

# Efficient. Accurate. Flexible.

Agilent Cary 60 UV-Vis Spectrophotometer



# Agilent Cary 60 UV-Vis

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



## Answers you can trust

The **Agilent Cary 60 UV-Vis spectrophotometer** is efficient, accurate, and flexible, and is designed to meet your immediate and future challenges. With remote sampling options, proven performance and low cost of ownership, you can be sure that the Cary 60 UV-Vis generates answers you can trust.

- Lowest cost of ownership—with an exceptionally long lifetime of 3 billion flashes, the lamp comes with a 10-year warranty for ultimate peace of mind.\*
- No need for cuvettes—the optional fiber-optic probe delivers accurate results in a fraction of the time, and with no cuvette or sipper, sample measurements are less prone to error.
- Measure precious samples with ease—the focused beam of the Cary 60 UV-Vis is perfect for measuring small volumes accurately and reproducibly. Preserve your samples by using less than 4  $\mu$ L instead of mLs.
- Exceptionally fast data collection—with a scan rate of up to 24,000 nm/min, you can scan the entire wavelength range (190 to 1,100 nm) in under 3 seconds.
- Choose sustainability—independently audited for its environmental impact, the Cary 60 UV-Vis has received the ACT (Accountability, Consistency, Transparency) label.



## For Your Application

Agilent is committed to providing solutions for your application. We have the technology, platforms, and expert guidance you need to be successful.

	Chemicals & Energy	Academic	Biotech & Pharma
Common applications for the Agilent Cary 60 UV-Vis	Quality control of raw materials and finished goods Color measurements and color matching Analysis of nutrients in water, food, and agriculture Analysis of turbid solutions or relatively highly absorbing samples Analysis of bulk optics (e.g., sunglasses) Study of pigments in art conservation through reflectance measurements	Characterization of unknown or newly synthesized compounds Monitoring kinetics of chemical or biological reactions that occur at sub-second rate Measurement of films and optical components Analyzing photochemical reactions <i>in situ</i> during sample irradiation	DNA and protein quantification Measuring cold biological samples (4 °C) immediately after removal from the refrigerator Drug purity and API concentration Preparation of fluorescent liquid samples before emission measurements Analyzing small amounts of precious sample (<4 µL)
Common accessories for the Agilent Cary 60 UV-Vis	Fiber optic transmission and reflectance probes and coupler Thermostatted single and multicell holders with temperature probes 18 cell changer Rectangular, cylindrical, micro, and flow cells	Fiber optic transmission and reflectance probes and coupler Thermostatted single and multicell holders with temperature probes Solid sample holder Rectangular, cylindrical, micro, and flow cells	Fiber optic microprobe (liquids) Thermostatted single and multicell holders with temperature probes Microvolume cuvettes TrayCell 2.0 Ultra-Microvolume Cell Rapid mix accessory

## Molecular Spectroscopy Innovations

1947

First commercial recording UV-Vis, the Cary 11 UV-Vis

1954

Release of the Cary 14 UV-Vis-NIR

1969

First rapid-scanning Fourier transform infrared spectrometer, the FTS-14

1979

First use of a mercury cadmium telluride (MCT) detector in an FTIR

1982

First FTIR microscope, the UMA 100

1989

Release of the acclaimed Cary 1 and 3 UV-Vis

1999

First 256 x 256 MCT focal plane array for analytical spectroscopy

2000

First ATR chemical imaging system

2007

Smallest, most rugged commercially available interferometer introduced

2007

TumbIIR sample accessory introduced—a revolution in FTIR liquid sampling

2008 to 2011

Agilent offers handheld and out-of-lab FTIR solutions

2017

Acquisition of Cobalt Raman spectroscopy

2018

Cary 3500 UV-Vis and 8700 Laser Direct Infrared (LDIR) Chemical Imaging System launched

