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Certificate information

Object for certification is a polished fragment (two pieces) of Chinga meteorite with daubreelite-troilite lamellar aggregates.

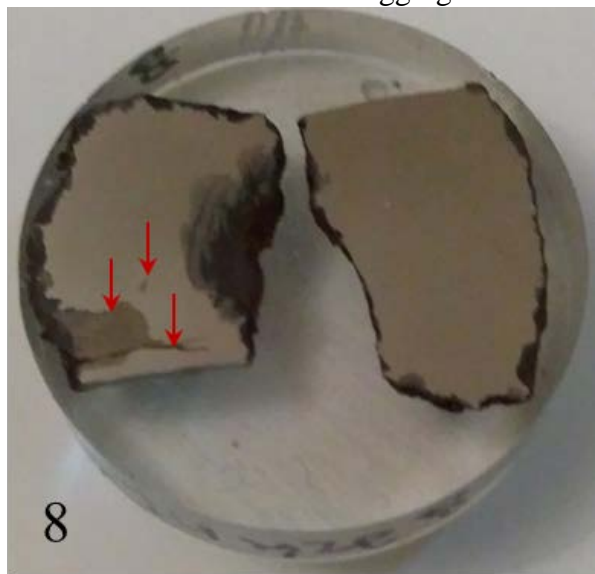


Fig.1. Photo of certified specimen.

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_2018-33-8).

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.

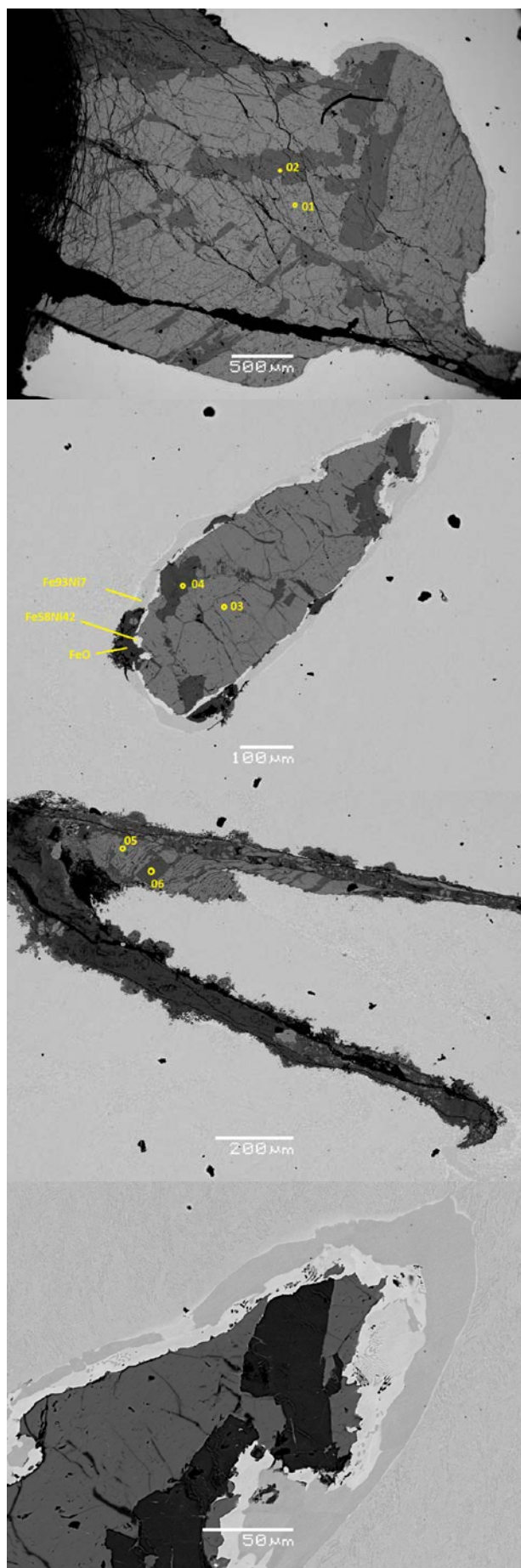


Fig.2 Daubreelite-troilite lamellar aggregates in plessite matrix.

Table 1. Microprobe analyses in studied spacemen

No	Phase	Fe	Mn	Cr	Ni	Co	V	S	Total
1	Troilite	61.4	0.27	1.14	b.d.l.	b.d.l.	0.26	35.92	98.99
2	Daubreelite	17.85	1.43	35.18	b.d.l.	b.d.l.	b.d.l.	43.32	97.78
3	Troilite	61.63	0.12	0.98	b.d.l.	0.26	0.27	35.73	98.99
4	Daubreelite	18.32	1.46	35.17	b.d.l.	0.19	b.d.l.	43.28	98.42
5	Troilite	60.87	b.d.l.	0.87	0.81	0.22	0.23	35.68	98.68
6	Daubreelite	18.13	1.15	35.1	0.18	b.d.l.	b.d.l.	43.2	97.76

Comments: all values in wt.% of elements, b.d.l. – below detection limit

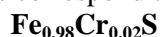
This spacemen is extremely rich in large daubreelite-troilite lamellar aggregates. The largest of them is a 5-mm rounded bleb with two elongated appendages 3 and 4 mm length respectively (see Fig.2). All daubreelite-troilite aggregates are well distinguishable by the eyes.

Daubreelite analyses correspond in average to formulae



Analyses are close to ideal formulae of daubreelite (FeCr_2S_4). These daubreelite analyses contain significant amounts of Mn (1.15-1.46 wt.% - see Tabl.1), which correspond to 0.06-0.08 formulae unit. Manganese content in this specimen is very high comparable to average for daubreelite in Chinga meteorite (0.78 wt.% of Mn). Enrichment in Mn possibly related with late stage of recrystallization of primary aggregate. Plessite also recrystallized to kamacite and taenite near daubreelite-troilite aggregates (see fig.2).

All troilite analyses correspond to formulae



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

Literature

Buchner, E., Schmieder, M., Kurat, G., Brandstätter, F., Kramar, U., Ntaflos, T., & Kröcher, 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.

Date: 2018, June 07