

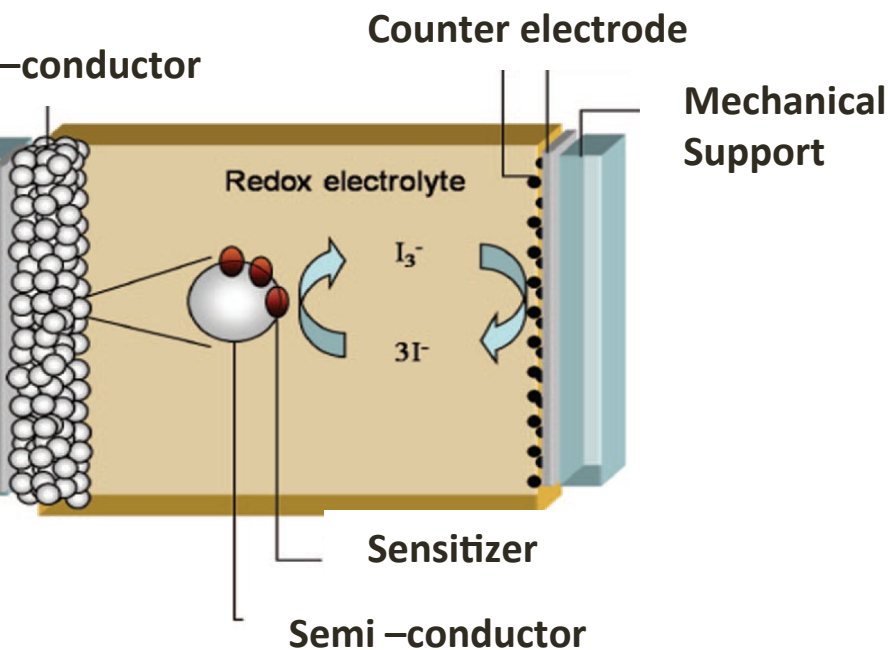
M3D4 : Solar cell assembly

What are we doing today?

- DSSC background (Jackie)
 - Main components of a DSSC
 - How a DSSC works: where do the e- go?
 - Kinetics in a DSSC: what allows e^- to move in the direction we want?
- Overview of fabrication process (Jackie)
- Doctor blading demo (Griffin)
- Build solar cells in Belcher lab

