Limu Granitic magma evolution and formation of W-Sn and Ta-Nb-Sn-W deposits, Guangxi, China

HUAYING LIANG[1], WENTIAN HUANG[2], JING WU[3]

[1] CAS Key Lab of Mineralogy and Metallogeny, lianghy@gig.ac.cn

[2] CAS Key Lab of Mineralogy and Metallogeny, ita19@163.com

[3] College of Rresource and Metallurgy, Guangxi University, Nanning, China, 41734291@qq.com

A Ggranite complex associated both with W-Sn and Ta-Nb deposits are rare found in south China although W-Sn and Ta-Nb deposits are related to highly fractionated granite. The Limu granite complex in Guangxi, south China hosts W-Sn quartz vein deposit in second stage lepidolite granite and disseminated Ta-Nb-Sn-W deposits in third stage topaz-lepidolite granite. This work reported muscovite $^{40}Ar/^{39}Ar$ and zircon U-Pb ages, geochemical and Nd isotopic compositions of the granite complex to shed light on magmatic evolution and genesis of different type mineralizaton. Muscovite from W-Sn quartz vein has $^{40}Ar/^{39}Ar$ plateau age of 213.7±1.1 Ma. Two hydorthermal zricons and two muscovite sampels from third stage granite assoiated with disseminated Ta-Nb-Sn-W mineralization yielded similar U-Pb ages of ca 203 and 208Ma, respectively. The Limu granite complex is peraluminous (A/CNK>1.1) with negative εNd(t) values (-8.5 to -9.7) and T_{DM2} ages of 1780–1685 Ma, indicating they were derived from partial melting of Paleoproterozoic basement. Low Zr/Hf (<13) and Nb/Ta (<5) ratios and the tetrad effect in rare-earth-element patterns of the second- and third-stage granites indicate that the magmas were highly evolved and underwent late-stage exsolution of fluids. Disseminated columbite, tantalite and cassiterite are semi-enclosed by quartz or occurr in the gaps between magmatic K-feldspar and albite without either alteration or reaction rims, suggesing they are crystallized contemporaneously. These features indicate that quartz vein mineralization was formed at ca. 214 Ma and was hydrothermal in origin, whereas Ta–Nb–Sn–W mineralization was formed at ca. 208–203 Ma and was of magmatic-hydrothermal origin. South China underwent not only the Yuanshan largescale- but also Indosinian strong- critical metal mineralization. Mantle-derived heat from a long-lived magma chamber was suggested for the high-temperature anatexis that formed the Limu Ta-Nb-Sn-W-rich melts during the Indosinian Orogeny.

This work was supported by the Chinese NSF (41772065).