COMPOSITION AND STRUCTURE OF METAL PARTICLES IN THE MELNIKOVO (LL6) CHONDRITE. Krot A.N., Zaslavskay N.I., Kononkova N.N. Vernadsky Inst. Geochem. Anal. Chem. USSR Acad. Sci., Moscow, USSR

Melnikovo was classified as an ordinary LL6 unbrecciated slightly shocked chondrite [1]. However there are some features of unequilibrium : chromite and kamacite of variable compositions. We have examined Fe,Ni-metal in the polished sections using optical microscopy, EPMA and SEM.

Fe,Ni-metal forms grains varying in size from 10 to 400 µm and associates with troilite (Tr), chromite, ilmenite, whitlockite, apatite.

Kamacite (Km) is usually polycrystalline (Fig.1), rarely occurs grains with Neumann bands or plate inclusions in taenite (Tn) (Fig.2). The main peculiarity of the Km is variable contents of Co (0.94-2.21 wt.%) and Ni (4.17-7.16 wt.%) either between different grains or within separate polycrystalline grains [1].

Tn is usually polycrystaline and zoned with Ni (31.85-42.43 wt.%), but several other varieties of Tn have been observed.

We have studied clear Tn having low Ni contents (22.31-22.97 wt.%) and relatively high Co (0.99-1.19 wt.%), and remaining clear on etching. It may be ordered Fe3Ni phase [2].

High-Ni (48-53 wt.%) clear Tn (Ttn) forms 1-10 µm wide rims on zoned Tn grains or on the inclusions of Km in them (Fig.2), and also occurs within metal particles of complex structure (Fig.3,4). One particle (Fig.3) is composed by Ttn core (Table 1, an.1) with an inclusion of Ni-Tr (an.2), and zoned Tn with Ttn rim (an.3). The other one (Fig.4) consists of Tn, Ttn, Ni-Tr, Km and associates with massive nearly pure Tr. Zoned Tn (an.4-6) rimmed by Ttn forms an individual grain in the right part and also surrounds polycrystalline Km core (an.7,8) and wide zone of Ttn (an.10-12) with inclusions of Ni-Tr (an.13) and Km. We have analysed small inclusion of Ttn (an.9) in the polycrystalline Km. The metal particle of similar composition and structure had been observed in the Ochansk (H4) chondrite [1].

These data suggest the different ways of the Ttn formation : in equlibrium with Km and Tn [3] and by the decomposition of Fe-Ni-S solid solution. We believe that individual metal particles have experienced different thermal history before accretion. Variable compositions of Km may be point out the lack of thermal metamorphism of the meteorite's parent body.

References: [1] Krot A.N. et al. (1991), this volume [2] Grokhovsky V.I. (1988) Meteoritica , V.47, p.57-60 (in Russian) [3] Affiattalab, Wasson. (1980) GCA, V.44, p.431-447

Composition and structure of metal : Krot A.N. et al.

Table 1

Chemical composition of Fe,Ni-metal and troilite in the Melnikovo chondrite

an.	Fe	Mn	Cr	Ni	Co	Cu	Si	S	P	Σ
1	48.86	n.d.	0.05	47.94	1.21	0.18	0.04	0.02	0.01	98.30
2	61.39	0.03	0.03	0.69	0.07	0.03	n.d.	36.24	0.00	98.47
3	43.55	n.d.	0.00	53.63	0.29	0.11	0.03	0.04	0.00	97.65
4	58.76	0.03	0.01	39.17	0.56	0.24	0.04	0.00	0.00	98.81
5	61.45	0.05	0.03	37.22	0.65	0.24	0.01	0.00	0.00	99.64
6	48.52	0.05	0.00	48.69	0.22	0.33	0.01	0.03	0.00	97.84
7	93.54	0.01	0.01	3.52	1.40	0.00	0.05	0.02	0.01	98.85
8	92.00	0.02	0.00	4.22	1.09	0.00	0.01	0.02	0.00	97.35
9	49.62	0.01	0.00	49.17	0.28	0.16	0.01	0.03	0.01	99.29
10	46.28	0.00	0.00	51.59	0.21	0.39	0.02	0.01	0.00	98.50
11	44.51	0.00	0.03	53.58	1.50	0.21	0.01	0.00	0.03	98.51
12	44.21	0.00	0.04	54.52	0.19	0.22	0.01	0.00	0.01	99.20
13	61.92	0.05	n.d.	0.60	0.00	0.05	n.d.	38.18	0.02	100.83

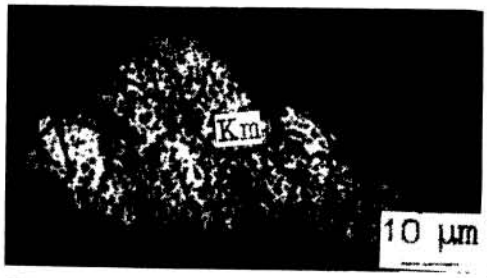

Fig.1.

Fig.2.

Fig.3.

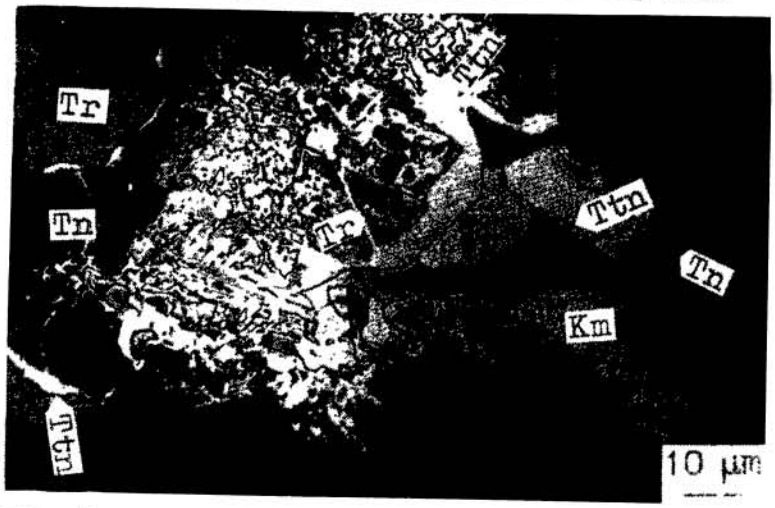

Fig.4.