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The Electrical and Physical Properties of Ni and ZrB_2 Schottky Contacts of n-type 4H-SiC[1] TOM ODER, TA-LUN SUNG, RANI KUMMARI, MARK DEL FRAINO, Youngstown State University — We report the electrical and physical properties of Ni and ZrB_2 Schottky contacts deposited on n-type 4H-SiC. Current-voltage (I-V) and capacitance-voltage (C-V) measurements were used to determine the electrical properties of the Schottky barrier diodes formed. The energy barrier of the diodes formed with the Ni Schottky contacts increased from 1.48 eV for non-annealed contacts to a maximum value of 1.81 eV after a 24 hour annealing in vacuum at 500 ^{o}C. The physical analysis of this contact determined by the Rutherford backscattering spectroscopy (RBS) revealed a significant formation of nickel silicide. A remarkable improvement of the ZrB_2/SiC Schottky contact was achieved when the ZrB_2 contact was deposited on SiC substrates held at temperatures above 400 ^{o}C. The energy barrier increased with the deposition temperature from an average value of 0.87 eV for contacts deposited at 20 ^{o}C to 1.07 eV for those deposited at 600 ^{o}C. The RBS spectra revealed a systematic decrease of oxygen with increase in the deposition temperature, which we believe is a result of oxygen escaping from the interface.

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