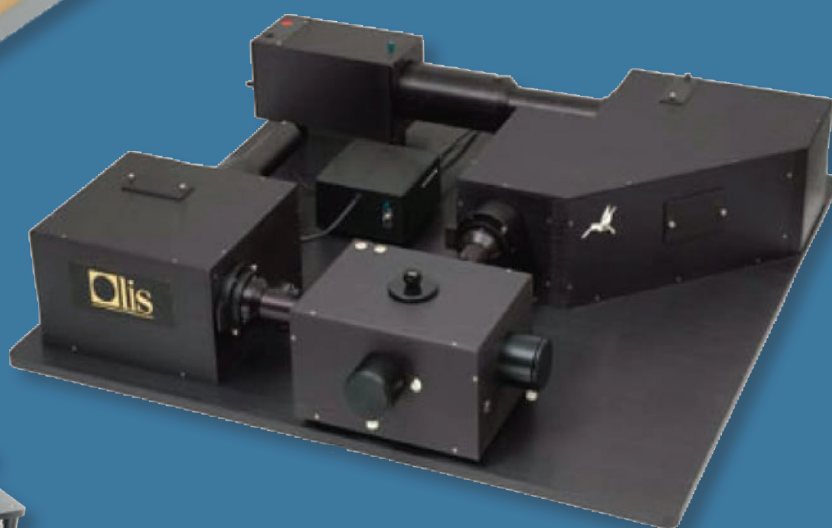
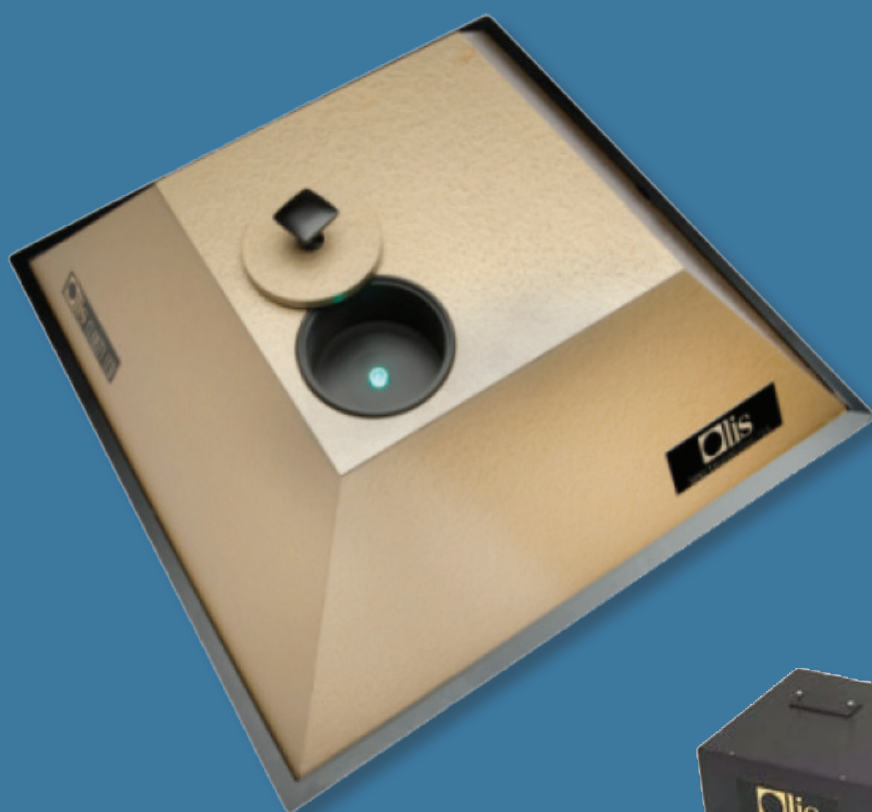


**MODULAR SPECTROPHOTOMETERS
FOR RESEARCH AND ADVANCED
TEACHING LABORATORIES**

olis[®]

**Product Catalog
2016**



Modular

Nearly every model is built from hand-crafted and hand-assembled modules; we don't do the plastic-form-housing-with-everything-hidden-inside. The result is precise production of exactly what you need and quality which last decades.

Spectrophotometers

Our products are UV, UV/Vis, Vis, and UV/Vis/NIR absorbance, fluorescence, polarization of fluorescence, circular dichroism, and circularly polarized luminescence spectrophotometers, usually the best in class among other commercially available products.

for

Research

Not QA/QC, but real research questions to be asked and answered

and

Advanced Teaching

Smart students deserve smart equipment.

