# Solid metal-liquid metal partitioning of Pt, Re and Os : Implication for Os isotopic anomalies in plume-derived lavas

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Coupled $^{186}Os/^{188}Os$ and $^{187}Os/^{188}Os$ enrichments of plume-derived lavas have been suggested to reflect material contribution from the outer core (e.g., Brandon, 1998). This geochemical hypothesis is based on an assumption that the outer core shows coupled enrichments in $^{186}Os/^{188}Os$ and $^{187}Os/^{188}Os$ ratio, reflecting the decay of $^{190}Pt$ and $^{187}Re$ to $^{186}Os$ and $^{187}Os$, respectively.

In order to examine this hypothesis, partitioning experiments of Pt-Re-Os between solid metal and liquid metal were performed using an MA-8 Kawai-type multi-anvil apparatus at 10-20GPa and 1300-1600C. Starting materials of Fe metal, Ni (7 wt.%) metal and FeS (5 wt.%; S in the bulk) were doped with 3 wt.% of Pt, Re and Os metals. Concentrations of all elements were determined using JXA-8800M electron probe microanalyzer with wave-dispersive spectrometry.

Measured partition coefficients of Pt, Re and Os increase with increasing sulfur content and almost constant with increasing pressure. On the basis of the present experimental results, it is likely to be impossible to generate the required Pt-Re-Os fractionation during inner core crystallization assuming that the light element in the Earth's core is sulfur only. The effect of liquid composition on the partitioning behavior of highly siderophile elements is much more significant compared to the effect of pressure and temperature. Hence, more experimental data on the other iron-light element systems and identification of the light elements in the core are needed.