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MINERALOGY OF THE SYENITIC ROCKS FROM THE YAMATO AND THE SØR RONDANE MOUNTAINS, EAST ANTARCTICA (ABSTRACT)

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Chemical variations of amphiboles in syenitic rocks from the northern Yamato and the central Sør Rondane Mountains, Antarctica, were investigated, based on petrography and experimental results.

The Yamato Mountains are made up of late Proterozoic to early Paleozoic high grade regional metamorphic rocks, syenitic and ganitic rocks (K. SHIRAISHI *et al.*: Mem. Natl Inst. Polar Res., Spec. Issue, **28**, 183, 1982). In the northern Yamato Mountains, dominant clinopyroxene syenite occurs in the stratigraphically higher section of the two-pyroxene syenite layers.

It is worth noting that bluish green hornblende which is close to edenite end member, occurs in the clinopyroxene syenite (Nos. Y80F3 and 73120904). The hornblende coexists with small amounts of biotite, clinopyroxene, perthite, albite and ilmenite. Dominant ferromagnesian mineral is subhedral bluish green hornblende. Previous experiment suggests that edenite end member is unstable under the vapor pressure beyond 5 kbar. The composition of amphibole shifts to tremolite-pargasite join from edenite under the high vapor pressure. A preliminary synthesized experiment for edenite suggests that the water vapor pressure for edenite is lower than that for hornblende under the same *P-T* conditions (T. OBA, unpublished data).

The Sør Rodane Mountains are underlain by various kinds of upper amphibolite to granulite facies metamorphic rocks, possibly of late Proterozoic age, followed by several stages of plutonism. In the oldest stage of three syenite intrusion stages, the largest body of layered syenite has a heterogeneous appearance in a mesoscopic scale. In the characteristic dark mafic layers and the younger leucocratic syenite (85012101A), constituent minerals are K-feldspar, bluish green hornblende, bluish green clinopyroxene, biotite, quartz and plagioclase. In the leucocratic layer (85012103C) of the rhythmic layered syenite, albite occurs along grain boundaries of orthoclase whereas it occurs as very thin films around orthoclase in the mafic layer (85012103B). In the youngest syenite which characteristically contains green microcline (amazonite), no amphibole is observed and green clinopyroxene occurs as subhedral prisms.

Bluish green richteritic actinolite with large orthoclase phenocrysts appears in both the leucocratic and mafic layers of the layered syenites. Microprobe analyses show that the maximum solubility limit of richterite content in actinolite is about 40 mole % in the leucocratic layer. Amphibole with microcline in the younger leucocratic syenite is common hornblende. As both hornblende and the richteritic actinolite have the wide stability field, they are stable under the physical conditions of crystallization of the layered syenite. The occurrence of richterite and albite suggests that Na and water vapor are concentrated in liquid at the later stage. On the other hand, the appearance of edenite from the Yamato Mountains indicates that the water vapor pressure decreases. Therefore, the appearance of richteritic actinolite depends on the high Na content of the bulk composition at the later stage of crystallization.

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