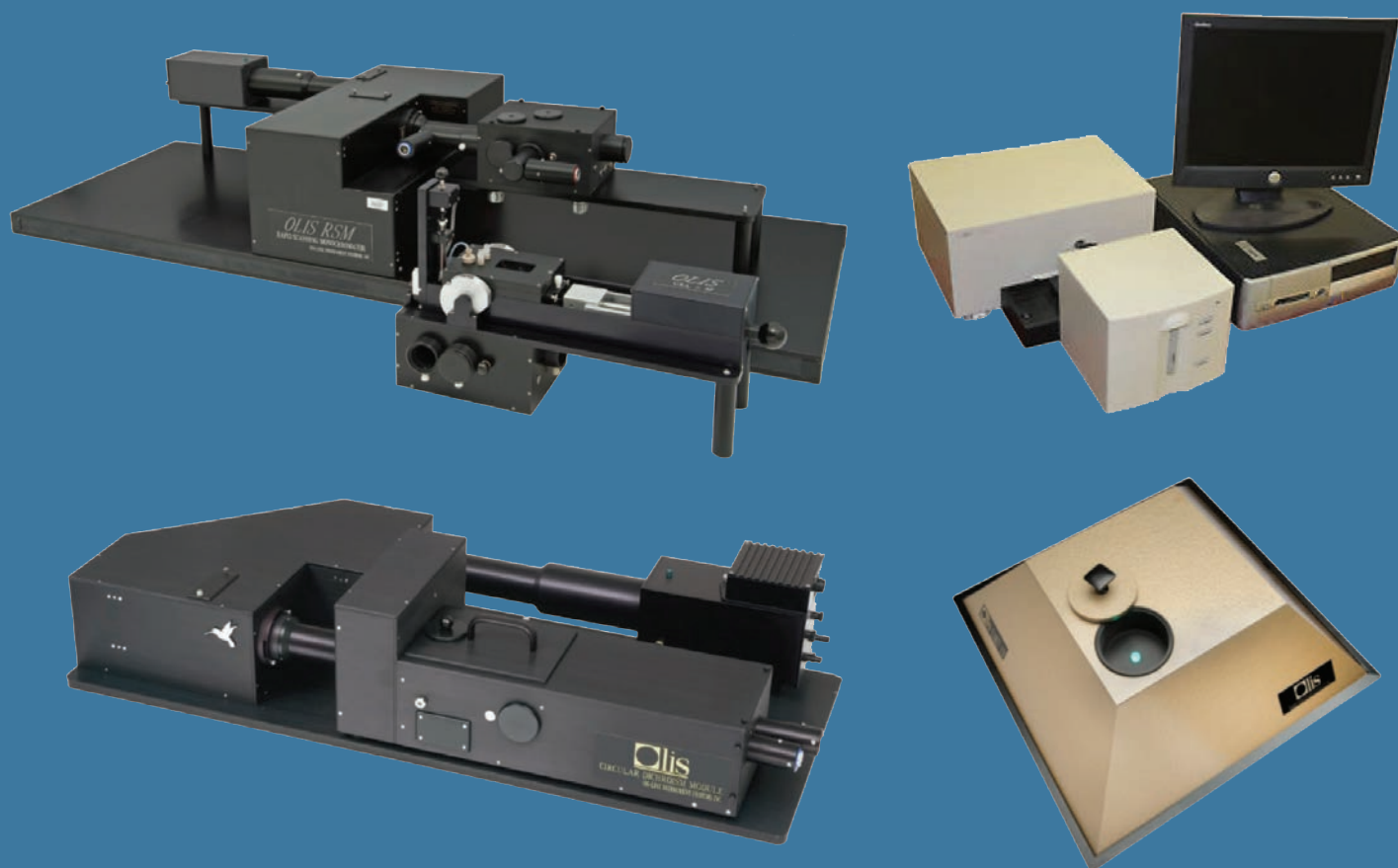
Laboratories

Circa 2016, all products are for bench top use.

Upcycling Spectrophotometers. Achieving CLARiTY.



From upcycling solid-state HP 8452/3 UV/Vis spectrometers to achieving the extraordinary CLARiTY series, we offer enduring products which save resources while advancing good science for the benefit of mankind.



