

Magmatic process of synplutonic mafic dykes in Ryoke belt at Shodo Island, southwest Japan

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Various synplutonic mafic dykes in igneous rock complex are widely distributed throughout the Tanoura Peninsula of the southern part of Shodoshima Island, in the Ryoke belt, southwest Japan. The common mineral assemblages are plagioclase + amphibole + biotite, sometimes quartz. Plagioclase phenocrysts (~ 3 mm) are observed in all dyke samples, these modes vary according to each samples (0.2 to 14 vol.%). Plagioclase phenocrysts have An-rich core (> An₈₀) and Ab-rich rim, these cores show partial dissolution shape indicate the magma mixing. An-rich core often contain inclusions of amphibole and/or biotite. Therefore, it suggest that the mafic end member of magma mixing is a low temperature hydrous basaltic magma. Ab-rich rim of plagioclase groundmass show similar Anorthite content. This observation suggest that both assemblage might be crystallized from the mixed magma during end stage.

Ratageski et al. (2005) performed the experiment of partial melting of mafic intrusion in lower crust. On the major oxides variation diagrams for SiO₂ contents, the experimental melt composition area by Ratageski et al. (2005) are located on the extension line of whole rock compositions of this study trend. This observation suggests that the felsic end member of magma mixing have similar composition for this experimental melt. Kutsukake (2002) proposed that the origin of the Ryoke tonalities were formed by the magma which generated the partial melting of amphibolites. This results also consistent with this study.

Mantle origin mafic magmas were acted as the heat source of the Ryoke granitic magmatism. It is quite possible that felsic magma and mafic magma mixed at the lower crust.

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