추진제 관로의 온도 저하에 따른 인공위성 추진시스템 해석

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An Analysis for Satellite Propulsion System at Low Temperature Condition of Propellant Pipeline

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Key Words: Satellite(인공위성), Propulsion System(추진시스템), Hydrazine(하이드라진)

Abstract : Usually, LEO satellites use hydrazine monopropellant propulsion system for satellite control and orbit transfer. The hydrazine freezes at 1.4 degrees C, therefore in order to keep hydrazine above its freezing temperature, MLI (Multi-Layer Insulator) and line heater, were applied on propulsion system. However, temperature of pipeline can go down below allowable temperature by damage of MLI or trouble of line heater. This paper presents the freezing of hydrazine by conduction from low temperature pipeline and the transient flow in propellant pipeline at low temperature condition.

나노스케일계의 평형상태에 관한 연구

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A Study on the Thermal Equilibrium State of Nanoscale Systems

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Key Words: Equilibrium(평형상태), Molecular dynamics(분자동역학), Nonoscale(나노사이즈)

Abstract : A state of equilibrium means that the thermophysical properties must be equal no matter where a measurement is taken in a system. However, some recent studies reported that there exists the temperature difference over a liquid-vapor interface even though the system is in a state of equilibrium when a system reduces to nanoscale size. Those conclusions leave a strong question as to whether the definition of a thermal equilibrium state should be changed for nanoscale systems. In this study, we carefully investigated the temperature profile over a liquid-vapor interface using the molecular dynamics (MD) simulation and found that the temperature discontinuity between a liquid phase and a vapor phase over an interface resulted from the methodological difference of the temperature calculation.