Abstract Submitted
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Surface-enhanced Raman spectroscopy of the nitrided SiO_2/SiC interface[1] S.H. CHOI, Vanderbilt University, M. PARK, D. WANG, J.R. WILLIAMS, Auburn University, W. LU, Fisk University, S. DHAR, L.C. FELDMAN, Vanderbilt University , AUBURN UNIVERSITY COLLABORATION, FISK UNIVERSITY COLLABORATION — Performance of silicon carbide (SiC) field effect devices is limited by poor channel mobility due to the high density of oxide/dielectric interface states, (D_{it}). In general D_{it} is crystal-face dependent. Carbon clusters generated by the high temperature oxidation process, are assumed to be the major contributor to this high defect density. Nitric oxide (NO) annealing reduces the interface states and results in an enhanced mobility, although the physical/chemical mechanisms are not yet established. We report a surface enhanced Raman spectroscopy (SERS) analysis of the 4H-SiC/SiO_2 interface, clearly showing carbon cluster bands, on the C (carbon-terminated) face. The concentration of the carbon clusters on the C-terminated interface is much higher than that of the Si-face, consistent with the higher D_{it} on the C-face. Furthermore, NO annealing results in a reduction of the cluster concentration. This result provides direct experimental evidence that carbon clusters exist at the as-grown interface and the effect of NO anneal at atmospheric pressure suggest removal of these interfacial carbon defects.

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