Geochemistry of Apatite and Biotite in Tin-Mineralized Late Triassic Granites in Bangka Island, Indonesia

Enrico Gilrandy W. Suharjo[1], Ryohei Takahashi[1], Andrea Agangi[1], Syafrizal Syafrizal[2], Pearlyn Manalo[1]
1. Akita University, Akita, Japan, 2. Institut Teknologi Bandung, Bandung, Indonesia

Late Triassic granite in Bangka Island is classified into two types based on mineral associations, i.e., biotite granite and hornblende-biotite granite. The biotite granite is more enriched in tin (mean of 14.4 ppm Sn) compared to the hornblende-biotite granite (mean of 3.30 ppm Sn). Both of those lack magnetite, indicating reduced conditions of formation, which is considered to be suitable to tin mineralization.

FeO content of apatite in the biotite granite (mean of 0.53 wt %; range from 0.17 to 2.10 wt%) is higher than that in the hornblende-biotite granite (mean of 0.29 wt %; range from 0.04 to 2.53 wt %), indicating a higher degree of Fe^{2+}/Fe_{Tot} ratio for the former. This suggests that the biotite granite formed under more reduced conditions than the hornblende-biotite granite. Higher water content of apatite in the biotite granite compared to that in the hornblende-biotite granite would be due to elevated water contents in the melt. The $Fe^{2+}/(Fe^{2+}+Mg^{2+})$ ratios of biotite in the biotite granite and the hornblende-biotite granite are mean of 0.81 with a range from 0.75 to 0.83 and mean of 0.74 with a range from 0.71 to 0.75, respectively, indicating more reduced conditions for the former.

The results suggest that the biotite granite is strongly related to tin mineralization in Bangka Island, and the mineralization is attributed to water-rich magmas with reduced conditions. We consider that chemical compositions of apatite and biotite can be indicators of tin mineralization for granite in Bangla Island.