

MINING IN SPACE

student Shkurganova M. A.

scientific supervisor – senior lecturer Yalovik E. I.

Belarusian National University of Technology

Minsk, Belarus

People's needs are growing every day, and Earth's resources are being depleted. According to geologists' forecasts, the remaining resources should be enough for us for more than 30 years. What should we do? Do we need to take a more rational approach to the use of Earth's resources or look for new ways to extract minerals? The answer is obvious. With the increase in the consumption of minerals and the depletion of their reserves on Earth, humanity will probably have to start extracting resources in space.

The objects where, according to scientists, it is possible to extract minerals in space are asteroids. Asteroids are small celestial bodies that move in orbit around the Sun. They appeared during the formation of the Solar System more than 4.6 million years ago. The largest cluster of these celestial bodies is located between Jupiter and Mars, it is called the main asteroid belt. Various minerals and volatile compounds that make up the rocks of the asteroid will serve as a source of iron, nickel and titanium. Geologists expect that some asteroids contain water-containing minerals from which oxygen can be obtained, which is very important for the existence of life, as well as hydrogen, one of the main types of rocket fuel [1].

After all, some elements such as gold (Au), cobalt (Co), platinum (Pt), iron (Fe), manganese (Mn), molybdenum (Mo), nickel (Ni), osmium (Os), palladium (Pd), rhenium (Re), rhodium (Rh) and ruthenium (Ru), which are now extracted from the upper layers of Earth, lay in the bowels of asteroids when they fell to the Earth. Resource extraction can also be carried out on the planets

closest to Earth. The second planet closest to us, Mars, has a geological structure similar to Earth. This means that all the main compounds belonging to the Earth can be mined there, such as iron, calcium, aluminum, cobalt and the like. Geologists also suggest that there may be traces of lithium, copper, gold, zinc, nickel, niobium and other elements on the Red Planet. Venus and Earth have similar sizes, mass, composition and the time at which they formed. The crust of Venus, like our planet, consists of basalt, there is also a large iron core and a mantle full of silicates. It is believed that some of these celestial bodies contain more precious metals than the entire earth's crust. Due to the large mass of our planet and gravity, a significant part of heavy metals have sunk to the core, and on most asteroids, whose weight is many times less than the weight of the Earth, metals are distributed more or less evenly.

We need new ways of developing civilization on Earth. The exploration of space for the purpose of mining opens up new horizons for us. This will help support the global economy as a whole for a long time. As we can see, space exploration is developing quite intensively. Although in the near future, industrial extraction of metals in space and their delivery to Earth is a difficult task, and so far such projects pursue rather scientific goals that require large investments. In addition, researchers have other long-term plans for these celestial bodies: scientists consider asteroids as a site for the construction of space cities.

References

1. Кладовые металлов на астероидах: как в космосе хотят освоить добычу [Electronic resource]. – Mode of access: <https://trends.rbc.ru/trends/futurology/63ff24f19a79475d36adea76/>. – Date of access: 23.02.2023.