**Overview of Dye-Sensitized Solar Cells (DSSC): Key components and basic operating principle**

Key components in our DSSC:

1. **Semi –conductor:** TiO2
2. **Sensitizer (dye):** N719 dye
3. **Electrolyte and redox mediator:** I3- / I-
4. **Counter electrode:** Platinum
5. **Mechanical support:** FTO glass and TCO, transparent conducting oxide

Electron flow in the DSSC:

DSSC schematic; Chemical Rev. 2010, 110, 6595-6663

1. Dye becomes excited by light.
2. Dye injects an electron very rapidly to the TiO2\* (the conduction band), dye is oxidized in the process.
3. Electrons are transported through the semi-conducting TiO2, move through the load, and eventually reach the counter electrode.
4. At counter electrode, normally platinum, the electrons reduce the redox mediator located in the electrolyte of the DSSC.
5. Redox mediator diffuses to meet and regenerate oxidized dye molecules.

\* The TiO2 (or other semiconductor used in the DSSC) promotes directional flow of electrons in the solar cell. This is due to kinetics of electron movement. Once injected quickly to the TiO2(10^-12 seconds), electrons are not as easily recombined with the sensitizer or redox mediator (which occurs on a 10^-2, 10^-3second time frame). If instead, the electrons entered a metal, recombination events would be much more frequent.