PRODUCTS OF TERRESTRIAL WEATHERING AROUND SULPHIDE INCLUSIONS INSIDE DRONINO METEORITE

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Introduction: Some fragments of Dronino (Iron, ungrouped) were found for the first time in 2000. Depth of finding and thick crust of oxides and hydroxides [1,2] hint on a big terrestrial age of this meteorite. It is worth to note that weathering products have been found not only on the surface of fragments. Oxidized metal surrounded sulphide nodules inside the cutted slices of meteorite matter. Origin and mechanisms of such phenomena are of interest.

Experimental: The meteorite samples were prepared using standard metallographic techniques: mounting, grinding, polishing and etching with nital. They were examined using the inverted optical microscope Axiosvert 40 MAT (Carl Zeiss) and LabRam HR 800 Evolution (HORIBA Scientific) Raman spectrometer. LabRam equipped with Olympus BX-FM confocal optical microscope, a grating with 600 gr/mm, a Si-based, Peltier thermoelectrically cooled charge-coupled device (CCD) detector. Spectra were exited using 632.8 nm emission line of He-Ne-laser. Low power (0.2 mW behind the microscope objective x50) and long acquisition time (3 minutes per spectrum) was used to prevent hematite formation.

Results and discussion: Raman spectra were acquired along the boundary between unoxidized metal and troilite nodules. Peaks related to 119, 187, 278, 364, 378, 445, 486, 553, 684, 1147, 1364 cm⁻¹ were distinguished. This spectrum does not belong to hematite. Spectrum shape resembles magnetite spectrum with 309, 539, 667 cm⁻¹ lines. We assume that investigated area have spinel structure and peak shift is caused by variations in chemical composition.

It seems that nodules are encircled by magnetite mainly. We suppose that sulphide inclusions in this meteorite are significantly elongated and have contact with surface fragment and soil. Corrosion moves into sample along phase boundaries (see for instance [3]). Such hypothesis explains existing of weathering products in the middle of the fragment. Both exact shape and position of these inclusions in the fragments as well as their origin and orientations are the subjects of future investigations.

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