

Sensitive. Accurate. Flexible.

Agilent Cary Eclipse fluorescence spectrophotometer



Agilent Cary Eclipse Fluorescence Spectrophotometer

Agilent is your premier resource and partner for molecular spectroscopy. The world-renowned Cary product line, encompasses FTIR, UV-Vis-NIR and fluorescence instruments, offers you a comprehensive range of molecular spectroscopy solutions.



Answers you can trust

The Cary Eclipse fluorescence spectrophotometer is sensitive, accurate, and flexible, and is designed to meet your immediate and future challenges. With accurate temperature control, no sample photo bleaching, and a range of measurement options, you can be sure that the Cary Eclipse will give answers you can trust.

- Lowest cost of ownership—with a lifetime of 3 billion flashes, the lamp typically lasts 10 years. This longevity minimizes lamp replacement, saving you money over the lifetime of the instrument.
- No need for cuvettes—the optional fiber-optic probe delivers accurate results in a fraction of the time, improving your workflow and reducing your costs.
- Fast data collection—with a scan rate of up to 24,000 nm/min, you can scan the wavelength range in under 3 seconds and collect 80 points per second for kinetics measurements.
- Sensitivity—detect picoMolar amounts of fluorescein in both standard and micro cuvettes.
- Measure precious or biological samples with ease—the xenon flash lamp enables highly sensitive measurements on small volume samples to be made without sample degradation.
- Flexibility—choose from fluorescence, phosphorescence, chemiluminescence or bioluminescence collection modes, to provide a robust and versatile workhorse for all your analytical needs.

Superior optical design

Excellent sensitivity is a result of using a unique, intense xenon flash lamp, coupled with optimized grating blaze angles and coatings which ensure sensitivity across the whole wavelength range. Photosensitive samples are not exposed to continuous light as the xenon flash lamp flashes only to acquire a data point.

Extended sensitivity

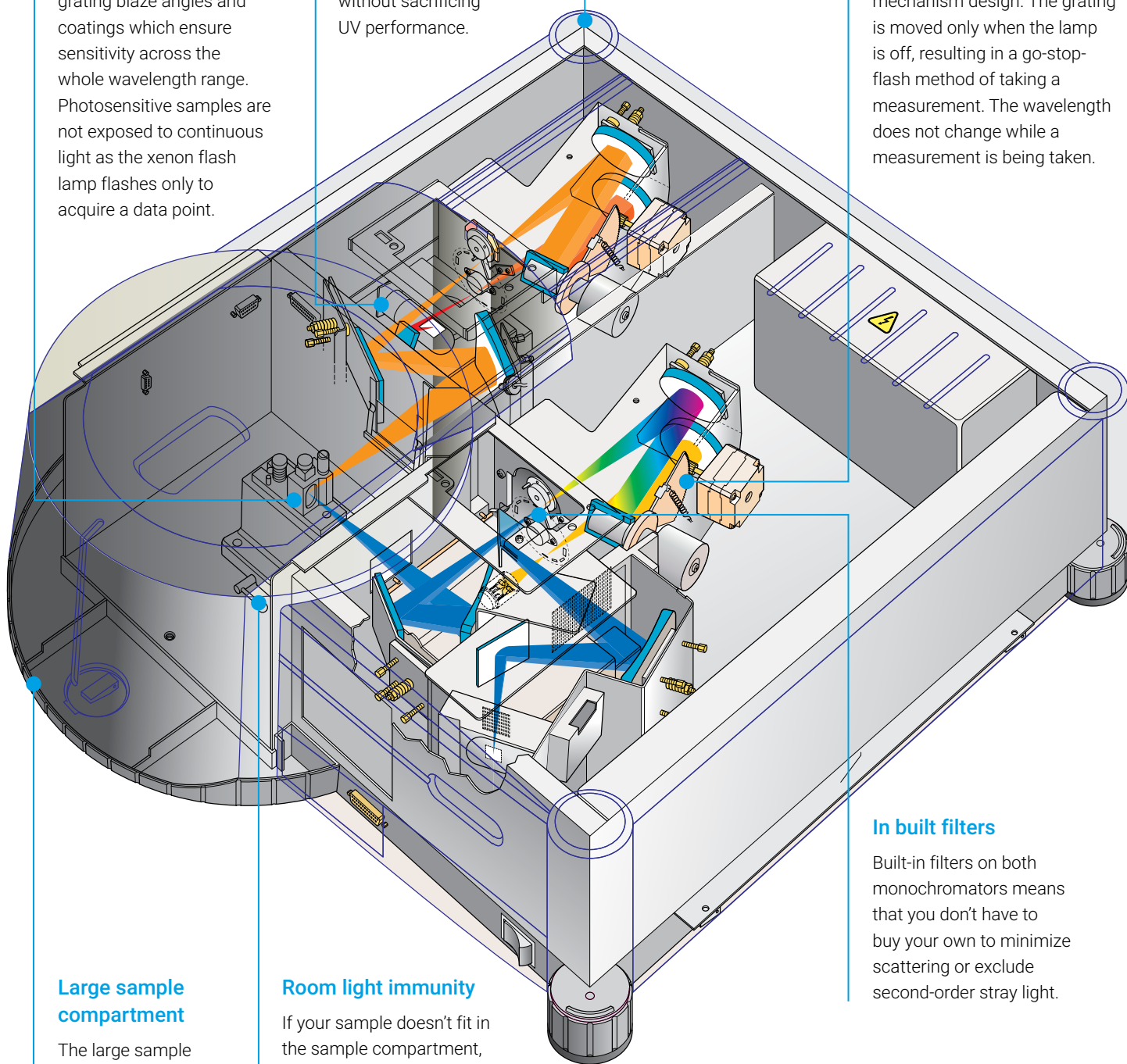
Red-sensitive Photomultiplier tube detectors extend sensitivity up to 900 nm without sacrificing UV performance.

