

M3D2:Purify active material

11/18/2015

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

1. BE Communication lab workshop: Research Proposals!
2. Prelab
3. Demo of FePO₄-phage reaction
4. Collect and wash active material: Fe(III)-phage nanowires
5. Prepare TEM samples
6. Prepare samples for 80°C vacuum oven

Congratulations! You made it through M2.



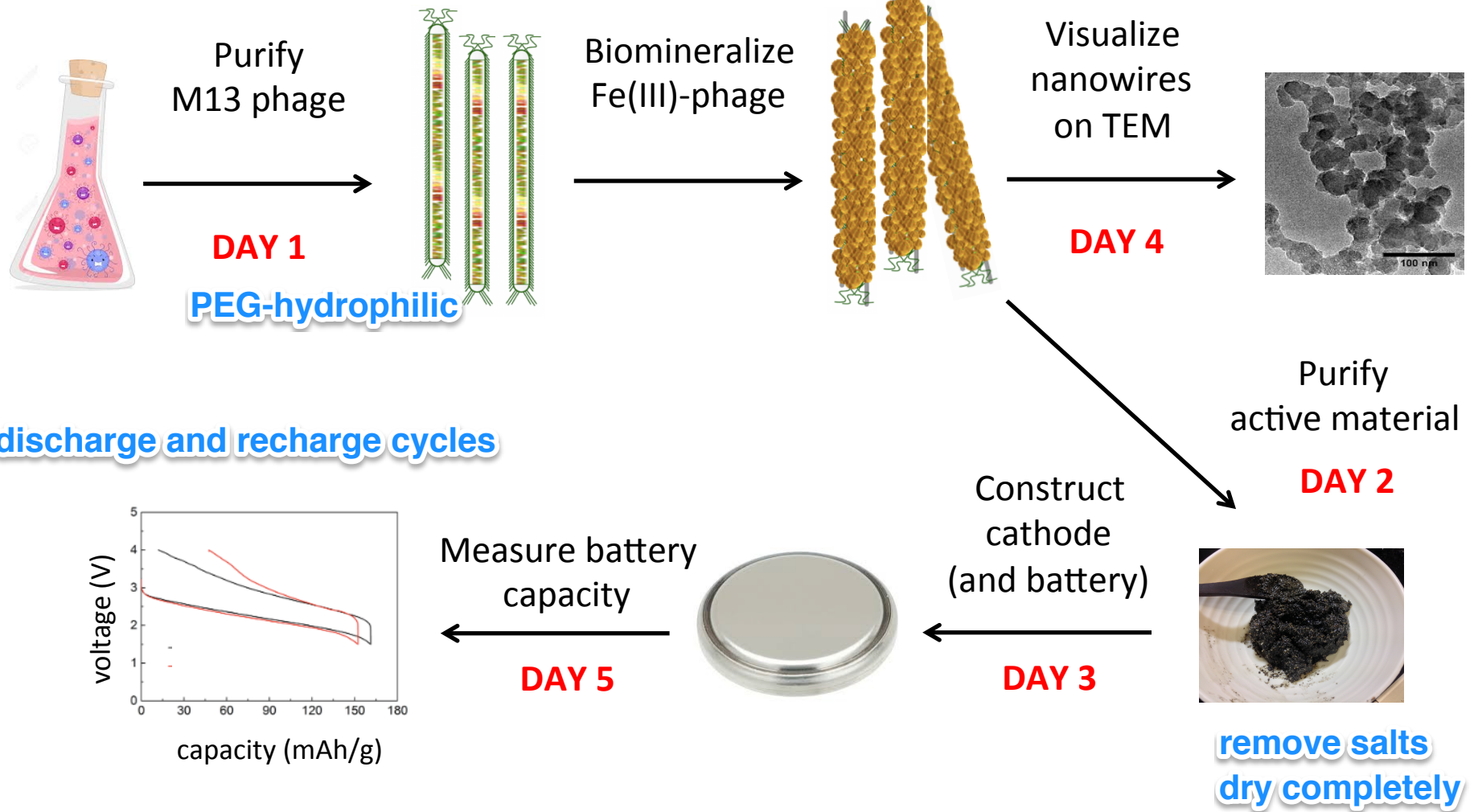
- ✓ Research report
 - returned on December 1st
- ✓ And also journal club and blog!



