

SPACE PROPULSION SYMPOSIUM (C4)
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A SCHEME STUDY FOR MINIMIZING WEIGHT OF PRESSURIZATION SYSTEM ON KSLV-II
UPPER STAGE

Abstract

Korea Space Launch Vehicle-II(KSLV-II) consists of 3 stages. Specially, weight minimization is essential in the third stage because the weight of the system and the payload is directly connected. The pressurization system is one sub-system that accounts for a system which has a considerable weight. In this paper, the trade-off study between some schemes of the pressurization system was performed for minimizing weight of the third stage. Hot helium gas system with heat exchanger, cold helium gas system, room temperature helium gas system operated without heat exchanger and helium bubbling system are considered as a pressurization system. The trade-off study was executed in terms of temperature rising of propellant, the weight of useless propellant residual caused by the temperature rising, the weight of system and the convenience of configuration and operation. As a result, it was recognized that the helium gas system with heat exchanger where helium gas is heated to 130 150K for Liquid oxygen tank and 273 288K for kerosene tank is the optimal scheme for the third stage of KSLV-II.