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Altering the Charge State of Surface Silicon Dangling Bonds using Nanoscale Schottky Contacts JASON PITTERS, IANA DOGEL, National Institute for Nanotechnology - National Research Council of Canada, ROBERT WOLKOW, Department of Physica - University of Alberta — The study of surface defects, and in particular, dangling bonds (DBs) on semiconductor surfaces and at interfaces has been an area of interest for years. Interest has been driven from the unique characteristics of the DB, due to fact that the DB state lies within the bandbap of the semiconductor and can assume various charged states. Recently, we have demonstrated that negatively charged dangling bonds can act as a gate electrode to control the flow of current through single molecules. We have also shown that DB clusters enter into a tunnel coupled relationship at close distances providing a means to implement room temperature QCA schemes. In order advance these experiments, it is important to develop strategies that can control the charge state of DBs. This presentation will show that nanoscale Schottky contacts of Titanium disilicide on hydrogen terminated silicon surfaces can change the charge state of DBs. DBs created within the depletion region have a reduced charge compared to those created at a distance from the contact. We also directly observe the band bending at the nanoscale Schottky interface using scanning tunneling microscopy and spectroscopy.

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