
OceanOptics
Color
Focused Kit
Spectroscopy Kits

Color

At the most basic level, spectroscopy is often considered the measurement of color. But color to any living thing is defined by the wavelengths its eyes are able to see, and this changes from species-to-species, and even from individual-to-individual.

Isaac Newton invented the color wheel in 1665 by using a prism, and he felt the last color ‘indigo’ was a recurrence of the first color ‘red’ and thus chose a wheel to represent them. Today we know these are actually linear energy levels based on wavelength, and these ‘colors’ extend beyond what our eyes can perceive…in both directions!

Random Color Facts:

- Red is the first color a baby sees
- White is the safest color for cars, as it is the most visible under all lighting conditions
- The dye Tyrian purple was made from sea snails and became three times more expensive than gold during the times of the Ancient Romans
- Blue is the favorite color of 35% of women and 57% of men
- Color can increase brand awareness by up to 80%

Components

System

Software

Experiment

Components

System

Software

These spectrometer and light source combos turn optical signals into meaningful numbers.

Spectrometers are powered and interfaced via USB, and light sources require standard power.

Essential | 310-810 nm

ST-VIS

Enhanced | 200-900 nm

SR-6UVV400

Superior | 350-1025 nm

HR-6VN400

Colored Swatches for Sample Experiment

Components

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Integrating Sphere

ISP-REF

Place samples over the top port for highly repeatable reflection measurements. The integrated light source covers most jobs, with an input port to pipe-in other source energies as well.

QP600-025-UV

The patch fiber provided with the Color Kit connects the integrating sphere and light source to the spectrometer.

WS-1

Use the WS-1 reflection standard for repeatable referencing in Reflectance or Absorbance modes.

The gloss-trap switch on the back of the ISP-REF allows you to measure…

RYH BFHLIKJG

LACFAPHPR AM RYH

RARJK EPRHTGJRHW

GHMKHLREAP

Hint: H = E

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Pro Tip: Ensure your SMA connections are tight for repeatable measurements. Loose fiber connections can lead to variable results.

Use the patch fiber to connect the spectrometer SMA port to the lower ‘S’ port on the integrating sphere.

Place the WS-1 upside-down over the top of the integrating sphere port for a repeatable light reference.

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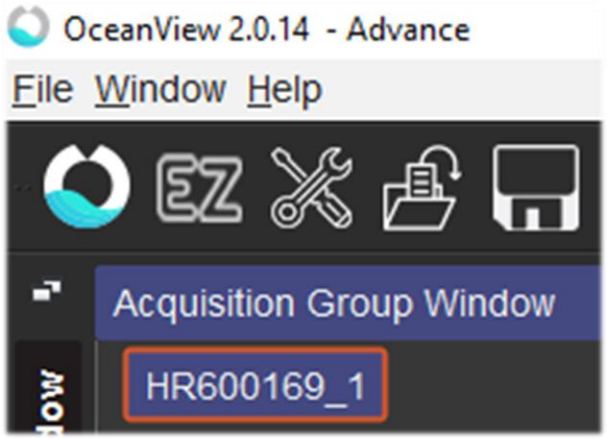
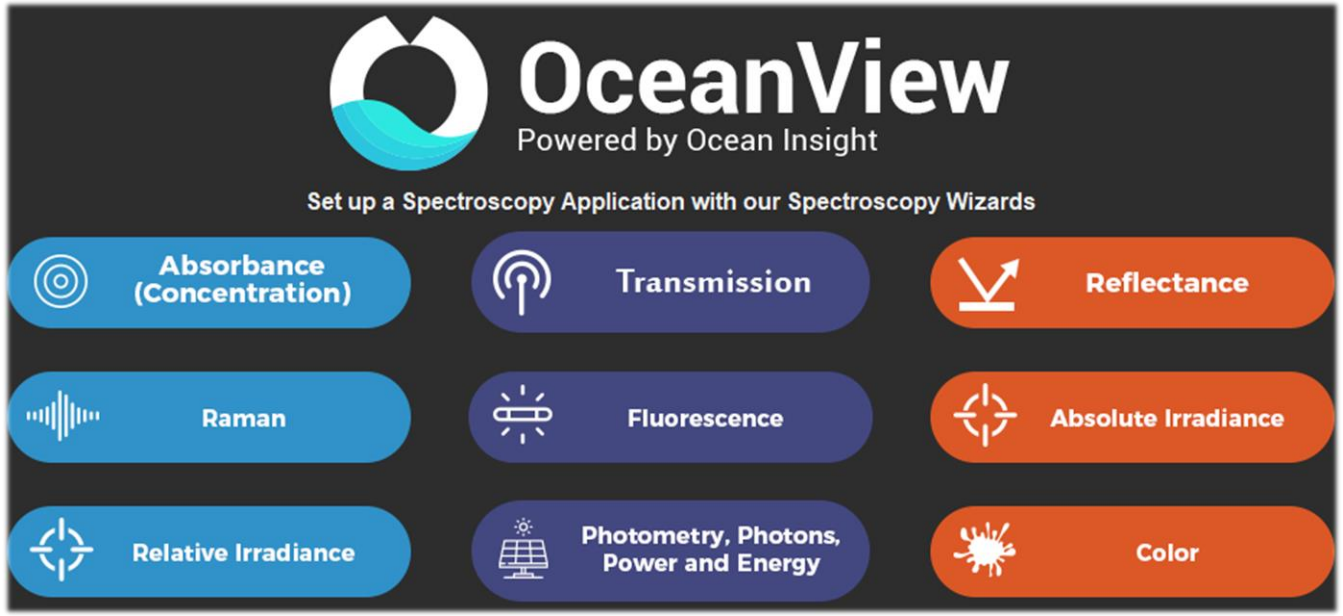


