

Experimental petrology of Goseong volcanoes, Korea

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Genozoic volcanoes with composition of alkali basalts are widely distributed in Southwest Japan, Korea, and East China. On the basis of geochemical studies, several models to explain magma origin of the alkali basalts were proposed (e.g., upwelling of hot asthenosphere, melting of stagnant slab, and so on). However, little is known about differentiation processes for the alkali basalts based on petrological studies. We therefore performed a series of experimental determinations of melting relation in alkali basalts on Goseong volcanic field, Goseong-do, Korea. Goseong volcanic field consists of seven volcanic plugs, and some of them are accompanied by lava flows. We have carried out petrological studies on alkali basalts from all the seven plugs. The alkali basalts have phenocrysts of olivine and augite and microphenocryst of spinel. Whole rock compositions show that the alkali basalts are relatively primitive ($\text{FeO/MgO} < 0$ and $\text{MgO} > 11$ wt %), and mineral chemistry supports this (Forsterite content in olivine > 87). The most primitive rock was selected for melting experiments at 1110-1220 °C and 1 bar under the oxygen fugacity along the fayalite-magnetite-quartz buffer. The experimental results show that mineral assemblage (olivine, spinel, and plagioclase) is different from natural one (olivine, spinel, and augite), indicating that crystallization pressures were probably higher than the melting pressure (1 bar). Thus, we will conduct melting experiments at high pressures in future work.