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Impact of annealing process on electrical characteristics of Ni Schottky rectifiers fabricated on p-type Si

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In this work, the electrical parameters of Ni/p-Si SBDs have been investigated using I-V and C-V techniques as a function of annealing temperature. The experimental analysis revealed that the SBHs of the Ni/p-Si SDs are 0.53 eV (I-V) and 0.54 eV (Norde) for as-deposited, 0.56 eV (I-V) and 0.58 eV (Norde) for 300 °C, 0.58 eV (I-V) and 0.59 eV (Norde) for 400 °C, and 0.50 eV (I-V) and 0.49 eV (Norde) for 500 °C, respectively. By performing C-V measurements for the Ni/p-Si SBDs, the SBH values were found to be in the range 0.64–0.59 eV for the as-deposited and 500 °C annealed samples, respectively. Further, interface state density (N_{SS}) values of Ni/p-Si SD is estimated and is noticed that the N_{SS} values decreases up to 400 °C annealing temperature and slightly increases after annealing at 500 °C.

Keywords: Schottky diode, ideality factor, MS structure, Schottky barrier height, interface state density.