

EE / CprE / SE 491 - sddec24-21

CdSe Solar Cell

Week 4 Report

Feb 21 – Feb 27

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

In the past week, we further broke down our research and then proceeded to share what we had learned over a week. Each member of the group had their own topics to research, which were as follows:

- Payton - Solar cell efficiency, specifically the Shockley-Queisser limit.
- Anders - Research solar cell efficiency and start doing basic calculations with a MATLAB script.
- Michael - Research viability of CdSe, not relating to the economics of the materials.
- Drew - Researched manufacturing techniques and learned how Thermal Evaporation.
- Jacob - Researched current solar cell market and gained key insight from Dr. Dalal on where to find data.
- Jonathan - Research simulation strategies/software for CdSe fab/performance

Pending Issues

After the first week of having more focused research topics, some of us have completed most of the research we set out to find, and others need more time. To ensure we all have something to do in case we are done early, we should figure out more topics that need to be researched than we can delegate for the next week.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Payton Bills	Researched S-Q limit by reading the original research paper. Asked Dr. Dalal clarifying questions on how S-Q limit works for tandem junction cells and continued to research to write an appendix on theoretical efficiency.	4	24
Anders Peterson	Continued developing the theoretical efficiency simulation tool. Discussed with Dr. Dalal how to implement certain parts of it. I was able to turn data from NREL of the solar spectrum, which will be turned into the ideal current made from a solar cell	5	20
Michael Thomas	Researched the viability of CdSe in terms of accessibility to Cd and Se respectively, costs per kg, environmental and health concerns, and have started looking into their geopolitics. Additionally, I have begun researching why CdSe may be a viable solution for a tandem cell with Si solar cells. Attended meetings.	5	25
Drew Jensen	Researched manufacturing techniques for CdSe, specifically thermal evaporation, because that is the technique that is accessible to us through the university. This technique is fairly popular and used in most applications of similar materials. I worked on establishing a base of knowledge to build upon to write a rough draft of an appendix for our final report and to understand the process when we utilize it.	6	20
Jacob Steffens	Researched current CdTe solar cell technology with the hopes of eventually devising a calculator we can use to estimate the energy generated from a cell given a specific cell efficiency and solar field area.	3	13
Jonathan Timm	Researched simulation software/technology for characterizing CdSe performance. Also includes sim resources for modeling fabrication process to increase likelihood of successful fab for a given cell trial.	4	18

	Additionally continued exploring Pvedu to further understand semiconductor physics/materials.		
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Plans for Coming Week

Continue with our areas of research and ensure we have a strong understanding of what needs to be researched moving forward to start the design process & feasibility study of CdSe solar cells.

Gitlab Activity Summary

Nothing to report.