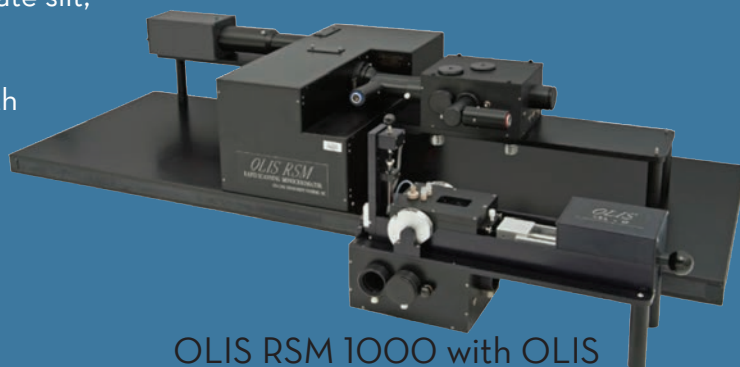
“Green” decades before sustainability was discussed, we improve what exists and create all-new only when it brings real benefit. In 1992, we designed a monochromator capable of millisecond spectral scanning, supporting kinetic studies on photoliable samples. In the late ‘90s, we introduced CD spectrophotometers with digital (permanent) calibration. In 2010, we introduced a new line of UV/Vis spectrophotometers which use integrating cavities instead of 1 cm² cuvettes, expanding the use of UV/Vis spectroscopy to include light scattering samples as well as clear solutions.

And, yes, optical excellence is a given when you are looking at products in this category. We work only with the best in class.

ABSORBANCE MODELS

OLIS RSM 1000 UV/Vis Rapid-scanning Spectrophotometer

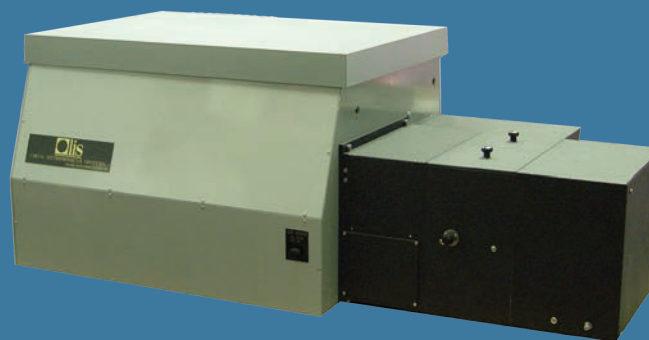
- Introduced and patented in 1994, our unique subtractive double grating monochromator with moving intermediate slit, known as, the RSM (Rapid-Scanning Monochromator)
- 1000 scans per second over 75, 230, or 450 nm breadth
- Photomultiplier tube detection for UV and Vis
- Optional InGaAs for NIR
- Standard spectral range nominally 200-800 nm, NIR extendible
- Rapidly varying monochromatic light makes this spectrophotometer perfect for kinetics on photoliable systems
- Standard is 500 nm blaze with 600 lines/mm



OLIS RSM 1000 with OLIS stopped-flow chamber in foreground

OLIS 17 UV/Vis NIR Dual Beam Spectrophotometer

- Upcycled Cary 14 or 17 prism/grating optical bench, yours or ours
- Older than most of us; better than nearly everything produced since
- Photometric accuracy, ± 0.0005 AU
- Stray light $\leq 0.001\%$
- Angstrom λ resolution, with computerized slit width adjustment
- Spectral range when configured as a CLARITY 17: 240-800 nm
- Units we upcycled in the 1980s, 1990s, and 2000s continue to be used. It's hard to imagine a more optically superb, functionally robust UV/Vis/NIR spectrometry system than the OLIS upcycled Cary 14/17



OLIS 17 UV/Vis NIR

ABSORBANCE MODELS

OLIS Upcycled Aminco DW-2/000 UV/Vis Spectrophotometer

Aminco DW-2/000



- Historic Gold Standard for Turbid Sample Studies, circa 1970s to today
- Upcycled Aminco DW-2 or DW-2000 from your laboratory or our storeroom
- Suitable for P450, mitochondria, plant and tissue suspensions, and other scattering samples
- Large face detector positioned centimeters from sample
- Measures two wavelengths simultaneously. The answer is a difference spectrum: scatter and chemistry – scatter

OLIS Upcycled HP 8452 UV/Vis Diode Array

HP 8452



- Solid-state, Rock Solid, now free of ChemStation!
- HP 8452 from your laboratory or our storeroom
- Utilizes the GPIB to USB connection
- Comprehensive data handling with OLIS GlobalWorks
- Single beam
- Deuterium lamp
- 2 nm resolution ; 190-820 nm
- 10 scans/sec over a span of up to 70 nm

