Content

Certificate information

Object for sertification is a polished fragment of Chinga meteorite with daubréelite-troilite lamellar aggregates.

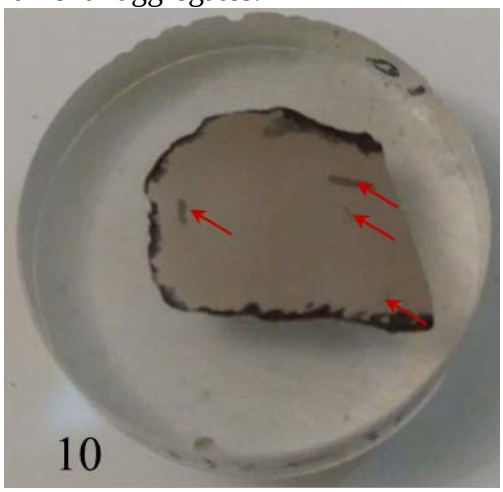

Fig.1. Photo of certified specimen.

Similar polished tablet from the same meteorite fragment stored in scientific collection of Fersman Mineralogical Museum (number FMM_FN174).

This certificate was written by Pavel Plechov from Fersman Mineralogical Museum. Original version of the certificate could be downloaded from Fersman Mineralogical Museum WWW-server (File FMM_Certificate_2018-33-10).

Results

Iron meteorite Chinga was classified as ataxite IVB with bulk composition (in wt.%): Fe -82,8, Ni - 16,6, Co - 0,55, P - 0,05 [Schaudy et al.,1972]. The main mineral in the Chinga meteorite is plessite.

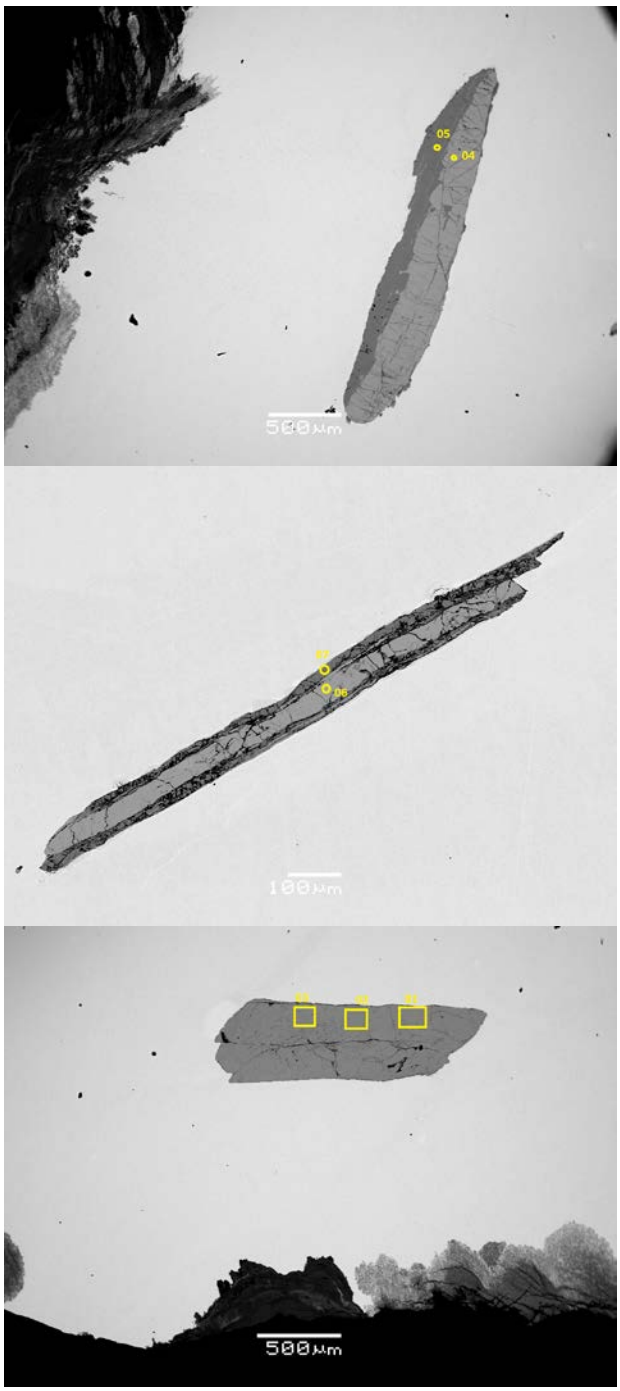

Fig.2 Daubreelite-troilite lamellar aggregates in plessite matrix.

This spacemen is extremely rich in large daubreelite-troilite lamellar aggregates. Four largest of them are shown by red arrows in Fig.1. All daubréelite-troilite aggregates are well distinguishable by the eyes. Largest aggregate has elongated shape, approximately 3.5 mm length and 0.3-0.4 mm width.

One aggregate consists of very thin ribbons of troilite and dobreelite. It allows measure bulk composition of troilite-daubreelite aggregate by area (see first three analyses in the Tabl.1). Bulk composition of this aggregate could be recalculated to formulae of some primary (still unknown)

mineral $Fe_5Cr_2S_8$. Decomposition of the primary mineral to daubréelite and troilite should reflect primary molar ratio 1:4 of these minals in primary unknown mineral.

Table 1. Microprobe analyses in studied spacemen

No	Phase	Fe	Mn	Cr	Ni	Co	V	S	Total
1	Area x500	42.92	0.27	15.36	0.13	0.17	0.36	38.7	97.91
2	Area x600	42.42	0.35	15.45	0.28	0.18	0.37	38.96	98.01
3	Area x600	42.02	0.19	15.87	0.14	b.d.l.	0.33	38.68	97.23
4	Troilite	61.41	0.18	1.25	b.d.l.	b.d.l.	0.39	36.62	99.85
5	Daubreelite	18.12	1.19	35.62	b.d.l.	0.2	b.d.l.	43.82	98.95
6	Troilite	61.7	0.1	0.99	b.d.l.	0.23	0.39	36.5	99.91
7	Daubreelite	19.14	0.61	35.15	0.14	b.d.l.	b.d.l.	43.74	98.78

Comments: all values in wt.% of elements, b.d.l. – below detection limit, Area x500 and Area x600 – analyses of troilite-daubreelite aggregate by scanning of area with magnification 500x and 600x retrospectively.

Daubreelite analyses correspond in average to formulae

$$\mathbf{Fe_{1.01}Cr_{1.99}S_4}$$

These daubréelite analyses contain small amounts of Mn (0.61-1.19 wt.% - see Tabl.1).

All troilite analyses correspond to formulae

$$\mathbf{Fe_{0.97}Cr_{0.02}S}$$

Impurity of Cr for troilite and excess of Fe in daubréelite are typical for daubréelite-troilite aggregates.

Literature

Buchner, E., Schmieder, M., Kurat, G., Brandstätter, F., Kramar, U., Ntaflos, T., & Kröchert, J. (2012). Buddha from space—An ancient object of art made of a Chinga iron meteorite fragment. Meteoritics & Planetary Science, 47(9), 1491-1501.

Schaudy, R., Watson, J. T., & Buchwald, V. F. (1972). The chemical classification of iron meteorites. VI. A reinvestigation of irons with Ge concentration lower than 1 ppm. Icarus, 17(1), 174-192.

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