

Continental collision metamorphism supposed from garnet amphibolite from the Song Ma suture zone, northern Vietnam

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The Song Ma suture zone distributed mainly in northern Vietnam, has been regarded as the boundary between the Indochina and the South China cratons. Serpentinite is mainly aligned along the suture zone that has been considered to be fragment of oceanic plate between these cratons. The metamorphic rocks are also distributed along the suture zone intermittently, which has been regarded as the Proterozoic amphibolite-facies rocks by Vietnamese investigators. In this presentation, we discuss metamorphic signature of this terrane based on the metamorphic textures and mineral chemistry of garnet amphibolite.

The garnet amphibolite is composed mainly of garnet (core, Alm56-59Prp3-6Grs32-35Sps4-6; rim, Alm56-59Prp8-12Grs29-31Sps0-2), barroisite with pargasitic thin rim, phengite, quartz and rutile. Actinolite (sometimes containing barroisitic core) + plagioclase symplectite and pargasitic hornblende + epidote + plagioclase corona around garnet are also observed in the matrix.

The chemical zonations of garnet and barroisite as well as corona texture around garnet suggest the decompression with heating process during the evolution. The actinolite + plagioclase symplectite might be formed from omphacite + quartz, which means garnet, omphacite, barroisite, phengite, quartz and rutile as initial assemblage at peak-pressure stage. The pressure-temperature conditions obtained from geothermobarometers using garnet, calculated omphacite and phengite yield c. 500-520 C at 2.0-2.2 GPa. The metamorphic conditions could indicate the rock was formed under the condition of low-geothermal gradient in continental collision zone between the Indochina and the South China cratons.