LAB 1

Rm 320, South Tower, Engineering Building

- Clean room tour and safety training
- Equipment operation training
- ITO deposition and characterization

Clean room

- What is a clean room?
- Discuss how to control the contamination in a clean room.
- What is a yellow room and its purpose?

Vacuum

- Why is vacuum required in most semiconductor fabrication processes?
- Discuss how to obtain a high vacuum environment.
- Discuss how to measure the vacuum.

ITO deposition and characterization

- Transparent conductive oxide (TCO) is a very important material for using as electrode for various optoelectronic devices.
- TCO: ITO (indium-tin-oxide), IZO (indium-zinc-oxide), AZO (aluminum-zinc-oxide), FTO (fluorine-doped tin-oxide)
- Discuss the conductive mechanism of ITO.
- Deposit the ITO thin film using sputter. Describe the experimental procedures. Explain the observed phenomena. Record the process parameter such as base pressure, process gas, gas flow, process pressure, deposition rate. What is the principle of sputtering deposition?
- Measure the thickness, the sheet resistance and the transmission spectra of the ITO films.
- Vary the gas flow of O_2 and investigate the performance (thickness, conductivity and transparency) of the resultant ITO films. Discuss the influence of process gas on the performance of ITO films.
- Vary the process pressure and investigate the influence of the process pressure on the deposition rate of ITO films.

Format of a lab report (you may use the IEEE EDL paper format):

0. Title, author, author affiliation, abstract, keywords

1. Briefly introducing the lab. (e.g., purpose of the lab; working principle of the devices; literature review; and etc…)

2. Experimental details. (experimental set-up; configuration and mechanism of the equipments; detail of the fabrication and the characterization; and etc…)

3. Results and discussion. (analyze the experimental data; answer the questions set by the instructor)

4. Conclusion.

5. Acknowledgements.

6. References.

3 pages limited!