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LARGE-SCALE APPLICATION OF NEW TYPES OF SPECIAL ALTERNATIVE ENERGY SOURCES IN SPACE STATIONS

Abstract

Today, in order for space stations to continue their activities properly and permanently, crystalline silicon solar panels or Gallium Arsenide-based solar panels with greater efficiency are used, which is one of the renewable alternative energy sources that constitute the main energy source of the stations. However, even though the highest known solar panel technologies are applied at the stations, the efficiency of these solar panels cannot exceed 50 percent. Therefore, as an alternative to solar panels, thermoelectric generators, a pure, new type of alternative energy source, with higher efficiency, renewable, ecologically clean, 0 percent carbon emission, and resistant to cosmic radiation, can be installed in the stations. Thermoelectric generators are elements built on modules (pillars) made of p- and n-type semiconductors, based on the Seebeck effect, which produce electric current when a temperature difference is created between their surfaces. The higher the temperature difference between the surfaces, the higher the linearly dependent electric current. In the parts of space where sunlight does not pass, an environment with temperatures of -2.7 Kelvin and lower is formed. Since the internal temperature of the space station and the temperature outside the station differ sharply, using a panel of thermoelectric generators in the space station, it is possible to prepare an energy source that produces electricity with great efficiency. However, although a high amount of energy can be obtained from thermoelectric generators at the beginning, the reason why it is not widely used in the space station is that the temperature balancing process starts due to the internal connection between the surfaces and in the end, the energy value drops. As a result of my research and experiments, in order to slow down this process, to prevent drops in the energy value of the product and to keep its efficiency stable, we need to apply nanocoatings with a very large area, made with nanotechnology, on both surfaces of Thermoelectric generators, using specially designed, high temperature conductivity substances. As an alternative to solar panels, the compact system developed as a result, because the principle of operation is based on the temperature difference, the sun will be able to operate continuously even where there is no light, and because it is a clean and highly efficient source, it will be widely applicable in space stations.