

M3D3: Cathode construction

11/19/15

Lab business

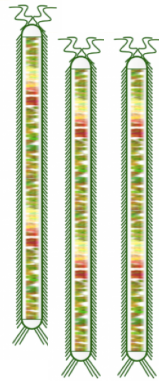
- BE Career Fair
 - Fri, November 20 (tomorrow!) from 3-5pm
 - W20-306
- Lecture on Tue, November 24
 - As scheduled, but no lab Tue/Wed, Nov 24/25
 - Come prepared to deliver a mini-presentation about your potential research proposal idea

Module 3 overview

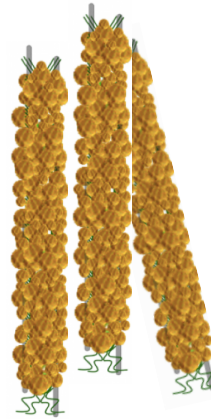


Purify
M13 phage

DAY 1

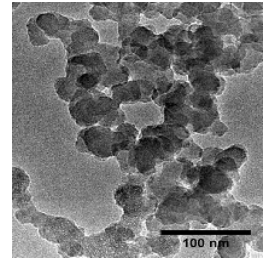


Biomine-
ralize
Fe(III)-phage



Visualize
nanowires
on TEM

DAY 4



Purify
active material

DAY 2



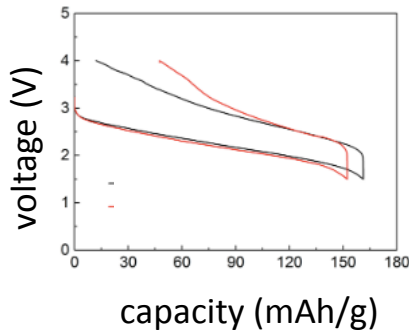
Construct
cathode
(and battery)

DAY 3



Measure battery
capacity

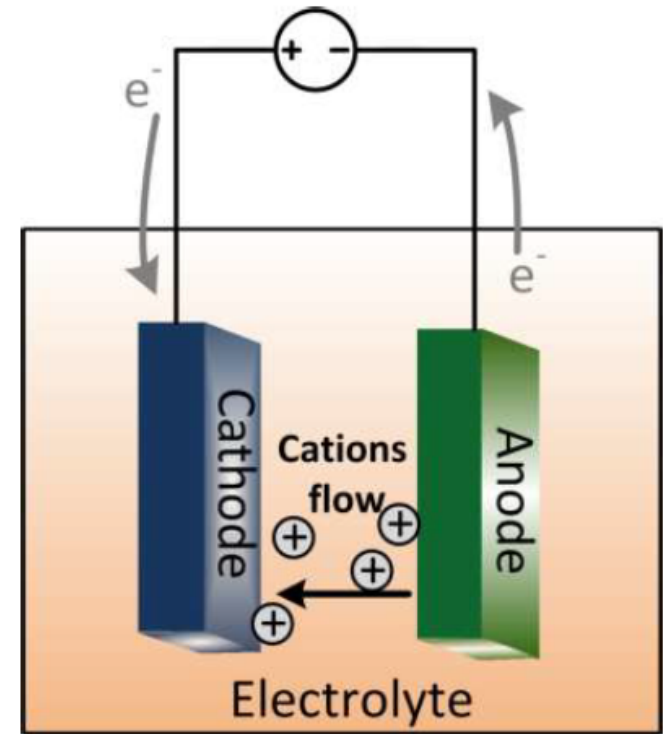
DAY 5



What is a battery cathode?

- Battery consists of two electrodes:
 - Cathode = positive electrode
 - Anode = negative electrode
- During discharge, cathode accepts electrons