OLIS Upcycled HP 8453 UV/Vis Diode Array



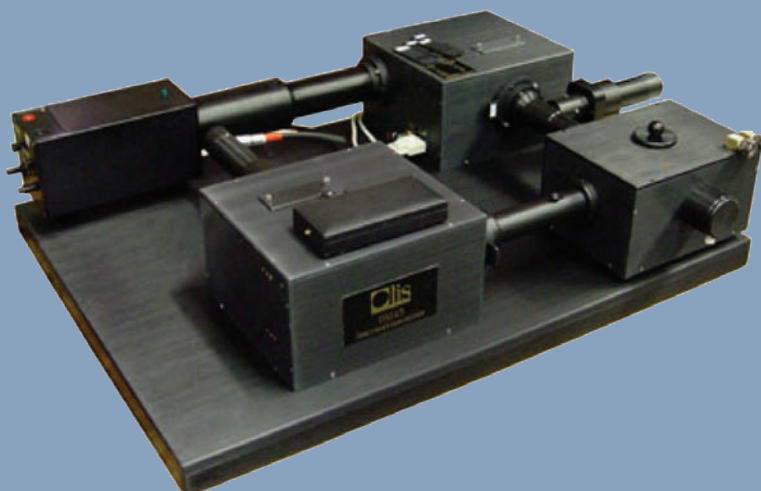
HP 8453

- Solid-state, Rock Solid, now free of ChemStation!
- Utilizes the LAN connection
- Comprehensive data handling with OlisWorks
- Single beam
- Deuterium & Tungsten lamps
- 1 nm resolution; 190 – 1100 nm
- 10 scans per second over a span up to 100 nm

FLUORESCENCE MODELS

OLIS DM 45 Spectrofluorimeter

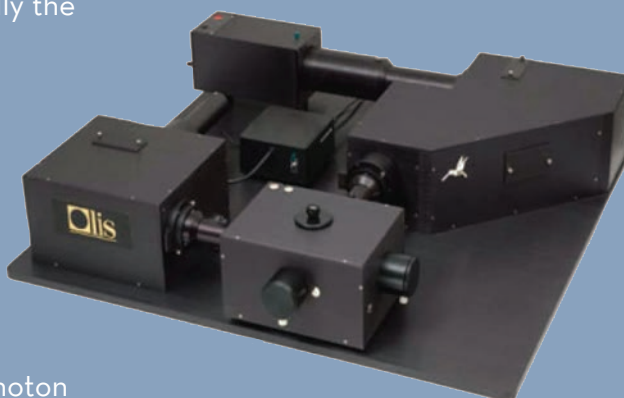
- Compact, Modular, Best Sensitivity
- “DM 45” defines “dual monochromator” system with 45 mm² gratings
- Two single grating OLIS monochromators for highest throughput
- 75 watt steady-state Xenon arc lamp
- Exquisitely sensitive Hamamatsu photon counting detector (230 – 870 nm)
- Perfect teaching tool with research performance
- Add the Polarization Toolbox to create a fluorimeter of tremendous pedagogical and research potential; see page 13



OLIS DM 45

OLIS DM 245 Spectrofluorimeter

- “DM 245” defines “dual monochromator” system with 45 mm² gratings, with one as a double monochromator (usually the excitation)
- Features the OLIS Hummingbird double grating monochromator for excitation and a single grating OLIS monochromator for emission scanning
- Very low stray light
- Steady-state 150 watt Xenon arc lamp
- Choose between exquisitely sensitive Hamamatsu photon counting detector (230 – 870 nm) for sensitivity, or analog photomultiplier tube for speed required for following fast kinetic events
- Excellent for high resolution absorbance reading
- Upgradeable to support CD
- Upgradeable to CLARITY 620 and OLIS DSM 20 CD



OLIS DM 245

FLUORESCENCE MODELS

OLIS Upcycled SLM 8000 Spectrofluorimeter

- The Best of the 1980-90's, Made Modern
- Upcycled SLM, typically from your lab
- Optically identical to the original, now with OLIS electronics and computerization
- Compares competitively with performance of today's very best spectrofluorimeters for microsecond and slower acquisition rate measurements
- Existing accessories can be maintained; OLIS accessories including temperature control, stopped-flow, and titration can be added

SLM 8000



OLIS 14 UV/Vis/NIR Fluorimeter

- Ideal for NIR Fluorescence of Nanoparticles, Quantum Dots, & Semiconductors
- Excitation 185-2600 nm with fully adjustable computer controlled slits 0.1 nm to 20 nm from upcycled Cary 14 prism+grating monochromator
- Two easily exchanged emission modules, each with its own monochromator and detector for 230-870 nm and 700-1650 nm
- Also supports all functions of the absorbance model OLIS 17 UV/Vis/NIR



CIRCULAR DICHROISM MODELS

OLIS MultiScan, aka, “Protein Machine”

- An Amazing Combination Measurement Spectrophotometer
- Simultaneous CD, fluorescence emission and excitation spectra, light scatter, second derivative spectra, and absorbance data
- One software package
- Minimum collection time for superb results as a function of absorbance, fluorescence, and circular dichroism
- Minimal sample used for simultaneous measurements
- High throughput means of capturing data on samples undergoing thermal denaturation
- Automatic “Data Tree” data storage organizes all data into manageable folders for easy analysis



OLIS “Protein Machine”

OLIS DSM 1000 CD Spectrophotometer

- Our Premier dual beam CD
- Built around the OLIS RSM 1000, now operating in conventional scanning model; rapid-scanning can be restored for absorbance applications
- Spectral range from deep UV to NIR; default 170-540nm
- Reconfigurable to OLIS RSM 1000 for stopped-flow and CLARiTY 1000 for suspension studies. These absorbance measurements can be made at rates to 1,000 scans/sec
- Permanent calibration established in factory installed software
- No lock-in amplifier, thus no user settings for amplitude, time constants, or sensitivity
- True dual beam detection
- Maximum modularity



What is DSM?

