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Implementation of a Thermal Desorption Apparatus in High-k Dielectrics EZEKIEL WALKER, VAISHALI UKIRDE, MOHAMED EL BOUANANI[1], University Of North Texas — Hydrogen plays a major role in semiconductor technology due to its pervasiveness in a variety of processes such deposition and post annealing of electronic structures. Therefore, it has become increasingly important to better understand the properties and behavior of hydrogen in semiconductors in order to improve the electronic performance of Advanced Metal-Oxide-Semiconductor (MOS) structures. Hydrogen is known to have the most ambivalent (both beneficial and detrimental) in MOS devices. Trap transformations under annealing treatments in hydrogen ambient is known to be highly efficient in improving the device characteristics by passivating defects at the SiO_2/Si interface. Comparable behavior in observed in the high-k dielectric based MOS structures. Despite a wealth of electrical knowledge, there is little direct information about the actual location and concentration of hydrogen, the trapping mechanisms and the effects under hydrogen annealing in high-k dielectric based MOS devices. Thermal Desorption studies would contribute in understanding hydrogen bonding strength and configurations in advanced MOS nano-structures.

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