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Schottky Barrier of CoSi2 Nanowires on Si LIFENG HAO, School of Materials, Arizona State University, PETER BENNETT, Department of Physics, Arizona State University — We report in situ measurements of the Schottky barrier for epitaxial CoSi2 nanowires on Si(100) using a UHV-STM. Defect-free nanowires of CoSi2 with atomically prefect facets and interface (see Fig.1)are grown by depositing Co onto a heated substrate in UHV. Nanowires length and width can be controlled by varying the deposition temperature. Electrical contact is made by disabling the feedback loop then lowering the tip until the current saturates. With such a controlled approach, repeated contacts can be made without significantly damaging the STM tip. An example of I-V curve is shown in Fig. 2, for the nanowire shown in the inset at room temperature. For the various nanowires, we find that the ideality factor decreases with nanowire width but is insensitive to nanowire length in the range -80°C to +100°C. It varies strongly with nanowire shape and interface. The departure from ideal values (n $\sim$ 1, phi $\sim$ 0.6eV) is believed to result from enhanced tunneling due to the small nanowire width and shape, which creates a strong electric field at the interface. The tunneling contribution may be decoupled from thermionic current via its temperature dependence.

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