セール・ロンダーネ山地小指尾根、ヘグボマイト含有スカルンの鉱物共生とその意義

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Mineral paragenesis and its implications in the högbomite-bearing skarn, Sør Rondane Mountains, East Antarctica

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The metamorphic rocks in the Sør Rondane Mountains underwent amphibolite to granulite facies metamorphism (Shiraishi et al. 1991). Högbomite-group minerals are complex Fe-Mg-Zn-Al-Ti oxides related to the spinel-group minerals. Their polysomatic structure is composed of spinel (*S*) and nolanite (*N*) modules (Armbruster 2002; Hejny and Armbruster 2002). We (JARE-50) found a högbomite bearing skarn at the Koyubi-Ridge area of the Brattnipene, central part of Sør Rondane Mountains, East Antarctica (Shimura et al., 2011). This högbomite have been approved as a new mineral (new polysome) as magnesiohögbomite-2*N*4*S*, by the Commission on New Minerals, Nomenclature and Classification of the International Mineralogical Association (no. 2010-084) (Shimura et al. 2011).

The skarn outcrop is located within the amphibolite facies - granulite facies metamorphic layers, which contain an interbedded dolomitic impure marble layer. The marble layer is about 30 m thick. The skarn appears along the lower (north) boundary of the marble layer. The skarn zone is about 3-10 m wide, and the following types of rocks are recognized;

(A) Impure marble (Dol ± Phl ± Tr)
(B) Spl + Fo ± Phl ± Dol ± Gk skarn
(C) Spl + Phl ± Tr ± Hgb skarn
(D) Spl + Crn + Hgb + Clc + Phl skarn
(E) Calc-silicate gneiss (Dol + Tr)
(F) Granitic gneiss (Bt + Pl + Qtz ± Kfs)
(G) Biotite gneiss (Bt + Pl + Qtz + Kfs)

Abbreviations of minerals are after Whitney and Evans (2010). The skarn sequences of (A)-(B)-(C) or (A)-(B)-(D) can be recognized from the marble bed to the center of the skarn zone. A sequence of (C)-(E)-(F)-(G) is also recognized from the skarn zone to the biotite gneiss layer. This mineral paragenesis can be explained by TiO_2-MgO-Al_2O_3-SiO_2-H_2O (TMASH) system. The zonation is reflecting the difference in the whole rock composition; these are Ca-Mg rich potion (A and B), Al-rich and Si-poor portion (C and D), and Si-rich potion (E, F, and G). This may be reflecting the difference in the diffusion rate of each element.

The following reactions are recognized in (D).

$10Spl + Crn + 2Rt + H_2O \rightarrow Hgb$

Magnesiohögbomite-2*N*4*S* must have formed during the retrograde metamorphic stage in the Sør Rondane Mountains.

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