Click the **OV icon**



Select **Color**, and then **New Percent Reflection Processing**

Components

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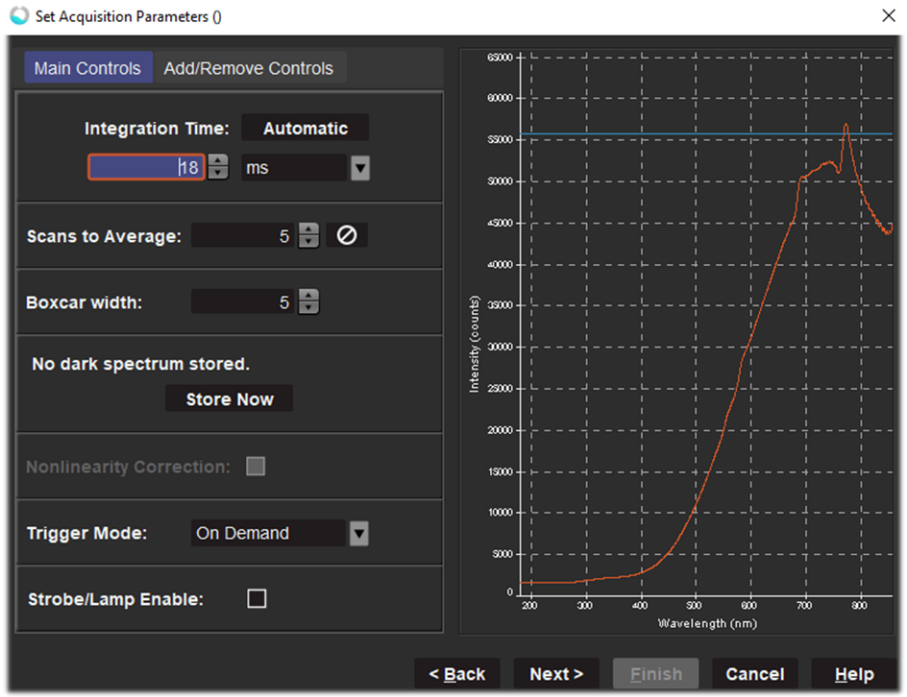
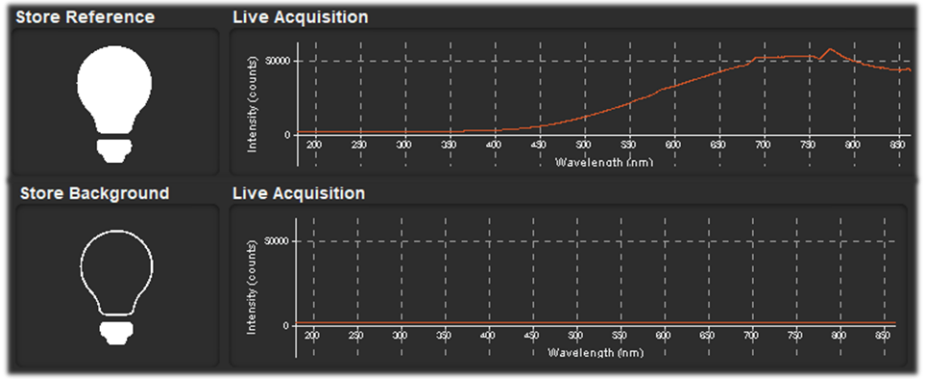
Pro Tip: Scans-to-Average averages individual pixels over time, while Boxcar averages neighboring pixels to smooth the spectrum.
The former increases scan time, but the latter does not. However, high Boxcar can begin to mute sharp peaks that may be important to your work.