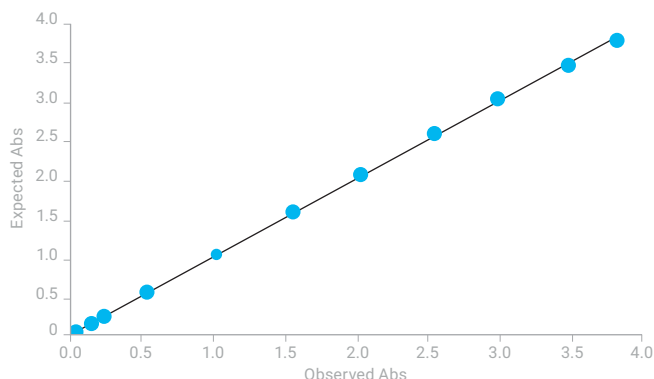
# Quality and Performance by Design

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

## The power of xenon

The Agilent Cary 60 UV-Vis uses the leadership and proven performance of its predecessor the Cary 50 UV-Vis, the **pioneer in UV-Vis xenon flash lamp technology**. The Cary 60 UV-Vis 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 and reducing the risk or user errors.
- Focused—The highly focused beam provides superior coupling to fiber optics, making the Cary 60 UV-Vis the best choice for UV-Vis fiber optic measurements.
- Robust—The combination of the xenon lamp and the superior mechanical design ensures the Cary 60 UV-Vis is inherently reliable. With over 10,000 Cary 60 UV-Vis shipped we confidently offer a 10-year warranty on the lamp.
- Economical—Traditional lamps, such as deuterium, need to be replaced frequently - a time-consuming and costly process. The reliability of the xenon lamp plus the zero warmup time, and low electrical energy use and maintenance requirements significantly reduces the cost of ownership.
- Efficient—The lamp only flashes when a reading is taken eliminating photo degradation, as precious or light-sensitive samples are not excessively exposed to UV light or heat.
- Flexible—The Cary 60 UV-Vis can be equipped with a comprehensive range of accessories providing the flexibility to measure a diverse range of real world sample types.



### Superior accuracy and photometric linear range

The photometric range of the Cary 60 UV-Vis extends above 3.5 absorbance units. As shown above, a correlation coefficient of 0.999 was achieved when measuring certified standards (Starna, S/N 14727, set type RM-9ND). The absorbance was measured at 525 nm using a 1 second signal averaging time.



### Try our calculator to see how your savings could add up

Choose a value based on your lab operational model:

Lamp replacements  
per year

Weeks of downtime  
per lamp replacement

With a Cary 60 UV-Vis powered by a xenon flash lamp, here's what your lab could save:

	Cost savings	Time savings
After 1 year		
After 10 years		

Assumes a deuterium and tungsten lamp replacement cost of \$1,400 per set, a requalification cost of \$3,100 per lamp set change, a 30-minute daily warm-up time, and 240 working days per year. All amounts are in U.S. dollars.

