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Study of Current-Voltage-Temperature (I-V-T) Characteristics of Palladium Schottky contacts on n-Ge (100)

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Abstract content
 (Max 300 words)

Current-voltage (I-V) characteristics of palladium Schottky contacts on n-Ge (100) have been measured in the 60-300 K temperature range, and analysed in terms of thermionic emission theory by incorporating the barrier inhomogeneity concept at the metal/semiconductor interface through the Gaussian distribution function. Diode electrical parameters such as ideality factor and Schottky barrier height were consequently extracted from electrical measurements. These electrical parameters indicate a very strong temperature dependence. While ideality factor n decreases, the zero bias Schottky barrier height increases with increasing temperature. The zero-bias barrier height versus $1/2kT$ plot has been drawn to obtain evidence of a Gaussian distribution of barrier heights. The temperature dependence of the barrier height for Pd/n-Ge (100) Schottky contacts depicts two Gaussian distributions. The Richardson constant and mean barrier height from the modified Richardson plot, were obtained as $0.32 \text{ Acm}^{-2}\text{K}^{-2}$ and 0.529 eV , respectively. This Richardson constant is much smaller than the reported of $50 \text{ Acm}^{-2}\text{K}^{-2}$. This deviation may be attributed to greater inhomogeneities and potential fluctuations at the contact interface.

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