HUANG Jie, ZHANG Cong , YANG Jingsui，CHEN Mei and SHENG Tingting, 2015. Petrological and Metamorphic Evolution Study of the Staurolite-bearing Garnet Amphibolite in the Nyingchi Complex of the Lhasa Block. *Acta Geologica Sinica* (English Edition), 89(supp. 2): 28-29.

Petrological and Metamorphic Evolution Study of the Staurolite-bearing Garnet Amphibolite in the Nyingchi Complex of the Lhasa Block

HUANG Jie[1,2], ZHANG Cong[1*], YANG Jingsui[1]，CHEN Mei[1,2] and SHENG Tingting[3]

1 State Key Laboratory for Continental Tectonics and Dynamics, Institute of Geology, Chinese Academy of Geological Sciences, Beijing100037, China;
2 School of Earth Science and Mineral Resources, China University of Geosciences, Beijing 100083, China;
3 School of Earth and Space Sciences, Peking University, Beijing 100871, China

1 Introduction

Metamorphosed mafic rocks in orogenic belts usually involve high-variance assemblages which are stable very large regions of pressure (P)–temperature (T) and compositional (X) space. In particular, amphibolite facies mafic rocks typically contain similar assemblages: hornblende, plagioclase and epidote, This common assemblage is not enough to calculate the temperature and pressure. However, the existence of Al-rich minerals makes it possible to do the P-T study.

2 P-T Evolution of Staurolite-bearing Garnet Amphibolites

The newly-found, staurolite-bearing garnet amphibolites in the Nyingchi complex of the Lhasa Block have the mineral assemblage of garnet, amphibole, staurolite, chlorite, plagioclase, mica and minor ilmenite and apatite. The cores of the garnet in the garnet amphibolite are extremely rich in Mn (X_{Sps}=0.12~0.15) and poor in Fe (X_{Alm}=0.45~0.50), whereas rims of them are relatively Mn-poor (X_{Sps}=0.01~0.03) and Fe-rich (X_{Alm}=0.60~.65), showing that the core and the rim of the garnets belong to two metamorphic generations The Xpy increases and Xgr decrease from the garnet core to the rim, indicating prograde metamorphic zonation characteristics (as in Fig 1). The amphibole grew in different metamorphic stages giving obvious composition differences. Staurolite, as an rare aluminium-rich mineral in the metabasite, has also recorded different metamorphic processes in its microstructure. Staurolite, in combination with the garnet compositional profile, makes it possible to

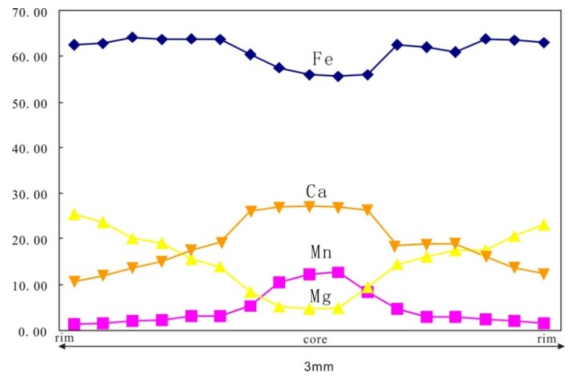

Fig.1. The composition profile of garnet from Linzhi garnet amphibolites in Lahsa Block.
$Fe=Fe^{2+}/(Fe^{2+}+Mn+Mg+Ca)$，$Mg=Mg/(Fe^{2+}+Mn+Mg+Ca)$，
$Ga=Ca/(Fe^{2+}+Mn+Mg+Ca)$

calculate the P-T evolution by phase diagram calculations. We have modeled the pseudosection of the staurolite-bearing garnet amphibolite under the model system of Mn-NCKMASHO, using Perple-X program With the help of Xpy and Xgr isopleths of the garnet, the peak metamorphic conditions have been defined 620ºC and 12kbar (as fig 2). The peak mineral assemblages are garnet, amphibole, staurolite and mica. In the meantime, the clockwise P−T path has also been demonstrated by the microstructures in the staurolites, suggesting that the staurolite-bearing garnet amphibolites have experienced three stages of metamorphism.

Acknowledgements

This research was funded by grants from the Ministry of Science and Technology of China (2014DFR21270), China Geological Survey (12120115026801, 12120115027201, 201511022) and the Fund from the

* Corresponding author. E-mail: huangjie@163.com

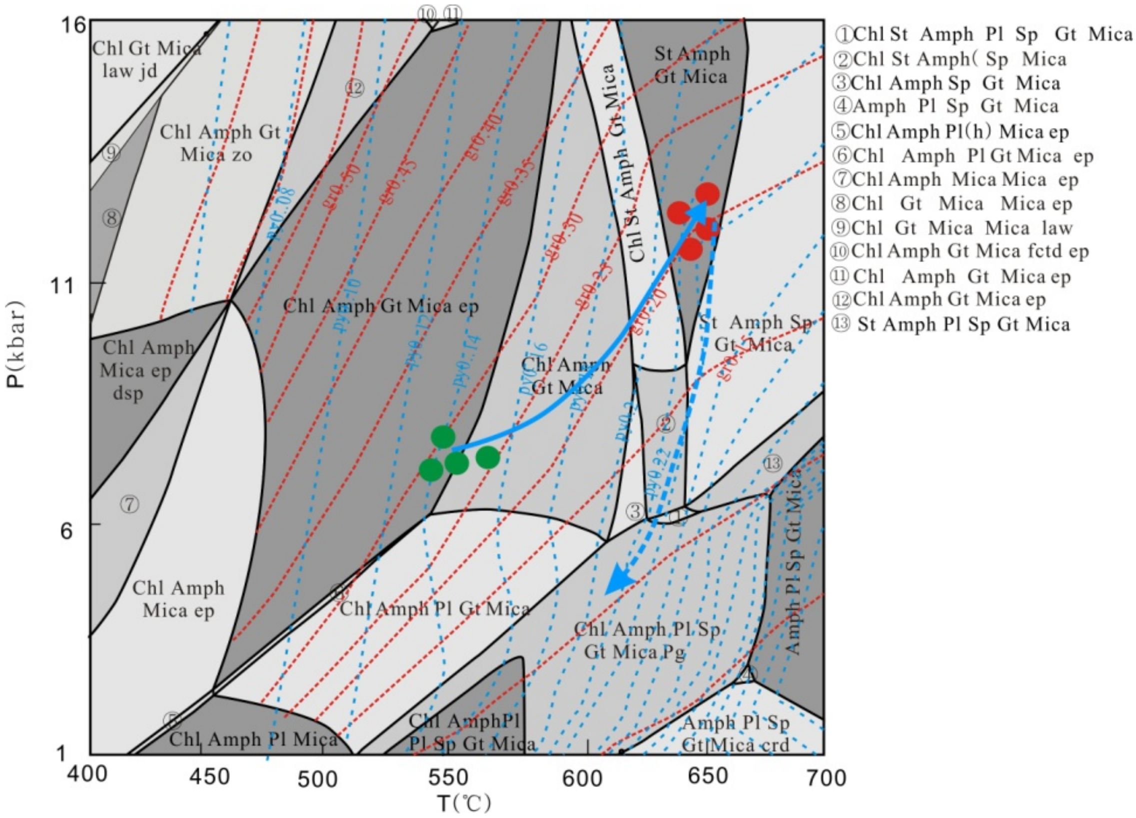

Fig.2 The P–T pseudosection and metamorphic P-T path of the staurolite-beraing garnet amphibolites.

State Key Laboratory of Continental Tectonics and Dynamics (Z1301-a20).