Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Effect of abrasive surface roughening on the secondary yield of various metals TIMOTHY GRAVES, The Aerospace Corporation — The secondary electron yield of metallic conductors plays a critical role in the development of multipactor discharges. These discharges require a secondary yield greater than unity at the appropriate energy level for sustained breakdown. By reducing the secondary yield below unity in the necessary energy range, multipactor and multipactor-induced glow discharges can be eliminated. Surface roughening has been shown to successfully lower the secondary yield to below unity (ref. 1). In addition, abrasive bead blasting has been shown to effectively reduce the secondary yield of copper surfaces while preserving voltage breakdown characteristics (ref. 2). This study investigates the effect of abrasive surface roughening on the secondary yield of materials such as copper, aluminum, and stainless steel. In addition to measuring the change in the secondary yield as a function of abrasive particle size, the multipactor resistance and voltage breakdown characteristics are investigated. In addition, the effect of vacuum conditioning via multipactor and rf plasma cleaning on the roughened surfaces will be discussed.
Ref. 1. H. Bruining. Physics and Applications of Secondary Electron Emission. McGraw-Hill, NY, 1954.
Ref. 2. T. P. Graves, Ph.D. Thesis, MIT. 2007

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Date submitted: 20 Jul 2007 Electronic form version 1.4