


M3D2:Purify active material

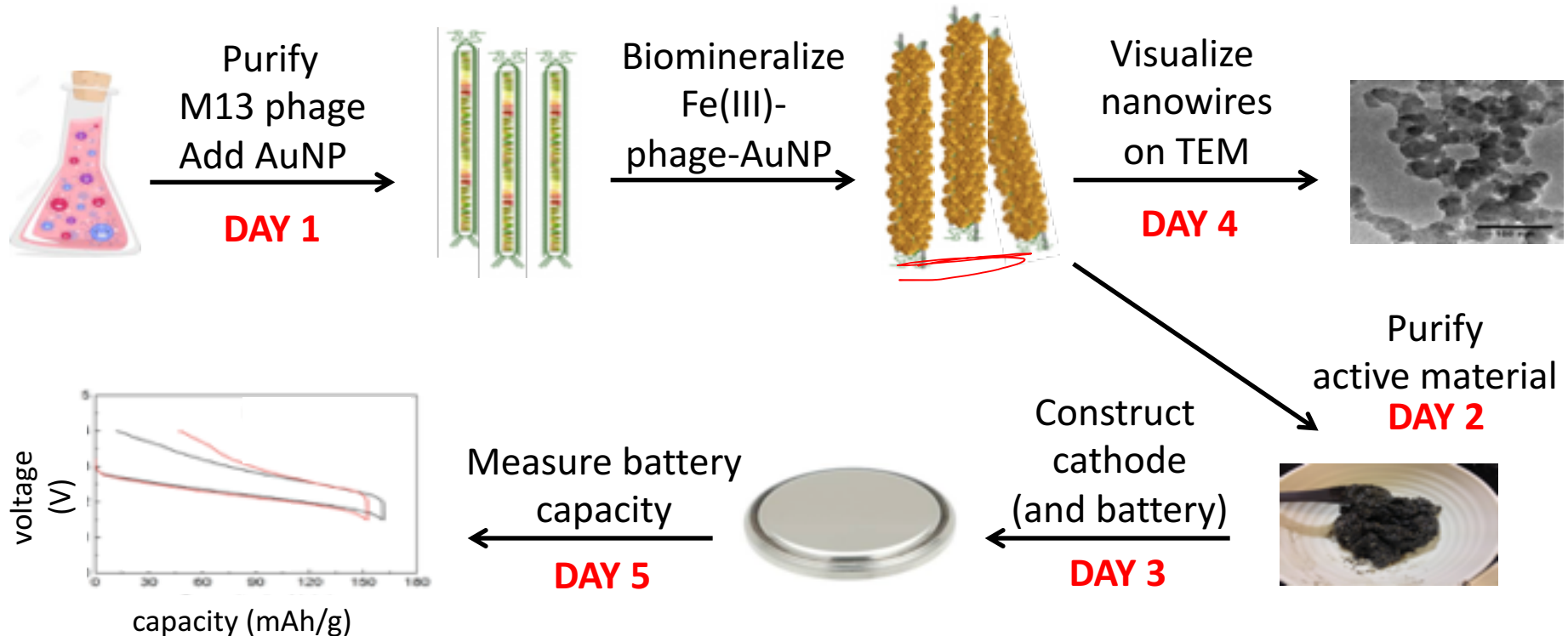
1. ✓ BE Communication lab workshop: Research Proposals!
2. Prelab discussion
3. Collect and wash active material: AuNP-Fe(III)-phage nanowires
4. Demo of FePO_4 -phage reaction
5. Prepare TEM samples
6. Prepare active material for 80°C vacuum oven

