Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

SCG61-P05 Room:Convention Hall Time:May 22 18:15-19:30

Heterogeneity of exsolution textures of ternary feldspars in felsic gneiss from Mt.Riiser-Larsen, East Antarctica

Yu Kodama[1*], Akira Miyake[1]

[1]Kyoto Univ.

Mt. Riiser-Larsen, East Antarctica is the one component of the Napier Complex. The Napier Complex consists of granulite-facies metamorphic rocks formed by multiple thermal events, including Late-Archean ultrahigh temperature metamorphism (Harley and Black, 1997). Based on ternary feldspar solvus models, the bulk compositions of ternary feldspars in felsic gneiss from Mt. Riiser-Larsen yield the minimum of metamorphic temperatures ranging from 1070 to 1110oC (Hokada, 2001). TH97012006 (hereafter shortend to 12006) is the garnet-porphyroblast-bearing portion of a garnet-bearing felsic gneiss from Mt. Riiser Larsen. This sample is almost composed of oligoclase($An_{29}Ab_{70}Or_1$; hereafter shortend to Olg), and mesoperthitic ternary feldspar(hereafter shortend to TF) composed of Olg lamellae and orthoclase($An_2Ab_8Or_{90}$; hereafter shortend to Or). Kodama et. al., (JAMS 2012 annual meeting) revealed that these unique exsolution textures in TF are results of combination of 2 types of exsolution textures; Type-A exsolution texture consist of coarse oligoclase lamellae and TF lamellae-like texture which contact with (010) plane; Type-B exsolution texture consist of fine oligoclase lamellae and fine orthoclase lamellae which contact with (-901) plane. However, problems that the mode of occurrence and textures of Olg grains and TF grains are heterogeneous are still remained.

In this study, to resolve the problems above, some high-resolution elemental maps of slab chips ($<$ 10 cm) of 12006 were obtained using by wavelength-dispersive X-ray spectroscopy (WDX), and comparison between the destribution of element and the occurrence of exsolution textures.

Petrographic characters of 12006 are devided into 4 types; (1)The area mainly consisted of Olg grains, (2)The area mainly consisted of Olg-rich TF grains, (3)The area mainly consisted of Or-rich TF grains, (4)The area mainly consisted of myrmekitic texture. Type(2) encloses type(3), Type(3) encloses type(4). Chemical compositions of type(2) to (3) are continuous, but chemical compositions of type(1) to (2) and type(3) to (4) are discontinuous. It is revealed that the difference of distribution of type-A and type-B exsolution texture corresponds to the difference of chemical compostions within 4 types above. The heterogeneous distribution of Olg grains and TF grains is result of change of local bulk chamical compositon of 12006.

Therefore, the following formation process of Olg grains and TF grains in 12006 was suggested; (1)Olg-rich crystals and TF melt were formed by partial melting (or something) (2) By fractional crystallization, Olg-rich to Olg-poor TFs were formed. Chemical composition of these feldspars is continuous. (3) Myrmekite-like textures were formed in contact with Or-rich TFs. (4) Type-A exsolution textures exsolved at Olg-rich TFs. (5) Type-B exsolution textures exsolved at all TFs by spinodal composition. The partial melting can cause coexistence of crystals and melt at (1), however, there are not enough evidence to make it clear that partial melting occurred. Further data about heterogeneity in 12006 are needed to reveal formation process of entire rocks.

Keywords: ternary feldspar, exsolution texture, Napier Complex, ultra high temperature metamorphism