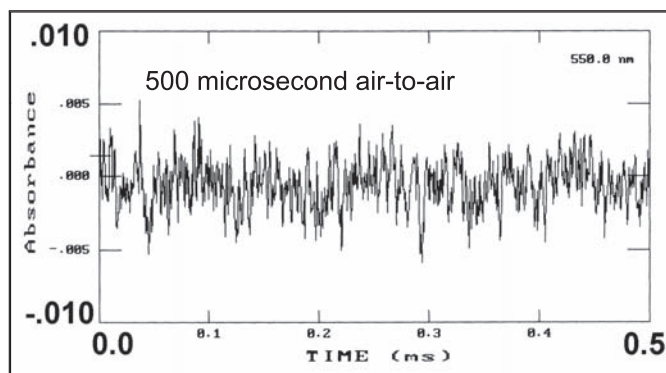


DeSa Rapid-Scanning Monochromators create Olis RSM 1000 Spectrophotometers of unparalleled speed, versatility, and performance.

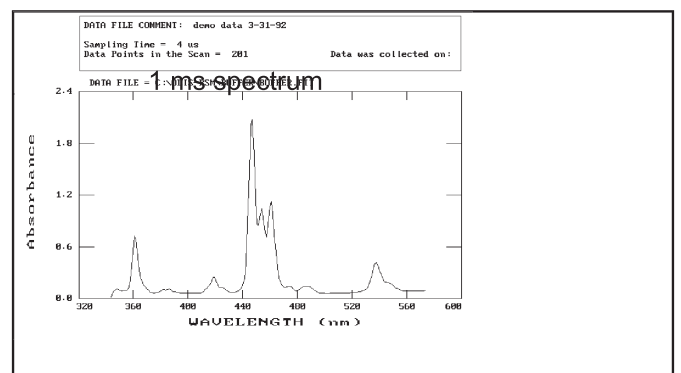
Everything else is just a diode array.

Olis RSM 1000 systems are available for UV, Vis, NIR, emission, and CD. Acquisition rates to 1000 pts/ms

Milliabsorbance readings in microseconds. Noise in the fourth and fifth decimal place is achievable with milliseconds to seconds of signal averaging.

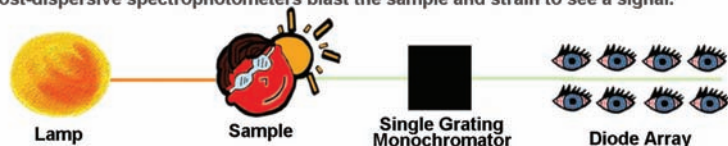


Milliabsorbance readings in milliseconds. Here, a one millisecond scan of a holmium oxide filter.



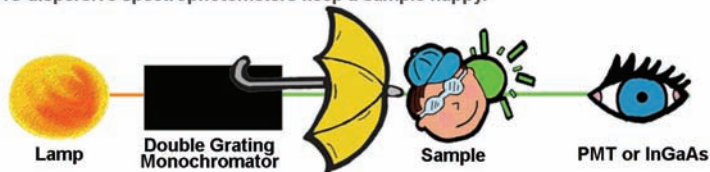
Diode Array (them)

Post-dispersive spectrophotometers blast the sample and strain to see a signal.



Scanning Spectrophotometer (us)

Pre-dispersive spectrophotometers keep a sample happy.



Monochromatic Illumination

Gentle monochromatic light is used for all measurements, so that photolabile samples can be studied safely and successfully. Sample is measured only with the appropriate wavelengths. Broadband light and stray light—inherent in diode array systems—are never a concern.

