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Effect of Post-Oxidation Annealing on High-Temperature Grown SiO_2/4H-SiC Interface

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Metal-Oxide-Semiconductor FETs using 4H-SiC have been investigated intensively because thissemiconductor has excellent physical properties for power-device applications. However, the MOSFET is still under performed due to low channel mobility. One of the origins of the low channel mobility is attributed to high interface-trap density (D_{it}), particularly located near conduction band edge of the semiconductor. The prevailing factor contributing to this trap is due to existence of intrinsic carbon that is originated from two sources: (1) residual carbon from surface of substrate prior to oxidation and (2) carbon generated at the interface during oxidation. It has been generally accepted that SiO_2 grown from nitridation could significantly reduce this trap. Majority of these works were performed at temperature lower than 1200°C. There are limited reports on the effect of nitrided oxide, both directly grown or post-oxidation annealed, at higher temperature. Therefore, we are reporting the SiO_2-SiC interface properties of the oxide grown at 1300 and 1400 °C in dry oxygen and comparing with the properties of the oxide underwent post oxidation annealing (POA) using nitric oxide gas (NO).

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