DSM = Direct Subtractive Method, which is CD by definition [CD = $\text{abs(L)} - \text{abs(R)}$]



OLIS DSM 1000 CD

CIRCULAR DICHROISM MODELS

OLIS DSM 20 CD



OLIS DSM 20 CD Spectrophotometer

- The American made CD for protein secondary structure determination work
- Built around the OLIS Hummingbird subtractive double grating monochromator
- Permanent calibration established in factory installed software
- No lock-in amplifier, thus no user settings for amplitude, time constant, or sensitivity
- Smallest CD available
- Brilliant light throughput, 170 - 700 nm
- Reconfigurable to CLARITY 620 and OLIS DSM 20 CD

OLIS DSM 17 CD



OLIS DSM 17 CD Spectrophotometer

- Built around classic Cary prism-grating monochromator
- Choose two PMTs for 185 - 800 nm or one PMT and one InGaAs for 185 - 1700 nm
- Permanent calibration established in factory installed software
- No lock-in amplifier, thus no user settings for amplitude, time constant, or sensitivity

OLIS DSM 172 CD Spectrophotometer



OLIS DSM 172 CD

- Supporting CPL and Polarization of Fluorescence, as well as CD and absorbance
- Optically identical to OLIS DSM 17 CD except single beam detection
- Sample compartment is now Polarization Toolbox and scanning emission monochromator and detector support Circularly Polarized Luminescence (CPL), Polarization of Fluorescence, and Anisotropy
- Permanent, digital calibration established at factory
- No lock-in amplifier, thus no user settings for amplitude, time constants, or sensitivity

CLARiTY MODELS

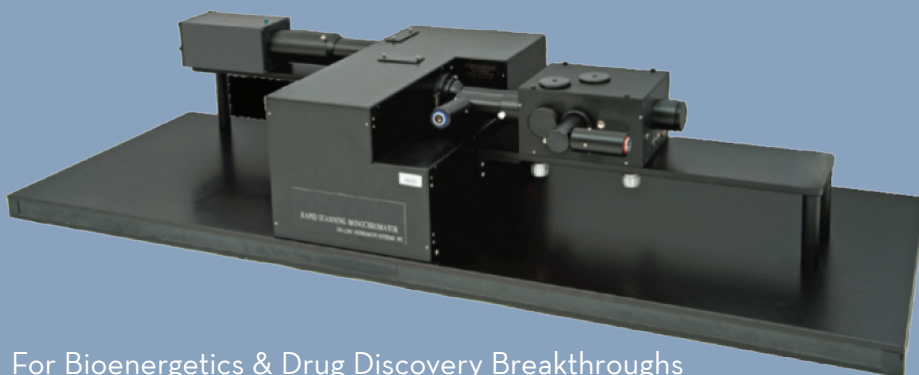
Why CLARiTY?

Because these models see absorbance even in light scattering samples.

Distinguishing characteristics of all CLARiTY models:

- Unlike 1 cm² based spectrophotometers, CLARiTY instruments use an integrating cavity as the sample holder.
- This integrating cavity is suffused with a fully diffuse gas of photons, which is the measurement light.
- This measurement light touches every molecule within the chamber; the entire sample is used in the measurement.
- The sample can be a solution (e.g. purified protein) or a suspension (e.g., proteins bound within living cells), or even a small solid (e.g., a grape or nanoparticles coated quartz shard).
- The effective pathlength is 0.125 mm to 30 cm, based on the integrating cavity chosen. The very short pathlength supports absorbance readings to 22 AU. The long pathlength is used for dilute samples, to 0.001 AU/cm.
- Raw data are pathlength corrected using a method developed by Javorfi, et al, and expanded by DeSa to include all wavelengths.

