

Hydrogen and oxygen isotope of glaucophane in lawsonite eclogites preserving pillow structure

MASUYAMA, Yuya¹ ; HAMABATA, Daichi¹ ; TOMIYASU, Fumiya² ; UENO, Yuichiro² ; OKAMOTO, Kazuaki^{1*}

¹Saitama University, ²Tokyo Institute of Technology

In order to understand evolution of life, change of seawater chemistry from Hadean, Archean to present is significant. Pillow structure is well-preserved in the Archean greenstone belt (e.g. Komiya et al., 1999). Oxygen and hydrogen isotope of rims in the pillow is useful conventional tool to decipher chemistry of Paleao-seawater from Archean to Present. However, Archean greenstone belt suffered regional metamorphism from greenschist to Amphibolite facies condition. Therefore, it is necessary to testify the validity of pillow chemistry from recent (Phanerozoic) metamorphosed greenstone. We have systematically collected pillowed greenstone from blueschist and eclogites. Two eclogite exhibiting pillow structures were chosen for oxygen and hydrogen isotope analysis. One is from Corsica (lawsonite eclogite collected with Dr. Alberto Vidale Barbarone) and another is from Cazadero, Franciscan belt (collected by Dr. Tatsuki Tsujimori). The both are ascribed as MORB from major and trace bulk chemistry and Ca is rich in the core and Na is poor in the rims. The former exhibits garnet, omphacite, lawsonite, and glaucophane. Phengite is in core of the pillow and chlorite is in the rims. In the latter, besides garnet, omphacite, epidote and glaucophane, chlorite is recognized with phengite in the core. Glaucophane is richer in the rims from the both samples, therefore isotope analysis of glaucophane was done. Mineral separation was carefully done using micro-mill, heavy liquid and isodynamic separator. 20 mg specimens were used for oxygen isotope analysis and 2mg were for hydrogen analysis. $\delta^{18}\text{O}$ of the all analysis (7.7 to 8.3) is within the range of unaltered igneous oceanic crust and high temperature hydrothermal alteration although rims (8.3 for Franciscan and 8.0 for Corsica) are higher than cores (7.7 for Franciscan and Corsica). δD data is also consistent with hydrothermal alteration. It is relative higher in core from the Corsica and Franciscan (-45 and -56) than of the rims (-49 and -57, respectively), suggesting dehydration in deep subduction zone.

Keywords: lawsonite eclogite, pillow structure, glaucophane, oxygen isotope, hydrogen isotope, seawater chemistry