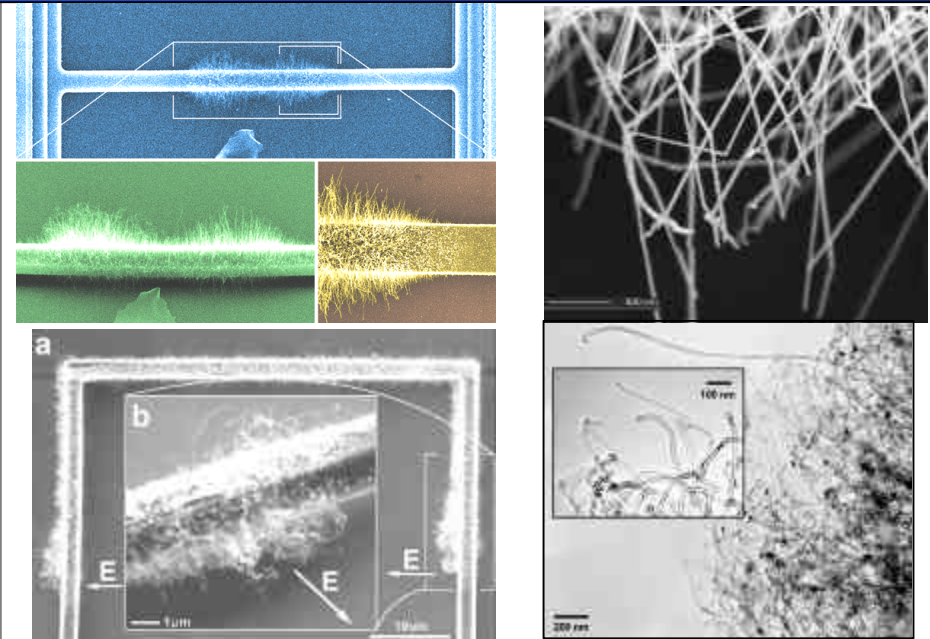


Synthesis, Assembly and Integration for Nanowires/Nanotubes

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Goals and Potential Impact if Successful

- We are developing post-CMOS processes for direct synthesis, assembly and integration of nanowires/nanotubes for sensing, actuation and communication applications
- The goal is to use foundry services for circuitry and post processing for nanostructures for low manufacturing cost
- This opens up the integration of bottom-up and top-down processes taking advantage of both approaches
- No post-assembly process is required for nanostructures by using self-synthesis, self-assembly and self-integration



Approach and/or Accomplishments

- Localized heating and synthesis of nanostructures using the VLS growth mechanism with localized heating
- Proof-of-concept demonstration on the synthesis of nanowires and nanotubes of 5~80 nm in diameter and up to 10 μm in length on a MEMS bridge
- Proof-of-concept demonstration of self-assembly of nanowires and nanotubes between two MEMS bridges
- Preliminary demonstration of gas sensing of assembled nanotubes

Bottlenecks and Open Research Questions

- Control of the synthesis process including diameter, orientation and properties of nanowires/nanotubes
- Doping of silicon nanowires
- Electrical contact properties of nanostructures
- Packaging
- Circuit integration
- False readout