DSSC components

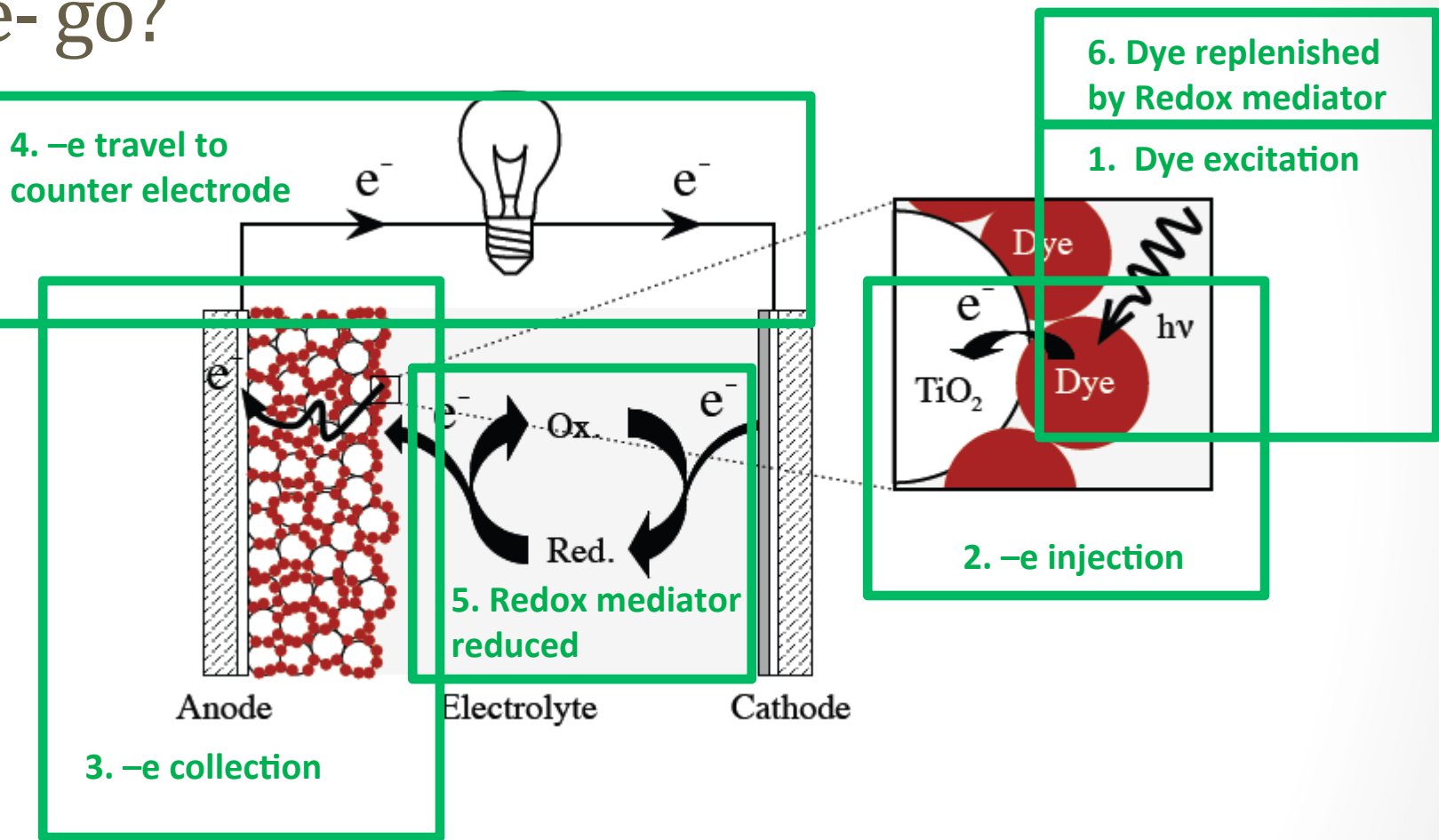
General



Our DSSC's

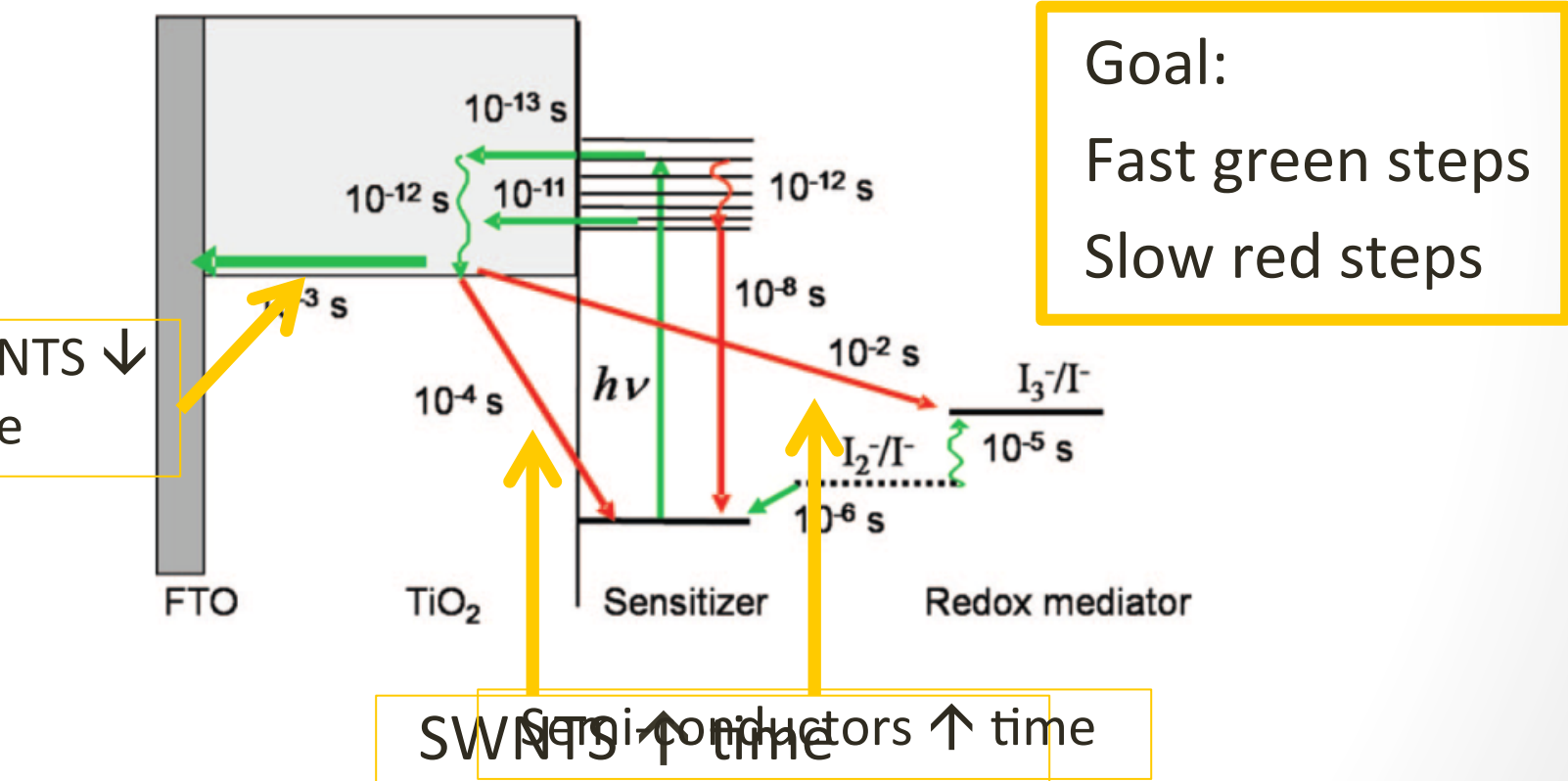
- **Semi-conductor:** TiO₂
- **Sensitizer (dye):** N719 dye
- **Electrolyte and redox mediator:** I_3^- / I^-
- **Counter electrode:** Platinum
