Two Noble Families display what happened in their early days

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At the first glance there is nothing similar in behaviour of the refractory highly siderophile noble metals (NM) and the highly volatile inert noble gases (NG). However, all these species are extremely under abundant in the Earth's mantle relative to the solar composition, and this common feature allows them to record processes invisible by other chemical / isotopic systematics.

Since long a post-giant-impact late veneer of chondrite-like material (LV) is widely discussed as a plausible explanation of NM elemental and isotopic abundances in the mantle [1, 2, 3]. Less attention has been attracted to the possibility that this same LV could have delivered to the Earth a volatile-rich material, characterised by, e.g., (almost) solar isotope compositions of He and Ne. Moreover, an enhanced density of this material could also stabilize a noble-species-bearing reservoir (DDP [4]), preventing its intense mixing within the convective mantle.

Chemical transport modeling shows that flux of LV materials from DDP into the mantle could be responsible for chondrite-like relative abundances of NM, solar-like light NG, and contribution of early generated radiogenic Xe isotopes [5]. New results of modeling are presented and discussed.

[1] Wanke *et al*. (1984) Archaean Geochemistry. A. Kroner, *et al*. (eds), Berlin, Springer-Verlag**,** 1-24. [2] Kramers (1998) Chem. Geol. 145, 461-478. [3] Brandon *et al*. (2006) Geochim. Cosmochim. Acta 70, 2093-2103. [4] Tolstikhin and Hofmann (2005) Phys. Earth Planet. Inter. 148, 109-130. [5] Tolstikhin and Kramers (2008) The Evolution of Matter. Cambridge, Cambridge University Press, pp. 520.

Platinum deposits in hardrock of the Konder massif

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The problem of finding of promising ore areas in the bedrock of Ural-Alaska type intrusion, which until recently were considered only as source of placer, is now actual. It is necessary to study the regularities of location of platinum mineralization and to find the new search criteria. Alkaline-ultramafic massif Conder (Aldan Shield, Siberia) is now a major source of mined platinum placers. The rocks, that contain the platinum mineralization, were known until now only in chromitite [1]. Chromite schlieren really are most enriched with platinum (Pt-Fe alloys) and other minerals of platinum group elements (PGM), the content of which is about 0.5 kg/t. Our research has shown the possibility of finding of platiniferous zones unrelated to the chromite ores. Dunites with a rare accessory of chromite also contain platinum grains, ranging in size from 80-120 mμ in fine-grained dunites and up to 1 mm – in pegmatoid dunites.

In addition, intensive platinum mineralization was found in the rocks area near a tectonic contact between dunite and clinopyroxenite in the eastern part of the Konder massif. PGMs occur in dunites as well as in clinopyroxenites. A significant part of the Pt-Fe grains are porous. Cooperite amaunt to about 30% of PGM grains. Iridium, osmium, irarsite, hollingworthite, erlichmanite, laurite, braggite, bowieite, kashinite, ferrorhodsite, nickel-rich equivalent of cuproiridsite and Pd-Pb-S unnamed phase were found in Pt-Fe alloys as inclusions. Pt-Fe alloys are sometimes partially replaced by tulameenite and Pt-Cu alloys.

Thus, chromite ore is not the only determining criterion in the search for platinum ores. Localization of platinum ore at the contact of dunite and pyroxenite, the presence of numerous sulphide and sulfoarsenidov of PGE, associated with platinum, as well as post-magmatic transformations and replacement of primary Pt-Fe alloys – all indicate the active involvement of S-, As-containing fluids in the formation of these deposits. Such conditions can be created within the permeable dunite, enabling for the migration of fluids- and PGE-rich residual melt and cristallization the platinum ore near the contact with a less permeable pyroxenites.

[1] Rudashevsky *et al*. (1992) *Miner. Journ*. **14**(5), 12-22 (in Russian)

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