

IAF SPACE EXPLORATION SYMPOSIUM (A3)
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THE METHOD FOR CREATING ICY SOIL IN A VACUUM CHAMBER

Abstract

Water has become a focal point in lunar exploration missions, with recent discoveries revealing its presence mixed with lunar soil at the poles. To facilitate these missions, the Korea Institute of Civil Engineering and Building Technology (KICT) has developed the Dirty Thermal Vacuum Chamber (DTVC), capable of creating a vacuum environment and containing a significant amount of lunar simulant soil. Utilizing the DTVC, an environment simulating icy lunar soil has been established to validate ice exploration technology at the lunar poles. To achieve this, the chamber is equipped with a cooling plate designed to effectively lower the temperature of the lunar soil simulant, while a specialized depressurization/cooling process has been devised based on the phase diagram of water. Through the implementation of these methods and tools, icy soil with a moisture content of 10 wt% has been successfully created within the vacuum chamber.