

Nanoelectronics Undergraduate Research Fellowship (NURF) 2010 Project Summary

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Project title: Selective Wet Etches for a GaSb/InAs system for TFET Fabrication

The current proposed fabrication process of the TFET requires an etch that etches GaSb over InAs with high selectivity. There will be a thin cap of InAs (~25 nm) above AlGaSb in a GaSb substrate. The GaSb substrate must be etched about 100 nm deep along the sides of the InAs cap to create steep sidewalls. The InAs cap must remain intact, so the etch must have a selectivity on the order of 1000. The etch also needs to be selective of GaSb over AlGaSb so that it does not undercut the cap, but it can afford to be less selective over AlGaSb than it is over InAs.

My job over the summer was to try and find candidates that could be the wet etch needed to fabricate the TFET. Much of my research time was spent reading articles about GaSb/InAs systems. Once I found an etch that seemed like it could be a possible candidate, I went into the cleanroom, prepared AlGaSb/InAs diode samples with photolithography, cleaved the samples into pieces, and then tested the etch on each piece for different amounts of time to determine etch rate, effects, and selectivity. By the end of the summer, I helped to find two possible etch candidates that demonstrated very high selectivities, and compiled enough information about wet etching and GaSb/InAs systems to give the next person a head start when they are trying to find this etch.

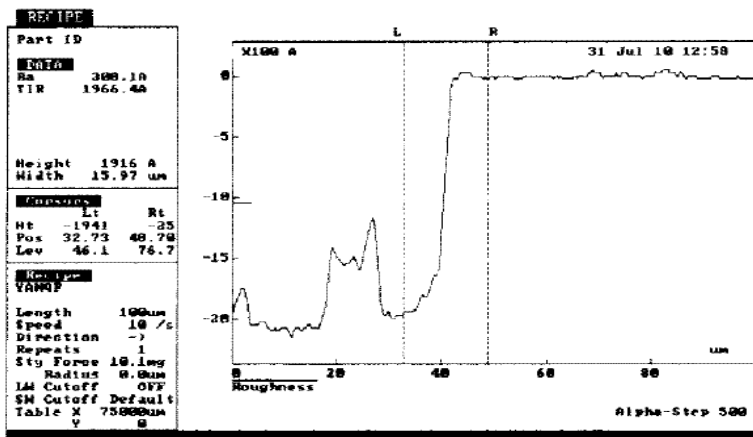


Figure 1: Alphastep Screenshot of sample etched using possible candidate Tetramethylammonium Hydroxide solution at 343 K