[EE] Evening Poster | S (Solid Earth Sciences) | S-IT Science of the Earth's Interior & Tectonophysics

# [S-IT22]Interaction and Coevolution of the Core and Mantle in the Earth and Planets

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Recent observational and experimental investigations have significantly advanced our understanding of the structure and constituent materials of the deep Earth. Yet, even fundamental properties intimately linked with formation and evolution of the planet, such as details of the chemical heterogeneity in the mantle and light elements dissolved in the core, remained unclear. Seismological evidence has suggested a vigorous convection in the lower mantle, whereas geochemistry has suggested the presence of stable regions there that hold ancient chemical signatures. The amounts of radioactive isotopes that act as heat sources and drive dynamic behaviors of the deep Earth are also still largely unknown. We provide an opportunity to exchange the achievements and ideas, and encourage persons who try to elucidate these unsolved issues of the core-mantle evolution using various methods, including high-pressure and high-temperature experiments, high-precision geochemical and paleomagnetic analyses, high-resolution geophysical observations, geo-neutrino observations, and large-scale numerical simulations. Since this session is co-sponsored by geomagnetism, paleomagnetism and rock magnetism division of the SGEPSS, contributions in geomagnetism and geodynamo simulation are also encouraged.

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# [SIT22-P30]High precision $^{182}W/^{183}W$ isotopic compositions of terrestrial samples

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Tungsten (W) has five isotopes (M = 180, 182, 183, 184, 186), and $^{182}W$ isotope is a beta-decay product of derived from $^{182}Hf$ with the short half life of 8.9 m.y. Both Hf and W are highly refractory elements and are accumulated in the early stage of the proto-earth. As Hf and W are a lithophile and is a siderophile elements, respectively, $^{182}Hf$-$^{182}W$ system could give constraints on 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 $^{182}Hf$. Improvement of analytical techniques of W isotope analyses allows us to obtain highly precise $^{182}W/^{183}W$ ratios of vocanic rocks, which leads to findings of W isotope 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 (Rizo et al., 2016) and with negative anamalies of those such as the Loihi basalt.

In our study, high-precision W isotope ratio measurement with MC-ICP-MS (Thermo co. Ltd., NEPTUNE PLUS) has been developed. We have measured W standard solution (SRM 3163) and obtained the isotopic compositions with a enough high precision of ± 5ppm. However, the standard solution, which separated by cation or anion exchange resin, has systematical $^{183}W/^{184}W$ drift of -5ppm. These phenomena was also reported by Willbold et al. (2011). Therefore, we corrected the measured W isotope ratios of samples with the standard solution processed by the same method as that of the samples. This technique leads to the reproducible W isotopic compositions with reproducibility of several ppm. We have obtained the negative $^{182}W/^{183}W$ for the basalts with the high $^{3}He/^{4}He$ isotopic composition from the Loihi, Hawaii, through the developed analytical method. This result is consitent with that of Mundl et al., (2017). As negative anomaly of $^{182}W/^{183}W$ could be created by the early earth core segregation, it is probably a signature of core-mantle interaction.