- **Mechanical support:** FTO glass with TCO (transparent conducting oxide) film

How a DSSC works: where do the e- go?

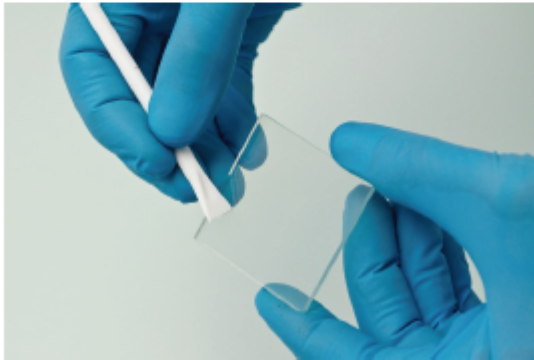
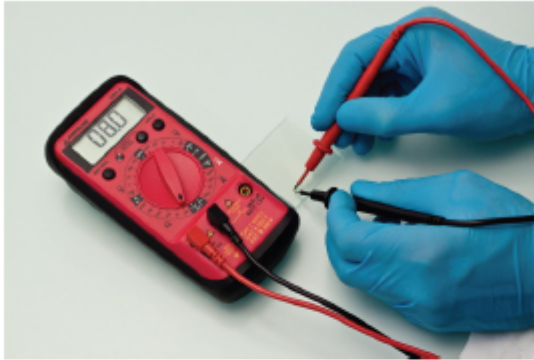


Kinetics in a DSSC: what allows e^- to move in the direction we want?

