Study on the mineralization age of the Akenobe polymetallic deposit in the southwest Japan, on the basis of Re-Os geochronology.

*Mitsuki Ogasawara[1], Junichiro Ohta[1,2], Mizuki Ishida[1], Kentaro Nakamura[1,2], Kazutaka Yasukawa[1], Koichiro Fujinaga[1,2], Yasuhiro Kato[1,2]

1. School of Engineering, The University of Tokyo, 2. Ocean Resources Research Center for Next Generation, Chiba Institute of Technology

The northern part of Hyogo Prefecture (Bantan area) is a unique area with many mineral deposits that had produced various industrially important metals. For instance, the Nakase deposit had been known for the extremely high-grade gold ore. The Ikuno deposit had been one of the major silver mines in Japan. Among them, the Akenobe deposit produced large amounts of tin, copper, zinc, and tungsten, as well as indium, a critical metal for electronic devices.
A mineralization age is a key constraint to understand the ore genesis of such a large deposit with a significant polymetallic mineralization. However, the mineralization age of the Akenobe deposit was not constrained well. A previous study indicated that the mineralization stages of the Akenobe deposit could be divided into earlier Cu-Zn-Pb stage and later Sn-W stage. Therefore, mineralization ages obtained directly from veins are necessary to understand the ore-forming processes during each stage of the Akenobe deposit.
Here, we applied rhenium (Re)-osmium (Os) dating to ore samples from the Akenobe deposit to directly determine the mineralization age of the ore veins. First, to investigate the distribution of Re and Os, we conducted Re-Os mapping by a laser ablation-multiple collector-inductively coupled plasma-mass spectrometer at the Ocean Resources Research Center for Next Generation, Chiba Institute of Technology. The result showed that Re is concentrated in a quartz part with fine (~50 μm) molybdenite in samples from the Chiemon No.4 Cu-Zn-Pb vein. Then, we cut and separated the Chiemon No. 4 ore sample into several pieces and analyzed their Re-Os isotopic composition. As a result, we obtained an age of 76-82Ma (including the errors), which was older than the previously reported ages of other mineral deposits in the Bantan area (66-63 Ma) [1]. In our presentation, we present the analytical result and discuss its implications for the mineralization process of the Akenobe deposit.

Keywords: Hydrothermal deposit, Polymetallic deposit, Akenobe deposit, Molybdenite, LA-MC-ICP-MS, Re-Os geochronology

