belts.

This research was supported by NSFC of China (No. 40873004) and the Chinese National Key Project for Basic Research (No.2006CB403502).

Role of sulphur in hydrocarbon formation of Paleogene lacustrine source rocks in the Jiyang Depression, East China

ZHANG LINYE* AND ZHANG SHOUCHUN

Geological Scientific Research Institute, Shengli Oilfield Company, SINOPEC, Dongying, 257015, China (*correspondence: zhanglinye2006@163.com)

In the Jiyang Depression in East China, the Paleogene source rocks were formed in saline and fresh water environments [1]. On the basis of the comparison between experimental simulation and geologic profiles, saline water source rocks have two hydrocarbon-formation zones as early and late stages, while fresh water source rocks have only one zone as late stage.

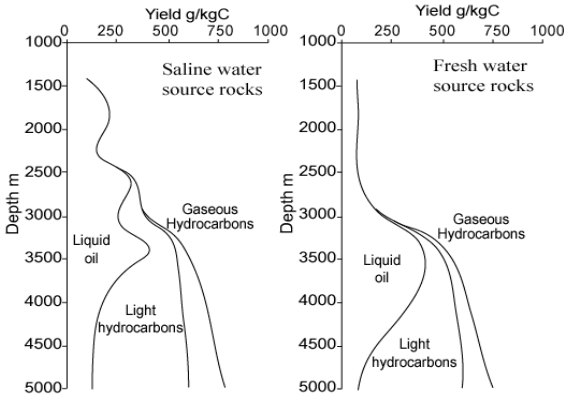

Figure 1: Hydrocarbon generation schemes.

The difference of hydrocarbon formation is mainly due to the organic facies of source rocks. Hydrocarbon formation thresholds strongly correlate with organic sulphur contents [2]. The sulphur contents in the kerogen of saline water source rocks are 3.2%-14.7% (main range 6-9%). Those of fresh water source rocks are 1.05%-4.90% (main range 1-3%). The S-C bound has a relatively low energy. The typical samples of saline water and fresh water source rocks were calculated to be 177.77 kJ/mol and 190.37 kJ/mol in hydrocarbon transformation activation energy, respectively.

[1] Zhang Linye *et al* (2004) *JPG* **27**. 389-402. [2] David *et al* (1992) *AAPG* **77**. 1303-1314.