Small footprint

The Cary Eclipse occupies only 600 mm (24 inches) of bench space.

Fast scanning

The Cary Eclipse scans at 24,000 nm/min without peak shifts due to the monochromator drive mechanism design. The grating is moved only when the lamp is off, resulting in a go-stop-flash method of taking a measurement. The wavelength does not change while a measurement is being taken.



Large sample compartment

The large sample compartment makes it easy to install and remove accessories, and fit your own research apparatus.

Room light immunity

If your sample doesn't fit in the sample compartment, or it is easier to work with an open sample compartment, then simply leave the lid off. The unique xenon flash lamp and sophisticated signal processing give the Cary Eclipse room light immunity for fluorescence measurements.

Measure microvolume samples

Reduced volume cuvettes as low as 5 μ L are available. The horizontal beam profile ensures excellent sensitivity even with such low volumes.

In built filters

Built-in filters on both monochromators means that you don't have to buy your own to minimize scattering or exclude second-order stray light.

Superfast data collection

Scan the whole wavelength range in less than 3 seconds.

Quality and Performance by Design

Our proven record of optical design excellence and innovation ensures that you get the right answer every time.

The power of xenon

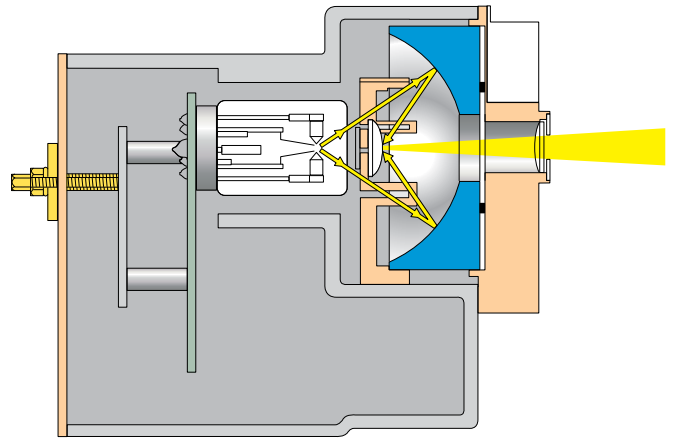
With unique xenon flash lamp technology, the Agilent Cary Eclipse is:

- Room-light immune—the unique optical design enables measurements to be made with the sample compartment open, allowing large or odd-shaped samples to be measured.
- Flexible—the highly focused beam provides superior coupling to fiber optics, making the Agilent Cary Eclipse the best choice for fluorescence fiber optic measurements.
- Efficient—the lamp only flashes when a reading is taken. This means zero warmup time, low electrical energy use, and low maintenance requirements. Photodegradation is also eliminated, as photosensitive samples are not excessively exposed to light.

Signal-to-noise

Signal-to-noise (S:N) mode enables you to control the level of precision you want across the whole scan. It is useful for samples that vary significantly in emission intensity across the wavelength range.

