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Fabrication of Si nanowires on Si (100) using a scanning probe tip JOSHUA SMITH, ROBERT DAVIS, YING YI DANG, GARY FEDDER, JIM BAIN, DAVID RICKETTS, Carnegie Mellon University — Reliable fabrication on the nanoscale is becoming increasingly important. The co-author team is investigating a nanolithography technique for the deposition of nanoscale features entitled “Tip-directed, field-emission assisted nanomanufacturing” (TFAN). The TFAN process involves the adsorption of a layer of silicon-containing gas, such as disilane, to a substrate and the selective patterning of the surface with field-emitted electrons from a scanning probe tip. The electrons crack the Si containing molecules, which results in the deposition of Si on the substrate. The adsorption of the Si-containing molecules to the substrate surface is critical to the success of this approach. The investigation involves the determination of the coverage, sticking coefficient, and time constant of disilane on the Si(100) surface using temperature programmed desorption and scanning tunneling microscopy.

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