Total Scan Time = *Integration Time x Scans to Average*

Hit '**Automatic**' button to auto-set Integration Time



Take light reference with light source on and WS-1 present

Take dark/background reference with light source off

Components

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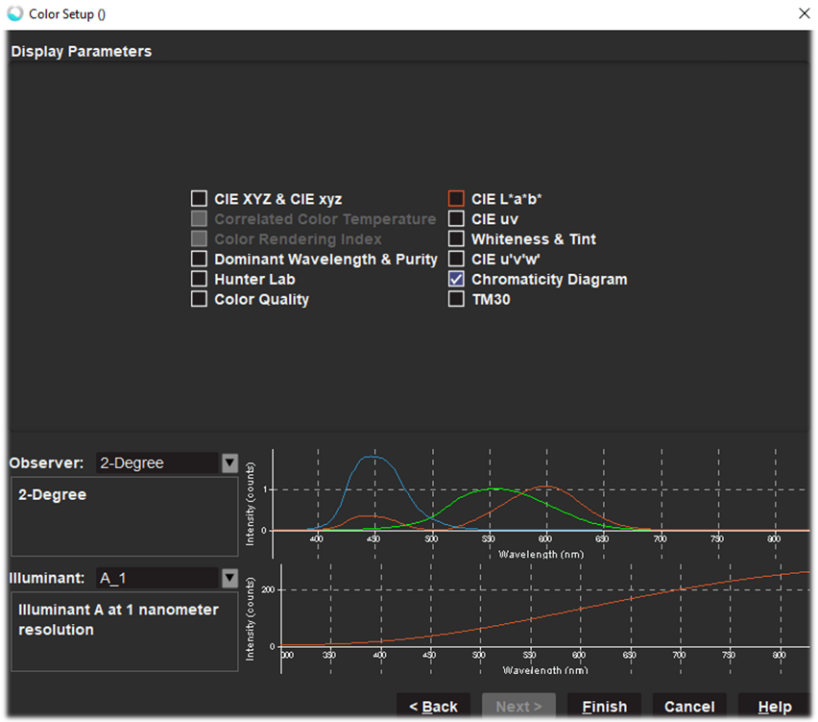
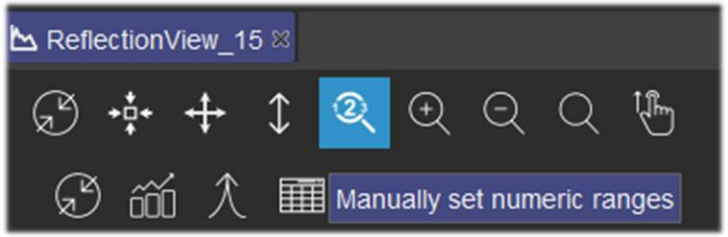
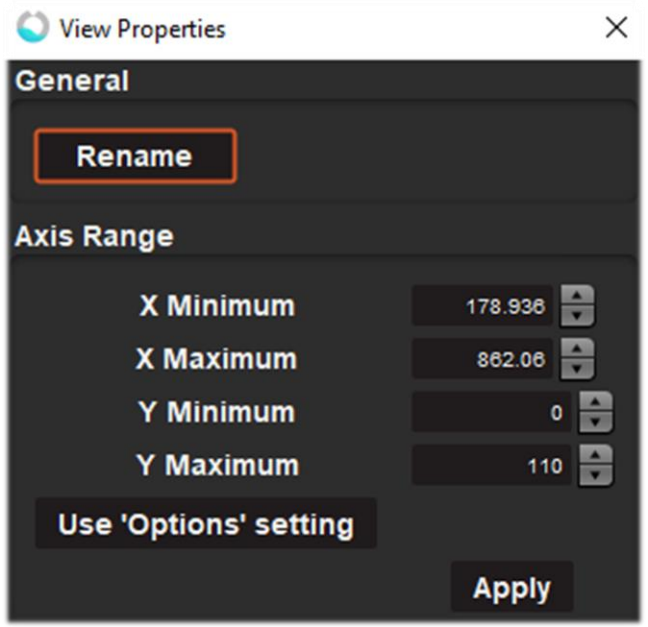


