Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Structure and defects at the SiC:SiO_2 interface[1] BLAIR TUTTLE, Penn State Behrend, SOKRATES PANTELIDES, Vanderbilt University — The pervasion of defects at the SiC:SiO_2 interface has limited the performance and commercializing of SiC based transistors. While the defects are believed to be related to excess carbon in the interfacial region, no compelling microscopic models exists. Here we report the generation of microscopic interfaces models for the SiC:SiO_2 interface. These models include a 1 nm amorphous oxide and several layers of crystalline SiC. Defect and defect reactions are explored. For instance, the 3-fold bonded carbon defect is calculated to have an acceptor level at Ev + 1.4 eV close to the value found experimentally and encouraging confidence in the methods employed. The recently discovered beneficial effect of sodium ions motivates our examination of the basic electrochemistry of the sodium ion interactions with the ideal and defected interfaces. A comparison between microscopic defect results and experiment will be presented.

[1]Work supported by the NSF grant DMR-0907385

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Date submitted: 20 Nov 2009 Electronic form version 1.4