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Electron Emission Yield Measurement of Polyimide

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E-induced secondary electron emission and P-induced photoelectron emission from space insulating materials is a very important factor in understanding spacecraft charging behavior. Especially, the electron emission yield of the spacecraft is highly dependent on space environments. Due to the injection of primary electrons or photons, and the emission of 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 ray, and also developed a scanning method for the total electron emission yield (TEEY) and photoelectron emission yield (PEY) measurement, which can avoid surface potential influence for insulating materials. About TEEY measurement, we installed 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. And about PEY measurement, we installed 5 band pass filters in order to limit the wavelength of the UV ray. The quantum efficiency curve of polyimide film and some kinds of cover glass were calculated.