S:N mode reduces scanning times by over 50% as the system scans quickly in areas of high emission intensity and increases signal averaging when the emission is less.



Superior optics

The Schwarzschild collection optics capture a large portion of the light from the powerful xenon flash lamp and direct it through the sample, resulting in excellent sensitivity and low signal noise.

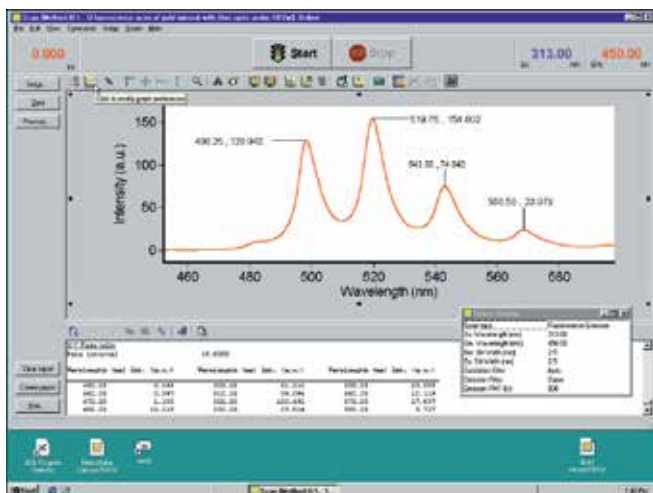


Distinctly Better Software

User friendly, application focused software provides complete instrument control.

Software designed for real samples

The modular design of the Cary WinFLR software means that it can be tailored to suit your analytical requirements. The software modules include basic wavelength scans or concentration measurements, through to measurements to suit life science applications requiring advanced polarization or thermal control.



Dedicated software applications

Streamline your measurements and save time with the easy-to-use WinFLR software. Investigate intracellular ion transfer processes using the Fast Filter module or study drug binding assays using kinetics and polarization.

Enhanced graphics features

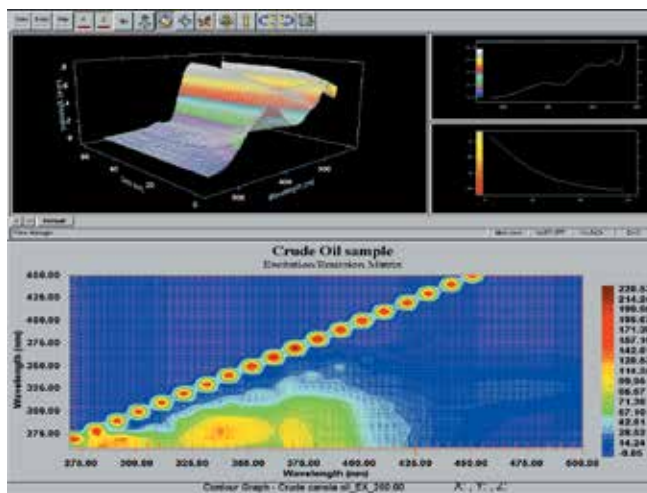
The graphics control module has automatic peak labeling, zoom, free and tracking cursor, multiple ordinate and abscissa formats. It also has smart copy/paste and overlay modes, making spectral interpretation and presentation for publications a breeze.

Advanced data processing

Use the spectrum calculator to apply mathematical operations, including addition, subtraction, division, multiplication, log, and square root functions, to spectra. The calculator also features mean, normalization, smoothing, up to fourth order derivatives, and integration algorithms.

Meet your application challenges

Use the powerful built-in Applications Development Language (ADL) to tailor the WinFLR software to meet your most specific applications.



Obtain 3-D graphs and contour plots in seconds

Automatically collect a series of excitation, emission, or synchronous scans in all x modes. The 3-D data can be sliced to produce single excitation or emission scans, or contour plots can be created to show the number of emitting species.

You can do it all with a Cary

The Cary Eclipse instruments are complemented by a range of accessories and software designed specifically for your application needs.

Performance enhancing accessories

The vast range of accessories for the Cary Eclipse ensures you can handle the widest variety of sample sizes and types.

Accessories for liquid samples

- Microplate reader for method development or high throughput measurements.
- Fiber-optic probes and couplers for fast accurate measurements without cuvettes.
- Peltier and water thermostatted single and multicell holders for precise temperature control.
- Temperature probes for accurately measuring the temperature inside the cuvette.
- Rapid mix accessory for investigating ultrafast kinetics measurements that are over within seconds.
- Manual and automated polarizers for excitation down to 275 nm.