Most Popular Gratings for the Olis® RSM (DeSa Mono)

| Blaze Wavelength | Ruling density lines/mm | Linear Dispersion (nm/mm) | Resolution ¹ (0.2 mm slit) nm | Wavelength Span nm | Wavelength Range ² nm | |
|------------------|-------------------------|---------------------------|--|--------------------|----------------------------------|-------------|
| 230 | 2400 | 1.54 | 0.3 | 38 | 150-350 | CD |
| 300 | 600 | 6.15 | 1.2 | 154 | 200-450 | Ultraviolet |
| 500 | 400 | 9.22 | 1.8 | 231 | 330-750 | Visible |
| 500 | 1200 | 3.07 | 0.6 | 77 | 330-750 | Visible |
| 1000 | 600 | 6.15 | 1.2 | 154 | 670-1800 | NIR |

Special Application Gratings

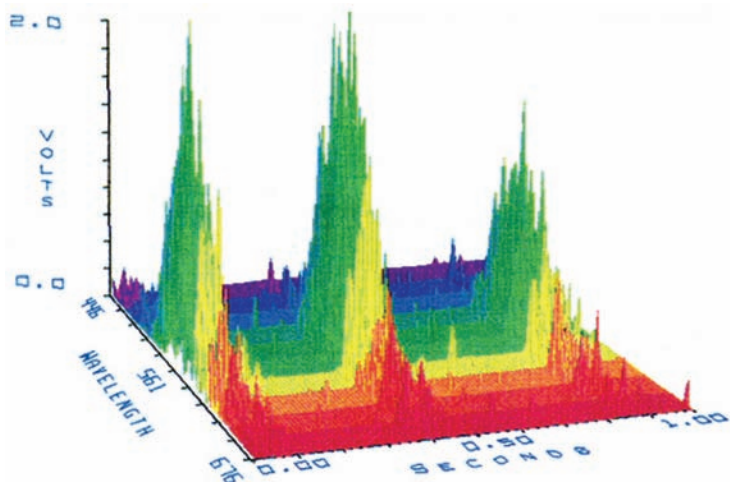
| | | | | | |
|-----|------|------|-----|------|---------|
| 405 | 3600 | 1.03 | 0.2 | 25.7 | 270-610 |
| 500 | 150 | 24.6 | 4.9 | 616 | 330-750 |

¹ Resolution values based on nominal intermediate slit width of 0.2 mm.

² Wavelength range based on a 2/3 blaze to 3/2 blaze.

Exchangeable Gratings for exactly the right optical parameters

Large 50 x 50 mm gratings can be replaced easily, so that one DeSa monochromator can be a high resolution UV system for one experiment and a broad resolution NIR system for another. Any pair can be chosen as 'default' with the 500 nm blaze, 400 lines/mm a common choice.

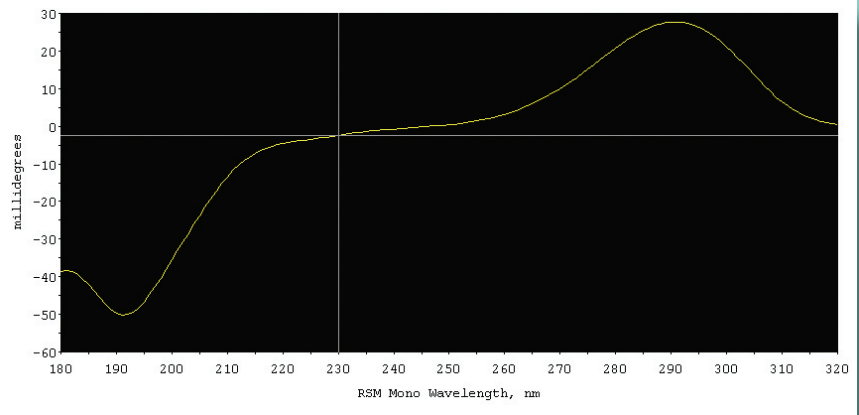


Fluorescence Emission Readings

Run the light through the DeSa monochromator in either direction, so as to use it as a scanning producer of light or a scanning detector of light. And, with two DeSa monochromators, achieve 1,000 emission scans per second at up to 250 excitation wavelengths! (Try that with a diode array!)

