

FEATURES ANIONIC STRUCTURE IMPACT GLASSES FROM A CRATER ZHAMANSHIN: RESULTS OF RESEARCH BY A METHOD OF LOCAL RAMAN SPECTROSCOPY

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Now there are two versions, determinate the nature “impactites-irgizite” of the Zhamanshin crater. According to the first version these formations are products extraterrestrial volcanism, brought by comets. The information from last researches indicates that impactites-irgizite have a terrestrial genesis – the second version. The main arguments in this dispute of different versions are data of petrochemistry studies.

Processes of formation both impactites-zhamanshinite, and impactites-irgizite, in comparison with magmatic glasses, are characterized by higher temperature melt - up to 3500 K. There is an assumption, that impactites-irgizite differ from impactites-zhamanshinite more high-temperature origin, first of all. It allows assuming existence of significant their differences anionic structures not only from anionic structures of natural magmatic glasses, but also at comparison among themselves. Important influence on structure impact glasses of both kinds should render time of existence of substance in the molten state. Thus, anionic structures impactites-zhamanshinite and impactites-irgizite is necessary to study.

Impact glasses are very heterogeneous. They consist of parts with incomplete melting of primary rocks and also variations of a chemical composition. Nevertheless use method of a local investigation, such as the local Raman spectroscopy, is necessary to use.

Investigate anionic structure was carried out by a method of local Raman spectroscopy on Raman spectrometer Renishaw 1000 (England) in 180° geometry in a range of $300\text{--}1400\text{ cm}^{-1}$. Spectra were registered from parts 1-10 microns. Subtraction of a laser luminescence was carried out with the help of the background line, which was simulated as smoothly growing curve.

Research has shown that at the investigated impactites-zhamanshinite have a lot of light parts, which Raman spectra are similar (fig. 1). In a low-frequency region of spectra is dominate the wide asymmetric band with maximum near 460 cm^{-1} and shoulder near 600 cm^{-1} . In the middle region of all spectra is

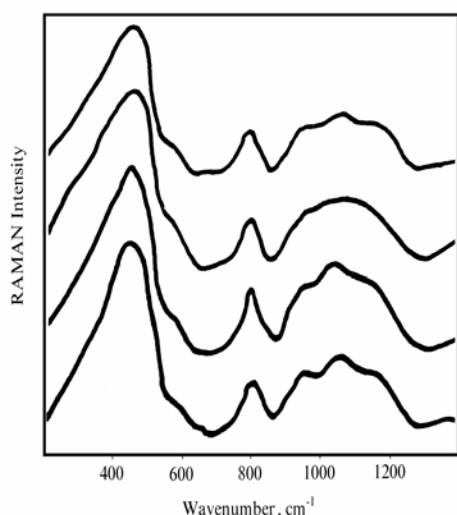


Fig.1. Raman spectra the light parts of impactites-zhamanshinite

present the band with maximum near 800 cm^{-1} . In high-frequency region of these Raman spectra is complicated band with three maxima near 950 , 1050 and 1150 cm^{-1} . These spectrums are typical for the quartz glasses. That confirms the results of petrography studying. Most of all investigated light parts of impactites-zhamanshinite are quartz glasses. Their structure is similar to model quartz glasses.

It is established that more dark parts of impactites-zhamanshinite registered Raman spectra, which typical for a crystalline state. Less common non-crystallite dark parts registered spectra, which typical for a silicate and aluminosilicate glasses with the disordered structure and composition.

Raman spectra of impactites-irgizite differ in the low-frequency and high-frequency regions of spectrum (fig. 2). In the low-frequency region the dominating broad asymmetric band is displaced. The maximum of this band is near 490 cm^{-1} . Position shoulder of this band coincides that is observed in spectra impactites-zhamanshinite – near 600 cm^{-1} . The bands in the middle region of spectrum have

standard position near 800 cm^{-1} . In the high-frequency region of spectrum one broad band with maximum

near 985 cm^{-1} is dominated. Therefore anionic structure impactites-irgizite is more homogeneous and high polymerization.

Structural unites with one non-bridging uniformly atoms of oxygen are present. It can be consequence that impactites-irgizite formed as a result of melting aluminosilicate glass complicated composition, but chemical and structural homogenizations of those glasses proceed before.

Results:

1. The impactites-zhamanshinite is chemically and structurally heterogeneous silicate and aluminosilicate glasses with complicated anionic structure. They were formed due to melting crystallized rocks.

2. It is established that the structure impactites-irgizite is close to structure high polymeric aluminosilicate glasses with ordered structure.

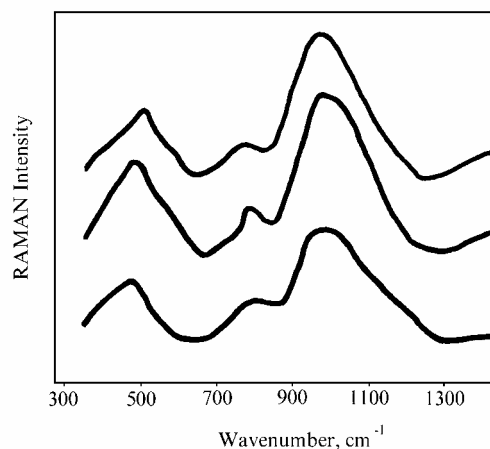


Fig.2. Raman spectra impactites-irgizite

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