Accessories for solids, powders, and pastes

- Solid sample holder to acquire fluorescence spectra of many sample types, including filters, powders, gels, optical components, and fabrics.
- Fiber optic reflectance probe and coupler.

High throughput microplate reader

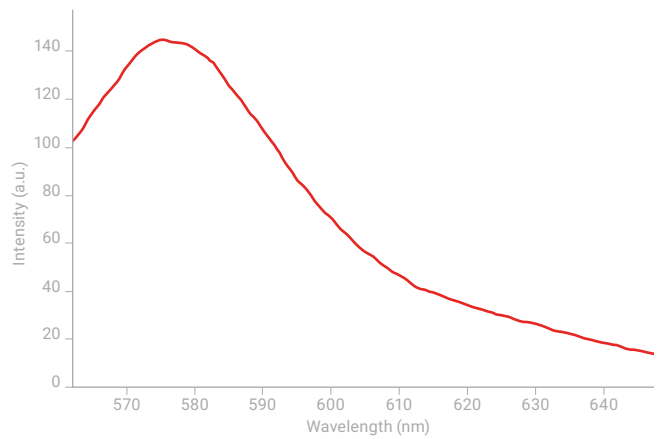
The microplate reader accessory turns the Cary Eclipse into a high throughput microplate reader in less than 30 seconds. It provides full wavelength scanning with excellent sensitivity using reflective optics instead of fiber optics.

- Measure 96 wells in less than 50 seconds and 384 in less than 90 seconds.
- Perform full wavelength scans on each well within minutes. Measure in steady-state fluorescence, phosphorescence, bio-/chemi-luminescence, or time-resolved delayed fluorescence modes.
- Measure minute sample quantities deposited on the sides or base of the wells.
- Customize the measurement positions for nonstandard microplates or substrates. Control the image spot size to as small as 2 mm in diameter.
- Automatically align the excitation beam on your microplates and store information about each plate type.
- Measure samples such as gels, films, and solids at various locations on their surface by using the microplate reader as an x-y transport.



Monitor temperature control

The temperature probe enables the temperature inside the cuvette to be measured, providing the most accurate data for temperature-dependent experiments. The WinFLR software monitors the temperature directly from probe, ensuring data is collected at the correct temperature.



Scan cells adhered to wells

The microplate reader can easily scan cells adhered to the side of a well, with excellent signal-to-noise. This figure shows an emission scan of Rhodamine B which has been coated to the side and bottom of a 384 well white microplate.

Chemicals and Materials Applications

When you need to consistently and cost-effectively deliver quality finished products, innovative, reliable analytical solutions are essential to your success. The Cary Eclipse enables minimal sample preparation and versatile sampling solutions.

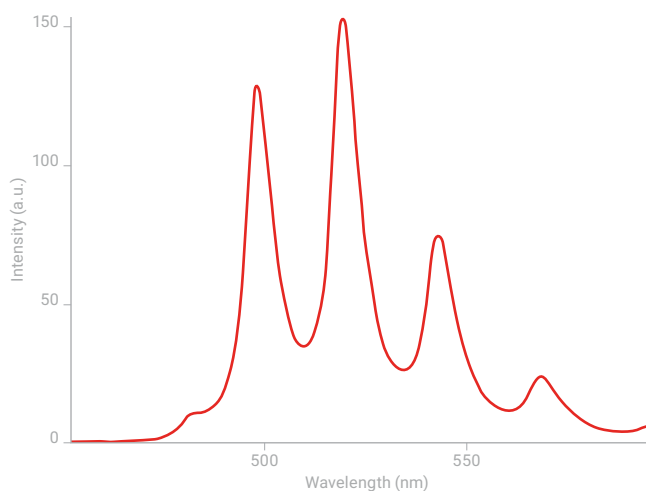
Flexible sampling

Combine the Cary Eclipse with fiber-optic probes to create a sensitive, remote-reading fluorescence spectrophotometer:

- Use the fiber optic system to measure emission from the surface of a solid or from a liquid
- Room light immunity means that there is no restriction on sample size or shape

Superior scanning

- Rapid scan rate of 24,000 nm/min without peak shifts is due to the design of the monochromator drive mechanism. The grating only moves when the lamp is off, resulting in a go-stop-flash measurement method—the wavelength does not change while a measurement is being taken.
- Use Computer Averaging of Transients (CAT) scan mode to average several individual scans until you are satisfied with the signal-to-noise quality.



