

Laboratory Report Format

Basic Semiconductor Processing and Characterization

1. Introduction and Background (~0.5 page)

In this short section, introduce the laboratory experiments, giving an overview of the goals. Mention which processes were undertaken and what was expected.

When writing, assume that your audience that will be reading this report is composed of senior undergraduate students that have just begun the EE/MSE 5201 course. The overall goal of this report will be to describe the process to these hypothetical students and to present and interpret the results for them. Respond to the questions in this handout in the corresponding section.

The format of the report should be similar to the format of this handout. Include a cover page with the title “Basic Semiconductor Processing and Characterization”, the course name and number, your name, your TA’s name, and the date. Number all of the pages. Figures should be numbered and may either be inserted within the text or included as individual pages. Staple the report together with a single staple.

2. Fabrication processes and characterization (~3 – 5 pages)

Mention the process steps and characterization techniques that will be presented in the Subsections of this Section. Indicate how these may relate to one another. For example, indicate the various ways you estimated the wet oxide thickness. However, give the details of each process or technique in the appropriate Subsection below.

In the following Subsection for each processing step, include the process conditions and parameters, the results of any pre-process calculations you did (like oxide thickness or sheet resistance resulting from a diffusion), and observations of the results. In the Subsections for characterizations that you made (like layer thickness or carrier type), briefly describe the techniques and give the measurement result, with an estimate of the accuracy. Consider including simple plots diagrams as appropriate.

2.1 Wet oxide growth

Present and describe the process for growing a wet oxide. Report the process conditions for both the oxide grown in Laboratory Exercise 2 and the oxide grown for

photolithography in Laboratory Exercise 4. Give not only the intended process parameters, but also the actual parameters, including any unintentional variations or problems.

2.2 Oxide thicknesses

In this Subsection, present all of your oxide thickness measurements for your two oxidations. Include estimates from oxidation time, oxide color, ellipsometer, and Dektak. Why might contribute to the different measurement techniques on the same oxide film giving different values? Compare your result to those of other lab sections. (You may want to make plots of the data from other sections.) To what may the variations be due?

2.3 Boron Diffusion

Describe the process for diffusing B into your wafer. Give not only your intended process parameters, but also the actual parameters, including any unintentional variations or problems.

2.4 Electrical measurements

Present and describe the basic electrical measurements introduced in Laboratory Exercise 1. What were the results from before and after the B diffusion? Compare your results to those of other lab sections. (You may want to make plots of the data from other sections.) To what may the variations be due?

2.5 Photolithography

Describe the process and results for the photolithography. What was the yield for this step, and why not 100%?

3. Conclusions and Recommendations (~0.25 – 1 page)

Give a very short recap of your overall process and characterization results What did you found valuable? How may the course be improved, in terms of the course content and the practical laboratory arrangements?