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# 霧島火山新燃岳 2011 年噴出物中の高 MgO と低 MgO 斜長石
# High-MgO and Low-MgO plagioclase phenocrysts in the 2011 eruption products of Shinmoedake, Kirishima volcano, Japan

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Plagioclase phenocrysts in the 2011 eruption products of Shinmoedake, Kirishima volcano is divided into high-MgO and low-MgO types, which may represent the two end components of mixing of magmas and may reflect the different temperatures of crystallization/annealing in the magma chamber. The MgO contents in plagioclase generally delineate increasing trends with decreasing Ca/(Ca+Na) ratio, and the MgO contents of the high-MgO plagioclase in the eruption products are 3 to 4 times higher than that of low-MgO type plagioclase. The high-MgO type generally have fairly homogeneous core with Ca/(Ca+Na) ratio of 0.82-0.92, whereas the Ca/(Ca+Na) ratio of the low-MgO type plagioclase ranges from 0.50-0.87. The high-MgO type plagioclase has voids in the core, whereas the low-MgO type plagioclase shows patchy or oscillatory zoned cores. The high-MgO type plagioclases generally have thin rim of lower Ca/(Ca+Na) ratio and high-MgO contents, whereas the low-MgO type may or may not have thin rim of high-MgO composition. The available experimental data suggest that three to four fold variation of the distribution coefficient of MgO between plagioclase and melt may be accounted for by differing temperature of crystallization and/or annealing. The distribution coefficient as defined by D(MgO)=(MgO)plagioclase/(MgO)melt varies from 0.05 at 1100-1200 degree C (Sato, 1989) to 0.021 at 950-1050 degree C (Sisson and Grove, 1993). The annealing temperature of the lower temperature dacitic magma is estimated from rare white pumices to be 850-900 degree C, whereas the high temperature end magma have 1000-1050 degree C from the pyroxene thermometry. We suggest that variable Ca/(Ca+Na) ratio of the core of low-MgO type plagioclase recorded previous intrusion events in the magma chamber, and Mg subsequently equilibrated in the low temperature dacitic magma in the magma chamber. The time scale of the diffusion annealing of Mg in the low-MgO plagioclase is more than 1000 years if we use the diffusion coefficient of Mg in plagioclase by LaTourrette and Wasserburg(1998). The thickness of the high-MgO rim in the low-MgO plagioclase is from 0 to 20 microns with sharp boundary against the core, suggesting short time duration between the mixing of magmas and the eruption.

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