EE / CprE / SE 491 - sddec24-21

CdSe Solar Cell

Week 4 Report

Oct. 04 - Oct. 31

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

We have successfully doped 5 silicon
wafers, which means we essentially had 5 silicon solar cells minus contacts. We consulted our advisor for advice on how to add contacts and came up with a few different methods. We implemented these and made two fully finished silicon solar cells.

Pending Issues

While testing our finished solar cells we ran into a plethora of issues related to the solar cells performance. After consulting with numerous graduate students, post docs and our advisor we got a few ideas of how to troubleshoot. Anders did some basic testing and discovered that our solar cells did not dope consistently. It turns out that the solar cells towards the front of the furnace did not dope as highly as the ones in the back. This is definitely the cause of at least some performance issues.

Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Payton Bills	Worked with anders to fabricate, test and troubleshoot silicon solar cells.	15	25
Anders Peterson	Fabricated 5 silicon solar cells, and troubleshooted them. We have been trying to put contacts on the Si solar cells before adding CdSe, however our Si cells have been giving us subpar results. We have some ideas as to why, which include changing the conductor we are using as the top contact. We will soon be adding the CdSe cell to the Si cell once we confirm that our first batch of Si cells are working okay.	30	58
Michael Thomas	Testing - Efficiency, shunt and series resistance, VI curve. Observed fabrication processes for 5 Silicon cells including Oxidation, HMDS and Photoresist, etching, doping, deglazing, boron and phosphorus deposition	16	25
Drew Jensen	Helped with the Si Cell fabrication: RCA cleaning, photoresist spin coat to protect from deposition and drive-in, and boron and phosphorus deposition and drive-in. I've also helped with the testing and contact deposition.	20	25
Jacob Steffens			
Jonathan Timm	Aided/observed fabrication with rest of team. Testing of efficiency and generation of IV characteristics, continued economics research.	14	22

Plans for Coming Week

It is impossible to determine whether doping was the sole issue in our cells so we are now planning to add contacts in the same way to the wafers that are properly doped. We will then be able to test performance to see if doping was the sole issue. If they

perform well, we will be ready to move to CdSe fabrication, and if not we will have to address potential issues with our contacts. This may involve fabricating a new batch of Si cells, however our current ones are in a semi functional state, and we expect to get some decent results if we are limited by time to only using those.

Gitlab Activity Summary
