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

Zhang, C.[1], Huang, J.[2] and Yang, J.S.[1], Li P.[1]

[1] Institute of Geology, Chinese Academy of Geological Sciences, Beijing 100037, China. congzhang@pku.edu.cn
[2] School of Earth Science and Mineral Resources, China University of Geosciences, Beijing 100083, China

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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 belongs to two metamorphic generations The X_{py} increases and X_{gr} decrease from the garnet core to the rim, indicating prograde metamorphic zonation characteristics growth. The amphibole grew in different metamorphic stages have obvious composition differences. Staurolite, as an uncomment aluminium-rich mineral in the metabasite, has also recorded different metamorphic processes in their microstructures, in combination with the garnet compositional profile, make it possible to 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 X_{py} and X_{gr} isopleths of the garnet, the peak metamorphic condition has been make out at 620ºC and 12kbar. The peak mineral assemblages are garnet, amphibole, staurolite and mica. In the meanwhile, 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.

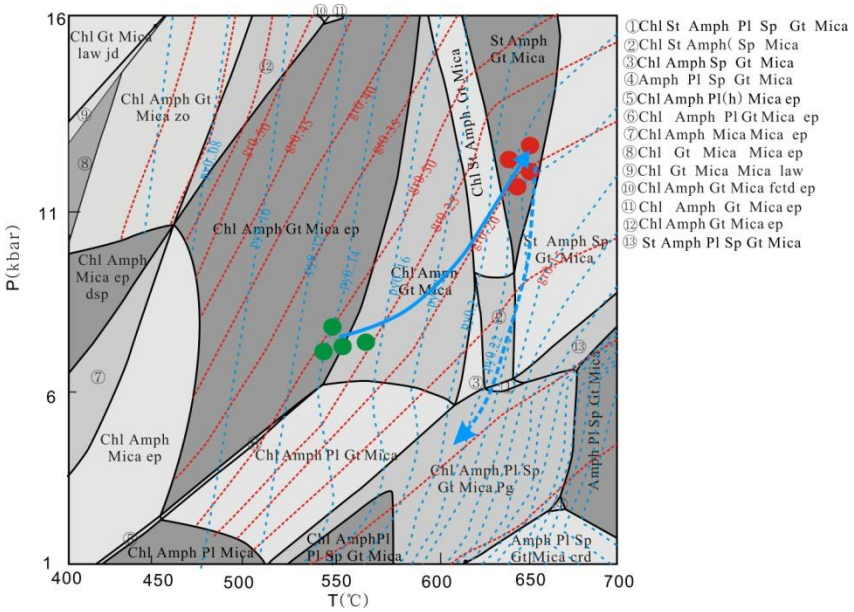

Figure 1: The P–T pseudosection and metamorphic P-T path of the staurolite-beraing garnet amphibolites.