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Electron Yield Measurements of Highly Insulating Granular Materials[1] TOM KEATON, MATTHEW ROBERTSON, JR DENNISON, Utah State University — Measurements of electron yield (EY) show how surface roughness and surface coverage of two different materials affect EY. Total, secondary, and backscattered EY data were taken for coverages from 0% to nearly 100% of homogeneous, highly-insulating, granular, 68 m sized, Al_2O_3 particulates mounted on conductive graphitic carbon substrates. Trends in maximum EY, energy of maximum EY, and slopes at low and high energy limits are evident between the graphitic to Al_2O_3 secondary EY data sets. EY curves at intermediate coverages are consistent with linear combinations of the constituent EY curves. Approximately 100% coverage Al_2O_3 data exhibited a suppressed maximum EY of ˜11% that of smooth, bulk Al_2O_3 or sapphire, indicating a roughness coefficient for granular surfaces. Backscattered EY showed minimal differences with surface roughness or Al_2O_3 coverage. Experimental results are compared with physically motivated EY models of multicomponent samples and for roughness coefficients characterizing varying size and shape of granular materials. Understanding how surface features of multicomponent systems can affect EY has numerous applications including semiconductor and insulator charging, EY suppression, and modeling of cosmic dust in early planetary body formation.

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