LabNotebook

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1 Objectives

This lab had 2 different tasks, the first was to visually see the differences in index of refraction between a solid and liquid by how visible the interface was. The other objective was to understand total internal reflection in waveguides.

2 Setup

Wires and breadboards were provided, as well as waveguides and LEDs. We were also given the necessary reagents and materials to prepare the index of refraction part of the lab.

2.1 Materials

We used borosilicate, polyacrylamide, polystyrene, and water for the first part.

The second part utilized waveguides and other plastic tubing.

2.2 Tools

The main tools used were power supply, ammeter, and voltmeter for the seconds part.

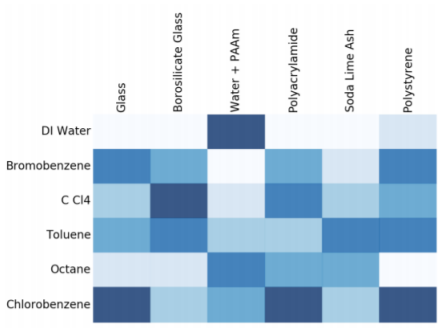
3 Procedure

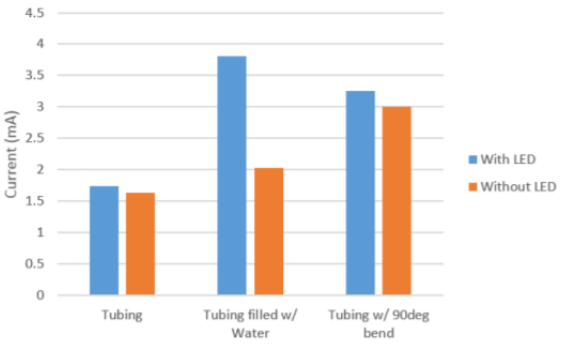
My group wast the first to do the visual refractive index lab, so we had to aliquot out all the chemicals. After, we dropped the different materials into each solvent and qualitatively measured how clearly we could see them.

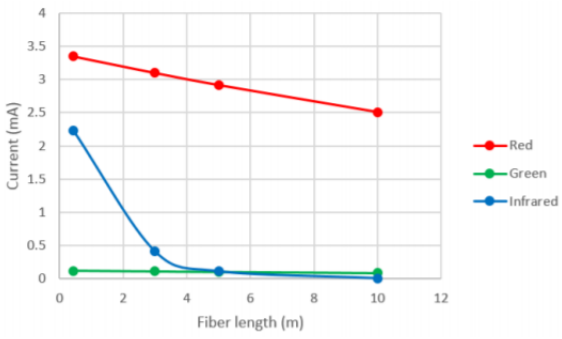
The second part of the lab is more involved - we had to measure the amount of light emitted from the end of a waveguide with different waveguides and different light wavelengths.

4 Results

Results of our experiments are shown below







5 Observations

It seemed clear that, after looking up the indices of refraction of each material, that the material and solvent with similar refractive indices seemed to merge. The material became less visible.
The plastic waveguides didn't properly contain the light with a 90 degree bend. Also, adding water improved waveguide performance. It was also seen that the amount of loss each waveguide exhibited depended on the wavelength of light used.