EE 491 Weekly Report

Week 4: 9/16-9/22

Group: *May14-03* **Advisors:** *Dr. Sumit Chaudhary, John Carr* **Client:** *ISU NanoLab*

Members: *Andersen, Martin; Diallo, Mouhamadou; Rodriguez, Nicholas; Straquadine, Joshua*

Project Title: *"Design and implementation of cryogenic current measurements on organic photovoltaic cells"*

Weekly Summary

This week was spent preparing for and designing our solution to our first deliverable, which is to improve the cryogenic system to get down to 80K. We spent our time researching several different aspects of the solution, including materials we can purchase to implement in the cryogenic chamber. We also met with our advisors and discussed those ideas, and we will begin testing some of those solutions next week.

Meetings

9/16 Brainstorming Session

Duration: *45 min* **Members Present:** *All*

Purpose and Goals:
Discuss our research, develop plan of attack to reach first deliverable, delegate tasks for further research

Achievements:

- Decided that we need a better cryogenic contact paste/pad
- Decided that we needed a layered cold trap setup
- Decided not to consider using liquid helium instead of nitrogen
- Discussed encapsulation and potentially changing the probe contact scheme for better thermal contact
- Decided who would work on which tasks

9/19 Group Recap Meeting

Duration: *1 hour* **Members Present:** *All*

Purpose and Goals:
Discuss our progress on our individual tasks, formulate a coherent plan to present to our advisors on 9/20

Achievements:

- Decided that a platinum resistive device would be the best/most cost effective solution to the temperature sensing problem
- Did the math for radiative heating of the sample from the external chamber walls, proved need for a layered cold trap around sample
- Refined scheme for cell encapsulation and potential contact scheme alterations

9/20 Advisor Meeting

Duration: *1 hour* **Members Present:** *All*

Purpose and Goals:
Inform our advisors of our progress at this point, ask about feasibility of our ideas and implementation details

Achievements:

- Our advisors liked the ideas we've come up with so far, asked us to continue
- Figured out how to purchase materials, to be ordered next week
- Prioritized tasks for the coming weeks

Pending issues

Right now, we have some different materials in mind, including some epoxies, thermal interface materials, and temperature sensors, but we have not yet ordered them. One issue was that the 3M technical representative was out of the office until next week. We have enough material to work with in the short term, but we'll need to place those orders quickly if we want to keep moving along.

Plans for next week

Next week we will be ordering our supplies and beginning our implementation in whatever capacity we can. We will begin with a meeting on Monday to get some tests running on the cells and to begin working with a cold trap in the cryogenic chamber.

Individual Contributions

Andersen, Martin: Attended the meetings, market research (3 hr)
Diallo, Mouhamadou: Attended the meetings, market research (4 hr)
Rodriguez, Nicholas: Attended the meetings, market research (5 hr)
Straquadine, Joshua: Attended the meetings, market research (4 hr)