HUOYANSHAN IRON METEORITE: BULK CHAMICAL COMPOSITION AND CLASSIFICATION.

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Introduction: The first piece of iron meteorite Huoyanshan was found on Oct. 6, 2016, by Mr. Yanzheng Wang, et al. at 15 km NE of the Mountain Huoyanshan. It was approved by the Meteorite Nomenclature Committee and published in MB106 [1]. And now, it is estimated that thousands pieces with a total mass more than ~700 kg have been collected with a piece weigh from100 g up to 8.9 kg.

Experiments: All trace elements are measured by a X Series 2 ICP-MS instrument (Thermofisher Scientific, USA). Major elements of Fe and Ni were measured using a VISTA-PRO, CCD simultaneous inductively coupled plasma-optical emission spectroscopy (ICP-OES, Varian Inc., USA). Details on interference corrections and the analyzing procedure were same as Wang et al.(2016) [2]. All chemical procedures and instruments were performed at the State Key Laboratory of Isotope Geochemistry, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences (GIG, CAS). Major chemical compositions of minerals were analyzed using a JXA8230 electron probe microanalyzer (EPMS) at the Institute of Geology and Geophysics, CAS. The beam current was 20 nA, and the accelerating voltage was 15 kV.

Petrology and minerals: It is a finest octahedrite, with Widmanstätten pattern consisting of kamacite (band width of <0.035 mm) and taenite. Kamacite contains 4.6-7.0 wt% Ni. Taenite shows a typical M-type zoning with Ni content decreasing from 36.7 wt% at the rims to 25.7 wt% at the cores. Minor schreibersite (～47.8 wt% Ni, ～15.1 wt% P) usually occurs within kamacite.

Bulk chemical composition: The Nantan is a IAB-MG iron which have a large recovery mass and have been analyzed many times by different researchers. To verify the accuracy of the data, two duplicate pieces of Nantan iron meteorite were measured in this study. The results show that the data are consistent on two duplicate samples and with published data. Therefore, the acurrancy is well in this study. The bulk chemical compositions of Huoyanshan are listed in Table 1.

Table 1. The chemical composition of Huoyanshan.

Name	Type	wt %		ppm														
		Ni	Co	P	Cr	Ga	Ge	As	Ru	Rh	Pd	Sn	W	Re	Os	Ir	Pt	Au
Nantan-1	IAB-MG	7.8	0.44	0.12	8.2	74	281	12	4.2	1.2	3.1	4.6	1.1	0.15	0.71	1.7	4.8	1.5
Nantan-2	IAB-MG	7.8	0.43	0.13	12	71	265	12	4.1	1.1	3.1	4.4	0.66	0.15	0.95	1.6	4.6	1.5
HYS	IAB-sLH	22	0.62	0.11	9.1	1.1	1.7	30	0.07	0.06	8.8	10	1.1	0.002	0.04	0.02	0.04	2.0

Note: Ni and Co were measured by a ICP-OES, trace elements were measured by ICP-MS. HYS – Huoyanshan iron meteorite.

Classification: The bulk chemical compositions of Ni (22, wt%) and Ir (0.02), Ga (1.1), and Ge (1.7 ppm) were ploted on log-log plots of Ga-Ni, Ir-Ni, and Ge-Ni, which were usually used as iron meteorite classification [3]. All of them were in the IIICD areas which have been grouped in IAB-complex [4] at present. Subsequently, the values of Ni, Co (0.62 wt%), As (30 ppm), Ga and Au (2.0 ppm) were ploted on log-log plots of Ni, Co, As, Ga vs. Au [4], and all of them were in areas of a subgroup of sLH. Worsham et al, (2016) [5] measured PGEs and Re-Os isotopes of 3 sLH iron. The characteristics of Huoyanshan PGEs are agree with those data from Worsham et al, (2016) [5].

Conclusions: Huoyanshan iron meteorite is an typical IAB-sLH. Until now, there are only 10 IAB-sLH iron were approved by the Meteorite Nomenclature Committee including Huoyanshan iron. Huoyanshan iron meteorite is significant to provid more information on research of IAB-sLH.

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