

Chemistry 103

Collection of Diffuse Reflectance Spectra with Ocean Optics Spectrophotometer

$\% \text{Reflectance} = \%R = 100\% \times (S_{\lambda} - D_{\lambda}) / (R_{\lambda} - D_{\lambda})$ where S is the sample intensity at a given wavelength λ ; D, the dark intensity; and R, the reference intensity.

A. Make sure the reflectance probe is connected to the instrument and that the probe is inserted in the 45° aperture of the reflection probe holder.

1. Turn on the light source (or make sure it is one) and open the Ocean Optics software by clicking on the Ocean Optics icon on the desktop. The integration time should be set at a value of 1250 msec so that the peak intensity of the tungsten light signal in the display reads approximately 3500. The display of the light intensity as a function of wavelength, under these conditions, should be similar to Figure 2 in your lab manual on page 7. Make sure you are viewing the output in the **Scope** mode by selecting **S** on



the mode toolbar: Alternately select **Scope mode** from the **Spectrometer** pull-down menu.

2. Take a reference reading of a reflection standard (one supplied or a piece of white water color paper) with nothing in the light beam. Choose **Store Reference** in the **Spectrum** menu.
3. Completely block the light path (with a finger and note the change in intensity) and **Store Dark** in the **Spectrum** menu.

Place the reflectance probe over your sample in front of the beam and select the **transmission mode** from either the **Spectrum** menu or click on **T** on the mode toolbar (above). Set the scale for 400-750 nm. To capture this image, click on **Snapshot** icon



or select the **Snapshot** mode from the **Spectrometer** pull-down menu. From the **Edit** Menu, select **Copy Graphical Spectrum** and paste the graph into a Word document for printing (see directions).

B. Samples to examine


1. Inject Glossy Photo Paper package. Move the reflectance probe over the surface of the package and record, in your notebook, the characteristics of the reflectance spectrum of each color.
2. Paint Samples. Collect the reflectance spectra of your dried paint samples. Make sure that you save copies (electronic) of the spectra for future use.

Pasting Ocean Optics Spectra into Microsoft Word

A. Ocean Optics:

1. **Spectrum** Menu: Snapshot
2. **Edit** menu: Copy Graphical Spectra

B. Open Word:

1. **Edit** menu: Paste
2. If you don't see the picture tool bar menu: Select **view**: toolbars: Picture.
3. Click on the text-wrapping icon, fourth icon from the right. Make sure the graph is selected. 
4. Choose **Top and Bottom** from the text wrapping menu
5. Deselect the graph.
6. Label and title the graph. Although two graphs will generally fit on one page, you will find it simplest to put a single graph on each page. Add a page break after each graph.
9. **Save** your Word Document either onto the Desktop and send it to yourself via e-mail or save it directly onto a diskette. You can then print your results as a Word Document.

At the end of the lab, any documents saved on the Desktop will be discarded.