^{187}Re-^{187}Os isotopic and highly siderophile element systematics of pallasites

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The ^{187}Re-^{187}Os and highly siderophile element (HSE; Re, Os, Ir, Ru, Pt, Pd) abundances in a variety of Main Group Pallasite metals (PMG), including four with anomalous metal (PMG-am), and Cold Bay, a member of Eagle Station grouplet (PES), as defined by Wasson and Choi [1].

A ^{187}Re-^{187}Os isochron age (4524 ± 24 Ma and initial ^{187}Os/^{188}Os = 0.09571 ± 0.00022) of the pallasites examined here is similar to 4484 ± 54 Ma, previously reported by Chen et al. [2], and hints that PMG may be older than IIIAB irons (Smoliar et al. [3]).

Log vs. log concentration plots for HSE of "normal" PMG show much greater scatter than for major iron groups, possibly indicative of isolated pockets of melts that evolved with different D values, perhaps reflecting diversifying S and P contents. In contrast, the same plots for "anomalous" PMG are generally linear, indicating that the relative D values did not change substantially during crystal-liquid fractionation that generated this subset of PMG. The HSE patterns of PES differ from those of PMG, but Pd contents are quite similar.

The HSE of most PMG can be modelled as mixtures of equilibrium solids and liquids in the IIIAB system. Some PMG (e.g., Finmarken and Marjalahti) with low Re/Os ratios, however, are problematic for this model, requiring either a much lower initial ratio for starting system, or a condition that resulted in a major change/reversal in relative Re and Os D values.

References

[1] Wasson J.T. and Choi B.G. (2003) *GCA* **67,** 3079-3096.
[2] Chen et al. (2002) *GCA* **66**, 3793-3810.
[3] Smoliar et al. (1996) *Science* **271**, 1099-1102.