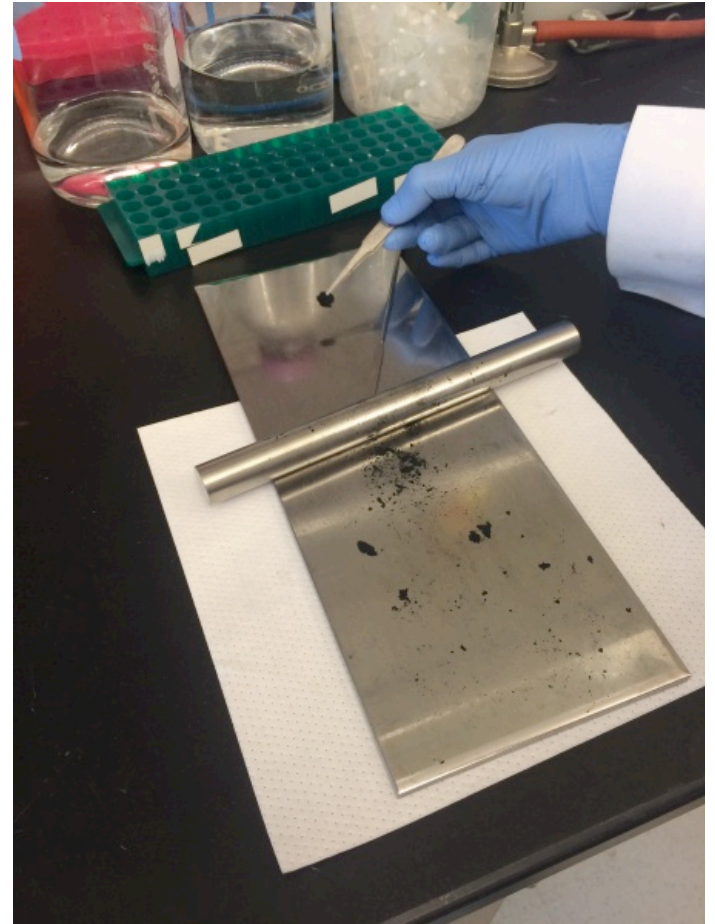
What is capacity?



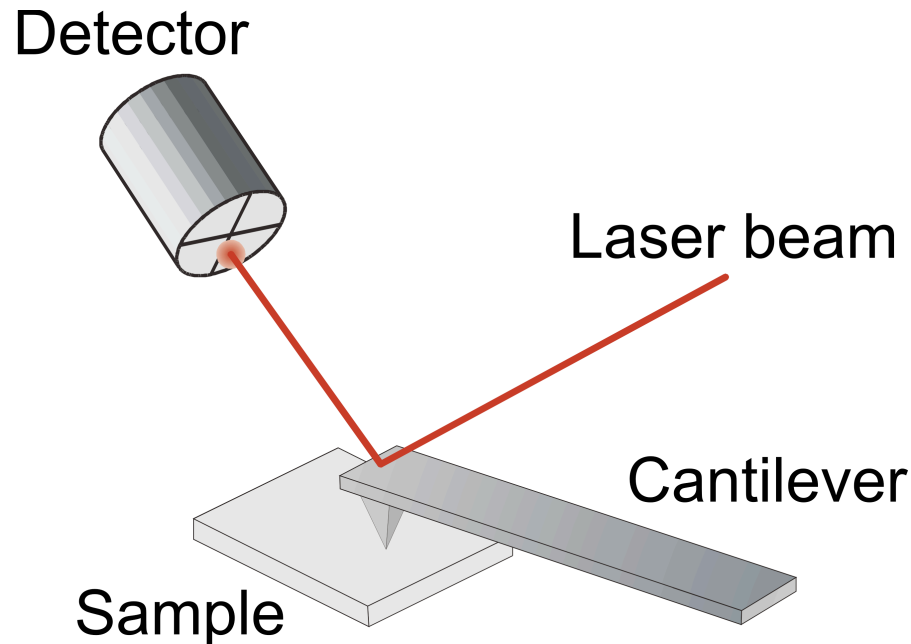
How might phage quantity impact
battery capacity?

How will you construct your cathode?

1. Weigh Fe(III)-phage nanowires (active material)
2. Mix with Super P and PTFE
3. Roll cathode material into thin sheet
4. 'Punch out' cathode disc
5. Weigh cathode
6. Dry cathode



Bonus experimental analysis: AFM



- Type of SPM – used to measure local properties
- Topology measured as vertical and lateral deflections of cantilever
- Deflections ‘read’ via laser and position-sensitive detector

Today...

- Construct cathode
- Research proposal peer exercise
- Visualize nanowires via AFM
- Class divided between protocols
 - Part 1 completed in Belcher Laboratory

Part 1	Part 2
Rozanne	Javier ¹
Trinh	Anthony ²
Lucy	Erin ¹
Cathy	Bekah ³
Tony	Rumya ²
	Cristie ³