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Interaction between silicon and thin films of hafnium oxide[1] JOHN HICKMAN, STEVEN MCDONOUGH, A.R. CHOURASIA, Dept. of Physics, Texas A&M University-Commerce — Thin films (20 Å) of hafnium were deposited on silicon substrates at base pressure of high 10^{-9} Torr. The substrate temperature was kept at 100, 200, 300, 400, 500, and 600 $^\circ$C during deposition. The interfaces thus formed were analyzed *in situ* by the technique of x-ray photoelectron spectroscopy using Mg anode as the source of excitation. The hafnium 4f, silicon 2p and oxygen 1s core level regions were investigated. The spectral data were obtained at various take-off angles to investigate the reactivity at various depths. The spectral data show that hafnium gets deposited as HfO_2. As the substrate temperature is increased, changes in the hafnium and oxygen core regions were observed. The data show that HfO_2 gets reduced either to elemental hafnium or to hafnium-suboxide as the substrate temperature is increased. No spectral changes were observed in the silicon core region indicating no chemical reactivity between HfO_2 and silicon till at least 600 $^\circ$C.

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