- M3 research proposal homework
 - **Team effort** due M3D3: refine your topic and approach then write a paragraph about your research question
(doesn't have to be your final project choice)
get feedback during downtime(s)
- Quiz on M3D3

Module 3: biomaterials engineering

active material



Biomining happened this weekend

- P8 coat protein modified to include DSPHTELP, negative charged peptide
- Electrostatic affinity between p8 and Fe^{3+} ... from $(\text{NH}_4)_2\text{Fe}(\text{SO}_4)_2$
 - 90% efficiency!
 - Fe^{3+} back into solution if wait > 12 h
- PO_4^{3-} from NaPO_4 precipitates Fe(III)
- nucleation / accumulation / mineralization ensues
 - amorphous $\alpha\text{-FePO}_4 \neq$ crystal

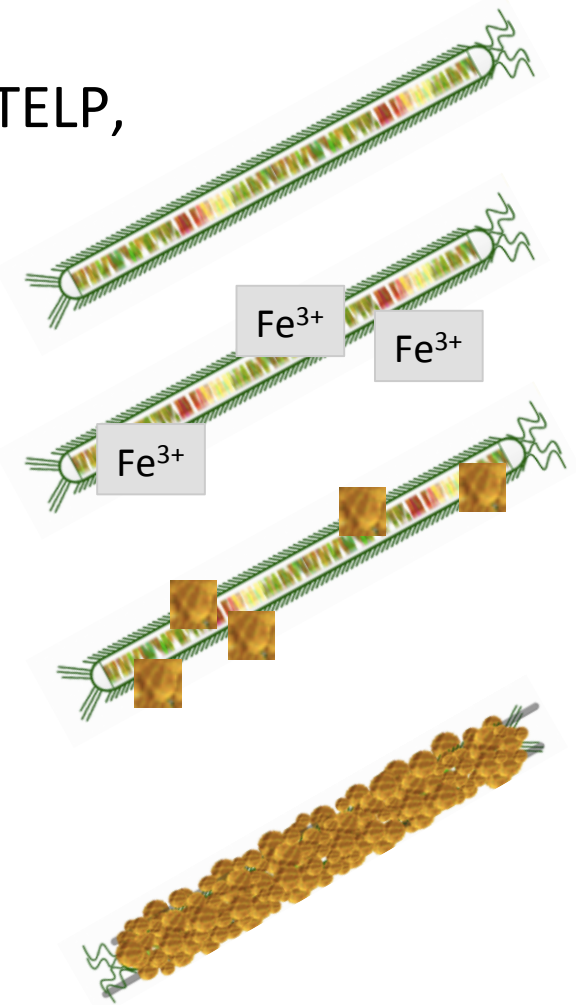
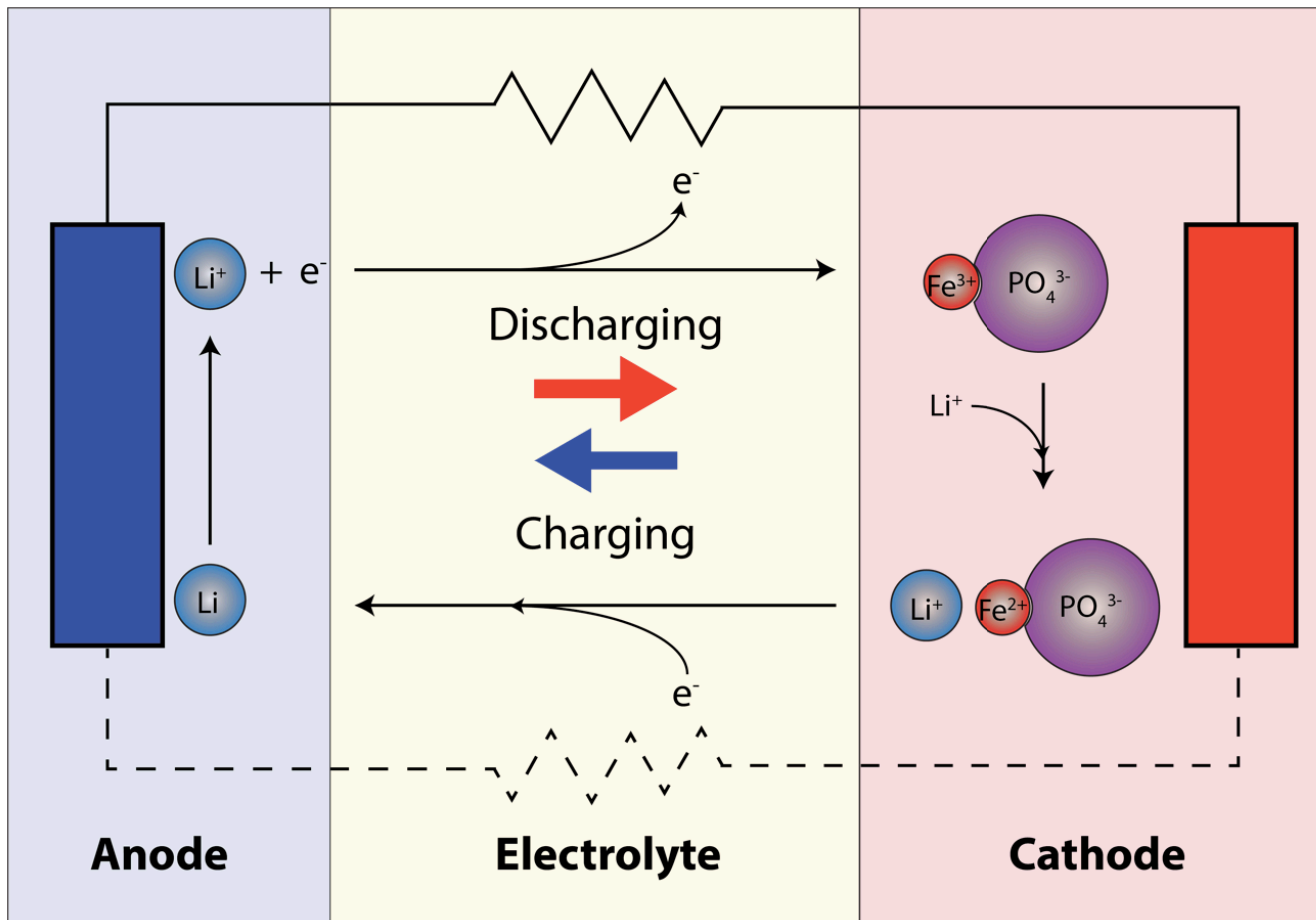
