ELECTRONIC PROBE STUDY OF DHAJALA (H3.8) METEORITE'S MAIN MINERALS.

Voropaev S.A.[1], Dushenko N.V.[1], Fedulov V.S.[1], Senin V.G.[1]

[1]V.I. Vernadsky Institute of Geochemistry and Analytical Chemistry RAS, Kosygina 19, Moscow

Introduction: The study of the meteorites' mineral composition is necessary to understand both the processes in the early Solar system and for the formation conditions of theirs parent bodies. It also determines such physicochemical properties important for the asteroids evolution as strength [1], thermal conductivity, and the possibility of preserving gases and water. As a rule, silicates form up to 90% of the composition of ordinary chondrites and knowledge of their chemical composition allows using Raman spectroscopy to "cut off" this bulk, thereby extracting unique minerals [2]. This is especially true of chondrites of the lowest petrological types, up to 4, since they may contain pre-solar mineral relics, such as diamonds and SiC. In this paper, the main mineral composition of Dhajala chondrite, type H3.8, is investigated as the first stage necessary for subsequent degassing experiments. The fall of the Dhajala meteorite occurred on January 26, 1976 near the town of the same name in India [3]. Samples of this meteorite were transferred to us for research from the collection of Academician E.M. Galimov, GEOKHI RAS.

Methods: The study of the chemical composition of the main minerals of the chondrules and matrix was carried out on the CAMECA SX 100 electronic probe. Basic measurement parameters: the current is 10 mA, the voltage is 15 keV. The analysis showed the presence of partially balanced olivines, pyroxenes and plagioclase (Na-Ca solid solutuions, mainly). Also, numerous FeNi grains of kamasite, taenite and FeS troilite were found. We investigated both the chondrite substance before heating and after heating at temperatures of 300 C and 700 C. Figure 1 shows electronic photographs of BSE samples. The development of cracks in mineral grains after heating is noticeable.

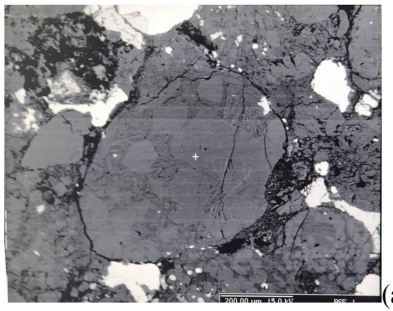
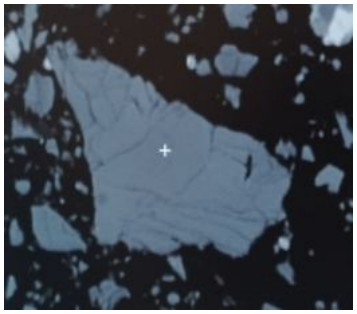

(a)

(b)

Figure 1. (a) General view of Dhajala chondrite before heating; (b) pyroxene grain after heating at 700 °C

Results and Discussion: Main minerals which compose the H3.8 Dhajala (olivine, orthopyroxene, oligoclase) are presented in Table 1. The presence of plagioclase makes it possible to use Raman spectroscopy methods for more detailed phase analysis in the future [4].

Table 1. Chemical composition of the main silicate mineral phases of the Dhajala (H3.8) meteorite.

Na2O	K2O	CaO	MgO	SiO2	Al2O3	FeO	Total, wt%
0	0,01	0,06	42,2	39,66	0,01	19,04	101,34
0,03	0	0,17	35,18	58,71	0,22	5,56	100,63
7,82	0,56	3,98	2,65	63,14	19,84	1,15	100,01
0	0,01	0,52	55,75	42,98	0,16	1,02	100,61
3,36	0,05	1,09	27,57	47,17	7,64	12,52	100,39
5,24	0,28	11,99	5,88	56,63	17,17	1,43	99,72

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References:

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