

Abstract Submitted
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Improved Ni/SiC and ZrB₂/SiC Schottky Barrier Diodes by High Temperature Processing¹ TOM ODER, TA-LUN SUNG, EDWARD SUTPHIN, SARA SCHAEFER, RANI KUMMARI, Youngstown State University — High temperature processing was used to improve the barrier properties of SiC Schottky diodes fabricated with Ni and ZrB₂ Schottky contacts. The Ni/SiC diodes were annealed in vacuum at 500 °C in 20-hour intervals for a total of 110 hours. The average Schottky barrier heights determined by I-V measurements, increased with annealing time from 1.48 eV for non-annealed contacts to 1.81 eV for those annealed for 20 hours. The improvement is believed to be due to the formation of nickel silicide. The ZrB₂ Schottky contacts for the ZrB₂/SiC diodes were deposited at temperatures between 20 °C and 800 °C. The barrier heights increased with the deposition temperature from an average value of 0.87 eV for contacts deposited at 20 °C to 1.07 eV for those deposited at 600 °C. The Rutherford backscattering spectra of the ZrB₂/SiC contacts revealed a decrease of oxygen with increase in the deposition temperature and showed no reaction at the ZrB₂/SiC interface. We ascribe the improvement of the ZrB₂/SiC diodes to the removal of oxygen from the contact when deposited at high temperatures.

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