### Excellent noise performance

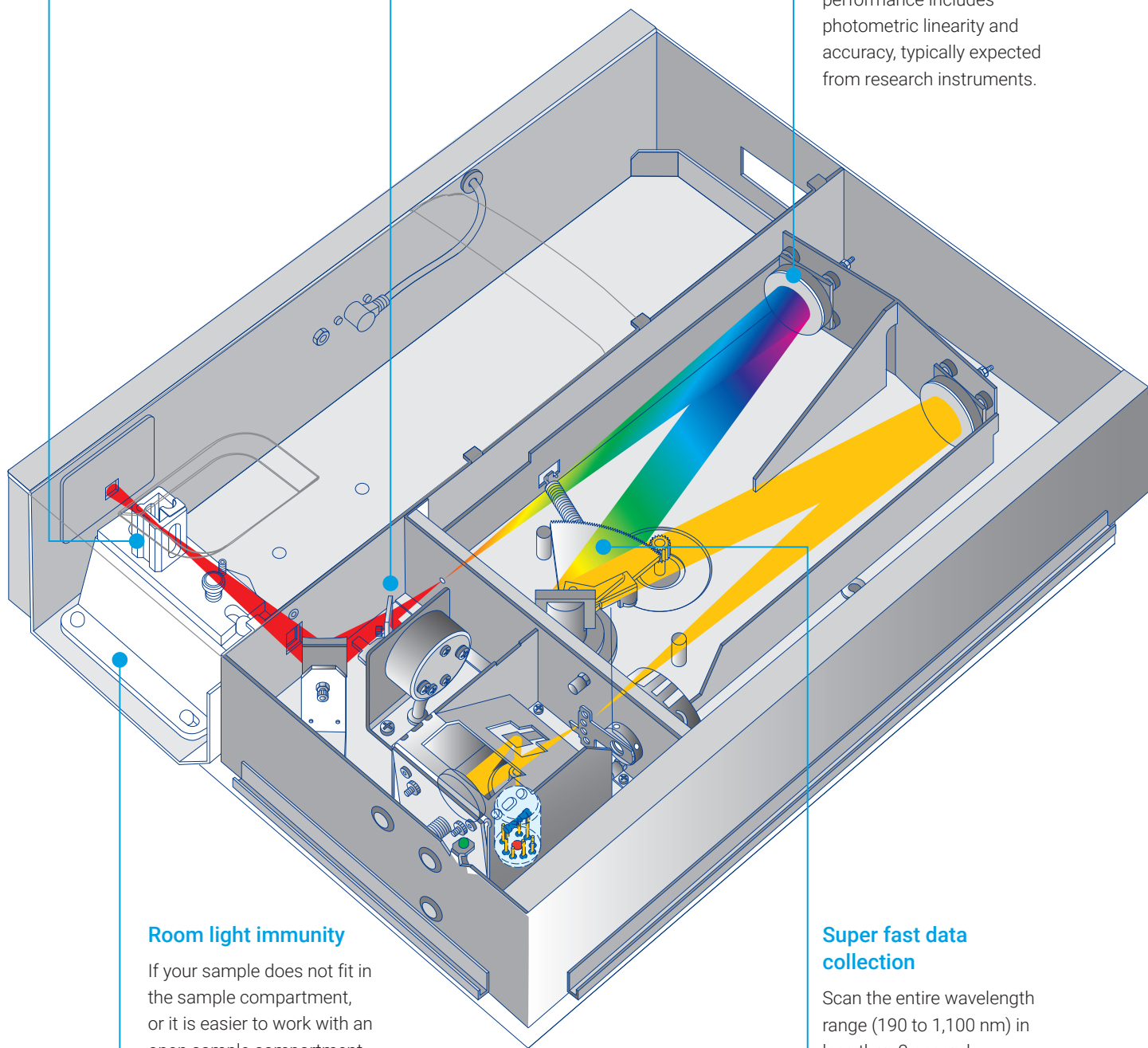
The light beam is very bright and focused—less than  $1.5\text{ mm} \times 1.0\text{ mm}$  at its focus—ensuring excellent noise performance even when using small aperture microcells.

### Simultaneous reference correction

As a double beam UV-Vis instrument the Cary 60 UV-Vis maintains peak integrity at every scan speed through simultaneous sample and reference beam measurements.

### Superior and proven optical design

Leveraging design capabilities from our research grade Cary spectrophotometers, the Cary 60 UV-Vis provides excellent optical performance. This performance includes photometric linearity and accuracy, typically expected from research instruments.



### Room light immunity

If your sample does not fit in the sample compartment, or it is easier to work with an open sample compartment, then simply leave the lid off. The xenon flash lamp means the Cary 60 is not affected by room light.

### Super fast data collection

Scan the entire wavelength range (190 to 1,100 nm) in less than 3 seconds.

# Towards a more sustainable lab

The Cary 60 UV-Vis has been independently audited for its environmental impact.

The Cary 60 UV-Vis received the **ACT (Accountability, Consistency, Transparency) label**, verified by My Green Lab. The label provides information about the environmental impact of the Cary 60 UV-Vis throughout its entire life cycle.

## Get your work done and meet your sustainability targets

The Cary 60 UV-Vis improves the environmental impact of laboratories without impeding productivity or scientific progress:

- Reduced energy consumption: for example, xenon source lamp only flashes when a reading is taken, no warmup time.
- Reduced hazardous waste production: xenon source lamp comes with a 10-year warranty, so there is no need to frequently replace and dispose of lamps.
- Long-lasting instrument (20+ years) with minimal maintenance.
- Manufactured using renewable energy.
- End-of-life take-back programs to ensure that the product is properly recycled or refurbished.

