

ソン・マ縫合帯に産する角閃岩の Sr・Nd 同位体組成

Strontium and neodymium isotopic compositional characters of amphibolite from Song Ma suture zone in Northern Vietnam

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Indochina Peninsula on southeast Asia is divided into three major tectonic provinces from northeast to southwest: the South China Block, the Indochina Block, and the Shan-Thai (Sibmus) Block, and many suture zones were developed along their boundaries. Northern Vietnam is considered to be a part of the southwestern margin of South China Block. Song Ma suture zone is a metamorphic complex developed between the South China and the Indochina Blocks (Osanai et al., 2008). They are composed of pelitic to psammitic metamorphic rocks with subordinate basic rocks within greenschist to amphibolite facies. Besides, high-pressure granulites were also found from the suture zone (Nakano et al., 2007), therefore, the metamorphic rocks might have formed during collision of the South China Block and the Indochina Block, and the basic rocks were possibly remnants of Paleotethyan oceanic crust. In this study, analytical results of isotope compositions of mafic metamorphic rocks are reported for considering the origin and later condition of metamorphic rocks in the suture.

Some amphibolite samples with eclogite were collected from Dien-Bien-Phu, Song-Ma, and Quy-Chau area along the Song-Ma suture zone. Almost amphibolites are composed from hornblende, epidote, plagioclase with subordinate diopside and rare biotite and titanite. Some amphibolites contain garnet porphyroblast with a few millimeter scales. Eclogite consists of abundant garnet, omphacite, phengite, quartz, zoisite, Na-Ca amphibole with minor rutile and magnetite. Plagioclase, Na-free augite and epidote occur around the veins, suggesting that this mineral association was produced during decompression after the highest-pressure condition for the metamorphic rock.

The amphibolite shows basaltic compositions belonging to typical tholeiitic series. They are slightly enriched incompatible elements, especially HFS elements as Y and Zr from the primitive mantle composition though their LIL element compositions were disturbed. Their Nd isotopic composition are relatively high with restored isotopic compositions of $^{143}\text{Nd}/^{144}\text{Nd} = 0.5125\text{--}0.5126$ at 250 million years before. Such compositional characters of HFSE and REE, which seem to be difficult to move by common fluid activity, are equivalent to those of basalt originated from depleted mantle. Amphibolites from Song-Ma area show nearly flat REE patterns and low Sr isotopic composition ($^{87}\text{Sr}/^{86}\text{Sr} = 0.705$); however, those from Dien-Bien-Phu and Quy-Chau areas show negative Eu-anomaly with high Sr isotope ratio ($^{87}\text{Sr}/^{86}\text{Sr}$ over 0.71). Such Sr isotopic composition has hardly restored to low equivalent to that from Song-Ma area at 250 million years before. Perhaps they were modified their minor element composition during the metamorphism by reacting with surrounding lithologies. On the other hand, amphibolites in the Song-Ma area probably leaves chemical features of mid-ocean ridge basalt after metamorphism based on the compositional evidence at least.