Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Temperature and Interlayer Control of Schottky Barrier Height[1]
YANG LI, WEI LONG, RAYMOND TUNG — The control of the magnitude of the Schottky barrier height (SBH) has been a much needed capability for advanced devices and design. Recent experimental and theoretical work has established the importance of controlling the interface structure in tuning the SBH. In our recent work, the temperature of the substrate and the effective temperature of the metal flux were individually and systematically varied to study their effects on the formation of the Schottky barrier. Electrical measurements, by variable temperature I-V and C-V method, of Au/Si and Ag/Si diodes fabricated on n- and p-type <100> and <111> substrates showed a significant dependence on fabrication conditions of the Schottky barrier. Lower deposition temperature led to more uniform contact between metal and semiconductor, which then led to higher SBH on n-type Si, with the expected, opposite dependence observed on p-type Si. In our present work, Silicon surfaces terminated with different types of stable closed-shell configurations are used to systematically study the influence of the interlayer on tuning the SBH. Electrical results and results obtained from surface chemical analysis and microscopic techniques are presented with special attention paid to the possible electrical inhomogeneity in the systems.

[1]Supported by National Science Foundation DMR-0706138

Yang Li

Date submitted: 21 Nov 2008 Electronic form version 1.4