

Abstract (paper not available)

IESD Properties of Space Used Polymer under Energetic Electron Irradiation

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Insulators or ungrounded conductors inside spacecraft may suffer internal charging caused by energetic electrons in outer radiation belt. The accumulation of electrons can result in internal electrostatic discharge(IESD) that poses a great direct threat to spacecraft electronics. To investigate the IESD properties of space used polymer, polytetrafluoroethylene(PTFE) plates were irradiated by Sr-90 source under different environmental conditions. Surface voltage of the samples was monitored and ESD pulses were recorded during the irradiation. According to statistical analysis of a large number of recorded ESD events, a positive correlation has been found between discharging interval and pulse amplitude. IESD properties of PTFE are influenced by variations of sample thickness, ambient temperature, electron flux and even the history of irradiation. Low temperature usually brings down polymer's conductivity, thus break-down is more likely to happen. At a higher flux level, the average interval of ESD events gets shorter and the pulse amplitude gets larger. Once break-down occurs, permanent local damage may develop inside insulators and the continuous irradiation makes discharging more frequent.
