Petrological study on the mafic igneous enclaves in the Miocene Miuchi granitoid pluton, southern Ehime Prefecture

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Mafic igneous enclaves with sub-angular shape are commonly occurred in the Miocene Miuchi granitoid pluton, southern Ehime Prefecture. The mafic enclaves (61-64 wt.% SiO_2, 0.5-2.6 wt.% K_2O) are composed mainly of plagioclase, biotite, quartz and opaque minerals. Acicular apatites are common in the mafic enclaves. Intergrowth texture of biotite and quartz/plagioclase are locally observed in the biotite-rich mafic enclaves. K_2O contents of the mafic enclaves increase with increasing SiO_2. Orthopyroxene, locally surronded by biotite, occurs in the mafic enclave with the lowest SiO_2 and K_2O contents. Biotite-rich reaction rim is observed between the orthopyroxene-bearing mafic enclave and host granite. The host granite samples surrounding the mafic enclave are relatively depleted in the K-feldspar (granodiorite in composition) compared to the dominant rock type of the Miuchi granitoid pluton (monzogranite - granite in composition) (67-78 wt.% SiO_2, 3.3-6.5 wt.% K_2O). The petrographic and geochemical characteristics of the mafic enclaves are suggestive of interaction with host granite magmas through hydration crystallization reaction: hydrous granitic melt + pyroxene + Fe-Ti oxides ±calcic plagioclase = biotite + quartz ±sodic plagioclase (e.g. Bard et al. 2005, J. Geol.).

Keywords: Miuchi pluton, Granitoid, Mafic igneous enclave

