

Project Summary

As plasma processing techniques become used increasingly for semiconductor and microelectronics fabrication, it is vital to understand the interaction between the plasma particles and exposed materials. Plasmas can modify the surface chemistry, surface morphology and optical and electrical properties of substrates. This proposed project will perform an experimental and computational investigation of the interaction of chemically reactive (hydrogen) and non-reactive (helium and argon) plasmas with ion-implanted materials and wide bandgap semiconductors. Studies will focus on using plasmas to process the target materials (via surface oxidation and plasma annealing) and to characterize the effect of the plasma parameters (density, ion and electron temperatures, etc.) on plasma-induced damage. This proposal calls for the development of a new linear, magnetized plasma source at Fisk University to carry out these studies. The implementation of this research project will be coupled with a new experimental training course to provide the undergraduate and graduate students at Fisk University with a unique opportunity to expand their research skills in the areas of vacuum technology, microwave technology, plasma production, and materials processing.