Sm-Nd isotopic characteristics and mingling texture between the High Ba-Sr granite and mangerit, South Korea

JIEUN SEO[1], SEON-GYU CHOI[1*], IN-CHANG RYU[2], YOUNG JAE LEE[1], AND YOUN-JOONG JEONG[3]

[1] Department of Earth and Environmental Sciences, Korea University, Seoul 02841, South Korea (*Correspondence: seongyu@korea.ac.kr)

[2] Department of Geology, Kyungpook National University, Daegu 41566, South Korea

[3] Division of Earth and Environmental Sciences, Korea Basic Science Institute, Chungbuk 28119, South Korea

The Hongseong is continental collision zone of the South Korea, which is thought to represent the eastern extension of the Triassic Dabie–Sulu collision zone of China. The post-collisionlal magmatism occur in this area. The post-collisional intrusion (233–230 Ma) consists of mangerite in the Gwangcheon, syenite and high Ba–Sr granite with syenite enclaves in the Haemi. These textural features are in agreement with those classic magma mingling textures both in megascopic and microscopic scales. In this igneous complex shows many mixing–mingling textures of mafic and felsic magmas such as aggregations/clots of mafics, ovoid quartz and alkali feldspar, spongy cellular plagioclase, poikiltic quartz and/or K-feldspar, step-zoned plagioclase, boxy-cellular plagioclase, calcic plagioclase zones, and acicular apatite.

The mangerite, syenite, and syenite enclaves exhibit a shoshonitic affinity, a total alkalinity (Na_2O+K_2O) of 7.38–9.64 wt. %. The Sm and Nd concentrations of mangerite and syenite enclave show from 13.3–14.5 ppm, 87–94.2 ppm, respectively. While, the high Ba–Sr granite show the Sm and Nd concentration of the 4.2–4.8 and 26.0–30.2 ppm, respectively. The mangerite and syenite display a narrow range in Nd isotopic compositions ($^{143}Nd/^{144}Nd$=0.511806–0.511858) and Sm isotopic compositions ($^{147}Sm/^{144}Nd$ = 0.0925–0.0947). While, high Ba–Sr granite show $^{143}Nd/^{144}Nd$ = 0.0512135–0.512148 and $^{147}Sm/^{144}Nd$ = 0.0958–0.0985.

The texture, geochemical, and Sm–Nd isotope data suggest that the Gwangcheon intrusive complex (mangerite and syenite) and Haemi syenite enclaves were derived from mantle source, while formed Haemi high Ba–Sr biotite granite was derived from continental crust after the Triassic continental collisional tectonic environment of the North and South China blocks in Korea.