

EE / CprE / SE 491 - sddec24-21

CdSe Solar Cell

Week 3 Report

Feb 14 - Feb 20

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

- **Team Meeting** - Determined specific goals for each person to complete
- **Advisor Meeting** - Had a weekly meeting with Dr. Dalal to discuss specific deliverables, timelines, and goals for the semester and week
 - **Anders Peterson** -
 - Work calculating the theoretical efficiency of a solar cell for single junction band gaps (SQ efficiency limit). Write an abstract about it for the eventual final presentation
 - **Drew Jensen** -
 - Create a list of common manufacturing methods for CdSe. Emphasis on thermal evaporation because this is what we have in the lab
 - **Michael Thomas** -

- Research the geopolitics of Cadmium and Selenium and how to obtain the materials. Also, look into the environmental and health impacts of the materials.
 - **Jacob Steffens -**
 - Economics of silicon solar cells and solar farms. This will be used as a comparison to our expected economic forecast of CdSe.
 - **Payton Bills**
 - Calculate the theoretical efficiency of solar cells and learn how to implement multiple junctions to the SQ limit.
 - **Jonathan Timm**
 - Create a simulator for estimating the efficiency of a solar cell design with specific material parameters, using PVeducation as a guide.
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Pending Issues

Continue researching the topics listed above, and spend time at our next meeting debriefing the rest of the group on our specified area of research. Afterward, we will decide whether to move on to researching other specified topics the following week or continue delving into the research we have been looking into thus far.

So far, we have broken down our research into three main categories: design, simulation, and viability/feasibility. We will continue to do this. However, we need to get an approximate timeline for deliverables to prioritize research categories and tasks appropriately. For our timeline, we have started by giving ourselves week-long timelines for short-term goals, but we have not set a timeline for long-term project goal dates.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Payton Bills	Weekly meeting and preliminary research on SQ limit and multi junction solar cells.	3	17
Anders Peterson	Researched SQ efficiency limit and began	5	15

	creating a MATLAB script to calculate the theoretical efficiency of a single junction solar cell for specific band gap energies.		
Michael Thomas	I was sick most of the week and could not get as much done as I would have liked. Researched environmental and human hazards relating to Cd, Se, and CdSe. Additionally, began reading some of Baheri's thesis on CdSe solar cells	3	20
Drew Jensen	Did initial research on manufacturing techniques and the ways different groups have manufactured CaSe solar cells to reach different efficiencies. I also spent more time understanding the purpose behind research into CaSe solar cells and why it's worthwhile.	4	14
Jacob Steffens	Weekly meeting. Preliminary research into the economics of running solar fields with current solar cell technology.	1	10
Jonathan Timm	Traveled Fri-Mon, didn't have time for much of anything this week. Preliminary research on economics of solar cells w/ emphasis on introducing CdSe cells to industry.	3	14

Plans for Coming Week

We plan to debrief our group individually on who did what and the specifics of our research. Afterward, we will designate new or continued research topics for week 4. Additionally, continue breaking down the topics we need to research for design, simulation, manufacturing, and viability/feasibility to designate the work better.

Gitlab Activity Summary

There is no activity to report.
