Measurements of ablation phenomena on coaxial pulsed plasma thruster with separated propellant

Abstract

Coaxial pulsed plasma thrusters (PPT) are electrothermal thrusters for space use. In previous studies performed at Gifu University on the coaxial PPT (GOS-II), the duration of the late-time ablation was estimated from the durations of luminescence with and without the use of a bandpass filter. In the present study, to more quantitatively estimate the duration of the late-time ablation, the ablated gas behavior was investigated by high-speed photography for the propellants separated using a glass tube. As a result, the velocities of the neutral gas generated during the late-time ablation were measured for various cavity geometries, and the durations of the late-time ablation were evaluated. In addition, the potential for practical use of the separated propellant was confirmed from the viewpoint of the plume velocity.