Utility into the deep UV

With UV optics and deep UV detectors, a DeSa monochromator is optimized to scan as low as 167 nm. Rapid-scanning in the shortest wavelengths is rarely practical. Instead, the 'microsecond/ point' mode is used in conjunction with slow scanning to obtain spectra, such as shown at right. Collection time, 2.53 minutes.



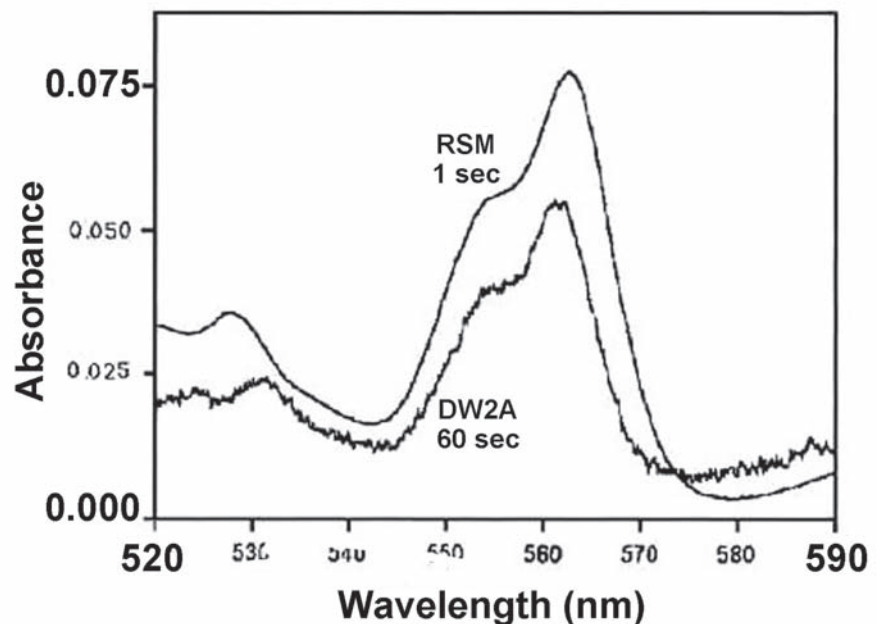
Utility into the NIR

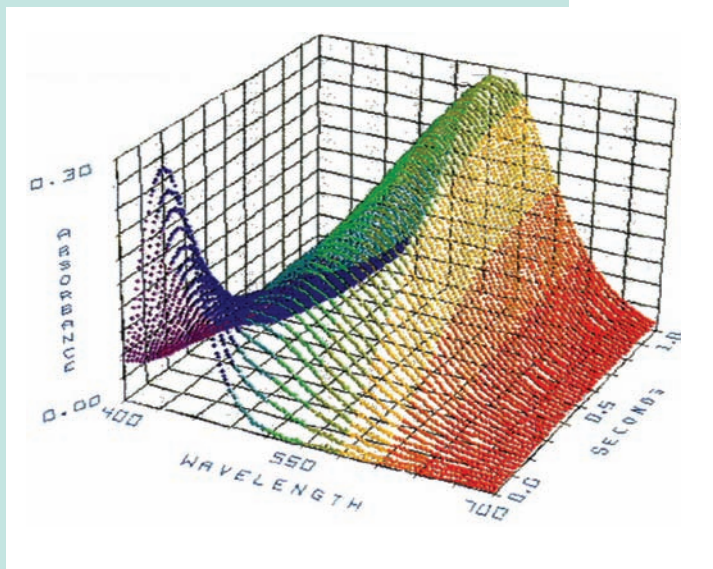
Economical and easily added gratings and InGaAs detectors expand the utility of the Olis RSM to 2600 nm, making the Olis RSM 1000 the only NIR spectrophotometer in the world capable of millisecond spectral scan rates.



