

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
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DEVELOPMENT OF SPACECRAFT SURFACE CONTAMINATION SENSORS

Abstract

We have been developing several types of flight sensors for spacecraft surface contamination. Solar-cell type sensors were developed for the M-V-2 launch vehicle and the Hayabusa probe to measure contamination caused by solid spin motors and ion thrusters, respectively. Lunar-A probe launch by the M-V-2 rocket was stopped, but the Hayabusa's sensors are providing a strange long term degradation trend independent from ion thruster activities. Another type of sensors using quartz crystal microbalances (QCM) were developed for the M-V-5 launch vehicle. The QCMs did not show any frequency change at the event of spin motor firings, but detected some depositions at nose fairing opening. Recently, new compact QCMs for spacecraft surface contamination measurements and material erosion measurements has been under development. A flight demonstration mission of the QCMs on a small satellite is under progress.