Select the color outputs relevant to you. You can also select a 2- or 10-degree observer, and the appropriate illuminant. Refer to the OceanView Manual for details on these settings. They include common illuminants such as daylight and fluorescent lighting at various resolutions.



Use arrow and magnifying buttons to move and zoom around the graph. The magnifying glass with numbers in it allows you to manually set the x- and y-axis range.



Components

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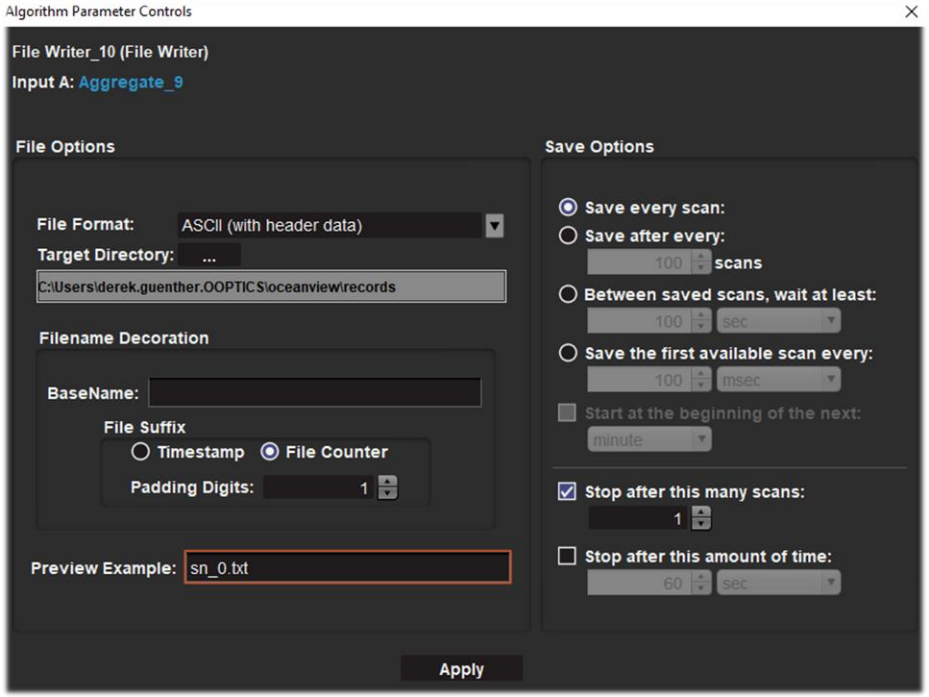
Pro Tip: Standard *ASCII* file type will save each spectrum to an individual file in column format. Changing File Format to *Time Series* or *Append Series* will place all spectra in a single compiled file in row format.

Select the gear icon to configure data save parameters.