Correct Absorbance Readings on Turbid Samples

Collect accurate absorbance readings on cytochromes, mitochondria, tissue suspensions, and other scattering samples. (Dual wavelength is a subset of hundreds of wavelengths.)



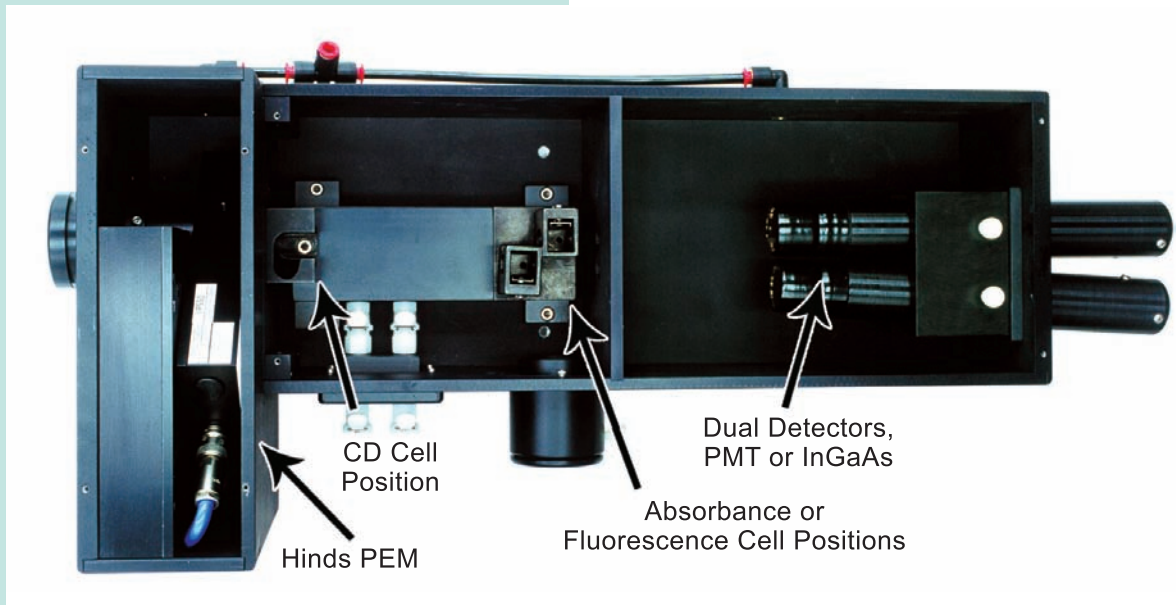


All these data in one measurement

These spectra were acquired from a single stopped-flow shot. A total of 1,000 scans per 1.0 second are acquired over hundreds of wavelengths. Reactions longer than 10 seconds are followed using signal averaging of the millisecond scans to result in 60, 30, 10, 2 or 1 scan per second.

