SYLVITE AND HALITE IN THE LUNAR SOIL. N.A.Ashikhmina, A.I.Gorshkov, A.V.Mokhov, V.G.Obronov. Inst. Ore Deposits Geology, Petrography, Mineralogy and Geochemistry, USSR Acad. of Sci., Moscow.

The binocular (magn. x50) and microscopic (x160) studies of the regolith delivered by the "Luna-24" automatic station have revealed inclusions in pyroxenes, a white fine-crystalline matter in vacuoles of glass fragments and a small crystal in the from of intergrowth with pyroxene.

The inclusions in pyroxenes are of the irregular or rounded shape, transparent, rarely opaque. Their distribution is uneven in the from of clusters and chainlets. The white fine-crystalline matter is situated on walls or completely fills the relatively large (0,01 mm) vacuoles opened by fractures of the glass fragments. The crystal has the flat rectangular shape and 0,15 mm in transverse and 0,2 mm at height. The well developed crystal faces cross at the right angle. The crystal is of the milk-white colour with the greasy lustre, brittle; under weak crushing it splitted in the minute flat fragments.

The secondary electron raster-type pictures obtained with the "Camebax" microprobe allowed to reveal in the glass the vacuoles of the various sizes (from 1 to some tens of microns). The micro X-ray spectrum analysis of the fine-crystalline matter from the glass vacuoles and of the crystal from the intergrowth with pyroxene has shown that they are identical and mainly consist of sodium, potassium and chlorine. The electron-diffraction photographs unambiguously give evidence of their belonging to sylvite and halite.

The electron microscopic study of the matter extracted from the glass vacuoles allowed to find in it in addition to sylvite and halite a few crystals of oldhamite (in its composition are detected calcium and sulphur; the parameter of the face-centered cubic cell is 5,7 Å) and kamacite (α-iron) with the parameter of the volume-centered lattice cell equal to 2,87 Å . In the kamacite composition there is some amount of nickel. From the fact of retention of symmetry of the kamacite face-centered cubic lattice follows that nickel replaces iron atoms in the α-Fe structure not well-orderedly.

The inclusions in pyroxenes are presented by the laminar glasses which are situated unregularly between the pigeonite blocks. In the glass inclusions there are the microvacuoles in which halite and sylvite are detected too. The chemical composition of the glasses is not stable but on the whole it is close to that of the pyroxene. The similar composition of the pyroxenes and the glass inclusions as well as the unregular position of these inclusions suggest the formation of the pyroxenes from the volatile-rich melt under the relatively rapid cooling. The formation of the glass inclusions with halite and sylvite can be related to the impact processes as well. Under the partial melting of pyroxenes sodium and potassium concentrated in the melt and precipitated along with the volatile phase in vacuoles and along microfractures.

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