Configure your file format, location, and naming convention on the left.

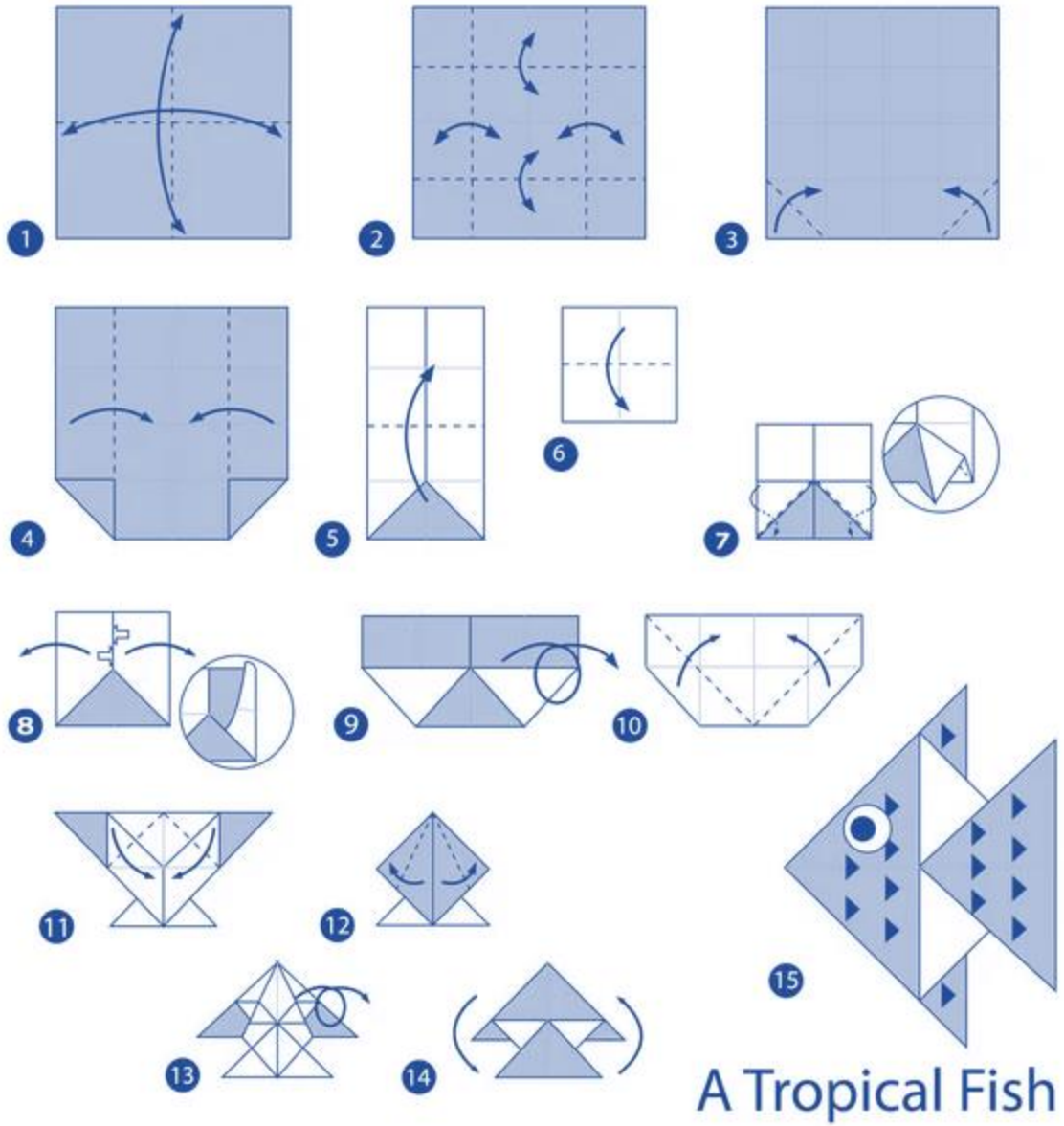
Configure the frequency and intervals of data logging on the right.



Don't forget to press '**Apply**' before exiting!

