

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Environmental Effects and Spacecraft Protection (6)

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TOTAL ELECTRON EMISSION YIELD MEASUREMENT OF INSULATING MATERIALS DUE TO
DIFFERENT TEMPERATURES

Abstract

E-induced secondary electron emission from space insulating materials is a very important factor in understanding spacecraft charging behaviour. Especially, the secondary electron emission yield of the spacecraft is highly dependent on temperature. Due to the injection of primary electrons and the emission of secondary electrons in the surface layer of insulating materials, the target surface will be negatively or positively charged. In our measurement methods, we use a single short, low-density pulsed e-beam, and also developed a scanning method for the total electron emission yield measurement, which can avoid surface potential influence for insulating materials. In order to create the thermal environment, we use a heater for high temperature and the shroud by using liquid nitrogen for low temperature. Under this experimental situation, the total electron emission yield of polyimide films of room, high and low temperature was tested. The conductivity variation of the polyimide film due to the different temperatures is considered to influence the total electron emission yield.