Announcements

- Pitch proposals in lecture on 11/20 to Prof. Belcher
- Quiz on M3D3 

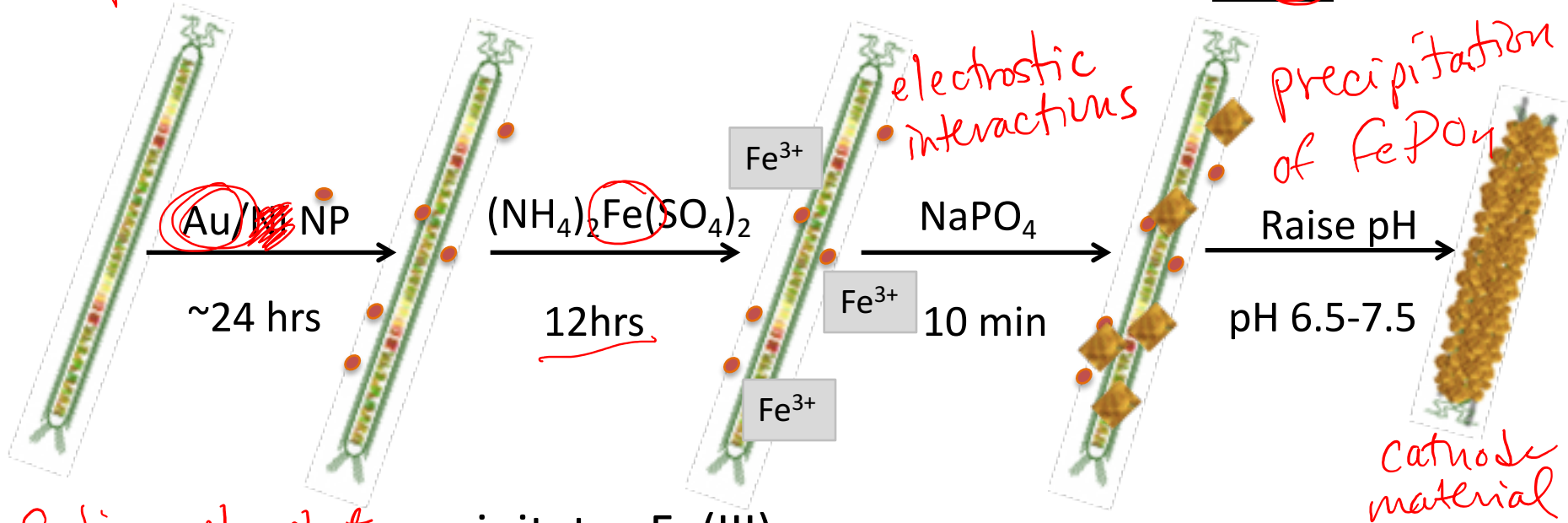
Module 3: biomaterials engineering

Do gold nanoparticles improve battery capacity?



Phage Biomaterialized with Iron and NPs

p8 coat protein modified to include DSPHTELP (+ / \ominus peptide)



Sodium phosphate precipitates Fe(III)

amorphous iron facilitates ion insertion into cathode material

While you were away...

Last night: $(\text{NH}_4)_2\text{Fe}(\text{SO}_4)$
This morning: Na_2PO_4 &
pH to 6.5-7.5

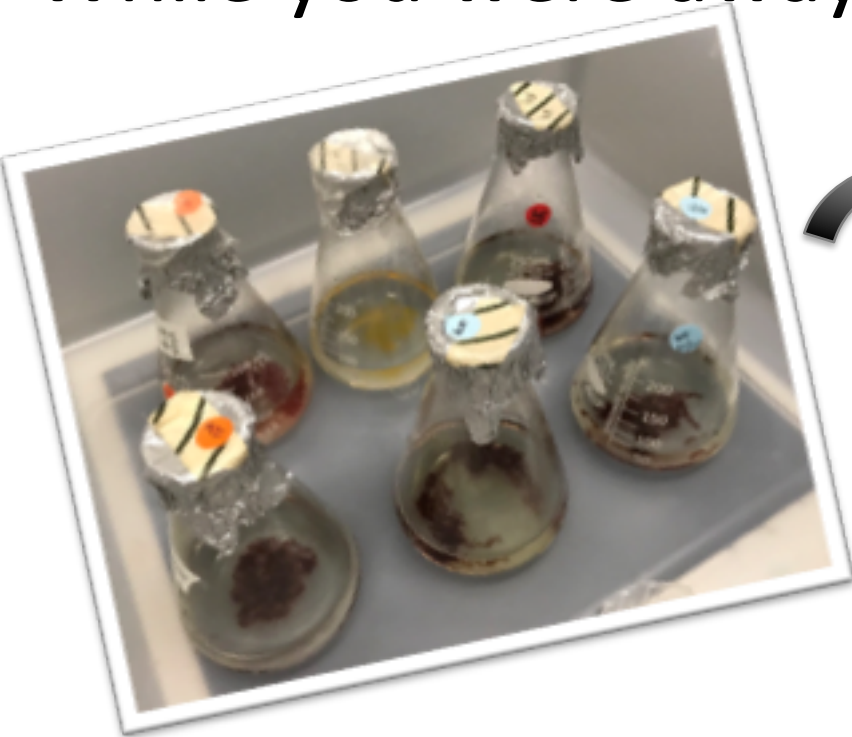
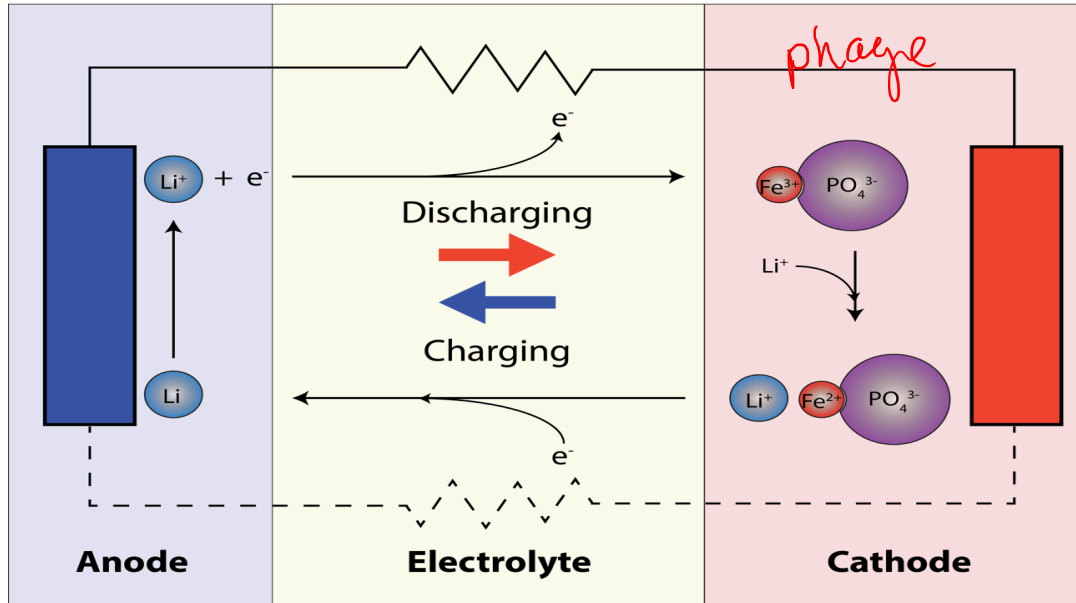


