KAPOSFÜRED: A NEW IVA-TYPE IRON METEORITE FROM HUNGARY. ***Bérczi Sz.*[1,2] *Földi T.*[3], *Kubovics I.*[1], *Simonits A.*[4], *Szabó A.*[5],** [1] Eötvös University, Dept. Petrology and Geochemistry, H-1088 Budapest, Múzeum krt 4/a, [2] Eötvös University, Dept. G. Technology, H-1088 Budapest, Rákóczi út 5., Hungary [3] GEMINILUX, H-1117 Budapest, Irinyi u. 36/b. Hungary, [4] Central Res. Inst. Physics, KFKI-AEKI, H-1525 Budapest, 114. P.O.Box 49. [5]GRANMA, H-2330 Dunaharaszti, Kossuth u. 90/a. Hungary. (berczi szani@ludens.elte.hu)

Abstract: An iron meteorite fell in Kaposfüred, Somogy County, Hungary, on May 7, 1995, at 3 a.m. (Geographical coordinates are: 17° 46' E longitude and 46° 25' N latitude.) The meteorite arrived from NE direction with high inclination path and excavated a ca. 1 meter deep crater in the garden of a local priest. The mass of the meteorite is 2.2 kg, its density is 8.14 g.cm^3. INAA studies showed, that Kaposfüred belongs to the IVA group of irons.

The History of the Fall: On the evening of May 6, 1995, Mr. M. Török, a parish reverend of the Kaposszerdahely Roman Catholic Parochy, decided that he would get up early in the morning to scythe the grass in his garden. Next dawn he was awakened by some brightness outside and while opening the door he observed the impact of a bright object at a distance of 7-8 m in his garden. He felt the turbulence caused by the incoming body and observed its shining tail. Since all this happened during the Bosnian war, his first idea was that a projectile had landed. He consulted his watch: it was 3 a. m. He went back to sleep and about 2 hours later he examined the mysterious object and found that it had dug up the soil in East-West direction. The diameter of the crater was about 1.5 meter and its depth was 1.1 meter. The crater was elongated towards Western direction and this fact signified the East-North-East arrival path. He also observed, that the projectile had decapitated one of his pine trees and melted the aluminium washing line. Then the priest tried to take out the object from the crater which melted his spade. Finally he managed to excavate it and put it in a bucket of water which was evaporated immediately.

This was how Rev. Török related the first appearance of an iron meteorite in this century in Hungary. (Found irons are Magura and Lénártó, from the last century)

The Shape: The shape of the iron meteorite is regular in that sense that it is sculptured by a few larger and smaller bowls. These bowls are separated from each other by sharper or more or less rounded crests. The shape of these oval and concave forms remembered one of us (T.F.) to be very similar to those small cavities, which develop on the anode in electronic tubes. During the operation of this instrument the strong stream of ions produces small cavities on anodes. Similarly, the larger, concave bowls on the surface might have been developed in an electrostatic ion-stream cavitation process while the body orbited the Sun. Therefore we suggest a model how this bowl shaped structure may be produced in a cosmic ion-stream excavation process.

Orbital Electrostatic State of a Conducting Iron Body: The surface of the orbiting iron meteorite body is always bombarded by the UV radiation of the sun, therefore they get enough energy for outer surface electrons to escape. This escape of electrons remains extra positive charge on the orbiting body, which slowly begins to work as an anode, because of its very high, some millions of volts electrostatic charge. Although initial liberation of Fe ions is random on the surface, the activized points step by step become "collectors" of the magnetic flux, so lines of magnetic force are denser in the vicinity of the forming bowls.

INAA Measurements for Classification of Kaposfüred: Preliminary EPMA studies (1) showed that the Ni content of the meteorite is 7.8 wt %. This and the fine lamellae of its Widmannstadten bands showed that Kaposfüred is a fine-octaedrite.

Small pieces (10-15 mg) of the Kaposfüred iron were analysed by nondestuctive neutron activation analysis (INAA) at the Budapest Research Reactor (Nominal power: 10 MW, average thermal flux: 5 10^{13} n/cm^{2}s). Following short (5 min) and long (24 hr) irradiation the samples were measured on a state-of-the-art Ge gamma-ray spectrometer (Canberra, USA) and the recorded spectra were evaluated by the Hypermet PC and KAYZERO program packages using the k_0-standardization method.

Summary: From (2) and (3) we could safely classify this new iron to the IVA group. On the basis of (4) it is probable, that Kaposfüred is a fragment of Asteroid 1986 DA.

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INAA RESULTS OF THE "KAPOSFÜRED-95" METEORITE - fell in Hungary on May 7, 1995

Element	Concentrations in ppm with rel. unc. (%)				**Weighted avg. conc. with rel. unc. (%)**		Conc. Range Class IVA ppm	NOTES
	Short irradiation*		Long irradiation**		**ppm**	**(%)**	(MALVIN 1984)	
Cl	4.0	(20)	-		**4.0**	**(20)**		*Weight: 14.1 mg
V	0.23	(7)			**0.23**	**(7)**		**Weight: 17.3 mg
Cr	0.21	(5)	0.20	(0.6)	**0.20**	**(2.5)**		
Fe	89.3%	(0.5)	88.2%	(0.3)	**88.5%**	**(0.6)**		
Co	0.389%	(0.3)	0.378%	(0.1)	**0.379%**	**(1.5)**	0.35%-0.45%	
Cu	154	(4)	142	(4)	**148**	**(4.1)**	100-200	
Ga	2.8	(10)	2.1	(4.3)	**2.21**	**(16)**	1.6-2.4	
Ni	7.82%	(0.7)			**7.82%**	**(0.7)**	**7.4% - 12.0%**	
As	3.5	(1.6)	3.45	(0.7)	**3.46**	**(0.7)**	1.7-18	
Ru	-		4.5	(15)	**4.5**	**(15)**	3-5[+]	[+]SCOTT 75
W	0.6	(6.2)	0.70	(4.3)	**0.67**	**(7.5)**	0.2 -0.8	
Re	0.24	(6.3)	0.23	(5.7)	**0.23**	**(2.1)**		
Os	3.0	(19)	2.9	(3.5)	**2.90**	**(1.7)**		
Ir	2.49	(1.1)	2.40	(0.6)	**2.42**	**(1.9)**	0.1-4	
Au	0.89	(0.5)	0.85	(0.2)	**0.86**	**(2.3)**	0.5-2.3	

References: (1) Kubovics I., Bérczi Sz. Ditrói-Puskás Z., Gál-Sólymos K., Nagy B., Szabó A. (1997): *Acta Mineralogica et Petrographica, Szeged,* **XXXVIII.** (in press), (2) Scott, E.R.D., Wasson, T.J. (1975): *Reviews of Geophys. Space Phys.* **13.** No. 14. 527-546. (3) Malvin D.J., Daode Wang, Wasson, T.J. (*1984): Geochim. Cosmochim Acta,* **48,** 785-804. (4) Ostro S.J., Campbell D.B., Chandler J.F., Hine A.A., Hudson R.S., Rosema K.D. Shapiro I.I. (1991) *Science,* **252**. 1399-1404.