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Passivation of 4H-SiC Silicon surface G. PENNINGTON, University of Maryland, College Park, C. ASHMAN, High Performance Technologies Inc., A. LELIS, U.S. Army Research Laboratory, N. GOLDSMAN, UNIVERSITY OF MARYLAND ELECTRICAL AND COMPUTER ENGINEERING DEPT. COLLABORATION, DOD HPCMP PET PROGRAM COLLABORATION, U.S. ARMY RESEARCH LABORATORY, ADELPHI, MD. COLLABORATION — The material properties of the silicon carbide (SiC) 4H polytype are ideally suited for use in metal-oxide-semiconductor field-effect transistors (MOSFETs) operating under high temperature, high power conditions. Currently, the development of lateral SiC MOSFETs is hindered by excessively small field-effect mobilities that are typically measured in these devices. The cause for such small mobilities is believed to be directly related to the very large density of traps measured at the 4H-SiC/SiO₂ interface. Recently, oxidation processing in the presence of nitrogen or in the presence of metals, has been shown to improve the mobility of 4H-SiC MOSFETs. However, there is no clear consensus on the physical mechanisms involved in improvement of the 4H-SiC/SiO₂ interface. We use *ab-initio* density functional theory to study passivation of the 4H-SiC Si surface by nitrogen, oxygen, aluminum, and sodium.

Gary Pennington
University of Maryland, College Park

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