Abstract Submitted
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Study of the stability of Se passivation layers on Si(001) surfaces using time-of-flight positron annihilation induced Auger electron spectroscopy[1] J. ZHU, NanoFab Center, Electrical Engineering, The University of Texas at Arlington, MANORI NADESALINGAM, Physics Department The University of Texas at Arlington, A. H. WEISS, Physics Department, The University of Texas at Arlington, MENG TAO, NanoFab Center, Electrical Engineering, The University of Texas at Arlington — The stability of Se passivation layers on a Si(001) surface was investigated using a non-destructive surface sensitive technique: Time-of-Flight Positron annihilation induced Auger Electron Spectroscopy (TOF-PAES). After 10 days of exposure in the air, the Se passivation layer was observed to incorporate some oxygen but to remain largely intact. Part of the adsorbed oxygen was removed during annealing at 400 $^\circ$C in the UHV-environment, however, some oxygen remained on the surface until high temperature annealing at 1030 $^\circ$C. We posit that that the oxygen that remained after the low temperature anneal was chemisorbed on the Si at defects in the Se passivation layer. The Se passivation layer was stable up to an annealing temperature of $\sim$ 800 $^\circ$C. The stability of the Se-passivated Si(001) surface is attributed to the saturation of the Si dangling bonds at the surface and to the strong Se-Si bonds.

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