To learn more about how the Cary 60 UV-Vis can help you achieving your sustainability goals visit:

[www.agilent.com/chem/cary-60-uv-vis\\_ACT](http://www.agilent.com/chem/cary-60-uv-vis_ACT)



# You can do it all with a Cary

The Cary 60 UV-Vis spectrophotometer is 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 60 UV-Vis ensures you can handle the widest variety of sample sizes and types.<sup>1</sup>

### Accessories for liquid samples include:

- 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 to measure the temperature inside the cuvette.
- Microvolume sampling cells to measure volumes <4  $\mu\text{L}$ .
- TrayCell 2.0 Ultra-Microvolume Cell for convenient and precise measurements of low volume samples.
- 18 cell changer for increased throughput and productivity.
- Rapid mix accessory for stopped-flow kinetics measurements.

### Accessories for solids, powders, and pastes

- Solid sample holder to characterize a variety of sample types, including filters, powders, gels, optical components, and fabrics.
- Fiber optic reflectance probe and coupler.

## Consumables for UV-Vis

- Agilent's range of UV-Vis consumables includes cuvettes, flow cells, and lamps.



1. Our list of accessories is ever growing. To find out about the latest available in your region, contact your local Agilent Representative or visit our website at [www.agilent.com/chem/UV/](http://www.agilent.com/chem/UV/)

# Distinctly Better Software

User friendly, application focused software provides complete instrument control.

## Software designed for real samples

The modular design of the **Agilent Cary WinUV software** means that it can be tailored to suit your analytical requirements. Whether it's a QA/QC application requiring wavelength scanning, or life science applications that require advanced enzyme kinetics or thermal control, the software can accommodate your needs.

The Cary WinUV software suite features several application-focused software modules designed to streamline method set up, data collection and analysis, reducing complexity while increasing productivity.

### Dedicated software applications

Streamline your work and save time with built-in modules designed to cover a range of UV-Vis applications. Calculate DNA purity or concentrations using the RNA/DNA module or study biological process with the enzyme kinetics module. Methods can easily be tailored for specific analytical problems.

### Easy to use software

The individual UV-Vis software modules are tailored around the analytical task at hand, with pre-set calculations and analysis tools relevant for finding answers quickly and easily. The software interface presents a neat workspace and follows an intuitive design that allows operators to switch between software modules seamlessly.

### Enhanced graphics features

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

### Advanced data processing

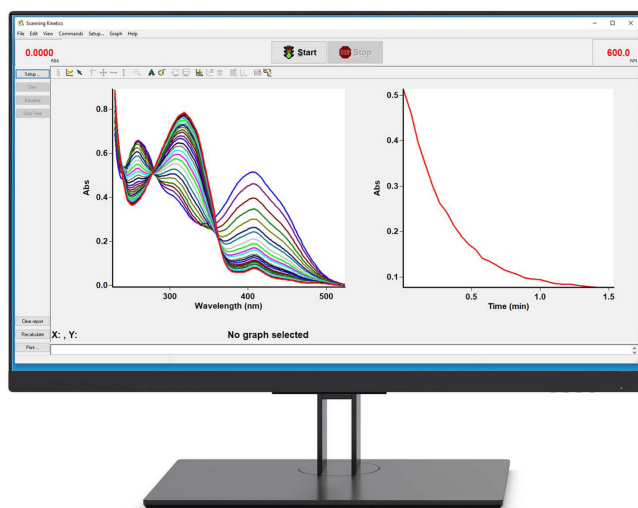
Use the spectrum calculator to apply mathematical operations, including addition, subtraction, division, multiplication, log, and square root functions, to spectra. The calculator also features mean, normalization, smoothing, up to fourth order derivatives, integration, and the Kubelka-Munk correction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

### Meet your application challenges

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

### Manage Data integrity

Optional built-in technical controls ensure the security of your data, control access, and facilitate compliance as defined by US FDA 21 CFR Part 11, EU Annex 11 and similar national electronic record regulations.



### Obtain kinetics curves easily

With a mouse-click you can obtain a kinetics curve from a series of repetitive curves. The insert shows the kinetics curve at 410 nm.

# Chemicals & Energy (QA/QC) Applications

When you need to consistently and cost-effectively deliver the highest quality finished products, innovative, reliable analytical solutions are essential to your success. The Cary 60 UV-Vis provides flexible sampling options and proven robustness, ensuring you can measure your samples with the highest accuracy.

