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## Evaporation Study for Integration of SOFI and MLI in Orbiting Liquid Oxygen Storage

As a cryogenic propellant of aircrafts, liquid oxygen has a low boiling point and can evaporate easily. It's significant to conduct the research in the orbiting storage of liquid oxygen for deep space exploration. Spray-on foam insulation (SOFI) and Multilayer insulation (MLI) are combined in storage of liquid oxygen. In our research, we built the evaporation test-bed for liquid oxygen ellipsoidal tank, and tested the evaporation characteristics of different insulation processes in simulated orbiting conditions. The reflector layer and the separator layer are Integrated together in the testment. The results show that daily evaporation rate of liquid oxygen reached less than 0.2% in high vacuum conditions, with boundary temperature of 90 K and 293K. Also, the meridional and zonal temperature distribution of different insulation layer is studied at steady-state. As the oxygen pressure rose from 0.1MPa to 0.6MPa, its saturation temperature (cold boundary temperature) increased from 90.06 K to 111.46K. The thermal performance of insulation system at different liquid oxygen pressures will be presented in this paper. And we predicted the direction of next exploration improvement.

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