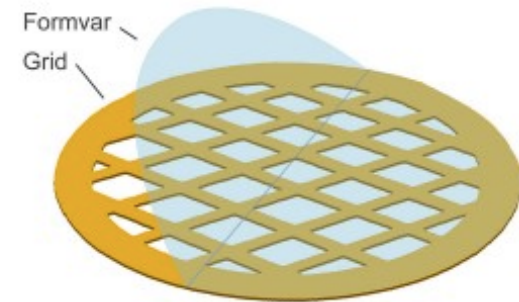


Diagram of M3 battery



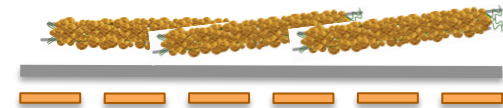
Set aside Fe(III)-phage for TEM inspection

- The Fe(III)-phage active material is in its purest form today
 - no impurities, binder, etc.
- Formvar coated Cu-grid
 - copper-orange side **bottom**
 - ✓ silver/black side where droplet deposited
top
- Practice handling it!



side view

sample
formvar
Cu-grid



In lab today...

1. Demo of FePO₄-phage reaction
 2. Collect and wash active material (lots of long spins!)
 3. Practice then prepare TEM samples
 4. Prepare samples for 80°C vacuum oven
- During the downtime you should discuss and choose a topic for M3D3 homework (and potentially beyond!)
 - Remember class time 11/24 Angi would like to hear elevator pitches from as many of you as possible.