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Improve the 4H-SiC/SiO2 interface quality through plasma annealing treatment[1] MAURICE MCGEE, ZENGJUN CHEN, Physics Department, Tuskegee University, Tuskegee, AL 36088 — Silicon Carbide (SiC) is a wide bandgap semiconductor material with broad applications in the technological realm. Its high thermal conductivity, high breakdown field, and high electron mobility make it beneficial for use in electronic devices that operate at high temperatures and high voltages. However, SiC does have limitations. One can be found at its interface with silicon dioxide (SiO2), where many defects are present. The higher the defects density, the more resistance there is for the electrons to flow freely. Consequently, the flow of electrons of the SiC-based devices has become greatly restricted. As a result of this, much effort has been done on reducing the defects density at the interface. In the present work, the plasma annealing allows us to incorporate nitrogen at the SiC/SiO2 interface. It is still not fully understood how nitrogen improves the interface, but the experiments have shown that the plasma annealing treatment significantly decreases the defects density. It is also shown in our results that the amount of incorporated nitrogen is positively related to the reduction of the defects density. Further experiments will be carried out to study the relationship between the plasma annealing and channel mobility enhancement in MOSFETs.

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