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LUNAR MINING POTENTIAL FOR HELIUM 3 FOR UNLIMITED ENERGY ON THE MOON AND
EARTH

Abstract

Lunar mining for Helium-3 (He-3) holds immense promise, offering a potential clean and virtually limitless energy source through its application in future fusion reactors. However, the path to this future is paved with challenges and ethical considerations. This abstract explores both the potential benefits and the intricate difficulties associated with lunar He-3 mining. On the one hand, the Moon offers a unique advantage. Unlike Earth, its unprotected surface has been bombarded by the solar wind for billions of years, implanting He-3 into the lunar regolith (soil). This abundance, estimated to be millions of tons, significantly surpasses the minuscule amounts found on Earth. Successfully extracting this resource could revolutionize energy production, addressing climate change concerns and providing a sustainable energy source for generations to come. However, the technical and logistical hurdles are formidable.

Extracting He-3 from lunar regolith requires innovative methods, as it remains tightly bound within the material. Developing efficient extraction and processing techniques, while ensuring minimal environmental impact on the lunar environment, is a critical challenge. Furthermore, designing and deploying autonomous or remotely operated mining systems capable of functioning under harsh lunar conditions requires significant technological advancements.

Beyond technical hurdles, economic considerations loom large. The cost of establishing lunar infrastructure, including mining equipment, transportation, and potential processing facilities, remains highly uncertain. Additionally, the feasibility of transporting He-3 back to Earth for fusion reactor use needs careful economic and logistical analysis.

However, due to the fact that Helium 3 holds the key to a clean Fusion Energy devoid of radiation waste products and also with a higher heat-electricity conversion ratio. This energy process can be easily replicated on Earth with existing technology as soon as Helium 3 can be procured from the Moon as Earth is not a viable source of Helium 3.

Despite these challenges, the potential benefits warrant continued exploration and international collaboration. Establishing international frameworks for responsible resource utilization, environmental protection, and equitable access to He-3 is crucial. By fostering collaboration and addressing the technical and economic challenges, lunar He-3 mining can become a reality, paving the way for a sustainable and energy-abundant future for humanity. This abstract explores all these challenges and benefits and also presents a viable case study for the extraction of Helium 3 from the Moon with existing technology.