MODAL ABUNDANCE OF MINERALS IN SOŁTMANY L6 CHONDRITE.

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Introduction: Quantitative data on elemental and mineral composition of meteorites, relative abundance of constituent minerals, their density and porosity enable ones to estimate physical properties of meteorites and their parent bodies [1-5]. Mineralogy, petrology and selected physical properties of Sołtmany chondrite (L6, S2, W0) have been studied since its fall on April 30th, 2011 [5-8]. The aim of the study was to estimate relative abundance of minerals in the Sołtmany meteorite

Methods: Literature data on elemental composition of the Sołtmany meteorite [6], mineral composition of the chondrite [7], and BSE images of the microstructure have been used for estimation of abundance of minerals in the chondrite.

Results: Preliminary data show that Sołtmany chondrite consists of the following minerals (wt%): olivine 48.1%, pyroxenes 26.3%, feldspar 10.2%, troilite 5.8%,, kamacite 6.1%, taenite 1.9%, (Fe,Ni as metal 8%), chromite 0.8%, merrylite 0.6%, and ilmenite 0.2%. Contribution of Opx and Cpx is not separated but the comparison of the Sołtmany's abundance of minerals with the literature data for L chondrites [9-14] shows a satisfactory agreement. Modal composition of Sołtmany expressed in vol% is: olivine ~48%, pyroxenes ~30%, feldspar ~12%, troilite ~4.5%, FeNi metal ~3.5%, other minerals ~2%.

Quantitative data on abundance of constituent minerals in Sołtmany chondrite together with the composition of minerals [7] and their heat capacities give the possibility to determine grain density, porosity, and specific heat capacity of the chondrite. The calculations show that grain density of the Sołtmany is 3.75 g/cm^3, porosity 7.4%, and specific heat capacity 674 J/(kg·K) at 300 K. All theoretically predicted values are close to those recently measured: 3.71 g/cm^3 [5], 6.8±0.4% [5], 705-769 J/(kg·K) [5], and 671 J/(kg·K) [8] at 300 K.

Conclusions: Relative abundance of constituent minerals estimated for Sołtmany L6 chondrite is within the range of modal abundance of minerals in L chondrites. Grain density, porosity and heat capacity of the chondrite have been precisely predicted.

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