OCGC Seminar

Deep mantle domains: Vestiges of the early history of the Earth?

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How much of the chemical heterogeneity present in mantle today dates to processes that occurred during Earth's planetary formation stage remains an unanswered question. Geochemical observations obtained from short-lived radiogenic isotope systems, however, provide important insights. This seminar will present results from the short-lived ^{182}Hf-^{182}W isotope system. Because of its short half-life ($t_{1/2}$=8.9 Ma), this system was only active during the first tens of million years of the solar system. Recent discoveries have reveiled that several mantle plume related rocks show well resolved ^{182}W excesses compared with terrestrial standards that are presumed to be representative of the present bulk mantle. Some of these mantle plume related rocks contain also high ^{3}He/^{4}He and D/H ratios indicative of un-degassed source reservoirs. Altogether, these results indicate that some mantle plumes are tapping one or more un-degassed primordial reservoirs within the Earth. The correlation between the large low seismic shear velocity provinces (LLSVP) imaged by seismic tomography at the base of the mantle, and the distribution of reconstructed eruption sites of large igneous provinces (LIP) and active hotspots, makes the LLSVPs possible candidate domains for the primordial reservoirs.

Refreshments to be served following lecture in 2130 Herzberg Laboratories

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