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**Fundamental Studies of p-type Boron Carbide to n-type Silicon PN Junctions**[1] SUDARSHAN KARKI, University of Missouri Kansas City, JOSEPH SANDSTROM, Centre for Nanoscale Science and Engineering, CHAD CLAYTON, SAAD JANJUA, M. SKY DRIVER, University of MIssouri Kansas City, K. I. POKHODNYA, Center for Nanoscale Science and Engineering, ANTHONY CARUSO, University of Missouri Kansas City — Boron carbide -to silicon PN junction diodes are of present interest to radiation detection, yet the diode properties are far from optimized because of a lack of processing correlation to the electronic and transport properties. This talk will discuss and contrast the p-n junction transport studies within the context of the diode processing conditions for both $B_4C$ and a-$B_5C$:$H_x$ forms of boron carbide. Of particular interest, we have found a correlation between the leakage current, turn on voltage and depletion region width as a function of elemental and defect impurity concentrations. Post growth thermal treatment helps to separate out the defect from elemental sites that could be causing deleterious transport and will be discussed as a function of both growth and annealing temperatures. The depletion region width on the boron carbide side was also determined by measuring the turn on voltage as a function of film thickness.

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