

- Announcements & Today in lab
- Pre-lab Lecture
 - ❖ M3 Major assignments
 - ❖ Where are we/going?

Today is M3D3

Announcements

- Main goal today: TEM at Koch
 - take notes in case of notebook collection and for FNT
- Secondary goal: start developing research proposal

- Next Tuesday in lecture: be ready to pitch your (preliminary!) idea and get feedback from Angie
- **Quiz** next time also
- Module 2 reports
 - revision due Wed, Nov 26th by 5 pm
 - ⊕ next time @ 2:30 PM

M3 major assignments

- Culminating team assignment for 20.109 [20%]
 - novel research proposal (*not* your UROP work)
 - define specific question and approach to address it
 - downtime in lab during M3 to work on it
- Module 3 mini-report [5%]
 - also done as a team, w/4 dedicated lab hours
 - no methods, narrow intro, results & discussion emphasis

Shannon's prompting questions

1. What is your area of interest?
2. What is the current state of the technology?
3. How can you address the shortcomings in the field?
4. Why is your approach novel and exciting?
5. What do you need to accomplish your goals?

Plus: read the assignment description and FAQ!!

4 years of experience

Where are we/going?

- Construction phase

(1) Nano-composites: phage/Au-TiO₂ (or SWNT); vary *size of Au NP*

(2) Solar cell device: integrate above into anode

convert light → voltage

slow TiO₂ deposition via Temp + solvent choice → more controlled rxn. gives "smoother" nanowires

- Evaluation phase

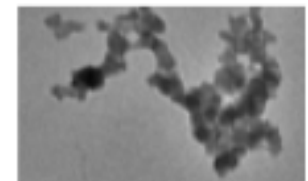
(1) TEM of nano-composites:

morphology/phys.: ρ , length, thickness, uniformity

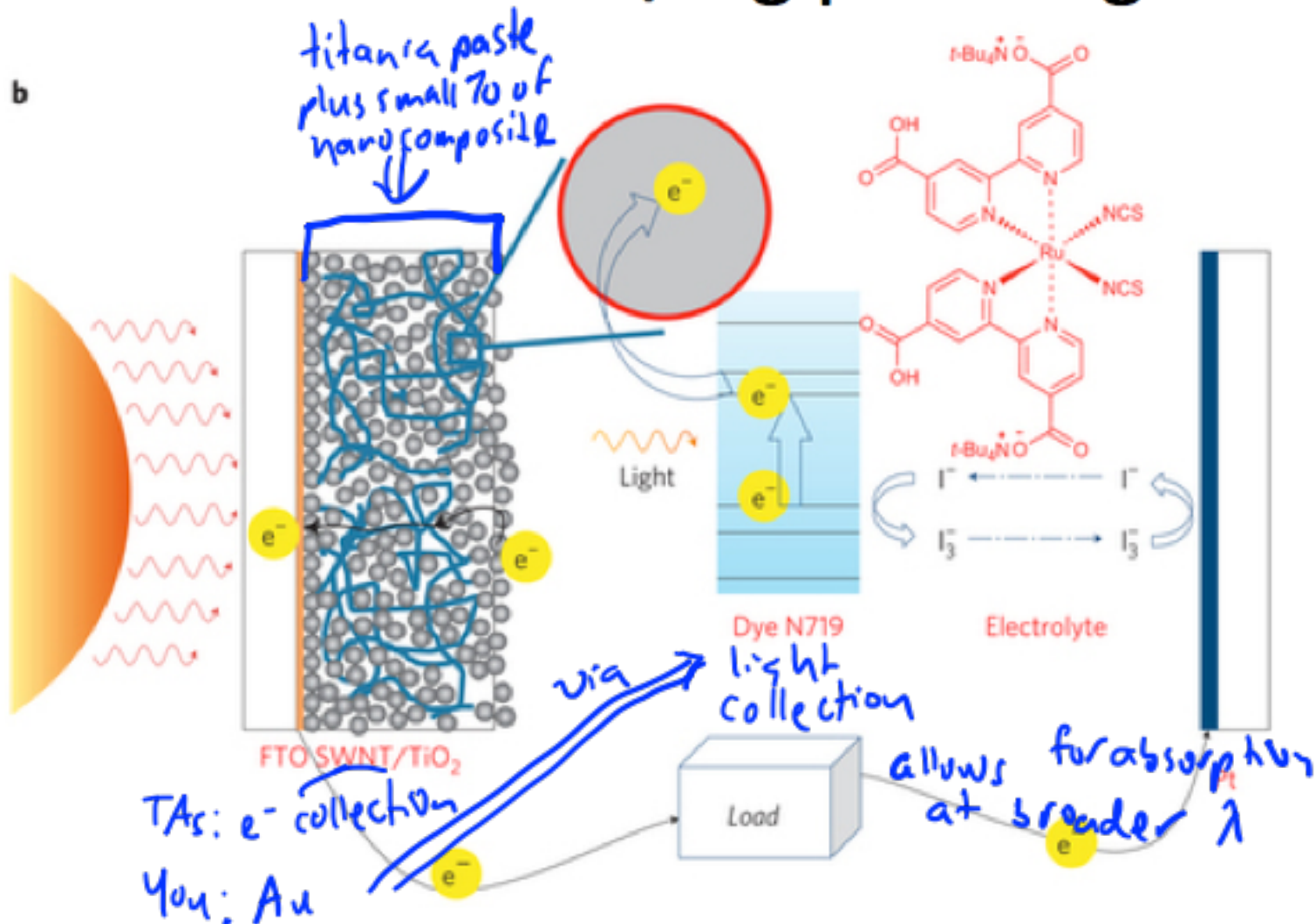
composition/chem.: by X-ray or energy loss

(2) Test device efficiency:

max power (from V, I); conversion efficiency (<10%)



Review device/big picture goal



Useful animation found by former instructor Aneesh: <http://youtu.be/3KRHJSOgzcw>