Li-enriched zircon in a felsic gneiss of the Harvey Nunatak, Napier Complex, East Antarctica

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Zircon has been one of the most frequently used minerals as a geochronometer for a long time because of its physicochemical stability and the containing of actinoides such as U and Th. Zircon is also used as an indicator of the magmatic and metamorphic environment by analyzing concentrations and isotopic ratios of trace elements. It becomes more important for zircon-geochronologists to check those trace elements in zircon for the interpretation of the zircon age. In particular, the concentration and isotopic ratio of trace elements such as lithium in zircon analyzed using secondary ion mass spectrometer suggests the existence of liquid water in the early earth's surface (e.g., [1]). We found extreme Li-enriched zircons ([Li] > ~100 ppm) in the Napier Complex, East Antarctica, and they are characterized on the basis of the concentration of the other trace element (K, Ca, Mn, Fe, Al, P, and rare earth elements(REE)) in the zircons analyzed by a single-collector type sensitive high-resolution ion microprobe [2].

Li-enriched zircons ([Li]: ~300-600 ppm) from an Opx-felsic gneiss in the Harvey Nunatak within the ultrahigh-temperature metamorphism region collected by JARE-58 Geological Field Survey Team. Some of the zircon grains collected from the Opx- felsic gneiss are hydrothermally altered because the zircons indicate high concentrations of non-formula elements such as Ca, Mn, Fe, Al, K, and light REE. The altered zircon grains indicates lower Li concentration than those of unaltered zircon grains. In this presentation, the behavior of the trace elements including Li in the zircons and quartz in the gneiss will be discussed.

[1]Ushikubo et al. (2008) Earth and Planetary Science Letters, 272, 666-676. [2]Takehara et al. (2018) Chemical Geology, 484, 168-178.