The color swatches that came with your Solids Spectroscopy Kit can be used for origami.

Try making this fish!



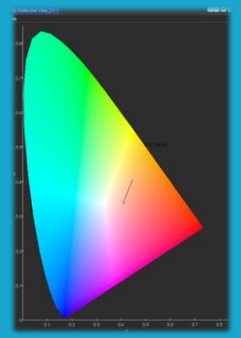
1 Assemble System and Complete Reflectance Wizard

from prior steps

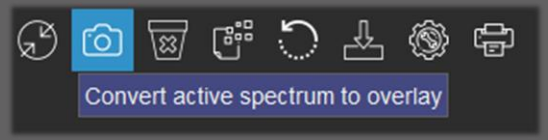
2 Sampling

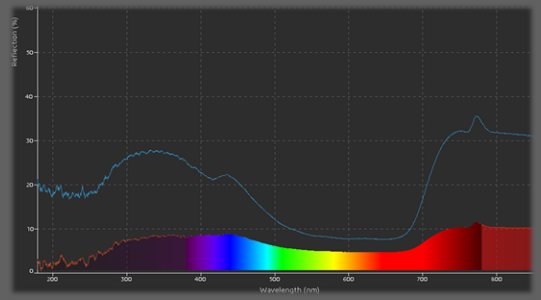
Remove WS-1 and place colored swatch over port

Note location of color cursor



3 Click Camera icon to freeze overlay





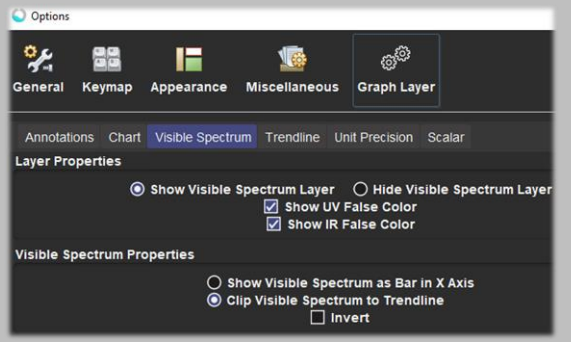
4 Change the swatch color. Take a new overlay.

What regions reflect more? Less?

5 Grab your favorite matching outfit.

How close do your colors match?

Pro-Tip: To see the full ROYGBV spectrum in the graph, right-click in the graph and go to Graph Layer Options. Go to Visible Spectrum and select Show Visible Spectrum Layer and Clip to Trendline.



