Abstract Submitted
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Models of Electron Yield Roughness Coefficient[1] TRACE TAYLOR, MATTHEW ROBERTSON, JR DENNISON, Utah State University — Models to calculate the effects of roughness on electron yield (EY) were developed for several surface morphologies and electron emission energy distributions. EY, the ratio of emitted electrons to incident electrons, plays an important role in many applications such as spacecraft charging, high voltage systems, and scanning electron microscopy. Surface roughness is known to generally reduce EY of materials by reducing the critical escape angle for an emitted electron, though coupling geometry effects with emission angular distributions can complicate the issue. Four surface morphologies were considered: square, triangular, sawtooth, and sinusoidal periodic wells, each with critical angles dependent on where the incident electrons strike along the width of the surface feature. Both secondary electron (with energies <50 eV) and backscattered electron (with energies >50 eV) yields are considered. Secondary electrons and backscattered electrons have different energy-dependent angular emission distributions (Lambertian and screened Rutherford, respectively), with backscattered electrons generally having a narrower distribution; specular and isotropic distributions were also considered as limiting cases. The results are compared to experimental EY data of roughened Cu and Al samples to verify the model.

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