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Schottky Barrier mapping of the W/Si diode using ballistic electron emission microscopy CHRISTOPHER DURCAN, ROBERT BALSANO, NICHOLAS PIENIAZEK, College of Nanoscale Science and Engineering, State University of New York at Albany, VINCENT LABELLA, Colleges of Nanoscale Science and Engineering, SUNY Polytechnic Institute — The Schottky barrier of the W/Si(001) diode was investigated and spatially mapped at the nanoscale using ballistic electron emission microscopy (BEEM) and ballistic hole emission microscopy (BHEM). The miscibility of tungsten and silicon creates a thin silicide upon deposition with transmission electron microscopy (TEM) and Rutherford backscattering spectrometry (RBS) showing the changes in the silicide over several weeks. Using standard current voltage measurements there is no change in the charge transport across the diode during this time period. However, BEEM measurements do show dramatic changes to the transport of ballistic electrons over time with nanoscale resolution. Time dependent Schottky barrier maps are generated over a 1μm x 1μm area and provide valuable insight to the barrier height homogeneity, defect formation, and interfacial effects occurring in the diode.

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