

SGC065-06

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Tungsten isotope composition of terrestrial rocks: constraints on core-mantle interaction and the accretion of the Earth

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Abundances of trace elements and their isotopes in the earth materials give information on the geochemical evolution of the Earth. ^{182}Hf - ^{182}W is one of the short-live nuclide system, hafnium- ^{182}Hf decays to tungsten- ^{182}W with a half-life of 9.0 Myr. The ^{182}Hf - ^{182}W system is useful for understanding the age of terrestrial core formation and core-mantle interaction. Lack of sufficient data of the tungsten isotopic composition of the Earth's mantle precludes discussion on the equilibration of the Hf-W system at accretion event and core mantle interaction. The scarcity of W isotopic data is resulted from that tungsten isotopic analysis is very difficult due to its low concentration in the Earth's rock.

We improved the existing W purification method, and analyzed W isotope ratio of 65 samples (160 data) from 7 areas by two Multi Collector ICP Mass Spectrometers (MC-ICP-MS). The samples exhibit the same W isotope ratios within the uncertainty of isotope analyses (0.0 ± 0.3). Considering the external reproducibility of the $^{182}\text{W}/^{184}\text{W}$ ratio and the estimated W abundance in the HIMU source mantle from South Polynesia Island, core contributions greater than 0.6% should be detectable in HIMU OIBs. These results also suggest that a perfect equilibration of tungsten isotopic analysis may have been achieved in the Earth's mantle during the accretion event.