

Abstract Submitted
for the TSF06 Meeting of
The American Physical Society

Interaction of Hafnium oxide with silicon¹ RICHARD MILLER, A.R. CHOURASIA, Department of Physics, Texas A&M University-Commerce — X-ray photoelectron spectroscopy has been employed to study the interaction of hafnium oxide with silicon. Hafnium was deposited in an oxygen atmosphere onto silicon substrates kept at temperatures: 20°C, 100°C, 200°C, 300°C, 400°C, and 500°C. The evaporation was done by the e-beam technique. The 3d and 4f core levels and the X-ray excited Auger regions of hafnium were recorded using the zirconium L_{α} radiation. The Auger parameter was determined from these spectra. The Wagner plot was constructed using the Auger parameter values. This plot showed a shift in the parameter from room temperature to high temperature. The data for 100°C, 200°C, 300°C, and 400°C showed no changes. This has been interpreted as no change in the stoichiometry of the hafnium oxide deposited on the silicon substrate. The 500°C sample shows a significant change indicating change in the environment of hafnium. At this temperature silicon is observed to remove some oxygen from hafnium oxide to form silicon oxide. The change in the Auger parameter has been interpreted as due to stress at the hafnium oxide/silicon interface.

¹Work supported by Research Corporation and Faculty Enhancement Grant, TAMU-Commerce.

A. R. Chourasia
Department of Physics, Texas A&M University-Commerce

Date submitted: 18 Sep 2006

Electronic form version 1.4