

EE / CprE / SE 491 - sddec24-21

CdSe Solar Cell

Week 8 Report

Mar 27 - Apr 2

Client: Vikram Dalal

Faculty Advisor: Vikram Dalal

Team Members:

Payton Bills – Team Lead | Client Interaction

Anders Peterson – Client Interaction | Component design

Michael Thomas – Individual Component Design | Testing

Drew Jensen – Individual Component Design | Testing

Jacob Steffens – Simulation research | Research aid discovery and distribution

Jonathan Timm – Simulation research | Simulation testing

Past Week Accomplishments

- Stack design has been decided to be a P-i-N junction solar cell with p-type a-Si as the hole transport layer, n-type CdSe in the middle, followed by n-type CdS for the electron transport layer. The top and bottom contacts will be ITO and FTO.
- Began simulations using BandEngg. This will allow us to simulate our solar cell stack and play around with various applied voltages, doping levels, and more to understand where our ideal values may lie. This will also help us visually show why the design will theoretically work.

Pending Issues

- Now that we know what our solar cell design looks like, we need to shift gear and put much more effort into possible fabrication and simulation methods available to us and what factors we can and cannot change during this process to try to make better cells.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Payton Bills	Worked on researching device structure, project management, and meeting with the TA.	2	40
Anders Peterson	Worked on learning how to measure quantum efficiency on solar cell samples, and worked on improving the measurement software.	2	46
Michael Thomas	Found the BandEngg simulator, and have started creating material data sheets that are necessary to simulating the cell's bandgap. Currently, we are able to simulate single material bandgaps, and I am working on creating combined data sheets as needed by the simulator to use multiple materials for heterojunctions. Additionally, created docs explaining ETL and HTL layers and material properties to look for when designing the solar cell stack.	5	45
Drew Jensen	Met during meetings and worked to understand the physics of heterojunction cells on my own. During meeting with Professor Dalal we learned about the different parts of our solar cell, the types of materials we should use for these parts, and the purpose for these materials in these roles.	5	34
Jacob Steffens	Attended meetings and assisted where I could. I've done a bit more research into the quantization of power systems as well.	4	30
Jonathan Timm	Attended meetings and continued researching the relationship of power systems to solar cells	4	34

Plans for Coming Week

At our weekly meeting, we will form a more well-developed plan and redistribute tasks for each team member. Our project needs this time to refocus and gather clearer goals as we move forward as not to waste time.