OLIS CLARiTY 1000



- For Bioenergetics & Drug Discovery Breakthroughs
- 100 scans/second to a single scan per second and slower
- 240 - 800 nm
- Fixed slit widths during scan
- True sample and reference (dual beam) acquisition by two photomultiplier tubes
- Reconfigurable to OLIS RSM 1000 stopped-flow and OLIS DSM 1000 CD
- Footprint: 60" x 20" x 14"

OLIS CLARiTY 620



CLARiTY 620

- Like the model 1000, but much smaller and no rapid-scanning
- Reconfigurable to the OLIS DSM 20 CD
- Footprint: 30" x 30" x 20"

CLARiTY MODELS



CLARiTY 17

OLIS CLARiTY 17

- The one CLARiTY produced from an upcycled Cary and thus open to NIR use, too.

OLIS CLARiTY VF and VF UV

- Tiny, Simple, Fabulous
- Spectral Range 240 – 850 nm or 240 – 600 nm
- Fixed wavelength readings at rates to 100 Hz; scan rates to approximately 20 nm/sec
- Single beam detection
- Tungsten and deuterium lamp for UV/Vis 240-800 nm and a pair of deuterium for UV only, 240-600 nm
- Addition of LED actinic sources creates the CLARiTY Pump-Probe for microsecond and slower photolysis work
- Footprint 16" x 10" x 6"



OLIS CLARiTY VF UV

OLIS CLARiTY CCD

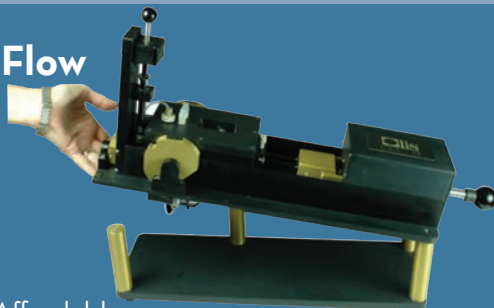
- Out Performs Every Diode Array Spectrometer
- Ultra low stray light single monochromator with 75 mm focal length
- Backlit CCD with 2048 pixels
- Pulsed Xenon source with integrated shutter
- Wavelength range is 240 nm – 760 nm with 2 nm resolution
- Single beam detection
- 1-10 spectra/sec
- Footprint 21" x 21" x 6"



OLIS CLARiTY CCD

OLIS ACCESSORIES

OLIS Stopped-Flow



- Useful, Simple, and Affordable
- Safety Interlock System is a series of sensors at the valves, pistons, and pneumatic drive which provides 100% guarantee against mis-firing and thus damage to the stopped-flow and loss of reagents
- Low volume per shot; adjustable
- Millisecond deadtime
- Easily added to and removed from any OLIS spectrophotometer
- Optional OLIS Tonometer Adaptor to introduce degassed solvents
- Optional OLIS Auxiliary Mixer to prepare reactive A + B solutions, creating 4 syringe configuration

Choose among four observation windows:

Absorbance optimized: 20 mm path-length (2 mm for optional fluorescence)

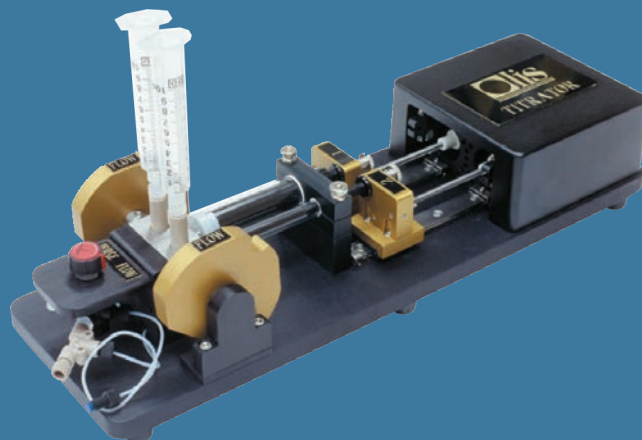
Low temperature, < -10 deg C: 10 mm pathlength (absorbance ONLY)

Fluorescence optimized: 4 mm (4 mm for optional absorbance)

Circular dichroism: 2 mm pathlength

OLIS Titrator

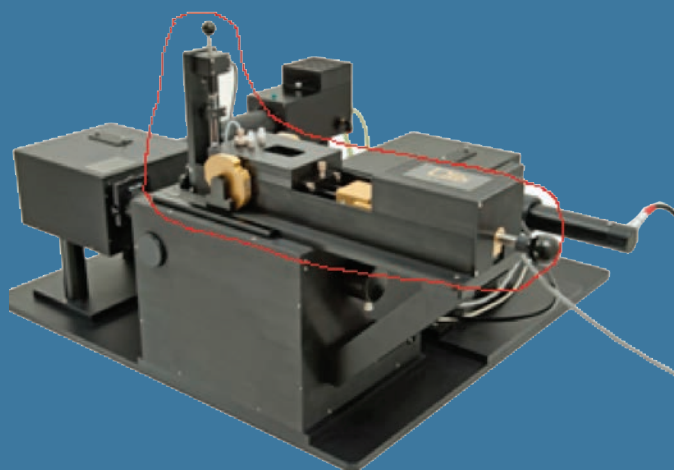
- Compatible for use with all pathlength cuvettes.
- Uses computerized infusion and withdrawal cycles from the syringes to the measuring cell.
- Sudsing issues are minimal
- Photolysis is minimum
- Mixing is complete
- Cuvette determines the volume used
- No overflow issues
- Can be added to any OLIS spectrophotometer



