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LOW ENERGY NUCLEAR REACTION WITH THERMAL BATTERIES AND THERMOELECTRIC GENERATOR FOR LUNAR MISSIONS

Abstract

In lunar missions, particularly those targeting the south pole where the average temperature is around 260 K, rovers often face challenges due to freezing temperatures, causing them to cease functioning. To address this issue, we propose the implementation of a Low Energy Nuclear Reactor (LENR) coupled with Thermoelectric generators as an alternative to traditional batteries for the rover. The LENR system operates by utilizing heavy water and a palladium electrode to undergo hydrolysis, generating energy to power the rover. However, a drawback of this process is the production of excess heat. This surplus heat is then effectively managed through a two-step process: firstly, a portion of the excess heat is utilized to regulate the rover's temperature during lunar nights. Secondly, the remaining excess heat is stored in the thermal batteries and later on required amount of heat is harnessed by the thermocouples to generate electricity, which in turn powers high-energy batteries. These high-energy batteries are crucial for maintaining the temperature within a chamber housing the LENR, ensuring optimal conditions for its operation. This integrated approach creates a continuous chain reaction, providing a sustainable and efficient power source for the rover in lunar environments, especially in areas with extreme temperature variations like the South Pole.