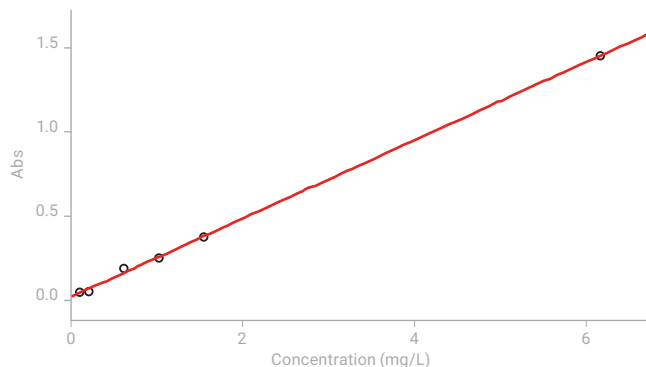
## QA made easy

- The Cary WinUV software supports up to 30 standards and 10 replicates, to give you maximum flexibility to set precision levels.
- Flexibility to run basic methods and if needed advanced control, for method development.
- Preconfigured applications include single point reads, scanning, concentration, and kinetics measurements.

## Flexible sampling

With a large sample compartment and room light immunity, the Cary 60 UV-Vis with fiber-optic probes is ideal for QC laboratories:

- Speed up production. Use fiber-optic probes to take measurements on the production line, rather than transfer liquid samples to cuvettes.
- Probes accommodate a wide range of sample volumes—from very large to microliter samples.
- Eliminates flow cell uptake times and system problems such as tubing leaks, degradation, and bubbles.



### Nitrate analysis of water

The concentration of nitrates in wastewater was measured on the Cary 60 UV-Vis using the fiber optic dip probe. This technique reduced the time of analysis by over 50%. Data quality was not compromised.



# Academic Applications

When you need to cater to many applications and user levels, flexibility and proven reliability are essential to your requirements. The Cary 60 UV-Vis provides accuracy and low ongoing cost of ownership, ensuring you can meet your immediate and future challenges.

## Powerful and intuitive software

- Intuitive interface makes it ideal for university teaching and research laboratories.
- Flexibility to run simple, preconfigured methods for undergraduate students, through to advanced methods for academic research.
- Applications include scanning, concentration, kinetics, and RNA/DNA measurements.

## Advanced kinetics analysis

- Data collection rates can be varied to collect more data when you need it. The Kinetics software also accommodates long, slow reactions and can collect data for up to 5 days without limiting the number of data points collected.

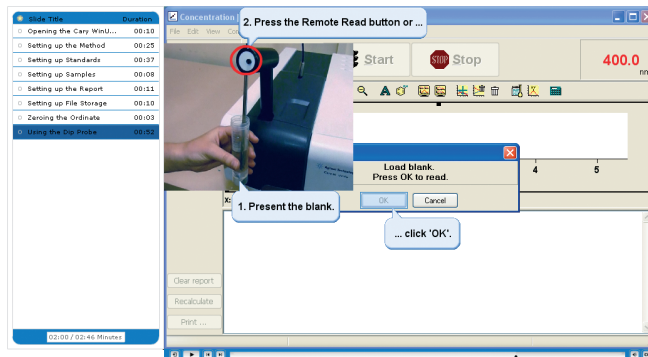
## Flexible data collection

- Wide range of accessories to cater for a diversity of applications and samples.
- Fiber-optic probes eliminate the need to transfer liquid samples to cuvettes, reducing sample loss and user error.



### Eliminate cuvette and sipper hassles

By using fiber optics probes, you'll never have to buy or clean a cuvette again.



### Self-paced learning

The Cary WinUV software includes step-by-step wizards and video clips to help bring users up to speed quickly.



### Solid sample measurements

The solid sample holders are compatible with a range of sample types.