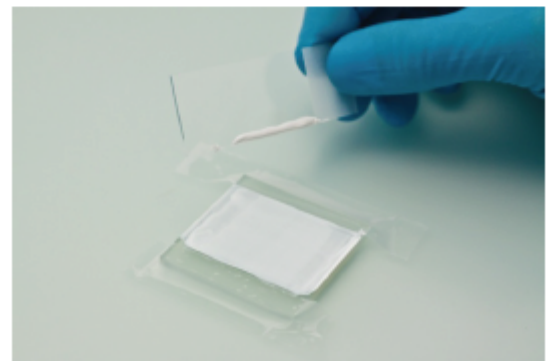
Directional electron flow occurs due to kinetics of electron injection and recombination events:



PUTTING THE SOLAR CELL TOGETHER

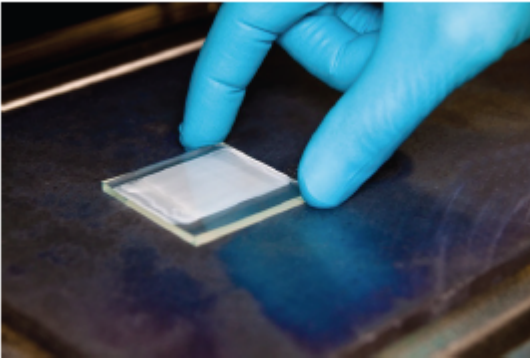


Identifying the conductive side of the TCO (transparent conductive oxide)



“Doctor-blading” the titania (TiO_2) paste

<http://www.solaroni>



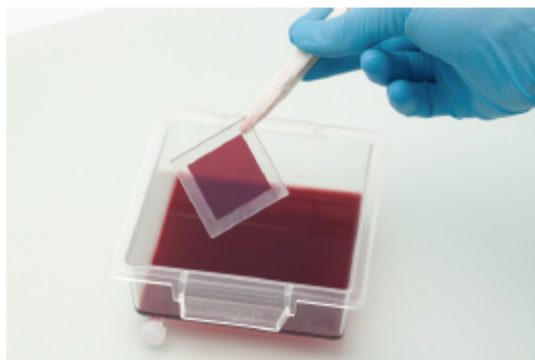
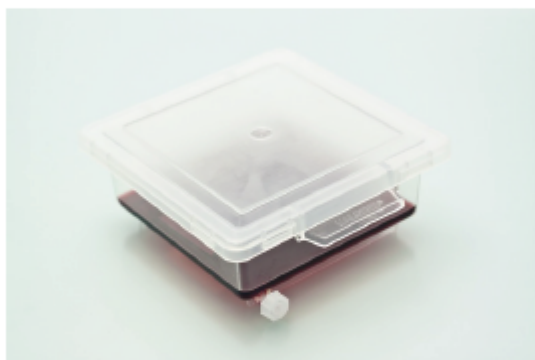
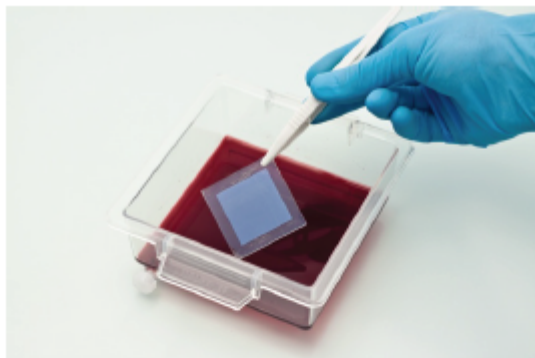
Sintering the film (heating)

