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SYMPOSIUM ON SAFETY, QUALITY AND KNOWLEDGE MANAGEMENT IN SPACE ACTIVITIES (D5)
Space Weather Prediction and Effects on Space Missions (3)

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UNDERSTANDING THE EFFECT OF ATOMIC OXYGEN EXPOSURE ON SURFACE AND VOLUME RESISTIVITY CHANGE IN LEO

Abstract

Spacecraft surface charging can leads to arcing and a loss of electricity generation capability of solar panel or even loss of a satellite. The arcing problem may be further aggravated by the atomic oxygen (AO) exposure in Low Earth orbit, which modify the surface of materials like Kapton, Teflon, anti reflective coating, cover glass etc used on satellite surface affecting materials properties such as resistivity, secondary electron emissivity, photo electron emission which govern the charging behavior. These properties are crucial inputs parameters for spacecraft charging analysis. To study the AO exposure effect on the charging governing properties, an AO exposure facility based on laser detonation of oxygen was built which produce 8-14km atomic oxygen with higher flux than in orbit. After exposing materials to 10years equivalent AO flux at the altitude of 700-800km, surface charging properties like resistivity and secondary electron emission is being measured. Measurement of surface and volume resistivity for AO exposed samples is under progress initially being done for Kapton. The measurement is being done using the charge storage decay method at a room temperature, which is considered most appropriate for measuring the resistivity for space application. The experimental analysis of material properties will be presented in conference.