PRIMITIVE PROPERTIES OF THE HEYETANG L3 CHONDRITE.

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Introduction: The Heyetang meteorite fell on rice field in Heyetang village, Xinshao County, China, in 1998. The stone weighed 2.5 kg, and was classified as a L3 chondrite. In order to assess the primitive property of this new meteorite, a detailed petrographical study has been carried out, and the results will be presented in the meeting.

Results: The Heyetang meteorite contains low abundance of opaque minerals, with 4.4 vol% metal and 2.3 vol% troilite. The metal and troilite occur predominantly as round or oval assemblages, decorated with multiple monomineral layers of troilite and silicates. Thin rims of fine-grained troilite were also found on most silicate chondrules. The metal consists of kamacite matrix and inclusions of taenite, with trace schreibersite. Minor phosphates were found at the rim of metal grains. Kamacite contains 3.18-6.23 wt% Ni and 0.38-0.86 wt% Co. Taenite has a wide range of Ni contents of 28.8-52.6 wt%.

The meteorite contains abundant chondrules and their fragments, with very sharp boundaries. The mesostasis of the chondrules are glass, or very poorly crystallized. Large heterogeneity of olivine and pyroxene can be readily observed in single crystals within chondrules and in crystal fragments in matrix in BSE images. The fine-grained matrix of the polished thin sections are completely dark under transmit light, and clasts of the fine-grained matrix can be noticed in BSE images. EDS analysis reveals high FeO and presence of S in the matrix.

Olivine has the average Fa content of 21.6 mol% with PMD of 65%. It contains minor Cr_2O_3 (≤0.27 wt%, with an average of 0.08 wt%), which shows no correlation with the FeO contents. Other minor elements are MnO (0.29±0.16 wt%) and CaO (0.15±0.14 wt%). Low-Ca pyroxene has the average Fs contents of 10.2 mole% with PMD of 91%. Other minor elements are CaO (0.50±0.54 wt%), Al_2O_3 (0.41±0.40 wt%), Cr_2O_3 (0.65±0.25 wt%) and MnO (0.31±0.18 wt%).

Conclusions: The low abundance of metal, Co contents of kamacite and Fa contents of olivine confirm that Heyetang is a L chondrite. The lower Fs contents of low-Ca pyroxene are due to its high unequilibrium, consistent with the sharp chondrules, presence of glassy mesostasis, very large PMD values of the Fa and Fs contents. Its petrographic type was classified as ≤3.4, according to the PMD values of Fa and Fs contents [1]. This is consistent with the presence of thin troilite rims on chondrules and opaque assemblages and the Cr_2O_3 contents of olivine, which suggest a type ≥3.2 [2]. In addition, the primitive property of the Heyetang meteorite was confirmed by the presence of many taenite inclusions in kamacite [3]. Base on the petrographic features, Heyetang was classified as L3.4.

References: [1] Sears D. W. G. and Dodd R. T. 1988 In *Meteorites and the early solar system* (*ed.* Kerridge J. F. and Matthews M. S.). 3-31. [2] Grossman J. N. and Brearley A. J. 2005. *Meteoritics & Planetary Science* 40: 87-122(36). [3] Kimura M., et al. 2008. *Meteoritics & Planetary Science* 43: 1161-1177.