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Probing Carrier Transport across Patterned Interfaces with Ballistic Electron Emission Microscopy WESTLY NOLTING, CHRISTOPHER DURCAN, ROBERT BALSANO, College of Nanoscale Science and Engineering, VIINCENT LABELLA, SUNY Polytechnic Institute — Electron scattering from sidewalls within aggressively scaled metallic interconnects dramatically increases the resistance, since the mean free path (˜40 nm) is larger than the dimensions of the structure. One method to study hot-electron scattering in nm-thick metallic films is Ballistic Electron Emission Microscopy (BEEM), which is an STM based technique. In this work, we perform BEEM imaging and scattering measurements on lithographically patterned nanoscale oxide "fin" structures with a Schottky diode interface to determine its ability to measure sidewall scattering. This is accomplished by acquiring data from BEEM images and spectra on a regularly spaced grid and fitting the results to determine both the Schottky barrier height and the amplitude of the spectra. The amplitude of the spectra is related to the scattering in the film and interface. The position of fin structures is then determined by mapping both the Schottky height and amplitude over a square micron to observe scattering at the interface caused by the patterned structures. The fabrication of the patterned 50-nm-pitched sidewall structures and the preliminary BEEM imaging measurements on these structures will be presented.

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