

Magma process of the granitic rocks around the Chichibu mine, Saitama Prefecture

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Chichibu granitic body in the western Saitama Prefecture is composed of quartz diorite and tonalite (Ishihara et al., 1987). The body is divided into two main bodies, namely Chichibu south body and Chichibu north body, accompanied with some small body (Hara et al., 2010). Radiometric ages of the Chichibu granitic body were dated 6.3 to 5.9 Ma (Ueno and Shibata, 1986;Saito et al., 1996). In this study, modal and chemical compositions and mineral chemical compositions of the granitoids from the north and south bodies, and the magma process of the Chichibu south body is examined.

The marginal part of the Chichibu south body has large amount of biotite, whereas the central part shows large amount of amphibole. With the increase in SiO₂ value, an A.S.I value increases in the less than 0.80 to 1.1 range, and the Chichibu south body has feature of I-type granites. The A.S.I value becomes low in the central part of the Chichibu south body, and the value becomes higher in marginal part. The rocks of the Chichibu south body are rich in a LIL element and deficient in a HFS element. From these features of trace elements, it can be considered that the Chichibu south body was formed by Island arc magma activity.

In conclusion, the following magma processes can be considered. The magma crystallizing plagioclase and amphibole was intruded into sedimentary layers of the Chichibu area. Then, it reacted to the surrounding sedimentary rocks at marginal of the Chichibu south body. A marginal part becomes locally peraluminous magma and it crystallized biotite. As a result, crystallizing of amphibole continues in the central part. It can be considered that amphibole increased in the central part of the Chichibu south body, and biotite increased relatively in the marginal part of the body.

Keywords: Chichibu body, granitic rocks, magma process