

Metamorphic P-T record in garnetite-pods from the Asemi-gawa region in the Sanbagawa belt, central Shikoku, Japan

Kazumasa Aoki[1]; Soichi Omori[2]; Shigenori Maruyama[1]; Masaru Terabayashi[3]

[1] Earth and Planetary Sci., Tokyo Institute of Technology; [2] Res. Centr. Evolving Earth and Planets, Tokyo Tech.; [3] Dept. Safety Systems Construction Engineering, Kagawa Univ.

The Sanbagawa belt is one of the best-studied high-P/T metamorphic belts in the world. In this belt, four mineral zones of chlorite, garnet, albite-biotite and oligoclase-biotite with a progressive increase of metamorphic temperature have been well established based on mineral assemblage and chemistry in pelitic schists (e.g. Higashino, 1975; Banno & Sakai, 1989). It has been considered that peak metamorphic condition of these rocks had not reached the eclogite facies condition. However, it has also been pointed out that diagnostic minerals in higher-grade zones, such as albite-biotite and oligoclase-biotite zones could have been formed by the Barrovian-type recrystallization with an extensive hydration during their exhumation back to the surface (e.g. Ota et al., 2004; Maruyama et al., 2004).

It is highly possible that prograde mineral assemblages are preserved well in quartz schist and metacarbonate, and refractory minerals such as garnet and zircon (e.g. Katayama et al., 2000; Maruyama et al., 2004), because these rocks and minerals are less permeable by fluid than perititic and mafic rocks. To find the lost record of peak metamorphism of the area, we collected garnetite-pods from the hornblende schists of the oligoclase-biotite zone in the Asemi-gawa region.

The representative mineral assemblage in the garnetite pod is Grt + Phe + Chl + Ep + Rt + Qtz +/- Hem. To estimate the peak P-T conditions of these samples, a geothermobarometric calculation using THERMOCALC ver. 3.25 (Holland & Powell, 1998) was carried out in the KCFMASH system. Activities of end-members used in the P-T estimations were obtained using the AX Program. The results of the P-T estimate were plotted in the range of P = 21.6-26.3 kbar and T = 515-578 degrees C. This condition is located in eclogite facies. Therefore, studied samples are considered to be reached to the eclogite facies condition during the prograde metamorphism.

In the Sanbagawa area, it has been considered that the eclogite facies rocks are limited to the eclogite bodies such as the Iratsu and Sebadani Massifs (e.g. Takasu, 1989; Wallis & Aoya, 2000). This study revealed that the peak metamorphic condition of the metamorphic rocks in the oligoclase-biotite zone was eclogite facies. It is suggested that the eclogite facies metamorphism of the Sanbagawa belt is not as localized but possibly whole region of the higher-grade zones of the belt. Thus, it is possible that the Sanbagawa 'proper' metamorphic rocks in the higher-grade zones were suffered eclogite facies metamorphism, and then these rocks overprinted by the recrystallization with an extensive hydration during their exhumation back to the surface.