# Biotech and Pharma Applications

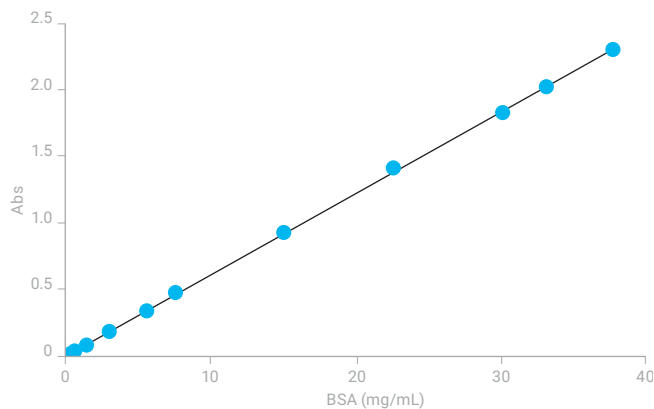
In a field that demands accuracy, productivity and regulatory compliance, your challenges have never been greater. The Cary 60 UV-Vis provides protection for precious samples, and ensures that you can measure your samples with the highest accuracy.

## Protect precious samples

- The fiber optic microprobe and microvolume sampling cell enable measurements of  $<4\ \mu\text{L}$  for precious biological and chemical samples.
- Photosensitive samples are not exposed to continuous light as the lamp flashes only to acquire a data point, preventing photodegradation.
- Sample compartment temperature is stable, as the lamp does not produce heat, ensuring accurate and reproducible data.

## Compliance and qualification

- Optional Agilent Cary WinUV Pharma software supports compliance as defined by US FDA 21 CFR Part 11, EU Annex 11, and similar national electronic records regulations.
- USP, EP, and BP instrument qualification tests provided as standard.
- Instrument test automation using the 18 cell changer accessory—just press start and walk away.
- Qualification services (IQ/OQ) for the Cary 60 UV-Vis hardware, software, and accessories is available.
- Up to 10 replicates and averages in the Cary WinUV software facilitate validation/verification as per ICH Q2 (R1).



### Measure microvolume samples

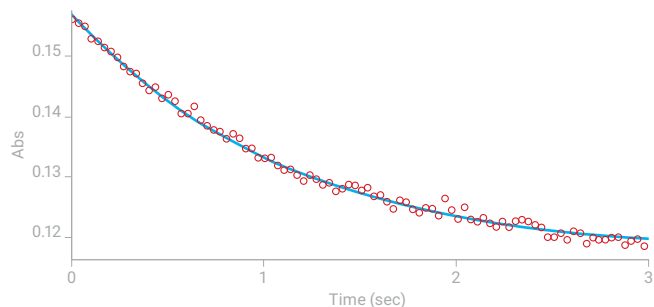
Determine the amount of BSA protein over a wide range of concentrations using  $<4\ \mu\text{L}$  of sample in a microvolume sampling cell. The exceptional photometric linearity of the Cary 60 UV-Vis ensures that data is accurate and reproducible, and eliminates sample dilution before measurement.





## Rapid and precise kinetics measurements

- Collect 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.
- Collect your kinetics data and perform enzyme kinetics calculations all in the same application. Lineweaver-Burk, Eadie-Hofstee, Hanes-Woolf, Eadie-Scatchard,  $V_0$  vs  $[S]$ , and Dixon  $1/V_0$  vs  $[I]$  plots are available.



### Measure short-lived reactions

The rapid mix accessory enables you to automatically start an analysis in less than 1/10th of a second after the two components are mixed.

### Measure cold samples straight from the refrigerator!

Use the fiber optics probe to measure cold samples. As the microprobe is completely submerged in the sample there are no condensation problems, which are difficult to eliminate when using cuvettes.



### Stopped flow kinetics

The rapid mix accessory is ideal for stopped flow kinetics measurements.



### Monitor temperature

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

## Agilent CrossLab: Real insight, real outcomes

CrossLab goes beyond instrumentation to bring you services, consumables, and lab-wide resource management. So your lab can improve efficiency, optimize operations, increase instrument uptime, develop user skill, and more.



Learn more:

[www.agilent.com/chem/cary-60-uv-vis](http://www.agilent.com/chem/cary-60-uv-vis)

Buy online:

[www.agilent.com/chem/store](http://www.agilent.com/chem/store)

Get answers to your technical questions and access resources in the Agilent Community:

[community.agilent.com](http://community.agilent.com)

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Further information:

[Cary 60 UV-Vis spectrophotometer](#)

[Cary WinUV software](#)

[Cary 60 UV-Vis Spectrophotometer – The Power of Xenon](#)

[Xenon Flash Lamps for UV-Vis & Fluorescence](#)

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