



APLQY Spectrometer

Instrument:

Quantaaurus-QY C11347-12 from Hamamatsu

Software:

PLQY Software V4.6

Purpose:

For measuring the absolute photoluminescence quantum yield of light-emitting materials. Can also measure excitation wavelength dependence of quantum yield, PL spectrum, PL excitation spectrum, and color measurements (chromaticity, color temperature, color rendering index, etc.)

To Begin:

- **Know the specifications of the instrument.**

Specifications	ViewSizer 3000
PL Measurement wavelength range	400 nm to 1100 nm
Monochromatic light source	
Light source	150 W xenon light source
Excitation wavelength	375 nm to 850 nm
Bandwidth	10 nm or less (FWHM)
Multichannel Spectroscope	
Measurement wavelength range	350 nm to 100 nm
Wavelength resolution	<2.5 nm
Number of photosensitive device channels	1024
Device cooling temperature	-15 °C
AD Resolution	16 bit
Spectroscope optical arrangement	Czerny-Turner type
Integrating sphere	
Material	Spectralon
Size	3.3 inch

- **Steps to startup the instrument**

NOTE: The instrument is powered off after use, if powering on immediate software connection may not occur, allow system and lasers to warm up for several minutes before opening software.



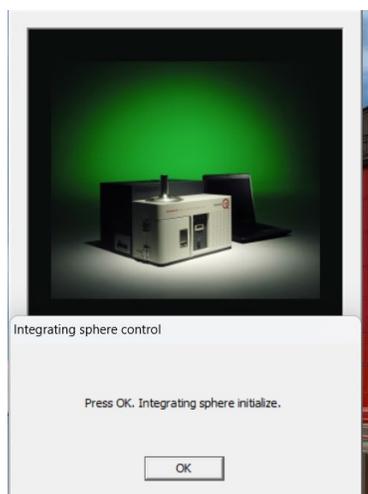
➤ **Power On Instrument**

1. The instrument power switch is located on the front panel. It lights up green when active
2. Log on to the computer

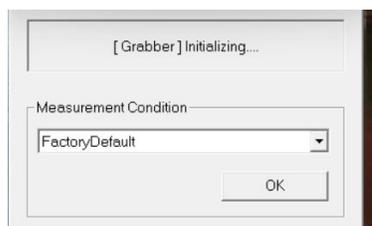
➤ **Open PLQY Software**



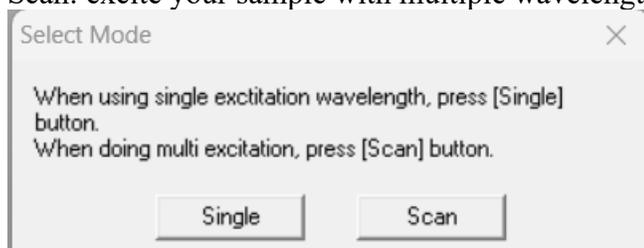
- Upon initialization of software, press OK to initiate Integrating sphere initialization.



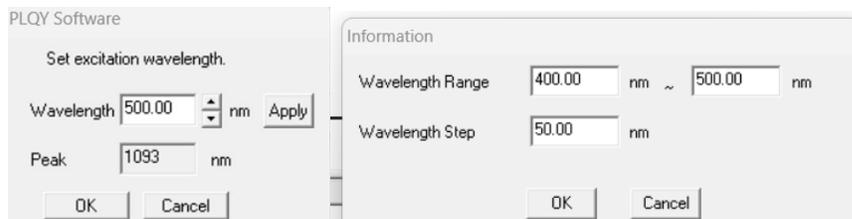
- Press OK when asked if the default measurement condition is acceptable.



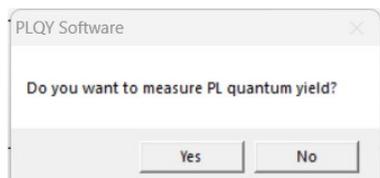
- The software will then ask you to select what mode to run in:
 - Single: excite your sample with a single wavelength
 - Scan: excite your sample with multiple wavelengths



- The software will then ask you to set the excitation wavelength/wavelength range (depends on single vs scan). Hit apply to save the change, then hit OK

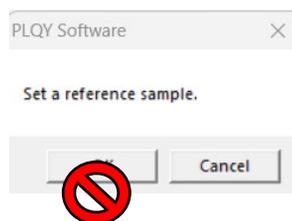


- The software will then ask if you want to measure PL quantum yield. Hit yes, then prepare to load a reference.



➤ Load and Take a Reference Scan

- The software will ask you to set a reference sample. **Do not hit ok until the reference sample is loaded.** The measurement will start as soon as the OK button is clicked.



There are 2 sample types supported – solids and liquids.

