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Low-Temperature, Remote Plasma Oxidation of SiC for MOS Device Applications. J.M. WILLIAMSON, B.A. TOLSON, Innovative Scientific Solutions, Inc., Dayton, OH, S.F. ADAMS, J.D. SCOFIELD, Air Force Research Laboratory, Wright-Patterson AFB, OH — Silicon carbide is considered a promising semiconductor material for high-frequency, high-power, and high-temperature devices because of its large band gap, high thermal conductivity, high breakdown strength and large saturated electron drift velocity. The performance of SiC metal oxide semiconductor (MOS) devices is limited by the defect density of the semiconductor/oxide interface. High-temperature thermal oxidation leaves carbon impurities at the SiC/SiO_2 interface resulting in high defect state densities with concomitant lower channel conductivity and decreased device efficiency. To circumvent the high sample temperatures used in thermal oxidation, plasma assisted oxidation of SiC wafers was investigated using O_2/Ar gas mixtures in a remote microwave plasma reactor. Results will be presented for the electrical and material properties of oxide layers as a function of gas mixture, surface temperature, and substrate bias. These results will be correlated with plasma properties determined by in-situ optical diagnostics.

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