Data Collection 3 --- Lab Guide

1 Overview

This week you will continue collecting data and stressing your cell. You will take J-V and EQE measurements for all eight pixels on your cell. After you have completed your measurements, you will return your cell to its stressor station. You will also complete your first draft of your team project proposal.

> Important
>
> The proposals have a different due date than other activities so your TAs have time to read them and give you feedback before your next lab section.

2 Lab Activities

2.1 Data Collection and Analysis

You will take J-V and EQE data and complete analysis using those data. If you are waiting for your turn on the apparatus, you can start setting up the analysis code in your Colab notebook or finish up your project proposal.

Look at the Apparatus Schedule to determine your team's schedule for the week and then download the Data Collection 3 Colab notebook file from Canvas. You will be collecting data at both apparatus this week, so make sure to upload all data files to your team Google Drive folder. The analysis you will do this week is the same as last week so you can copy that code to your new Colab notebook.

- **J-V Data Analysis:**
  - After collecting these data, in your Colab notebook create a SINGLE plot of all of the J-V curves of the **forward scans**. We are using the forward scans as NLR believes they are better representative of the cell.
  - You will calculate the Power Conversion Efficiency (PCE) for the pixels you plotted above, and save the PCE and J_{sc} values to a CSV file.
  - You will plot your PCE values for all weeks you have data for on a graph **with appropriate error bars.** See lecture slides about propagation of errors.
  - You will need to answer the questions in the 'J-V Analysis' section of your Colab notebook.
- **EQE Data:**
  - Do not forget to record measurement times in the EQE timelog.
  - After collecting these data, in your Colab notebook create a SINGLE plot of the External Quantum Efficiency (EQE) curves with data from your cell. You will also save the EQE data to a CSV file.
  - You will also need to answer the question in the 'EQE Analysis' section of your Colab notebook.

If you have any questions about editing the new code, **please ask your TAs for assistance.**

After completing the notebook, each member of your team must submit an identical copy of the .ipynb file and PDF to Canvas by the due date listed on Canvas.

2.2 Return Cell to Stressor Station

Once your team has completed cell measurements for the week, take your cell to the stressor room, plug in the resistor box, and place it on the hot plate in your team's stressor station. **Be careful not to burn yourself while placing your cell on the hot plate.**

2.3 Team Project Proposal

You began working on your proposal in lecture last week. **Take remaining open time in lab to finalize your first draft.**

3 Post-lab Activities

Submit the completed first draft of your team's project proposal by the due date listed on Canvas.

Please complete this week's reflection by the due date listed on Canvas.