TRACE ELEMENT DISTRIBUTION IN THE PALLASITE OMOLON. Z.A. Lavrentjeva, A.Yu. Lyul, G.M. Kolesov; Vernadsky Institute of Geochemistry and Analytical Chemistry, Russian Academy of Sciences, Moscow 119991 Russia; e-mail: aval@icp.ac.ru

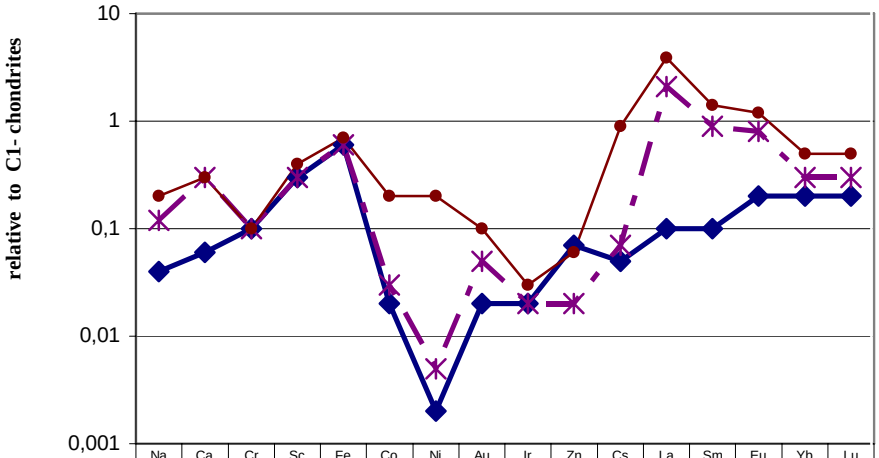
Introduction. The fall down of pallasite Omolon was observed in 1981 in Magadan region, Russia. The total mass of meteorite is about 250 kg. The pallasite Omolon are primarily composed of magnesia olivine and Fe-Ni metal. The preliminary study of olivine crystals shows that the meteorite belongs to main group of pallasites with rather low concentration of fayalite about 12.3 %. The Omolon meteorite is an unusual pallasite having essential portion of the olivine crystals with specific dislocation, which practically no observed in other pallasites [1]. The irradiation age of this meteorite was determined to be equal to 78 ±7 Ma - close to that of other stony-iron meteorites - Patwar, Thiel Mountain, Springwater, Admire [1]. By studying the rare gas isotopic composition also have been concluded that preatmospheric body of Omolon pallasite was rather big - with diameter about 1.5 - 2 meters with corresponding mass about some tens tons [2].

Samples and method. In the present paper the results of elemental abundances in separated fractions from Omolon pallasite are reported. The fractions were selected by handpicking under microscope and by particle-size analysis. Their elemental composition was determined by INAA using a technique for numerical subs traction of the matrix element backgrounds [3].

Results and discussion. Pure olivine grains (Fig 1) have flat to slightly HREE - enriched patterns with positive Eu anomalies and abundances that range from about 0.1 - 0.2 x C1. Olivines in contact whit matrix and with metal (Fig 1) have similar REE patterns. Both are LREE - enriched patterns with negative Eu anomalies and abundances that range from about 0.3 - 3.9 x C1. Troilite, magnetite and daubreelite (Fig 2) have HREE - enriched patterns with positive Eu anomalies and negative Sm anomalies (for magnetite and daubreelite). We observed high REE abundances in 3 fragments (N, O, P) nonmetallic fraction (Fig 3). All fragments have LREE - enriched patterns with positive Eu anomalies (N) and negative Eu anomalies (O, P) and abundances that range from about 8 - 98 x C1. The fragments enriched in Na (2.14 - 9.4xC1), Ca (1.2 - 2.0xC1), Cs (5.1 - 12.8xC1) and Hf (34 - 78xC1). Davis and Olsen [4, 5] observed high REE abundances in Ca and Mg phosphates in nonmetallic fraction. According to their model, REE abundances in the Eagle Station olivine are controlled by three steps: metal-silicate separation, cumulative separation of olivine and a formation of phosphate at olivine- metal boundaries. Apparently, fragments of pallasite Omolon enriched in phosphates.

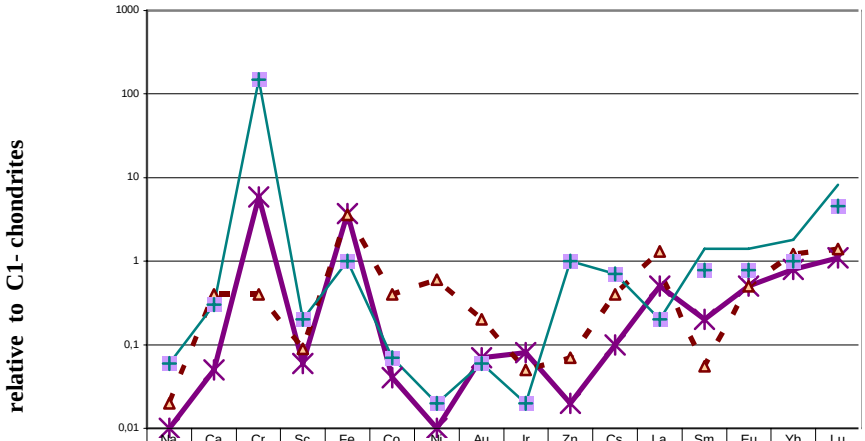
Conclusion. Apparently, the simplest model to explain the observed pattern in pallasite olivine needs two steps: the light REE-enriched phase is removed at first and the olivine crystal is formed as a cumulate later.

