Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

**Electrical and Structural Characterization of Pulsed Laser Deposited High-k Dielectric Thin Films on Si and Ge**[1] MICHELLE JAMER, M. ALPER SAHINER, Seton Hall University — The thin film growth conditions are correlated with the local structure and the electrical properties in $Hf_xZr_{1-x}O_2$(x=0.25-0.90) high-k dielectric thin films on Si and Ge substrates. We used pulsed laser deposition (PLD) technique in preparation of the thin films. Thin film growth parameters such as partial oxygen pressure, substrate temperature, laser frequency were systematically varied and the response of the local structure and electrical properties of the resulting high-k dielectric thin films were monitored. The local structural information acquired from extended x-ray absorption spectroscopy (EXAFS) was correlated with the thin film growth conditions. EXAFS experiments were conducted at the National Synchrotron Light Source of Brookhaven National Laboratory. The competing crystal phases of oxides of Hf and Zr were identified and the intricate relation between the stabilized phase and the parameters as: the substrate temperature; Hf to Zr ratio; and the partial oxygen pressure were revealed. The capacitance versus voltage and capacitance versus frequency measurements were performed. EXAFS modeling and fitting will be presented and structure growth and capacitance response correlations will be presented.

[1]Supported by NSF:DMI-0420952 and Research Corporation:CC6405

M. Alper Sahiner
Seton Hall University

Date submitted: 20 Nov 2009 Electronic form version 1.4