

Abstract Submitted
for the 4CF10 Meeting of
The American Physical Society

The Effects of Surface Modification on Spacecraft Charging Parameters AMBERLY EVANS, J.R. DENNISON, Utah State University — Charging of materials by incident radiation is affected by both environmental and physical conditions. Modifying a material's physical surface will change its reflection, transmission and absorption of the incident radiation which are integrally related to the accumulation of charge and energy deposition in the material. An optical analysis of the effect of surface modification on spacecraft charging parameters on prototypical Cu samples is presented. Samples were roughened with abrasive compounds ranging from 0.5 to 10 microns in size. Using a UV/VIS/NIR light source and a diffraction grating spectrometer, measurements were performed on pristine and modified materials. The index of refraction and absorption coefficient were determined using the Fresnel Equations. The resulting absorption coefficient and Tauc plot were used to determine the energy of the band gap. The measured spectra confirmed that surface modification does induce changes in optical reflection, transmission, and absorption. The increased absorption observed results in increased photon energy deposited in the material, leading to increased charge emission through the photoelectric effect.

Amberly Evans
Utah State University

Date submitted: 13 Sep 2010

Electronic form version 1.4