RAMAN SPECTROSCOPY STUDIES OF DIAMOND AND GRAPHITE PHASES IN JAH 054 UREILITE. A. Karczemska 1, T. Jakubowski 2, M. Kozanecki 3. 1 Technical University of Lodz, Institute of Turbomachinery, Wolczanska 219/223, Lodz, Poland (anna.karczemska@p.lodz.pl). 2Technical University of Lodz, Institute of Materials Science and Engineering, Stefanowskiego 1/15, Lodz, Poland. 3 Department of Molecular Physics, Technical University of Lodz, Poland.

Introduction: Ureilites belong to primitive achondrites. They are coarse grained rocks composed mainly of olivine, pyroxene (pigeonite) and carbon (up to 6%). Carbon occurs in vein-like areas, between olivine and pyroxene minerals. Polymorphs of carbon are mostly represented by amorphous carbon, graphite, diamond, lonsdaleite [1]. Sizes of diamonds are 1-10 μm. Diamond and graphite often coexist together. In this paper we try to find any correlations between diamond and graphite in JaH 054 ureilite. This could help in understanding the origin of diamonds in ureilites.

Samples and Experiments: We use polished slice of JaH 054 ureilite. Specimen was re-polished using non-diamond powder. Micro-Raman spectra were done on confocal micro spectrometer T-64000 (Jobin-Yvon) equipped with the BX-40 microscope Olympus. The 514.5 nm Ar line was used for sample excitation.

Results: We obtained 43 different diamond peaks, from 1321 cm⁻¹ to 1334 cm⁻¹, with wide spread of FWHM (full width at half maximum) parameters, from 0.75 cm⁻¹ to 13.37 cm⁻¹ [2]. Various Raman shifts show the significant diamonds differences occurring inside the sample. The Raman peak positions in some cases are shifted towards smaller wavenumbers, this could indicate about the presence of lonsdaleite. In Raman spectra of perfect monocrystalline graphite there is only the G band in the first order region at 1580 cm⁻¹. The 1350 cm⁻¹ band (D1) is commonly called "the defect band" and appears in poorly-organized CM or microcrystalline graphite [3]. The other bands in the second-order region which appear in the poorly organized CM are: 1150 cm⁻¹ (strongly debated), 1500 cm⁻¹, 1620 cm⁻¹ (D2) [4]. In our sample we have G, D1 and D2 bands corresponding to CM, with different peak intensities and FWHMs. Our statistical studies show some degree of correlation between diamond and other CM Raman peaks.