References: [1] Bondar Yu.V.et.al.[2002] LPSC XXXIII # 1067. [2] Shukoljukov Yu. A. et al. (1992) Geohimia No.7, pp.923.[3] Shubina N.A. and Kolesov G.M.(2003) Zhur of Anal.Chem.,58,980, in Russian. [4]. Davis A.M. and Olsen E.J. (1991) Nature, 353, 637 [5] Davis A.M. and Olsen E.J. (1996) Meteoretics & Planet. Sci 31, A34 -A35.



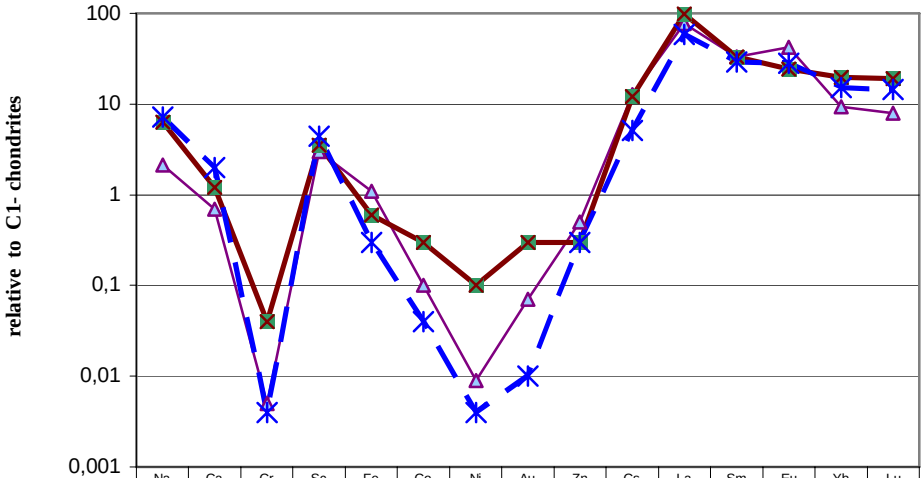
	Na	Ca	Cr	Sc	Fe	Co	Ni	Au	Ir	Zn	Cs	La	Sm	Eu	Yb	Lu
A	0,04	0,06	0,1	0,3	0,6	0,02	0,002	0,02	0,02	0,07	0,05	0,1	0,1	0,2	0,2	0,2
E	0,12	0,3	0,1	0,3	0,6	0,03	0,005	0,05	0,02	0,02	0,07	2,1	0,9	0,8	0,3	0,3
F	0,2	0,3	0,1	0,4	0,7	0,2	0,2	0,1	0,03	0,06	0,9	3,9	1,4	1,2	0,5	0,5

Fig. 1 C1-normalized trace elements abundance patterns for olivine fractions of Omolon pallasite.
ıre olivine; E – olivine in contact with matrix; F – olivine in contact with metal;



	Na	Ca	Cr	Sc	Fe	Co	Ni	Au	Ir	Zn	Cs	La	Sm	Eu	Yb	Lu
G	0,01	0,05	5,9	0,06	3,7	0,04	0,01	0,07	0,08	0,02	0,1	0,5	0,2	0,5	0,8	1,1
H	0,02	0,4	0,4	0,09	3,6	0,4	0,6	0,2	0,05	0,07	0,4	1,3	0,1	0,9	2,2	2,5
L	0,06	0,3	148,8	0,2	1	0,07	0,02	0,06	0,02	1	0,7	0,2	1,4	1,4	1,8	8,2

Fig. 2 C1-normalized trace elements abundance patterns for accessory minerals of Omolon pallasite.
G – troilite; H – magnetite; L – daubreelite;



	Na	Ca	Cr	Sc	Fe	Co	Ni	Au	Zn	Cs	La	Sm	Eu	Yb	Lu
N	2,14	0,7	0,005	3	1,1	0,1	0,009	0,07	0,5	12,8	77,7	33	42,1	9,4	8
O	6,3	1,2	0,04	3,5	0,6	0,3	0,1	0,3	0,3	12,2	98,7	33,4	24,4	19,6	19,1
P	7,2	2	0,004	4,4	0,3	0,04	0,004	0,01	0,3	5,1	58,9	28,9	28	15,1	14,5

Fig.3 C1-normalized trace elements abundance patterns for fragments of Omolon pallasite.
N – fragment 1; O- fragment2; P- fragment3;