

THE LUNAR SOIL FROM MARE CRISIUM: PRELIMINARY DATA.  
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Mare Crisium represents an example of young round mare with a well defined mascon. The depression of Mare Crisium is situated at the altitude of 5-6 km lower than the surrounding highland. The lunar soil sample was taken by the automatic space probe Luna 24 on August 18, 1976 from the south-eastern part of Mare Crisium (12°45'N, 62°12' E), the landing site being approximately 60 km to the north from the highland and 18 km to the south-east from the crater Fahrenheit (Picard X) with the diameter of 6.5 km. In the vicinity of the landing site, areas of dark mantle deposits and wrinkle ridges were observed. The estimated thickness of crater Fahrenheit ejecta at the landing site is up to 0.4-1.0 m. The total drilling depth in obtaining the samples was up to 2 m, the actual length of the core being of 160 cm, and its weight 170 g. The sample of lunar soil represents the final series of samples of the specific lunar geological profile obtained by the soviet automatic space probes: Mare Crisium (Luna 24) - its ancient marginal zone (Luna 20) - Mare Fecunditatis (Luna 16).

In spite of the fact that the drilling core of the lunar soil has a markedly complex layered structure, the detailed investigation necessary showed that its chemical composition is fairly uniform. The igneous rocks being the ingredient of lunar sample from Luna 24 are identified as mare basalts with low content of titanium (near 1%  $\text{TiO}_2$ ). These rocks are

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characterized by high alumina content similar to the composition of samples from the adjacent Mare Fecunditatis. The concentration of KREEP-components is low, the content of rare and trace elements is generally within the limits peculiar to the lunar mare basalts. The significant Ni-content up to  $10^{-2}\%$  (preliminary data) could be emphasized.

The fines of lunar regolith in comparison with igneous rock is characterized by the decrease of sodium content as well as some other volatiles and the increase of platinoid content. This peculiarity is presumably connected with the processes of formation and maturation of the regolith although the sample of Luna 24 commonly contain rather few particles with secondary alteration features, the studied fraction of the soil being characterized with low maturity. For example the size fraction -  $0.37 + 0.20$  mm consists of hardly more than 30% of secondary particles (agglutinates, regolith breccias and glasses) even within the highly "mature" layers of the regolith. Approximately 40-60% of slightly altered mineral grains are commonly found within this size fraction.

The leucocratic microgabbro are predominant among the igneous rocks of Luna 24; these are characterized with hypidiomorphic texture, the grain size being 0.2-0.3 mm. The preliminary data on mineral composition are as follows: plagioclase  $An_{90-95}$  50-60%, clinopyroxene  $Wo_{40}En_{10}Fs_{50}$  30-40%, olivine  $Fa_{80-85}$  5-10%, ilmenite with low MgO content and cristobalite are found in minor quantities. In lower but marked quantities basalts with poikiliophytic texture with grain size less than 0.1 mm are found. The preliminary data on mineral

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composition of these rocks are as follows: plagioclase  $An_{90}$  50%, clinopyroxene  $Wo_{20}En_{30}Fs_{50}$  50%, olivine  $Fa_{75}$  in small quantities, ilmenite, chromium-bearing ulvospinel. Furthermore troilite, metallic iron and zirconium mineral was found in the lunar igneous rocks.

The igneous rocks of the highland areas were found in rather minor quantities. In general, fresh fragments of relatively abyssal rocks or fragments representing the interior parts of basaltic flows are predominant in the composition of the rocks studied. Fragments of surface basaltic eruptions were not observed.

Based on chemical and petrochemical analysis, the characteristics of lunar soil and the area of Mare Crisium in comparison with the lunar soil of other lunar regions will be presented.