

Petrology and Geochemistry of the Yeongju-Chunyang Granitic Rocks of Early Jurassic age in northeastern part of the Sobaegsan Massif, South Korea

Myung-Shik Jin

Korea Institute of Geology, Mining and materials
30 Kajung-dong, Yusung-ku, Taejon, Korea. 305-350

Abstract

The Yeongju-Chunyang batholith of Early Jurassic age distributed in northeastern part of the Sobaegsan Massif, South Korea is the metaluminous to peraluminous granodioritic and granitic rocks. The major rock forming minerals of the granitic rocks are quartz + plagioclase + orthoclase/microcline + biotite ± hornblende ± muscovite, and minor minerals are apatite + zircon ± sphene and opaque minerals. The mineral assemblages do not define "I/S type granitoids in petrogenesis yet. Magnetic susceptibility in most rock samples range from 0.1 to 0.2 $\times 10^3$ SI except several samples with an average of 0.67 $\times 10^3$ SI, suggesting ilmenite series granites. Chemical analysis of major and trace elements including REE and Sr isotopes in 23 rock samples were carried out. SiO₂ ranges from 62.5% to 74.5%, and TiO₂, Al₂O₃, Fe₂O₃+FeO+MnO, MgO, CaO and P₂O₅ regularly show decreasing trends with increasing SiO₂, in contrast Na₂O and K₂O reveal increasing trends, suggesting that the granitic magma have been fractionally crystallized from a calc-alkaline magma. Other geochemical parameters from major elements also support the calc-alkaline magmatism. In addition, the trace elements show similar characteristics of a calc-alkaline magma. Whereas Sr, Y, Nb, Th, Zn, V, Hf, Sc, Be, Li, La, Ce, Sm, Nd and Eu are decreased, Rb, Ta and Co are increased, and Ba, Pb, Ni, Cr, Cu and U are fluctuating in log scale during the fractional crystallization. In the batholith, Σ REE and La/Sm values are steadily decreased during the fractional crystallization, and some of Eu/Eu* are suddenly decreased at late stage, suggesting that the granitic rocks might have been crystallized in the more reducing environment at late stage. Several REE patterns for whole rocks normalized by crustal materials are almost parallel to unity suggesting that the granitic magma might have been derived from the crustal materials as well as the initial ⁸⁷Sr/⁸⁶Sr of the batholith is 0.7150-0.7171.