

## Specific Fluorimeter Instructions for P Chem I Lab

### Case 1: Ru complex quenched with Fe

Excitation:  $\text{Ru}(\text{bpy})_3^{2+}$  fluoresces in the visible region of the electromagnetic spectrum.

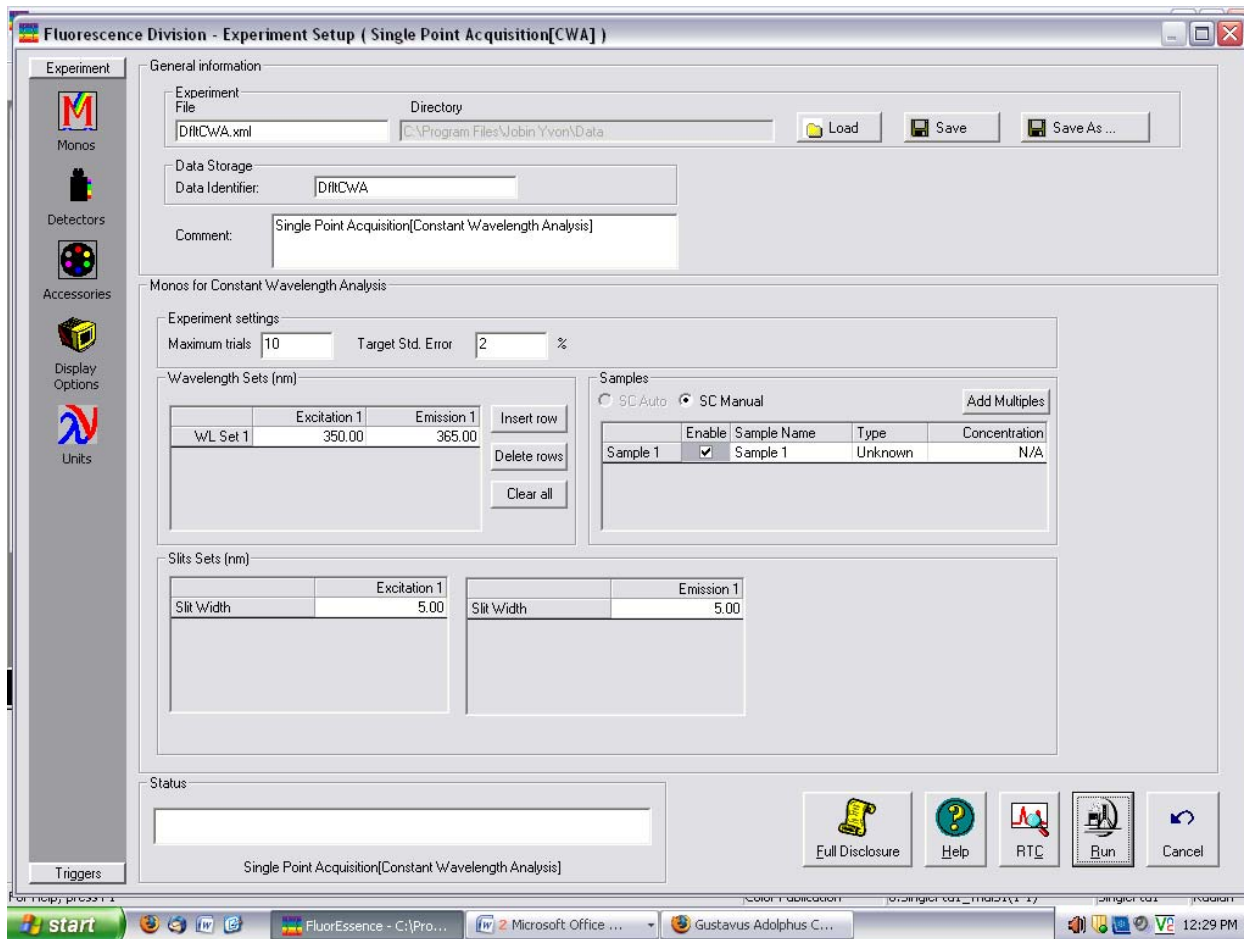
Therefore, you can use your eye to determine some of the parameters to set on the fluorimeter. First, collect an excitation spectrum of water (see handout of general fluorimeter instructions on how to set this up). Set your excitation wavelengths from 200-600 nm and the emission at 620 nm. Use 3 nm slits for both excitation and emission. As the spectrum is collected, open the lid of the fluorimeter and observe the solution. [PRECAUTIONS: NEVER LOOK DIRECTLY INTO THE LIGHT (JUST LOOK DOWN ON THE CUVETTE) AND PROTECT THE DETECTOR FROM STRAY LIGHT BY TURNING OUT THE ROOM LIGHTS.] Now, repeat the experiment with the  $\text{Ru}(\text{bpy})_3^{2+}$  solution. Where do you observe fluorescence? Describe your observations in your notebook. Repeat several times until you can estimate the wavelength of maximum fluorescence. This will be the excitation wavelength for your experiment. Note: If the fluorescence seems weak, you may need to open the slits. Never use a slit wider than 5 nm.

Emission: Now collect an emission spectrum of the  $\text{Ru}(\text{bpy})_3^{2+}$ . For your monochromator settings, use the excitation wavelength determined above and emission wavelengths of “excitation wavelength plus 15 nm” to 800 nm. Again, use slits of 3 nm (if the CPS are much lower than 2 million, you can widen... never have a CPS greater than 2 million). Determine the peak emission wavelength from the spectrum.

Now run a series of single point experiments... Click the “Experiment Menu” button on the toolbar. Select “Single Point” from the window that opens. The “Experiment Setup” window now looks slightly different (see Fig 1 below). Under the “Mono” icon, set your emission and excitation wavelengths as determined above. Use the same slits as above. Use the “Add Multiples” box to tell the computer to run the number of samples you have. Give a descriptive name for the spectrum in the “Data Identifier” field. Your data will now be presented not as a spectrum but as a spreadsheet. Run all of your samples (non-quenched and quenched) twice. Record the S1 signal (in CPS – counts per second). This will be used to calculate  $I/I_0$ .

### Case 2: Anthracene Quenched by $\text{CBr}_4$

Repeat as above. However, anthracene doesn't fluoresce in the visible. Therefore, skip the determination of the excitation wavelength and use 370 nm. Find the appropriate emission wavelength as above (you may adjust slits if needed) and run the single point experiments.



**Figure 1:** Experiment Setup window for Single Point Experiment