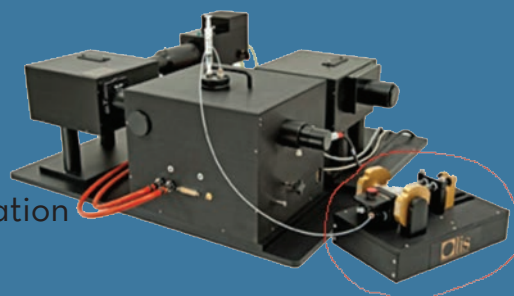
OLIS ACCESSORIES

OLIS Polarization Toolbox

- A Complete Course in Polarization Measurements
- Creates the extreme utility of the OLIS DSM 172, supporting absorbance, fluorescence, polarization of fluorescence, circular dichroism, and circularly polarized luminescence
- When added to an OLIS fluorimeter, supports polarization of fluorescence, anisotropy, and circularly polarized luminescence (CPL)
- When added to an OLIS absorbance spectrophotometer, supports absorbance, CD, LD and ORD
- Polarizers and PEM (or LCVR) can be positioned before or after sample or entirely out of the measurement field without use of tools or concerns about alignment, positioning, or calibration
- A single detector is used
- No polarizers are moved during the measurement
- No G-factor correction is required for anisotropy or polarization measurements
- Includes either 50 kHz photoelastic modulator or 5 Hz liquid crystal variable retarder for alternating (modulating) the states of polarization left-right or parallel-perpendicular
- Rapid switching (50 kHz) between polarization states allows the L-format configuration to be used for millisecond application such as stopped flow
- Perfect modern research tool for pedagogical environment



OLIS DM 45 with Polarization Toolbox and Stopped-Flow

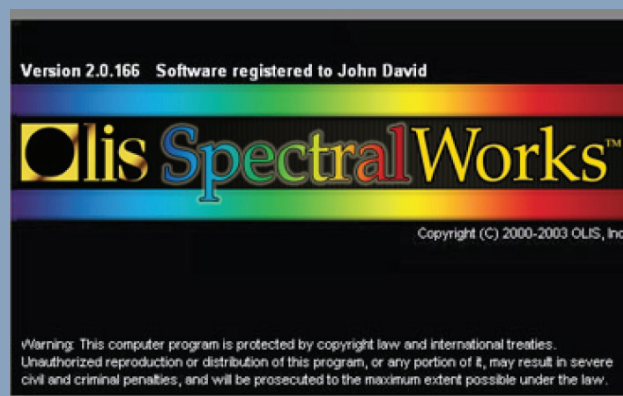


OLIS DM 45 with Polarization Toolbox and Titrator

SOFTWARE

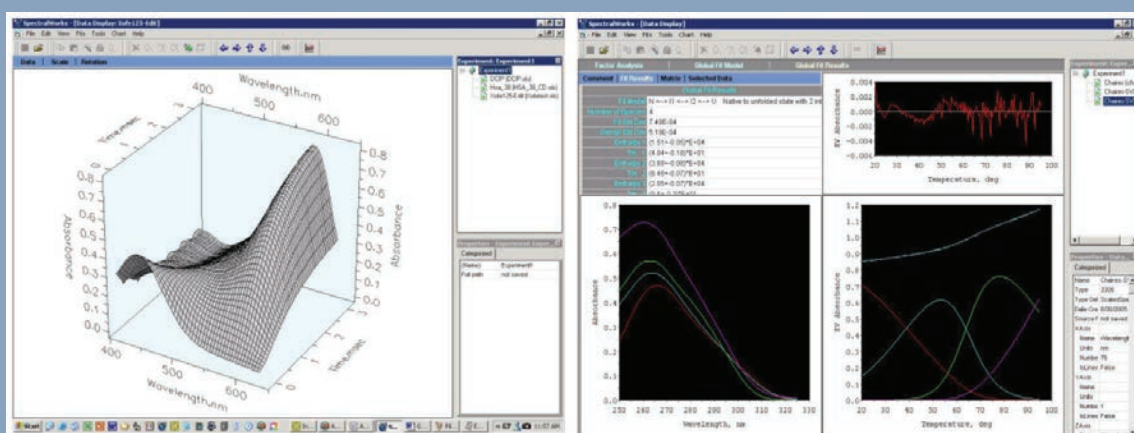
OLIS SpectralWorks

- Olis SpectralWorks is a comprehensive program for the dynamic display and analysis of 2D and 3D data files collected as a function of time, temperature, titration, pressure, concentration, or other variables.



