No Need To Fly To The Moon For Lunar Soil

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It is not necessary to fly to the Moon to get lunar soil even if the sample is required from the other side of this planet. A meteorite originating from the other side of the Moon has recently got into the hands of scientists. The meteorite investigation required precision instruments and grants from the Russian Foundation for Basic Research and the BÃ¼ro FÃ¼r Wissenschaftlich-Technische Zusammenarbeit Des Ã–sterreichischer Austauschdienst (Bureau for Scientific and Technical Collabration of Austrian Exchange Service).

A piece of lunar soil (its weight being slightly less than one kilogram) was knocked out by a meteorite blow and later fell on the Earth. Judging by a microparticle of zircon mineral the specialists not only calculated its age, but also made conclusions about the event that had taken place on the Moon at that time. It has appeared that about 2 billion years ago the rock containing a particle of zircon endured some planetary cataclysm and melted, and 500 thousand years ago a piece of rock was thrown away from the lunar surface into space by a meteorite blow.

Meteorite Dhofar 025 was found in 2000 in the desert on the Arabian Peninsula (Oman). It weights 751 grams and consists of breccia - sintered fragments of various minerals from lunar continents. Several years were spent on investigation of this celestial stone. To determine its age, the researchers of four Russia institutes jointly with Austrian colleagues found a microscopical grain of zircon in it â€“ the mineral consisting of oxides of zirconium, lead, thorium and uranium.

The isotopic composition in the two sections of this tiny speck was

investigated on the SHRIMP mass-spectrometer. The researchers were interested in ratio of stable isotopes of lead 206, 207, 208 and radioactive isotopes of uranium - 238 and 235. The grain was extracted from the core of meteorite, i.e. it had been isolated from the environment while the meteorite was lying on the Earth. That allowed the researchers to compare quantitative ratios of isotopes with known and dated rocks of the Earth and the Moon and to determine the age of meteorite. On the Earth, for example, zircon contained in gabbro from Eastern Australia was accepted as the standard for the uranium-lead relation.

Geochemists discovered that zircon from Dhofar 025 was of the same age as others, already known lunar rocks â€“ i.e. 4.3 to 4.4 billion years, but its composition had changed approximately 2 billion years ago. Most likely, that is the consequence of a powerful blow by a meteorite, as a result breccia was formed out of granite which contained zircon being investigated. This result, by the way, coincided with radiation age of meteorite calculated by isotopes of noble gases. Breccia was formed and carried out to the surface of the planet as a result of some catastrophe, and gases started to accumulate in it . However, that was not the meteorite bombardment well-known to researchers, to which the visible part of the Moon was exposed to 3.9 billion years ago. Consequently, the specialists believe that Dhofar 025 is nothing but a sample of lunar soil from the other part of the planet.

It is not for the first time that lunar meteorites were found in the region of Dhofar. Among the findings are, for example, Dhofar 305, 307 and others. Altogether, there were about 50 such meteorites found on the Earth. However, within thousands of years spent on the Earth with its oxygen atmosphere, under rain and sunshine, with temperature differences and in contacts with microorganisms that excrete deleterious substances, debris of the moon became gradually destroyed and by our time it turned out to be fairly contaminated by â€œterrestrialâ€? atoms,

it oxidized and lost part of original components. From this point of view, the integral Dhofar 025 meteorite is considered unique by the researchers.

Source: Informnauka (Informscience) Agency