EE 491 Weekly Report

Week 9: 10/21-10/27

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

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

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

Weekly Summary

This week we conducted a few tests with the epoxy and determined that it is usable under our conditions, but that it will take some practice and careful process controls to make it reliable. We also discussed methods of insulating the cryogenic chamber walls.

Meetings

10/24 Lab Meeting

Duration: *2 hours* **Members Present:** *All*

Purpose and Goals:
Find all of the necessary materials and run the first tests with the epoxy. The epoxy takes 18 hours to cure, so samples prepared today will be ready for our next meeting.

Achievements:

- Took us a while to assemble the necessary materials, but we managed to find everything and get some blank slides encapsulated as practice.

10/27 Lab Meeting

Duration: *4 hours* **Members Present:** *All*

Purpose and Goals:
Examine the encapsulation samples from last week, and begin encapsulating actual solar cells

Achievements:

- Found that the encapsulation samples from last week easily came off of the parafilm substrates—we were concerned that we wouldn't be able to find a suitable mold release material, but parafilm worked quite well.
- Tested the old thermistor with encapsulation, and found that the epoxy does a good job of conducting heat away from the potted devices.
- Encapsulated a few old solar cells with the goal of making contact to the devices. We tried indium shot and silver paste with very thin contact wires. Both methods were rather difficult on the first run, so results were mixed.

1Pending issues

We're making a lot of progress, and the encapsulation results thus far are promising. Determining a simple, repeatable method of contacting the cells is difficult (as expected) and we're going to need more tests. We feel like we're making good progress—our only real barrier is the lack of time for all of us to come in to the lab and work.

Plans for next week

Next week we will continue to test our encapsulated cells and see if we even made contact to the cells at all. We will also begin prototyping the insulation for the vacuum chamber and setting up some simple data collection software in LabVIEW. That software will act not only as a prototype for our later automation work, but it will also speed our testing and characterization efforts.

Individual Contributions

- Andersen, Martin: Attended meetings, worked with cryostat to test epoxy samples (7 hr)
- Diallo, Mouhamadou: Attended the meetings, worked with cryostat to test epoxy samples (7 hr)
- Rodriguez, Nicholas: Attended meetings, worked on preparing epoxy samples (7 hr)
- Straquadine, Joshua (Leader): Attended meetings, worked on preparing epoxy samples, worked on GPIB code in LabVIEW (9 hr)