Diagram of Mod3 battery

M13 phage: scaffold

AuNP (& SuperP): electrical conductor
(carbon)

Fe(III) PO₄: ionic conductor



Set aside Fe(III)-phage-NP for TEM inspection

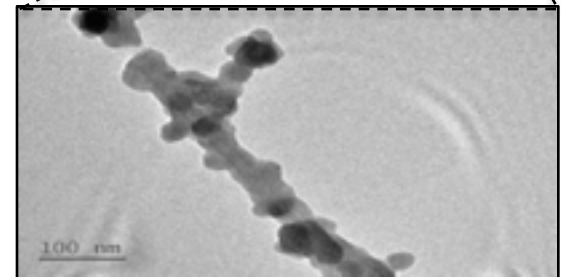
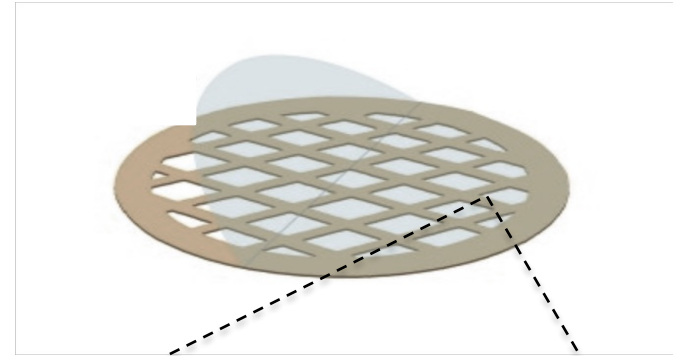
- The Fe(III)-phage-NP active material is in its purest form
 - No impurities, binder, etc.
 - Cu-grid, carbon mesh
 - Copper is the orange side
 - ✓ Silver/black side where droplet deposited
- Practice handling it with tweezers

side view

Sample
Carbon mesh
Cu-grid



add
phage



In lab today...

1. Do Part 3 First (Collect active material)
 2. Demo of FePO_4 -phage reaction during spin
 3. Practice then prepare TEM samples
 4. Prepare active material for 80°C vacuum oven
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- During the downtime you should discuss and choose a topic for M3D3 homework (and potentially beyond!) submitted as a pair/team
 - Quiz on M3D3
 - **Class time Tues. 11/20 Prof. Belcher would like to hear elevator pitches from all groups.**
 - No Lab next week! Work on research proposals!