



The a-SiC/c-Si(n) Isotype Heterojunction as a High Sensitivity Temperature Sensor

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The a-SiC/c-Si(n) isotype heterojunction has been studied as a temperature sensor by measuring its reverse current-voltage (IR-V) and reverse voltage-temperature (V-T) characteristics, as well as its reverse current temperature dependence. The IR-V characteristics exhibit an almost constant current, whereas the reverse current IR depends strongly on T (from 230 K up to 320K). The V-T characteristics, at different reverse currents, reveal a highly temperature sensitive behavior for the a-SiC/c-Si(n) junction. The measured values of temperature sensitivity ($\Delta V/\Delta T$)_{max} was found to be (≈ -2.5 V/K) in the moderate temperature range, which are much higher than those obtained with bulk semiconductor temperature sensors. The high sensitivity-temperature- range of the a-SiC/c-Si(n) heterojunctions can be controlled electrically within the regime of values from 230 K up to 320 K. Finally, the high sensitivity of these devices, in conjunction with the fact that a-SiC films can be used as an add-on to the existing Si technology, emerge new possibilities to the fabrication of high sensitivity temperature micro-sensors.

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