High precision $^{182}W/^{184}W$ of ocean island and LIP basalts from deep mantle

ASAKO TAKAMASA[1], KATSUHIKO SUZUKI[1,], YUSUKE FUKAMI[1,2], TSUYOSHI IIZUKA[3]

[1] Submarine Resources Research Center, JAMSTEC, Natsushima, Yokosuka 237-0061, Japan, (*correspondence: katz@jamstec.go.jp)
[2] Faculty of Science, Department of Chemistry, Gakushuin University, Tokyo, 171-8588, Japan
[3] Graduate School of Science, The University of Tokyo, Hongo, Bunkyo, Japan

Among five W isotopes, ^{182}W is a product of β-decay of ^{182}Hf with the relatively short half life of 8.9 m.y. As Hf and W are lithophile and siderophile, respectively, the ^{182}Hf-^{182}W radiometric system could constrain metal-silicate (core-mantle) differentiation, especially core segregation, in the very early Earth system because of its large fractionation between metal-silicate and the short half life of ^{182}Hf. Recent improvements of analytical techniques led to findings of $\mu^{182}W$ anomalies (mostly positive) in old komatiites (2.4 – 3.8 Ga) and young volcanic rocks with positive anomalies of 12 Ma Ontong Java Plateau and 6 Ma Baffin Bay [1] and with negative anomalies of those such as the Loihi and Samoa basalts [2].

We have developed High-precision W isotope ratio measurement with MC-ICP-MS (Thermo co. Ltd., NEPTUNE PLUS) equipped with desolvating nebulizer (ARIDAS II) following the chemical separation using both cation and anion exchange resin. A precision of the isotopic compositions of the W standard solution (SRM 3163) analysis we obtained is ± 5ppm. We have obtained negative $\mu^{182}W$ for the basalts with the high $^{3}He/^{4}He$ isotopic composition from the Loihi, Hawaii, through the developed analytical method. This result is consistent with that of Mundl et al., [2]. As the Earth's core should have a negative $\mu^{182}W$ value of ca. -210, the Loihi sample we analyzed probably contains a component with a signature of core-mantle interaction. We have obtained the high-precision W isotope data for the fresh drilled basalts from Louisville. Louisville is known to have been originated from the primordial deep mantle source. We will discuss the obtained results and the early evolution of the deep mantle.

Acknowledgement: JSPS Grant-in-Aid has supported this project. We are grateful to M. Kawamura for experiment and Y. Orihashi, T. Hanyu, M. Tejada for providing samples.

References: [1] Rizo H. et al. *Science*, 352, 809 (2016). [2] Mundl A. et al. *Science*, **356**, 66 (2017).