

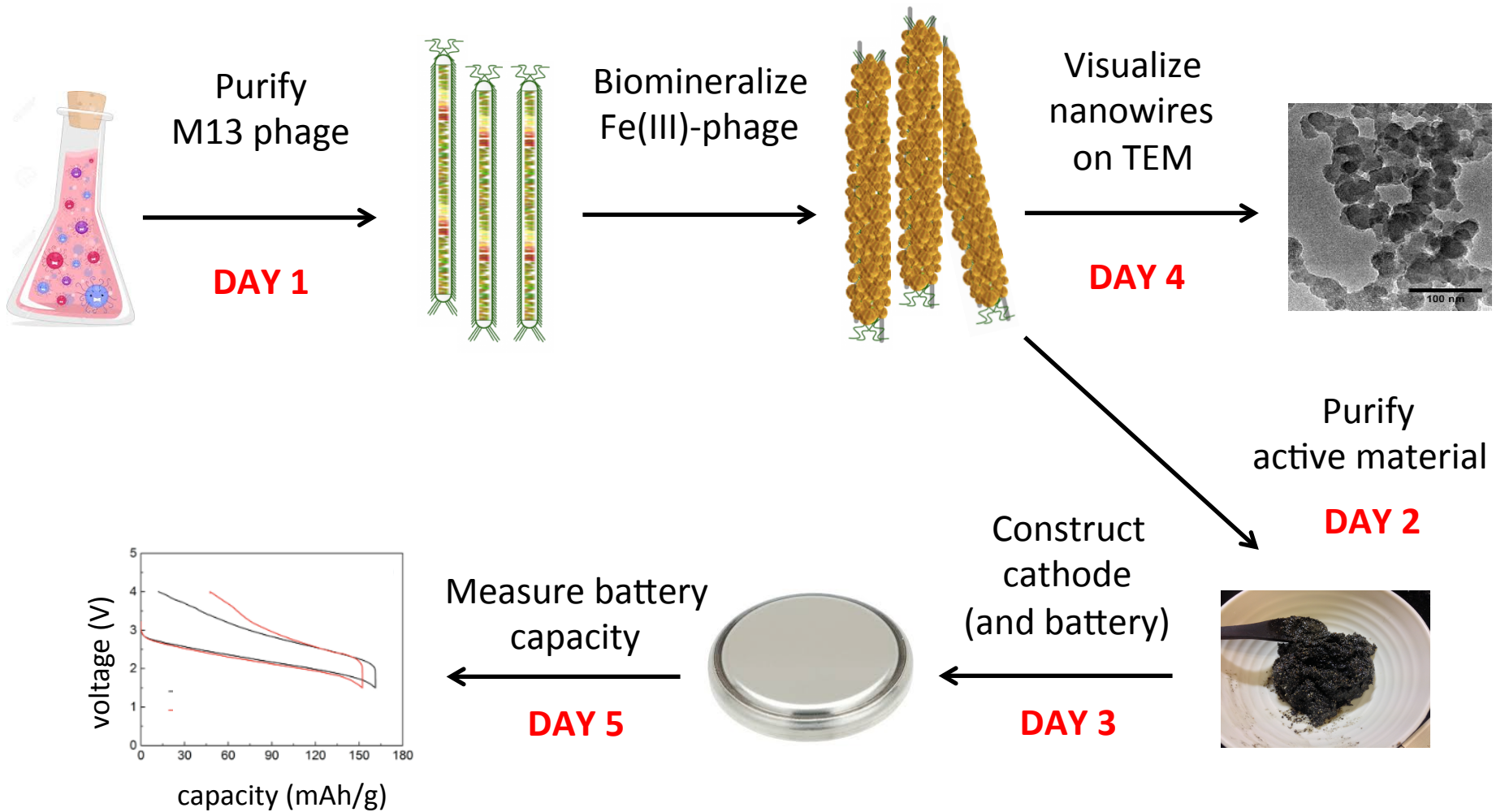
M3D3: Cathode construction

11/20/2015

Lecture Tues. 11/24 but no lab on Wed. 11/25

1. Quiz
2. Prelab
3. Construct cathode material (Belcher Lab)
4. Atomic Force Microscopy (Belcher Lab)
5. Research Proposal Peer Review Exercise (20.109 lab)

Module 3 overview

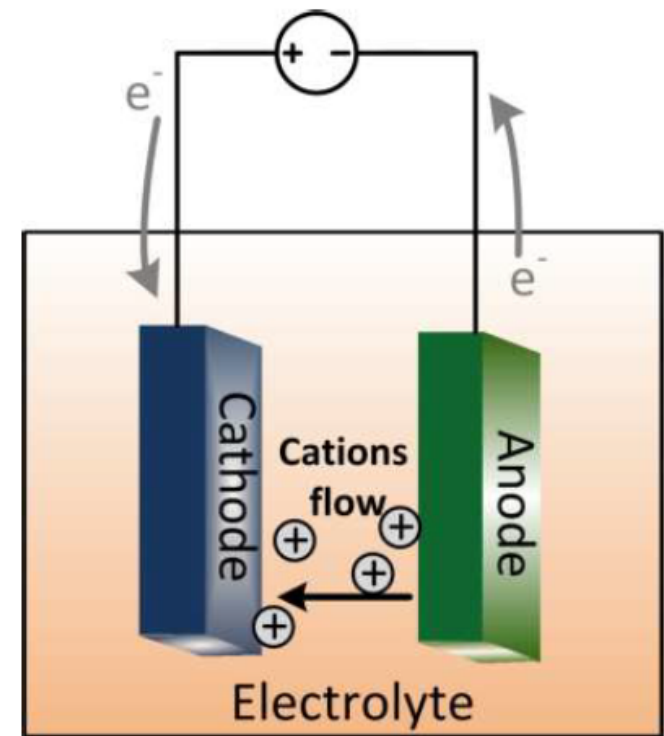


What is a battery cathode?

