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Determining the Critical Dose Threshold of Electron-Induced Electron Yield for Minimally Charged Highly Insulating Materials RYAN HOFFMANN, J.R. DENNISON, JONATHAN ABBOTT, Utah State University — When incident energetic electrons interact with a material, they excite electrons within the material to escape energies. The electron emission is quantified as the ratio of emitted electrons to incident particle flux, termed electron yield. Measuring the electron yield of insulators is difficult due to dynamic surface charge accumulation which directly affects landing energies and the potential barrier that emitted electrons must overcome. Our recent measurements of highly insulating materials have demonstrated significant changes in total yield curves and yield decay curves for very small electron doses equivalent to a trapped charge density of $<10^{10}$ electrons /cm^3. The Chung-Everhart theory provides a basic model for the behavior of the electron emission spectra which we relate to yield decay curves as charge is allowed to accumulate. Yield measurements as a function of dose for polyimide (Kapton^{TM}) and microcrystalline SiO_2 will be presented. We use our data and model to address the question of whether there is a minimal dose threshold at which the accumulated charge no longer affects the yield.

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