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Variable temperature conducting tip atomic force microscopy of cobalt silicide on n-type Si(111):7×7 and n-type Si(100):2×1 JOSEPH TEDESCO, J.E. (JACK) ROWE, North Carolina State University, ROBERT NEMANICH, Arizona State University — Cobalt silicide ($CoSi_2$) nanoislands have been formed by ultrahigh vacuum deposition of thin films (∼0.3 – 1.0 ± 0.1 nm) of cobalt on clean n-type Si(111) and n-type Si(100) surfaces followed by annealing to ∼900°C. Contact areas of the nanoislands were found to range from $\sim 50 \times 10^3 - 450 \times 10^3$ nm^2 when grown on Si(111) and from $\sim 100 \times 10^3 - 700 \times 10^3$ nm^2 when grown on Si(100). Conducting tip atomic force microscopy (*c*-AFM) has been used to record current-voltage (I-V) curves from the nanoislands at several temperatures between room temperature and ∼-200°C. The I-V curves are analyzed using thermionic emission theory to determine the Schottky barrier height, Φ_B, and the ideality factor, n, of the nanoislands. Room temperature values of Φ_B and n are found to be in the range of 0.35 – 0.63 eV and 1.1 – 1.8, respectively. Comparisons of Φ_B and n are performed for nanoislands of different shapes, and the temperature dependence of both Φ_B and n is analyzed. Richardson plots for the nanoislands are created and found to be non-linear at low temperature. The nanoislands were etched off the silicon surface using *ex situ* hydrofluoric acid (HF) etching and AFM was used to examine the shape of the nanoisland-substrate interfaces, and nanoisland properties are that shape.

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