<http://www.solaronix.com>

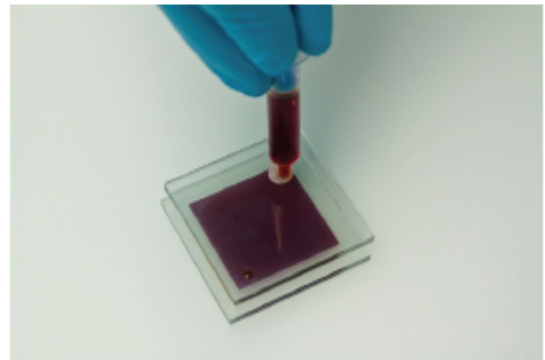
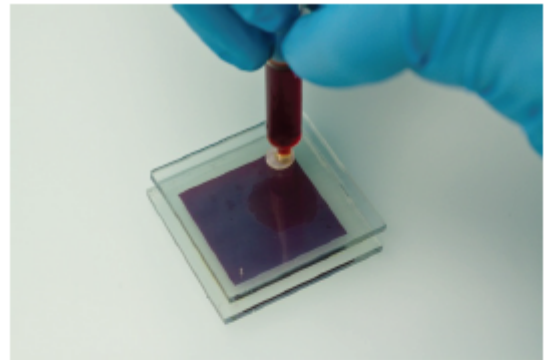
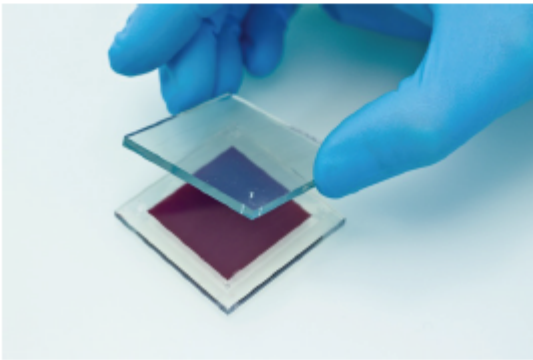
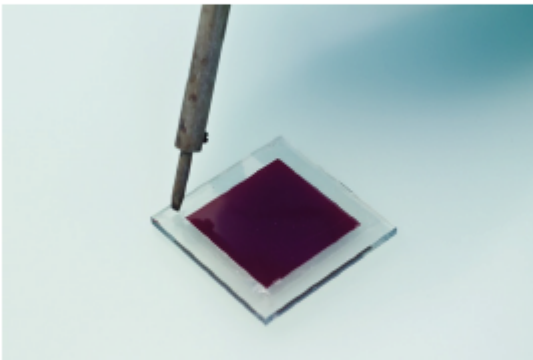
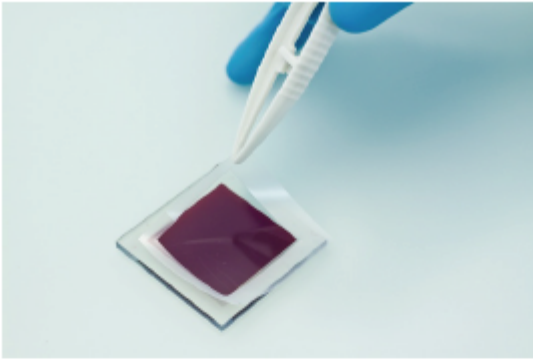
(1) Burn off polymer binder in paste to create pores for the dye. (Must be in air)

(2) Sinter nano-particles . Must be in argon, here particles are connected in a conducting network



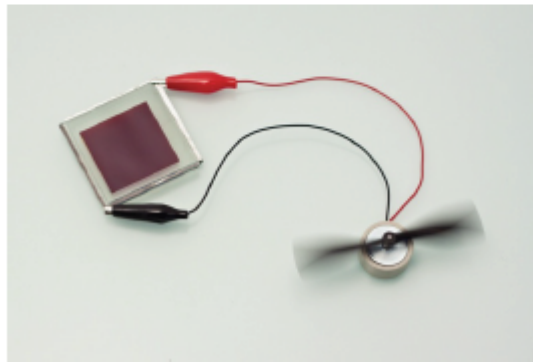


Dyeing the film <http://www.solaronix.com>



Filling the electrolyte

Assembling the device with another electrode



Testing the device