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Accomplishments and Conclusions

Below are summarized the significant findings of research carried out under the contract.

- High temperature annealing of SiO$_2$/Si structures in oxygen-deficient ambients initiates interfacial decomposition of oxide, leading to electrical activation of existing inactive defects.
- Addition of trace oxygen to the annealing ambient prevents formation of electrical defects.
- Metal impurities initiate the SiO$_2$/Si interfacial decomposition reaction.
- Positron annihilation depth profiling is sensitive to defect structures in thermal oxides, possibly associated with intrinsic defect generation which occurs during the thermal oxidation process.
- An advanced ultrahigh-vacuum-based multichamber processing and analysis system for CVD and oxidation studies has been designed, fabricated, and demonstrated.
- The reaction product for selective W CVD on Si using WF$_6$ is $\&$SiF$_4$. at low temperature and increasingly $\&$SiF$_2$. at higher temperature.
- Si diffusion through CVD-grown W can sustain the WF$_6$ reduction reaction.
- Improved techniques for molecular beam studies of CVD surface reactions have been developed.

Journal Articles Resulting from Contract


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