Measurement Sheet

Lab #4: Organic LED

MIT Nanomaker_Spring 2013

Experiment #1: Electrical Characterization of OLED

You are given a power supply and use alligator clips to connect it to your OLED. Record voltage (between -3V and 3V) vs current (mA) of the device.

1) IV curve of OLED



2) What is the threshold voltage? Is it a diode?

Experiment #2: Optical Characterization of OLED

Use your homemade spectrometer to characterize the wavelength of OLED. What color of light do you see? What is the wavelength (nm)?

Experiment #3: Photoluminescence

Shine UV light onto your OLED. Observe the substance absorbs photons and then re-radiates photons. Use your spectrometer to characterize the wavelength.

1) What color of light do you see? What is the wavelength (nm)?

2) What are the difference between electroluminescence and photoluminescence?

Follow-up Questions:

- Why are pixel sizes shown here not the same for R, G, and B?



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- Are glow sticks also based on electroluminescence like OLED? Explain.

- How to explain the emission color of quantum dots with the Heisenberg uncertainty principle?

- A dye laser is a laser which uses an organic dye as the lasing medium, usually as a liquid solution. It can usually be used for a much wider range of wavelengths and tunable lasers and pulsed lasers. An electron in a long, organic molecule used in a dye laser behaves approximately like a particles in a box with width 4.18 nm. what is the wavelength of the photon emitted when the electron undergoes a transition (a) from the first excited level to the ground level and (b) from the second excited level to the first excited level? (Hint: the energy level: $E_n = n^2 h^2 / 8mL^2$)

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