MICRO RAMAN SPECTROSCOPY AND CATHODOLUMINESCENCE INVESTGATIONS OF DIAMONDS IN UREILITES.

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Introduction: Raman Mapping and Scanning Electron Microscopy with Cathodoluminescence are the powerful tools for investigations the diversity of carbon in meteorites [1-7]. They allow to show the distribution of diamonds in the samples. Diamonds in ureilites are of different sizes, from nanometers up to micrometers [4]. There are still questions about their origin. New results show wide diversity of diamonds types basis on Raman shifts and on cathodoluminescence spectra investigations.

Samples and Experiments: Study are based on several ureilites (DaG 868, Dhofar 1303, NWA 3140, JaH 054, Sahara 98505, Almahata Sitta). Raman mapping studies have been done with use of WITec alpha RA instrument equipped with an one grating (600 g/mm, BLZ=500 nm) UHTS 300 spectrometer, Newton-CCD camera (1024 x 127 pixels) and Nikon 100x (NA=0.95) objective. Frequency doubled NdYAG laser (532 nm line) was used for sample excitation. Scanning Electron Microscope LEO, type 1430 with microprobe EDS-ISIS 300 and cathodoluminescence device type VIS-View with spectrometer have been used for cathodoluminescence investigations.

Results: Monocrystalline cubic diamond has Raman peak at 1332 cm^{-1}. The Raman spectra in ureilites show the diamond peak shifts from 1297 cm^{-1} to 1340 cm^{-1} and the wide range of FWHM parameter. It is possibly because of the nanometer crystals sizes, or internal stresses in crystals, or because of different polytypes of diamond occurring in the sample. Even unshocked ureilites contain diamonds, it means that probably some of ureilitic diamonds have not shock origin.

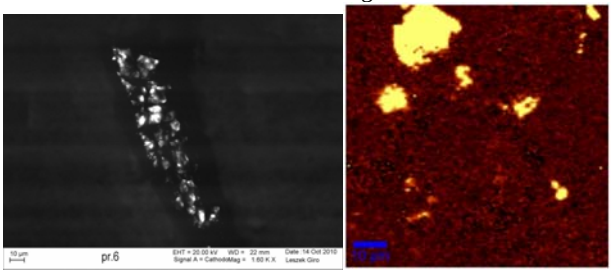

Fig.1. CL image of DaG 868 and Raman Mapping of JaH 054, ureilite diamonds are bright spots.

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