Experiment

Sampling Tip

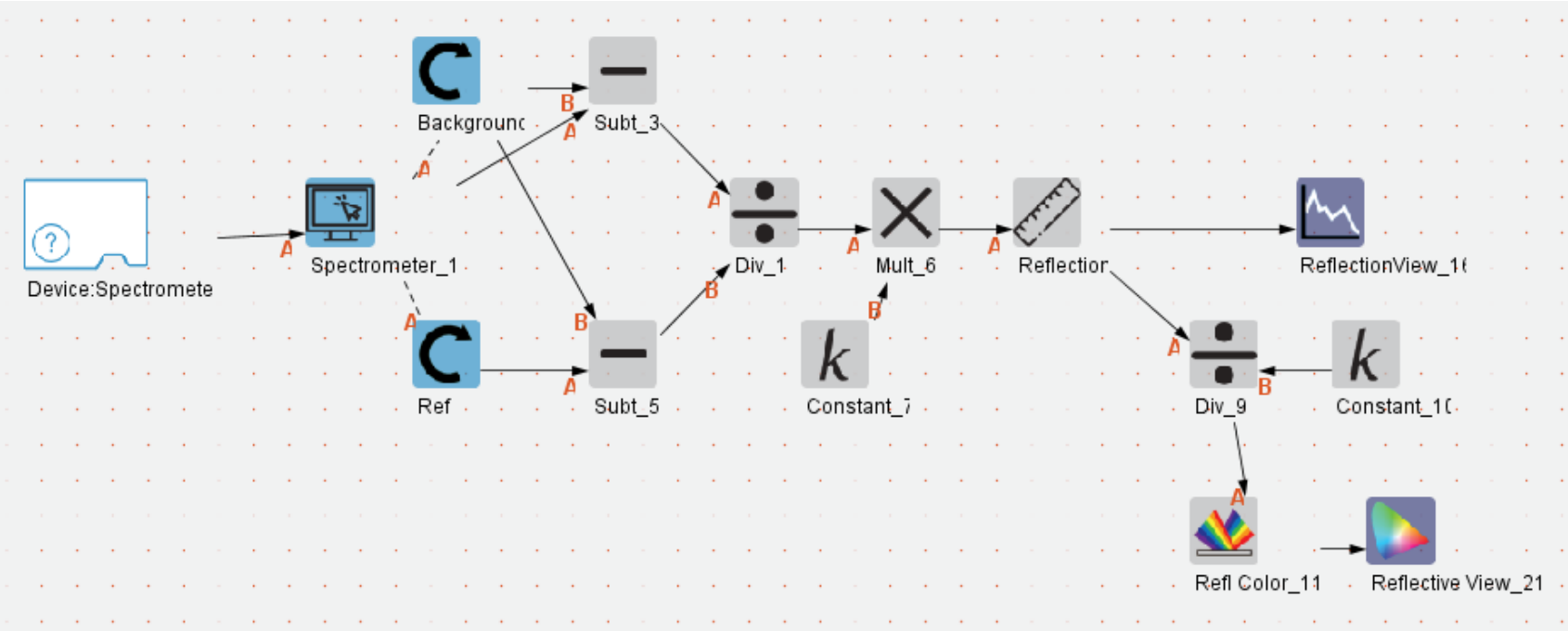
For powdered samples such as soil, use a Petri dish or quartz tray to create a flat and uniform distribution over the ISP-REF port.

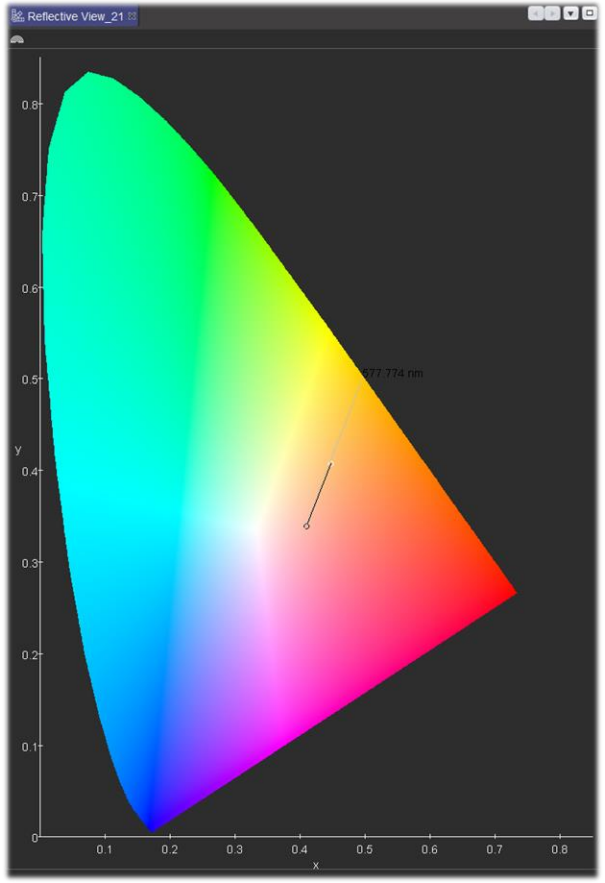
Typical Petri dish plastic will absorb UV signals, but quartz will allow UV trends to pull through.

Schematic

OceanView's Schematic interface is a powerful feature that allows highly-customizable spectral math and numerical methods to be implemented. Wizards are useful tools to build the core foundation of a schematic, which can then be modified by the user however may be needed.

The below schematic is generated by the Color Wizard.





