THE SYCHEVKA IIIA IRON METEORITE. Krot A.N., Zaslavskay N.I., Petaev M.I., Kononkova N.N., Kolesov G.M., Barsukova L.D. Vernadsky Inst. Geoch. Analyt. Chem. USSR Acad. Sci. Moscow, USSR

The Sychevka iron meteorite weighing about 65 kg was found in 1988. The polished and etched (in 2 vol.% nital) sections were studied by optical microscopy and electron microprobe The chemical composition was determined by INAA.

The meteorite is characterized by common set of minerals (kamacite, taenite, troilite, schreibersite, chromite) which compositions are listed in Table 1.

Kamacite and plessite of variuos textures (net, felsite) form a Widmanstaten pattern. There are four generations of Neumann bands in the kamacite suggesting several shock events suffered by the meteorite. The average bandwidth was found to be 1.5 mm, that is in the range for medium octahedrites [1].Kamacite also occurs as inclusions in schreibersite and in that case it is characterized by low contents of Ni in comparison with the other varieties of the mineral.

Taenite is ussually zoned and surrounds the plessite fields or is a part of their composition. There are a lot of rounded schreibersite -metal droplets in a thermally heated edge zone of the meteorite. The metal in the droplets is enriched in P (1.76 wt.%) and Ni (20.25 wt.%).

Schreibersite occurs as inclusions within kamacite bands and plessite fields or surrounds the latters.We have observed the brecciation zone (1x2 mm)composed of the fragments of troilite, schreibersite and chromite. Chemical composition of schreibersite indicates the different formation temperatures [2]. The melted schreibersite in assosiation with the Fe,Ni-metal differs by low contents of P, Ni and high Co (Table 1).

Trolite is a rare mineral in the Sychevka. It was observed on the cut meteorite surface as a monomineral nodule (20x16 mm), in the intergrowth with schreibersite and as a component of the Reichenbach lamellae and the brecciation zone. All types of troilite are very similar in composition.

Chromite is a quite pure chromite (MgO 0.00; Al2O3 0.07; SiO2 0.02; TiO2 0.00; FeO 34.8; Cr2O3 65.04; MnO 0.41; V2O3 0.09; ZnO 0.77 wt.%).

The contents of Ga (23.6 ppm), Ni (9.1 %), Au (1.1 ppm), Cu (185 ppm) and Ir (0.37 ppm) in the Sychevka are in the range of chemical group IIIA of iron meteorites [1,3].

References: [1] Scott E.R.D., Wasson J.T. Revs Geophys. Space Phys., 1975, V.13, N4, p.527-546, [2] Clarke R.S., Goldstein J.I. Smithsonian Contrib. Earth Sci.,1978, N 21, p.1-80, [3] Malvin D.J. et al. GCA, 1984, V.48, N4, p.785-804

The Sychevka IIIA iron meteorite: Krot A.N. et al.

Table 1

Chemical compositions of the minerals

	1		2		3	4		5
	$\bar{X}$	σ	$\bar{X}$	σ	$\bar{X}$	min	max	$\bar{X}$
Fe	91.59	1.14	91.21	1.55	95.32	65.62	87.69	78.91
Cr	n.d.		n.d.		0.03	n.d.	n.d.	n.d.
Ni	6.01	0.75	6.74	0.55	4.95	11.30	32.52	20.25
Co	0.65	0.05	0.61	0.05	0.65	0.17	0.50	0.38
S	n.d.		n.d.		0.05	n.d.	n.d.	n.d.
P	0.09	0.07	0.07	0.04	0.08	0.00	0.05	1.76
Σ	98.34		98.63		101.08			100.38

	6		7	8	9		10	11
	$\bar{X}$	σ			$\bar{X}$	σ		
Fe	59.96	0.62	52.67	43.42	45.20	3.14	47.42	64.22
Ni	24.77	0.63	32.64	43.24	39.45	3.24	37.20	27.53
Co	0.19	0.02	0.19	0.14	0.13	0.04	0.08	0.35
P	15.38	0.26	15.75	15.13	15.34	0.21	15.05	8.65
Σ	100.30		101.25	101.94	100.12		99.75	100.79

	12		13
	$\bar{X}$	σ	
Fe	67.96	1.65	61.98
Ni	22.41	1.28	0.01
Co	0.37	0.04	0.04
P	10.81	0.68	0.00
S	n.d.	n.d.	36.86
Σ	101.55		98.89

1-3-kamacite:1-band, 2-within plessite,3-inclusions in schreibersite; 4-taenite;5-Fe,Ni-droplets in a melted schreibersite; 6-12-schreibersite:6-in the kamacite bands,7-in an a_2-phase with an inclusion of a_2,8-with an inclusion of kamacite,9-within or around plessite,10-11-near the thermally heated zone:10-unmelted, 11-melted,12-with the droplets of Fe,Ni metal,13-troilite