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

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

A ^{187}Re-^{187}Os isochorn 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 may indicate that Re-Os fractionation in the PMG may significantly postdate the IIIAB irons.

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 metal" 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 the PMG, but Pd contents are quite similar.

The HSE of most PMG can be modelled as either mixtures of equilibrium solids and liquids, or mixtures of early-formed solids and evolved 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, oxidation and volatilization loss of Re relative to Os, or a condition that resulted in a major change/reversal in D values of Re and Os.

[1] Wasson J.T. & Choi B.G. (2003) *GCA* **67**, 3079-3096.
[2] Chen *et al.* (2002) *GCA* **66**, 3793-3810.

Nonequilibrium interaction between surfactants and expandable clays

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Wyoming Na-montmorillonite (SWy) and Arizona Ca-montmorillonite (SAz) were interacted with cationic surfactants (hexadecyltrimethylammonium (HDTMA) bromide). HDTMA adsorption onto montmorillonites occurred by adding HDTMA bromide stock solution to the clay dispersion in centrifuge tubes, making the solution concentration equivalent to the cation exchange capacity (CEC) of the clays.

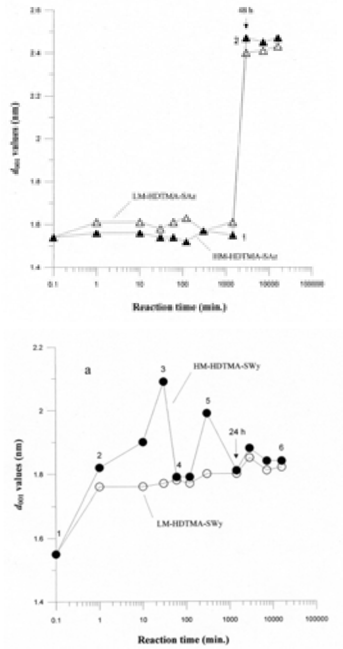

Figure 1: Basal spacing variations of SWy (top) and SAz (bottom) depending on the reaction time after HDTMA loading.

There were some higher expansions of the SWy reacted with high-micellar (HM) HDTMA. Such a large layer expansion occurring within several hours did not happen in the case of the low-micellar (LM) HDTMA. On the other hand, there was not a rapid increase of basal spacings in SAz as compared with SWy, except for a later significant layer expansion just after 48 h reaction.

From the results, it is assumed tha the difference in the adsorption behavior exhibited by the two montmorillonite types partly arises from their intrinsic nature; that is, inorganic cations originally existed on the clay surfaces. Additionally, the micelle concentration of the surfactants affects the development of organomontmorillonite, especially in the intercalant formation and stabilization under nonequilibrium.