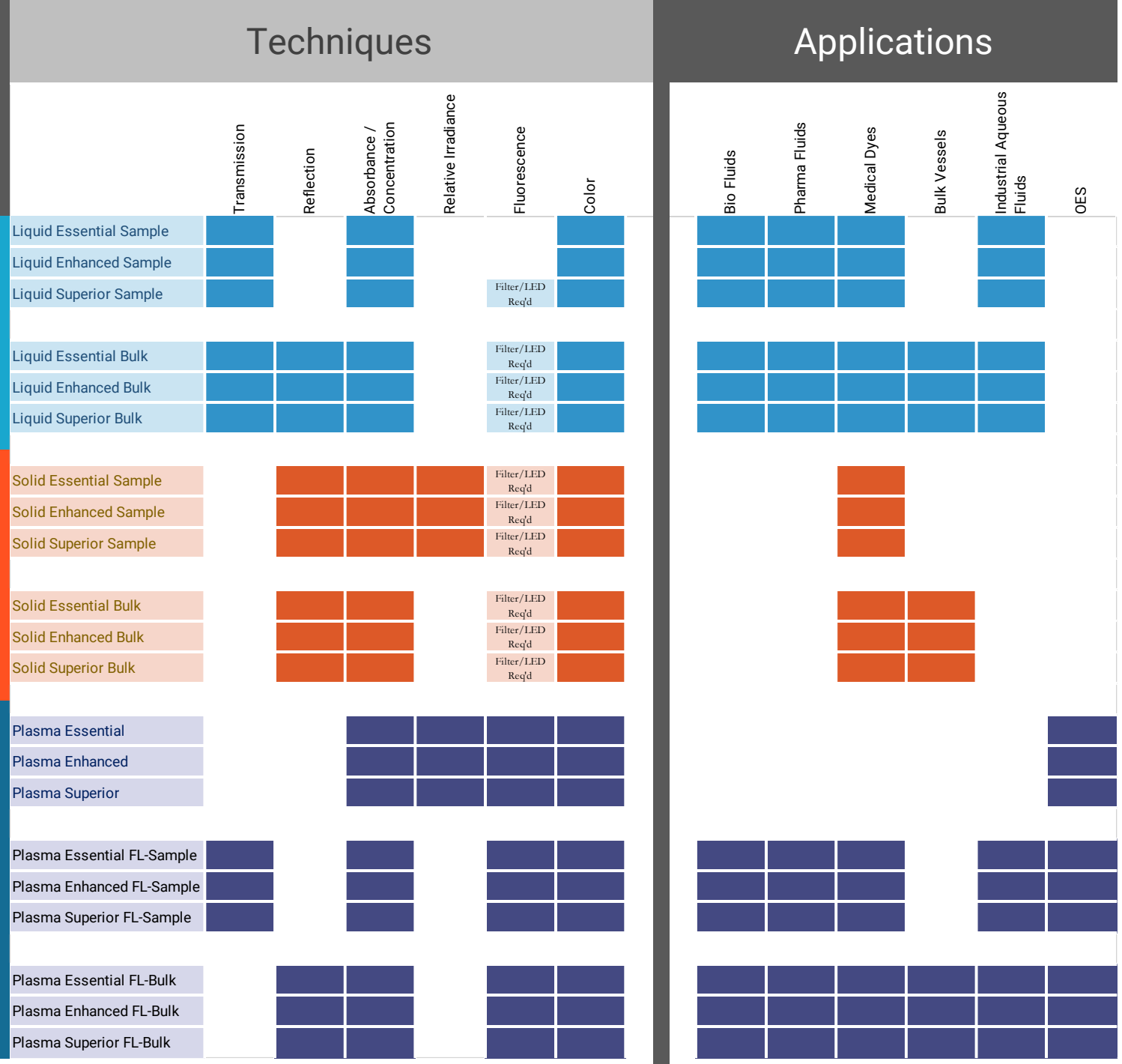
Open the *Refl Color* node to change the observer and illuminant parameters.

Spectroscopy Kits

Liquids

Solids

Plasma



THE SPECULAR COMPONENT OF THE
TOTAL INTEGRATED REFLECTION

Crypto-Quip Solution:

OceanOptics

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