

Sr-Nd-Hf isotopic characteristics of late Paleoproterozoic A-type granite, South Korea : implication on the Paleoproterozoic orogeny

HYEONCHEOL KIM¹, CHANG WOO KWON², KYO-YOUNG SONG³, TAEHOON KIM⁴

¹124 Gwahang-no, Yuseong-gu, 34132 Daejeon, South Korea
hckim@kigam.re.kr

²124 Gwahang-no, Yuseong-gu, 34132 Daejeon, South Korea
cwkwon@kigam.re.kr

³124 Gwahang-no, Yuseong-gu, 34132 Daejeon, South Korea
kysong@kigam.re.kr

⁴124 Gwahang-no, Yuseong-gu, 34132 Daejeon, South Korea
tkim@kigam.re.kr

Hornblende-biotite granite exposed in the middle-western part of the Gyeonggi massif, intruded the Paleoproterozoic basement gneisses and graphite-bearing garnet-sillimanite schists whose youngest zircon age is thought to be older than ca. 1850 Ma. The granite is peraluminous A₂-type granodiorite-alkali granite, and is plotted in the within plate granite region of tectonic setting discrimination diagrams. Rb-Sr and Sm-Nd whole-rock isotope ratios define errorchron age of 1153±450 Ma and isochron age of 1851±330 Ma, respectively. Zircons separated from the granites show transparent euhedral grain shape with common thin bright overgrowth rim. Zircons show complicated magmatic zoning pattern without inheritance core. Weighted mean age of the SHRIMP zircon U-Pb analysis for five different samples yielded 1677.3 ± 9.2 Ma, 1684.1 ± 7.7 Ma, 1689.6 ± 7.1 Ma, 1697.1 ± 8.8 Ma, and 1699 ± 12 Ma. Initial $\epsilon_{\text{Hf}}(t)$ values of zircons range from -14.27 to -10.60. It suggests that parental magma of the granite to be most likely formed by partial melting of pre-existing crustal material. This interpretation is corroborated by initial $^{87}\text{Sr}/^{86}\text{Sr}$ and $\epsilon_{\text{Nd}}(t)$ values of granite (0.714 ± 0.051 and -7.6, respectively). Sr-Nd whole-rock and Hf zircon isotopic characteristics of the hornblende-biotite granite suggest a reworking of lower crust and lithospheric mantle during the late Paleoproterozoic (ca. 1.9-1.8 Ga) in Korean Peninsula.