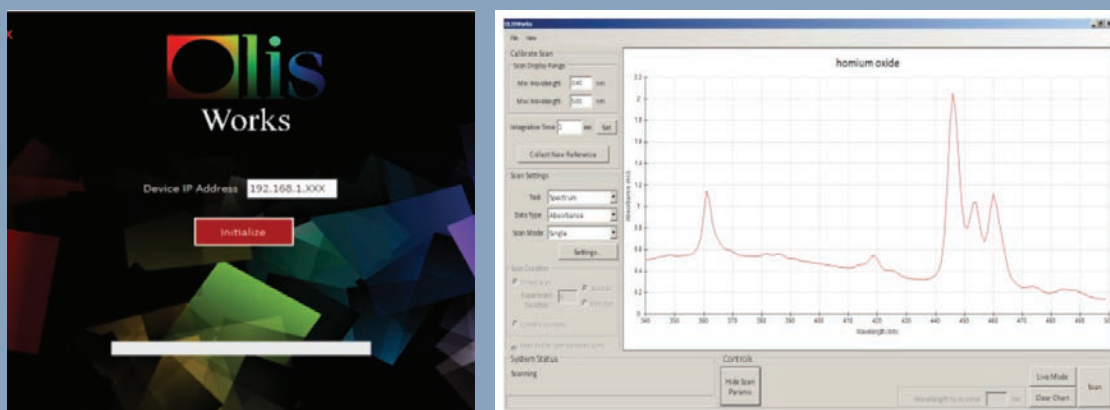
OLIS GlobalWorks

- Olis GlobalWorks included with SpectralWorks and used for data analysis. Global analysis of kinetic and equilibrium data produces better results. Often, global analysis makes the difference between correct and incorrect conclusions.



OLISWorks for HP 8453

- OLISWorks is a data acquisition and instrument control software package developed for use with the HP 8453 diode array spectrophotometers. Windows® 7/10 Compatible.





In 1974, Richard DeSa and two colleagues got the idea for On-Line Instrument Systems after receiving requests for “the computerization you described in your publication¹.”

The company name reflected the goal of putting laboratory instruments on-line with computers. In 1976, the company received their first purchase order, which came from James Fee at the University of Michigan. In 1980, DeSa walked away from his tenured faculty position at the University of Georgia’s biochemistry department.

All sales during the first two decades were such ‘upcycling’ of spectrophotometers which were too good to discard but too old to use elegantly.

By 1992, increasingly dissatisfied with the hardware others were producing, Dick DeSa started designing hardware, too. The first device was his stopped-flow mixing systems (page 11). In 1994, he patented his still unique “subtractive double grating monochromator with moving intermediate slit²,” aka, the OLIS RSM 1000 (page 3).

Every product in this catalog was first designed for one particular scientist. Some configurations have been reproduced rarely; other products are quite popular.

You’ll notice that the majority of spectrophotometers can be dual-purposed as a CLARiTY, named for their success in seeing absorbance clearly in the presence of turbidity.

After decades of saving hundreds of premier optical benches from disuse and landfills, we are now helping scientists save untold resources in minimizing sample preparation through the use of these integrating cavity³ spectrophotometers (pages 9-10).

CLARiTY models are unique to OLIS. Owning one will add vast blue oceans of new experimental opportunities and endless resource savings to you.

You can support Thermo, PE, Agilent, and other mega-corporations and get a reasonable, disposable product. Or, you can choose to purchase your next spectrophotometer from **our smart, progressive, and enduring small American business and enjoy advantages in optical excellence, electronic reliability, and endless upgradability.**

¹ A Practical Automatic Data Acquisition System for Stopped-Flow Spectrophotometry, Computers and Biomedical Research Volume 2, Issue 5, October 1969, Pages 494-505

² US Patent 5,285,254, issued Feb 8, 1994

³ Publications which focused Dr. DeSa’s efforts included **Integrating Cavity Spectroscopy** Elterman, P., *Applied Optics*, 9 (9), 2140 (1970): “This method has the virtue of being independent of the scattering within the material sample, the reflectivity of the material surface, and the geometry of the sample.”



Be among the people who can say,
"I love the instrument, I love the people"

**For more details about OLIS products, to request a
price list, or request a specific brochure:**

www.olisweb.com

sales@olisweb.com

1-706-353-6547 (Worldwide)

1-800-852-3504 (US & Canada)