

SLAGHEK'S IRON: A REDISCOVERED IIIAB IRON METEORITE. V.Moggi-Cecchi¹, S.Carpino¹, S.Caporali^{1,2}, G.Pratesi³, F. Manenti⁴, ¹Museo di Scienze Planetarie, Via Galcianese 20/h, I-59100 Prato, Italy, e-mail v.moggi@pratoricerche.it, ²Dipartimento di Chimica, Università degli Studi di Firenze, Via della Lastruccia 3, 50019, Sesto Fiorentino, ³Dipartimento di Scienze della Terra, Via G. La Pira 4, I-50123, Firenze, Università degli Studi di Firenze, Italy, ⁴Museo di Storia Naturale del Mediterraneo, Via Roma 234, I-50127 Livorno

Introduction:

Iron meteorites are considered fragments of differentiated asteroidal cores which, after their formation, underwent such extremely intense impact events that they lose their external layers and became exposed to further impact phenomena. The Slaghek's Iron meteorite is a nice specimen belonging to the III AB group of iron meteorites, that fell in an unknown locality of the Atacama Desert, Chile, where it has been recovered presumably at the end of the 18th century. The meteorite displays an external surface covered by several small-sized regmaglypts formed during the crossing of the terrestrial atmosphere (Figure 1). A cut and etched surface displays a clearly distinguishable Widmanstaetten pattern due to the intergrowth of kamacite and taenite laths (figure 2). The meteorite was accidentally found in 2010 during a recognition of the repositories of the Museo di Storia Naturale del Mediterraneo. When it was found the meteorite was accompanied by a label indicating the catalogue number 2865 and the following sentence: "Iron meteorite (octahedrite with schreibersite inclusions), Atacama Desert, Northern Chile, gift of the Commendatore Gino Slagheck, studied by Prof. Mario Bertolani", besides to the results obtained via wet-analyses performed by Bertolani [1,2] (tabella 1, column A). In this label there was neither mention of the official name of the meteorite nor of the circumstances of the acquisition to the Museo di Storia Naturale del Mediterraneo collections.



Figure 1: photographic image of the main mass of the Slaghek's Iron meteorite displaying several regmaglypts; a distinct Widmanstaetten pattern is visible on the cut surface.
FOV = 12 cm



Figure 2: photographic image of the type specimen of the Slaghek's Iron meteorite (MSP 5193) which provided the fragments for textural and compositional analyses. FOV = 7 cm

Experimental and bibliographic data

Aiming to get a classification of the meteorite according to the modern parameters the sample has been sent to the Museum of Planetary Sciences of the Provincia di Prato, Italy, where a fragment has been analyzed by means of mass spectrometry to determine its minor and trace elements contents (inv. # MSP5193, figure 2). Analyses have been performed at the Dipartimento di Chimica dell'Università di Firenze by mass spectrometer.

	Slaghek's Iron		
	A	B	C
Fe	89,81	-	-
Ni	7,89	8,77	8,82
Co	0,67	0,51	0,53
P	0,34	-	-
S	0,07	-	-
FeO	0,78	-	-
SiO ₂	0,05	-	-
Cu*	-	188,00	186,00
Ga*	-	22,00	24,00
Ge*	-	51,00	53,00
As*	-	8,53	8,47
W*	-	0,77	0,73
Ir*	-	0,45	0,45
Au*	-	0,99	0,98

Table 1: results of compositional analyses on minor and trace elements of the Slaghek's Iron meteorite: a) Bertolani, 1950 (Wet-analysis); b) Wasson, 1998 (INAA); c) Rugi, 2011 (MS); all data are in wt. %, apart from those marked with * (in $\mu\text{g/g}$)

Textural analyses performed by means of metallographic microscope at the Museum of Planetary Sciences and of scanning electron microscope at the Dipartimento di Chimica dell'Università di Firenze allowed to determine the mean kamacite bandwidth (0.8 mm) and to texturally classify the meteorite as a mean grain-sized octahedrite (figure 3).

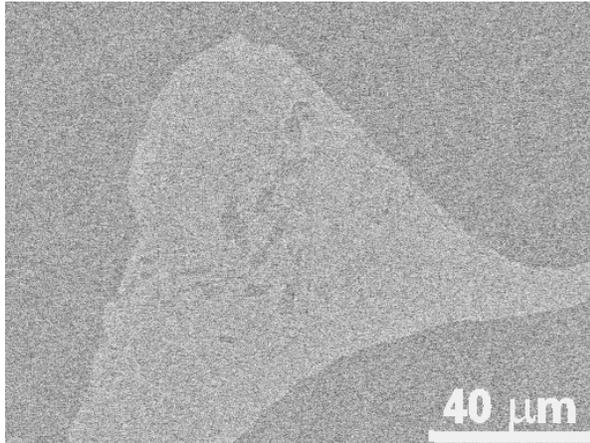


Figure 3: scanning electron microscope image of a fragment of the type specimen sample MSP 5193: pale gray = taenite; dark grey = kamacite

In order to get further information, a bibliographic search has been performed in the Catalogue of Meteorites [3] and in the Meteoritical Bulletin Database (<http://www.lpi.usra.edu/meteor/metbull.php>). The search in the Catalogue of Meteorites using the keywords "Atacama Desert" provided results on a meteorite named Slaghek's Iron, a 1.9 Kg meteorite found in an unknown locality of the Atacama desert around 1900 and donated by G.H. Slaghek-Fabbri to the Technical Institute of Livorno. In the report are also indicated the results of the analyses performed by Bertolani [1,2] and those performed by Wasson [4,5] on a small fragment provided by the Università di Modena in 1998 (table 1, column C). The search in the Meteoritical Bulletin provided similar results. Either in the Catalogue and in the Bulletin there is no mention of the location both of the main mass and of the type specimen, which therefore had to be considered officially lost.

Discussion and conclusions

Through the comparison of the new analytical and textural data, which point to a classification as IIIAB iron meteorite, with previous analyses and bibliographic data it has been possible to understand that the specimen was moved from the collections of the Istituto Tecnico di Livorno to those of the Museo di Storia Naturale di Livorno and that the information about the sample's name had been lost. It has been therefore

possible to assign the official name Slaghek's Iron to the unknown meteorite. The two samples belonging to the Museum of Planetary Sciences and to the Museo di Storia Naturale del Mediterraneo can be therefore considered the type specimen and the main mass of the meteorite, respectively. A separate entry with new analytical data and the location of the type specimen and of the main mass has been sent to the Meteoritical Society Nomenclature Committee for the publication on the electronic and paper version of the Meteoritical Bulletin.

References: [1] Bertolani (1950a) *Period. Miner.*, **19**, 127-137; [2] Bertolani (1950b) *Rend. Soc. Min. Ital.*, **6**, 29; [3] Grady (2000), "Catalogue of Meteorites, 5th ed.", *CUP ed.*, pp. 696. [4] Wasson et al. (1998) *GCA*, **62**, 715-724; [5] Wasson et al. (1998) *MAPS*, **33**, 175-179;