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Integrated High Switch Test System to Determine Time-Dependent Dielectric Breakdown HEATHER PETROCCIA[1], Villanova University — As a 2011 SPS summer intern, I worked for NIST in the Semiconductor Division learning about characterizing defects in MOSFETs. The lifetime and reliability of a MOSFET is directly related to the projected lifetime of an electronic device. By applying an increased stress voltage to the gate oxide, the lifetime of the MOSFET within an electronic device can be simulated. From this simulation, the reliability of the device can be determined from a mathematical extrapolation which is derived from breakdown data. Although time dependent breakdown has been thoroughly studied in the past in silicon dioxides, large statistical studies are still necessary to confirm the already accepted models for extrapolating mean lifetimes as well as increasing the accuracy of the projected lifetime. By creating an integrated high switch test system to determine time dependent dielectric breakdown, we hope to create a more affordable and efficient system to test copious numbers of oxides. This system is composed of set of highly parallel switches which apply a stress voltage to a total of 48 oxides. By implementing LabVIEW, the level of the stress voltage as well as the break down voltage and time can be determined. From this data further statistical analysis can be applied.

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