THEMUKUNDPURA CM2 CHONDRITE – MINERALOGICAL AND MAGNETIC SIGNATURE

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Introduction: Immediately after an observed fireball and fall, meteorite fragments of about 2 kg in mass have been found and collected by local people near the small village of Mukundpura at 6th June 2017. Macroscopic description and first analyses of the fragments reported that the meteorite belongs to the group of primitive chondrites. Further investigations classified the stone as a CM 2 carbonaceous chondrite [1-4].

Samples and investigations: We have obtained 3 samples from this new meteorite, 5.40, 0.70 and 0.14 grs in weight, respectively, for our studies (see fig.1).

CC–falls only	Smith et al.	Rochette et al.	Macke
C ungrouped	-	4.72 – 4.85	4.69 – 4.77
		4.80 (3)	4.73 (2)
C I	-	4.56 – 4.78	4.49
		4.67 (5)	
C M	3.34 – 4.10	3.38 – 4.33	3.30 – 4.45
	3.67 (9)	3.76 (13)	3.76 (10)
C O	4.22 – 4.45	4.29 – 4.86	4.31 – 4.81
	4.35 (3)	4.55 (6)	4.57 (6)
C V	-	3.62 – 4.85	3.65 – 4.41
		4.29 (7)	4.07 (4)

Figure 1: The 0.70 gr sample: common features are a variety of ol- and pyx- bearing chondrules and refractory inclusions such as CAI. The background of the large inclusion in the center is under investigation.

Table 1: Summary of Magnetic Susceptibility (MagSus) values of selected groups of carbonaceous chondrites (CC) from published databases [5-8] and own data. First row of each CC group reflects the range, second row the average value and no. of investigated meteorites, respectively.

Results: The main focus of our present investigations is on the mineralogy and phase composition (in comparison with known similar meteorite falls), and the magnetic classification based on Magnetic Susceptibility (MagSus X). The two larger fragments have been used for the magnetic classification (MagSus X): magnetic susceptibility values were found to be 3.45 and 3.47 (specific magnetic susceptibility in log X 10^{-9} m^3/kg), average MagSus value is therefore 3.46. Table 1 provides a summary of published MagSus values of selected carbonaceous chondrites (C, CI, CM and CV), based on observed falls only [from 5-8]. Due to the extremely high influence of terrestrial alteration effects meteorite finds should be handled with care concerning a useful classification using MagSus. Based on our MagSus results Mukundpura can be classified as a CM 2 carbonaceous chondrite, laying on the lowermost scale of the MS value range. This reflects a comparably low content of the dominating Fe - mineral phases, mainly magnetite - like components (Fe - oxide, and minor Fe-Ni metal).

Our investigations by Raman Spectroscopy and Optical Microscopy identified the following dominating mineralogical phases of the Mukundpura meteorite: olivine (various compositions, often near forsterite in composition), pyroxene (mainly OPX), carbon - phases (large spectrum), Fe - sulfides (mainly troilite), Fe - oxides (mainly magnetite, rare chromite). Non common or rare phases were: pyroxene (CPX), carbonate (mainly calcite), refractory inclusions (CAI), metal (Fe-Ni) and a few presently non identified phases.

The new CM 2 carbonaceous chondrite is characterized by a low shock degree. More detailed results will be presented in our poster contribution.

References

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