

SPACE PROPULSION SYMPOSIUM (C4)
Interactive Presentations (IP)

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EXPERIMENTAL INVESTIGATION FOR RELIABLE START-UP OF 5W MICROWAVE
ELECTROTHERMAL THRUSTER AS MEANS OF PRIMARY PROPULSION FOR NANO AND
SMALL SATELLITES IN REALISTIC SPACE CONDITION

Abstract

Microwave Electrothermal Thruster (MET) is one of the derivative of electrothermal propulsion devices. Its characteristics including electrodeless design, long lifetime, and slight plume contamination make it very attractive for future application as means of both primary and secondary propulsion. Making use of the thermal-vacuum experimental system, the factors which influence reliable startup and steady work of low power 5Watt coaxial resonant cavity MET such as propellant kinds including water, coupling probe length, mass flow rate, incident microwave power, position of inner conductor, and sealed material selection of microwave connector were studied. The dependence of MET performance such as thrust, specific impulse and efficiency on the parameters of propellant mass flow rate and incident microwave power are discussed and analyzed. Along with their use on nano/small satellite platform, the effects of plasma non-uniformities are also studied and the results are presented.