

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Nanometer-resolution studies of “end-on” metal contacts to vertical Si nanowires W. CAI, Y.L. CHE, J.P. PELZ, The Ohio State Univ., E. HEMESATH, L.J. LAUHON, Northwestern Univ. — There is great interest in semiconducting nanowires (NWs) and carbon nanotubes (NTs) for future electronic devices and fundamental studies of low-dimensional systems. However, the critical *contacts* to NWs and NTs are still poorly understood. For example, it is predicted (but not yet demonstrated) that Fermi level pinning should be much weaker at small “end-on” NW or NT Schottky contacts [1]. We have previously used cross-sectional ballistic electron emission microscopy (BEEM) to quantify small-size effects in Schottky contacts to cleaved quantum wells [2]. Here we describe on-going work to study individual end-on contacts to Si NWs. Vertical Si NWs were grown on Si(111) substrates, embedded in spin-on-glass, and planarized with a chemical mechanical polish. A brief HF etch and thin Au film deposition were then used to make end-on NW contacts. Initial studies with AFM, SEM, internal photoemission spectroscopy, and BEEM demonstrate we can make and measure end-on Schottky contacts to 80nm diameter Si NWs. We will discuss on-going work to optimize sample processing (to reduce roughness near the NWs) and then to quantify the dependence of local contact properties on Si NW diameter. Work supported by NSF Grant No. DMR-0805237. [1] F. Leonard *et al.*, Phys. Rev. Lett. **84**, 4693 (2000). [2] C. Tivarus *et al.*, Phys. Rev. Lett. **94**, 206803 (2005).

Wei Cai

Date submitted: 28 Nov 2008

Electronic form version 1.4