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Barrier Heights of Antimony / and Bismuth / P -Silicon (100) Junctions

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Abstract: Junctions were fabricated in vacuum of about 10^{-5} Torr by thermal evaporation of Sb or Bi onto chemically etched p-type silicon (100) substrates. The electrical properties were studied by current voltage (I-V) measurements. Some of the Sb and Bi junctions were heated-treated for $\frac{1}{2}$ hr at 200 and 150°C, respectively. The barrier height (BH) was equal to 0.64 eV for both as-deposited and heat-treated Sb junctions, while it was 0.56 and 0.74 eV for as-deposited and heat-treated Bi Junctions, respectively. These observations indicate that for Sb junctions, annealing at a temperature of 200°C resulted only in partial elimination of any interfacial layer (oxide), while it modified the density of interface states. On the other hand, for Bi junctions, heat-treatment at 150°C eliminates completely the oxide layer, while also modifying the density of interface states.

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