Fiber optics measurements

The Cary Eclipse fiber optic system can be used to measure the emission from the surface of a solid or that emitted by a liquid, without compromise in data quality.



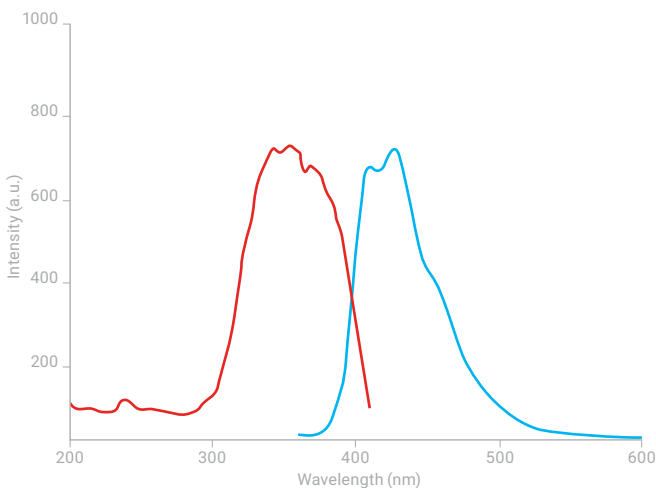
Solid sample measurements

Use the solid sample holder to easily measure the fluorescence properties of samples—from optical filters, paints, and fabric to specialty chemicals such as optical brighteners.

Fluorescence measurement of detergents

Use the Cary Eclipse fluorescence spectrophotometer with solid sample holder to measure the fluorescence of optical brighteners in laundry detergents.

- Solid sample holder is easy to install and align, minimizing sample preparation.
- Use in combination with the powder holder and edge mounting kit for even greater solid sampling flexibility.
- Acquire spectra with the sample compartment open.



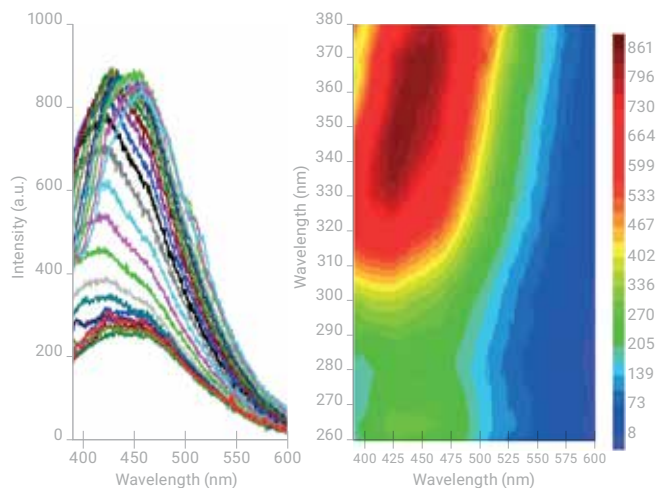
Examine the fluorescent properties of a common laundry detergent

The excitation and emission spectra of the powder show optical brighteners absorbing in the region between 320 and 390 nm and emitting over the 400–500 nm range. Fabrics washed in this detergent would exhibit a blue hue.

Fluorescence measurement of stalactites

Use the Cary Eclipse fluorescence spectrophotometer with fibre optic coupler and probe to measure the fluorescence of demanding solid samples such as stalactites.

- Measure oddly shaped samples such as stalactites and live corals using an optical light guide.
- Fiber-optic probe and coupler are easy to install and align and require no sample preparation.
- Easily acquire fluorescence spectra—simply place the solids tip on the surface of the sample without any need for light shielding.



Investigating the fluorescent properties of a crosssectioned stalactite

The probe tip was positioned on the stalactite surface to collect the excitation emission matrices (EEMs). The system can also be used for gemstone fingerprinting and impurity detection, and for soil, mineral and ore analysis.

Life Science Applications

In a field that demands accuracy and productivity, your challenges have never been greater. Today, analysis must be done more reliably, more efficiently, and with even higher quality results than ever before. Agilent provides unrivalled optical performance and superior temperature control to measure the most challenging of samples with the highest accuracy.

