THE UNUSUAL METALLIC PARTICLES IN KRYMKA LL3.0 CHONDRITE.
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It's shown the composition, structure peculiarities and possible scenario of formation of unusual metallic particles in Krymka LL3.0

In metal released from gentle crushed after removal of chondrules of Krymka LL3.0 chondrite matter were detected two types unusual metallic particles. The first particles type mainly consist of coarse-grained (≥50 μm) kamacite and fine-grained (≤10μm) Ni-high ( ~53wt.% ) taenite. These particles have well-defined zonal structure: kamacite is in central part of particles whereas taenite is in outside and the grains of taenite form the mantle around kamacite. In second particles type Fe,Ni-phase contains only fine-grained Ni-rich taenite. In both particle types there are also fine-grained phosphate, troilite and silicate. Both particle types have mostly rounded to subrounded form. For studing of detected particles some element contents in following fractions of Krymka metal were measured by INAA : a) in primordial metal with particle sizes ≤75 μm, 140-250 μm and ≥250 μm; b) in two fractions of primordial metal ≤75 μm partly etched by 1M HCl and 6M HCl; c) in the fragments of detected particles. These fragments were obtained from rounded and subrounded metallic particles ( 140-250 μm ) after treatment by 6M HCl twice. Every time from obtained mixture of particles were released particles with size ≤75 μm. These particles are most probably fragments of mantle and of second type particles. The remaining particles ( ≥75 μm ) after etching and seaving are probably enriched by coarse-grained kamacite from zonal particles

The analysis obtained data have been shown following:

1) for the most purified from silicate the metal fractions is observed the negative linear correlation Co vs Ni (Fig.1a).The end-members of this dependence are the compositions of monomineral phases of taenite and of kamacite measured by microprobe in zonal and in second type particles. Therefore in most cases in Krymka metal α- and γ-phases there are the equilibrated Ni-Co distribution. According to compositions of α-and γ-phases and Fe,Ni-phase diagram this equilibration was reached at ~300°C

2) On plot Au vs Ni is observed the positive correlation (Fig.1b) but in this case the data are deviated from linear regression more than for dependence Co vs Ni.

3) On plot Ir vs Ni is absent any single correlation (Fig.1c). For metal (140-250 μm) and for its fragments released after etching there is the positive correlation. But for metal ≤75 μm and its fraction after etching can observed slightly negative correlation. It's to be noted on plot Au vs Ni the data for Ir-rich metal fractions are deviated from linear regression in the region of Au-low contents. Therefore, fine-grained fragments detected by us particles differ from fine-grained matrix metal at least by Ir and Au contents.

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We assume the zonal particles were formed by accreted of fine-grained metal particles and Ir-rich submicron metallic grains [1] to surfaces of coarse-grained kamacite. The agglomeration of first two components only has led to formation of second type particles. Later on the short-lived heating event has led only to sintering of the agglomerates. It's to be noted the precursors of fine-grained particles were partially oxidised, perhaps during the formation of the unequilibrated chondrites matrix [2]. As a consequence Ni content in remaining part of metal is increased. Futher increase of Ni content in this metal has occured probably *in situ* during Ni diffusion between metallic particles and Ni interface diffusion at temperature right up to ~300°C. All these processes have led to formation of Ni-rich mantle in zonal particles and the particles from fine-grained high-Ni taenite.

REFERENCES :1 .E.Rambaldi, EPSL, 31, 1976, p.224. 2. H.Nagahara, GCA, 1984, v.48, p.2581.

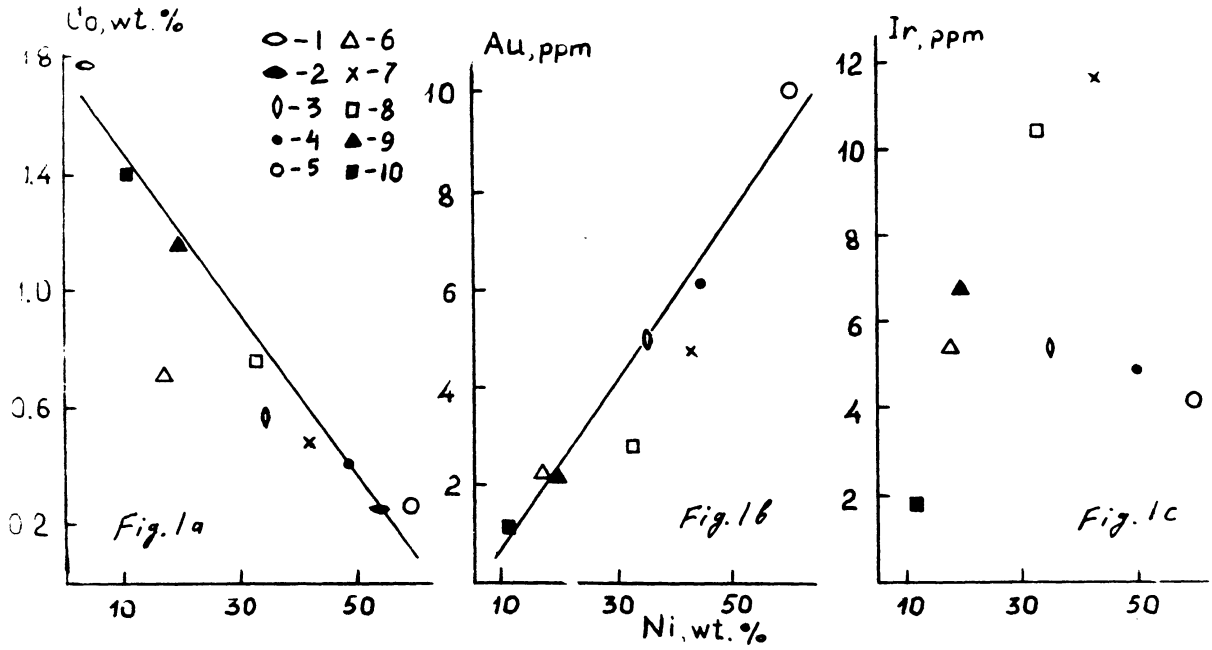


Figure. The correlation of Co, Au, Ir vs Ni in metal Krymka chondrite . 1,2 - kamacite and taenite in particles of 1 and 2 types; 3 -the primordial metal ≤75 μm; 4,5 -the primordial metal ≤75 μm etched with 6M HCl and 1M HCl, respectively; 6 - rounded metal particles ( 140-250 μm ); 7,8,and 9 - the fragments of rounded particles released after treatment with 6M HCl: 7,8 the fragments ≤75 μm after first and second treatment, respectively; 9 -the remaining metal (≥75 μm); 10 - the metal particles ≥250 μm