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

What is capacity?

amount of charge stored in battery



How might phage quantity impact battery capacity?

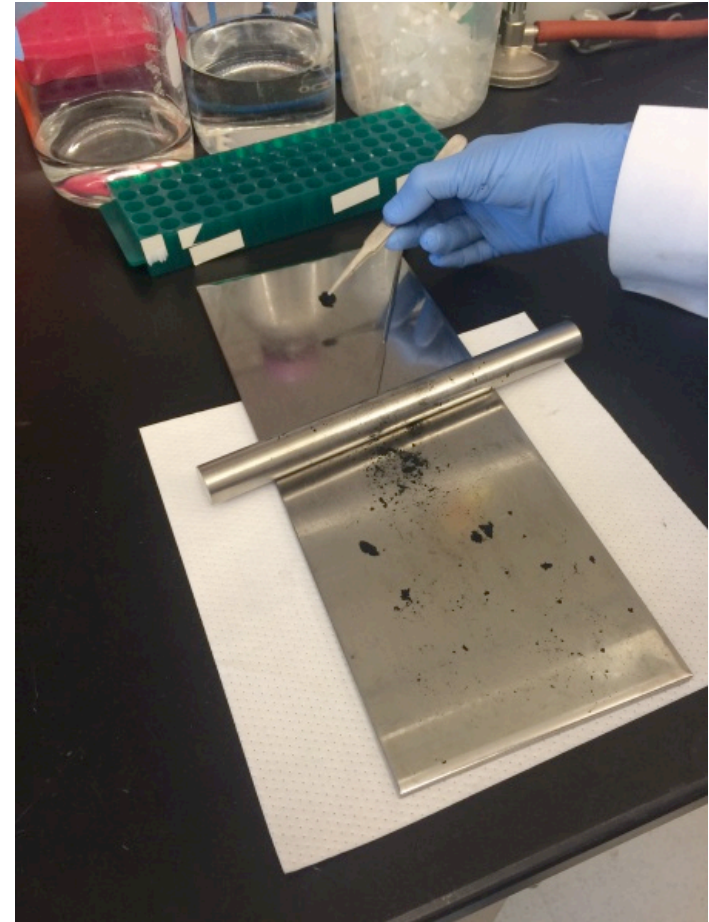


superP: carbon, increase conductivity

PTFE: teflon, bind carbon and active material

How will you construct your cathode?

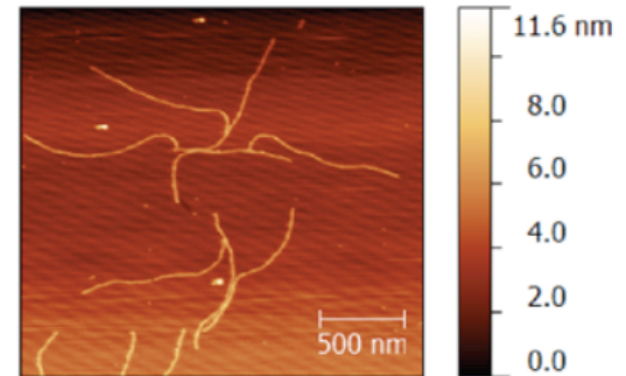
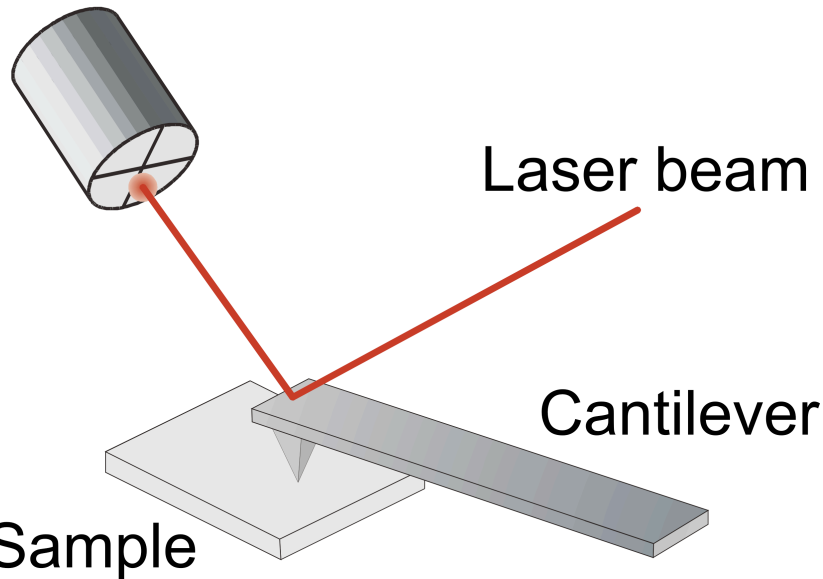
1. Weigh Fe(III)-phage nanowires (active material)
2. Mix with Super P and PTFE
3. Roll cathode material into thin sheet
4. 'Punch out' cathode disc
5. Weigh cathode
6. Dry cathode



atomic force microscopy

Bonus experimental analysis: AFM

Detector



- 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 and AFM
- Research proposal peer exercise

- Class divided between protocols

- Part 1 completed in Belcher Laboratory

Part 1	Part 2
Jiapei Chen	Charlotte Keeley
Raymond Liu	Emily Keeley
Julia Kudryashev	Tammy Tai
Brianna Berrios	Andrew Tang
Ashley Chapin	Wangui Mbuguiro
Paola Perez	