NANOFAB ENERGY STORAGE

CNST Center for Nanoscale Science & Technology

Nanowire Lithium-Ion Battery

PROJECT LEADER: Alec Talin (NIST)

COLLABORATORS: Dmitry Ruzmetov, Amit Agrawal (NIST and University of Maryland); Henri Lezec, Vladimir Oleshko, Sergiy Krylyuk, Albert Davydov (NIST); Khim Karki, Kamal Baloch, John Cumings (University of Maryland)

GOAL

To fabricate a single nanowire Li-ion battery and observe it charging and discharging.

KEY ACCOMPLISHMENTS

Designed, fabricated, and tested complete Li-ion nanowire batteries measuring < 1 μm in diameter.

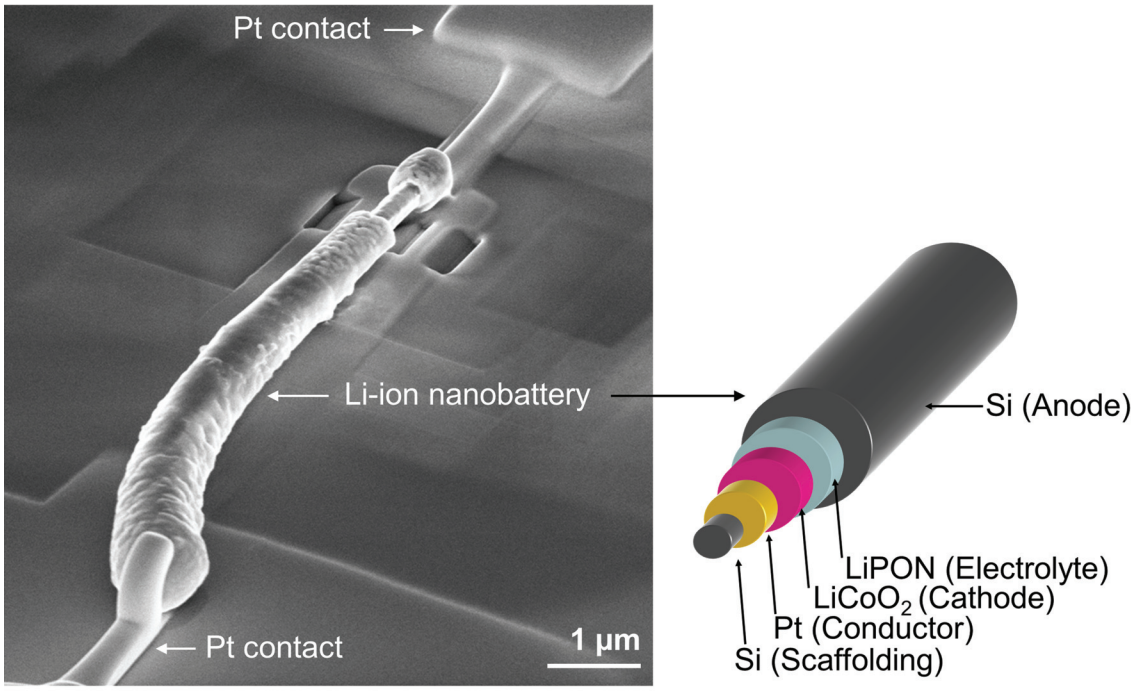
Observed real time void formation at the $LiCoO_2$/LiPON interface using transmission electron microscopy.

Developed a measurement technique to characterize electrical and structural changes in a nanobattery during charge and discharge cycles.

KEY NANOFAB PROCESS

Sputter deposition of a layered electrolytic cell around a silicon scaffold patterned using a focused ion beam.

Scanning electron micrograph showing a nanobattery connected in a circuit, along with a cross-sectional schematic of the battery.



REFERENCE

http://www.nist.gov/cnst/erg/nano_eecs.cfm