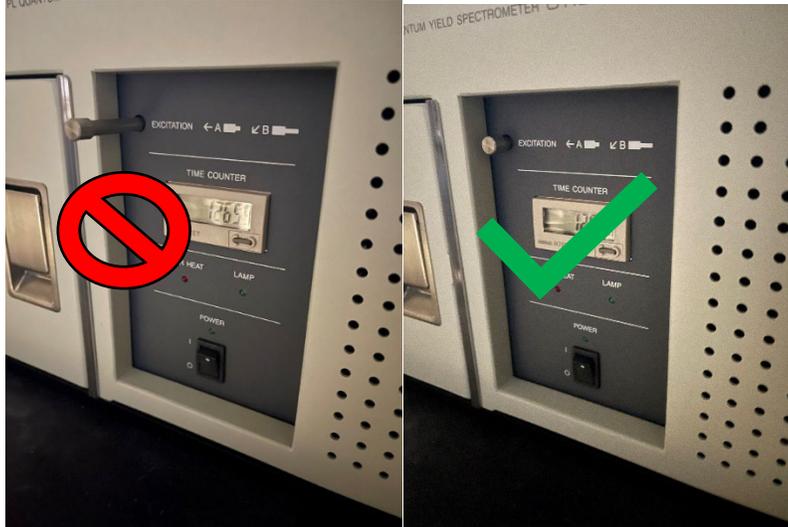
➤ SOLIDS STAGE LOAD PROCEDURE



Gas line to Argon

Solids sample compartment

- Make sure the light path pin is pressed in



- Open the sample compartment, then remove the solids tray by unscrewing the set screw with one hand, and supporting the stage with the other hand



- Place a clean quartz petri dish in the center of the stage
 - Check if they are clean with the provided black light nearby



- Then load the stage and the empty dish into the spectrometer. Close the chamber door and proceed with the reference scan.

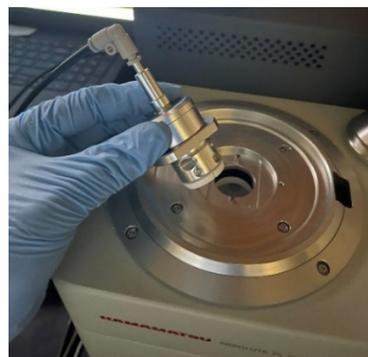


➤ **LIQUIDS STAGE LOAD PROCEDURE**

- Make sure the light path pin is pulled out



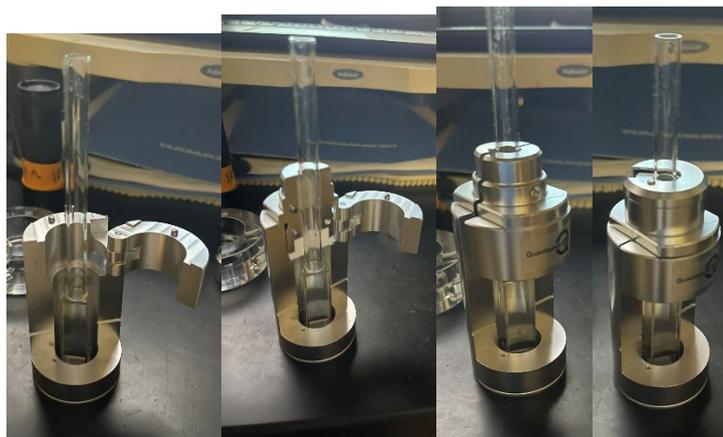
- The cuvette holder for the spectrometer makes use of the inert gas line port.
 - Remove the port from the spectrometer.



- Disassemble the clamps around the end of the gas line so the parts lay as shown below.



- The cuvette has a special setup apparatus that will help correctly align the cuvette with the clamps that once held the gas line. Follow the visual guide below for assembly.



- Filled the cuvette with around 3 mL of your solvent.
- Place the cuvette into the port where the gas line was, and then cover the cuvette with the provided stainless steel cap.



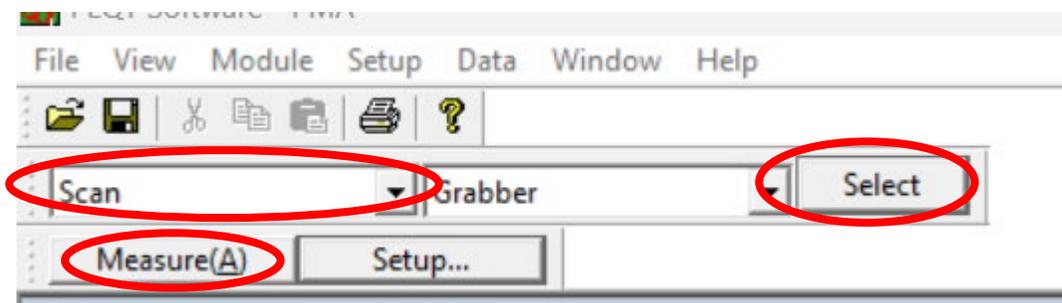
- You may now proceed with the reference scan.

➤ **Sample Loading and data collection**

- After the reference scan completes, load your sample using the same steps as before
 - For solids, load them in the empty quartz dish
 - For liquids, fill the cuvette portion with ~3 mL of sample
- Select **OK** and the measurement will proceed
 - For single wavelength excitations, the software will ask if you want to measure the next sample. If you run more than 1 sample, load the new sample before hitting **OK**. If finished, hit **Cancel**.

➤ **Save Data and Take a new measurement**

- The data collected on this run will be displayed on screen.
 - To save a report of your data, select **file -> print-> save as pdf**
 - To save the raw data in the graph, right click the graph window and export the data as a text file.
- To start a new measurement, select the type of measurement in the dropdown menu next to Grabber, then select **Measure(A)**



➤ **Clean Up**

- Close the control software
- Clean all used quartz dishes and cuvettes with appropriate solvent
 - All cuvettes and dishes are reusable and are expensive \$\$\$. Do not damage these.
- If you used the cuvette setup, reassemble and reattach the gas line connector
- **Turn off** the spectrometer using the power button on the front panel
 - This will prolong the life of the Xenon lamp.
- Collect your data from the computer using a thumb drive.