Protect precious samples

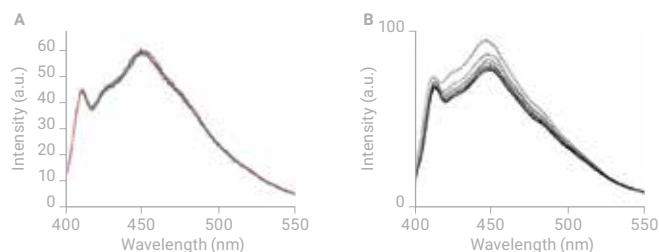
- Photosensitive samples are not exposed to continuous light as the lamp flashes only to acquire a data point, preventing photodegradation.
- Micro cuvettes enable highly accurate measurements of precious biological samples.
- Sample compartment temperature is stable, as the lamp does not produce heat, ensuring accurate and reproducible data.

Rapid and precise kinetics measurements

- Collect steady-state fluorescence data at 80 points per second, and pause data collection at any time to add reagents without affecting performance.
- Extend collection times during a run.
- Perform time-resolved phosphorescence and delayed fluorescence lifetime measurements.
- Use the rapid mix accessory to analyze reactions that are over in less than 1–2 seconds.

Intracellular ion concentrations

- Use the fast filter accessory or the fast slew rate of the monochromators to collect data for intracellular ion concentration analysis or pH measurements in real time. This could be 50 ms to 1 second for ratiometric measurements or every 12.5 ms for single wavelength dyes.



No photo bleaching

Emission wavelength vs intensity for BFP following 370 nm excitation. A negligible drop in peak BFP emission (450 nm) was recorded after 10 successive scans at a scan rate of 120 nm/min (total exposure time 12 min 30 s) using the Cary Eclipse (a). Photobleaching of approximately 20% was observed by using a commercially available instrument fitted with a traditional xenon arc lamp (b).

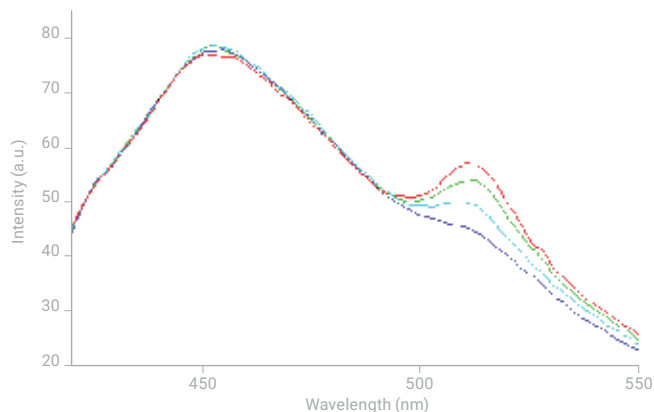


Automated polarizer

Simplify measurements by using the automated polarizer and WinFLR software to automatically measure changes in polarization over time.

Rotational motion of molecules

- Optional UV transmitting film polarizers enable excitation down to 275 nm, ensuring that even tryptophan can be excited without photobleaching.
- Polarizers allow measurements to be obtained at the significant angle of 55° as well as the complimentary angle of 35°.
- With a low extinction ratio in the cross-position, rotational motion of proteins and solvent interactions can be measured with high precision and accuracy.
- Sturdy design ensures the polarizers are easy to clean and maintain.



Monitor cell function of photosensitive samples at the protein level

Emission spectra of the blue fluorescent protein (BFP)- green fluorescent protein (GFP) fusion protein following 360 nm excitation are shown. GFP emission (~510 nm) is seen upon specific excitation of BFP alone (360 nm), indicative of FRET.

Excellent temperature control

- The Cary Eclipse temperature controlled peliter thermostatted cell holder offers:
 - Simultaneous measurement of up to four samples
 - Rapid and precise temperature control essential for controlling the intensity of fluorescence emission
 - Excellent stability control over time (typical variation ± 0.05 °C)
 - Minimal cell-to-cell variation (maximum difference, 0.2 °C at 37 °C)
 - Accurately measure the temperature of the actual sample within the cuvette using temperature probes
 - In-built electromagnetic stirring providing complete control of the stirring speed, with no fluctuations (up to 4 cells)
 - Temperature ramp rates as slow as 0.06 °C/min can be selected for thermal denaturation and renaturation studies of DNA via fluorescence resonance energy transfer (FRET)

Agilent CrossLab: Real insight, real outcomes

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