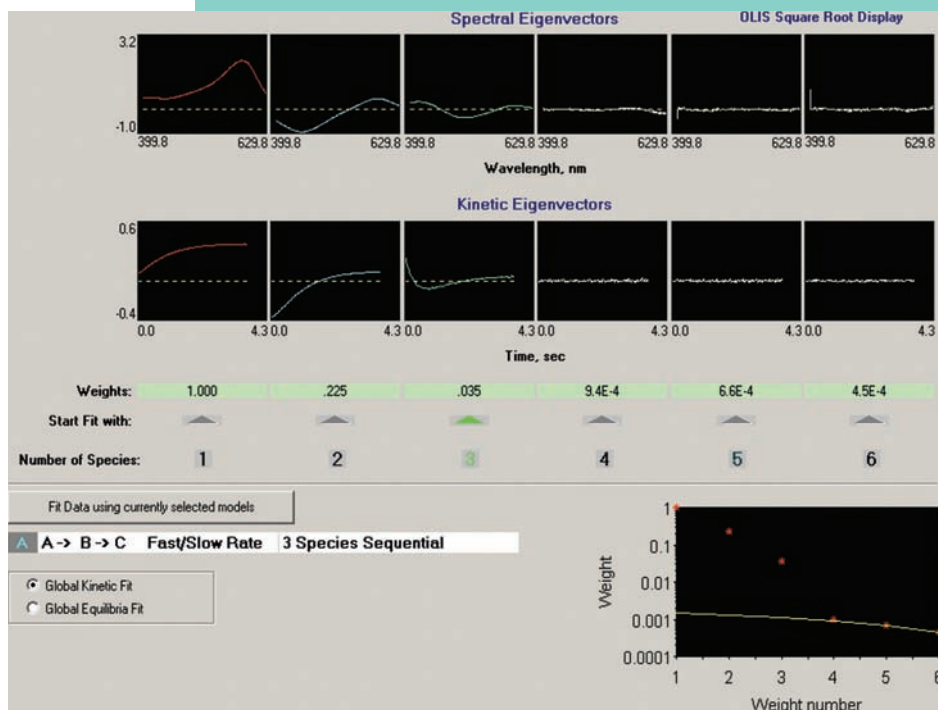
Digital Circular Dichroism Spectroscopy

This sample compartment is used to produce the Olis DSM 1000 CD models. This self-contained "CD Module," shown without its lid, holds the electronics, cuvette holders, and detectors required for digital dual beam CD data acquisition. If desired, remove the default trio of cuvettes and replace them with a magnet, a CD stopped-flow, a multiple-position Peltier holder, cryogenic flask or other sample holder.



Modern Algorithms for Correct Conclusions, Fast

Analyze kinetic and spectral results, graphically and numerically. Work with data files of any size up to 4000 scans of 500 points per scan. Time start to finish: 1-2 seconds. Starting values needed: usually 0. Equations available: 59 chemical models for 3D data; 24 for 2D.



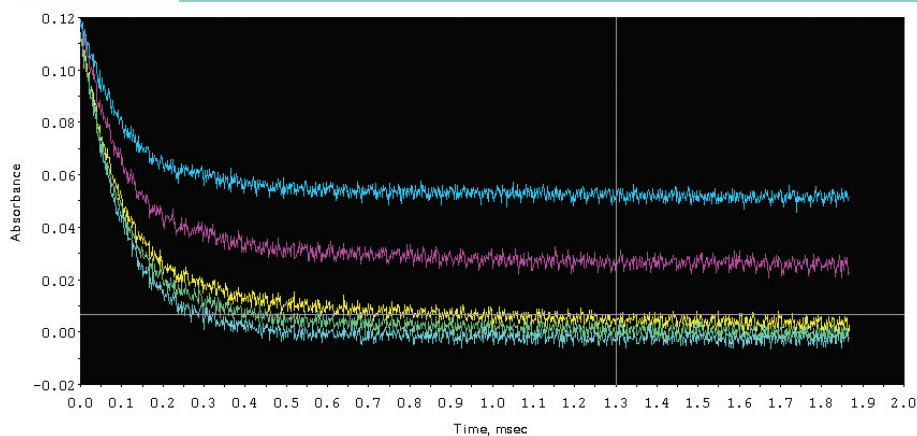
Results of SVD clearly indicate 3 species

“One of the reviewers said there is no way that you can do optical stopped-flow studies with a B12 compound, yet there it is, because unlike a diode array, you are not blasting the hell out of the sample with white light in the RSM.”

— George Reed of University of Wisconsin after obtaining beautiful data on a photoliable B12 compound (data accepted and published in Biochemistry, 2000)

Automatic Collection and Averaging

Fire external photolysis sources (lasers, LED, pulse lamps, other) with the OLIS software repetitively as a function of time or wavelength; the software will treat the ensemble of records as a family for averaging or other processing. Here, traces were acquired at 5 different wavelengths, each collected in 2 milliseconds.



Components of a Dual Purpose RSM 1000

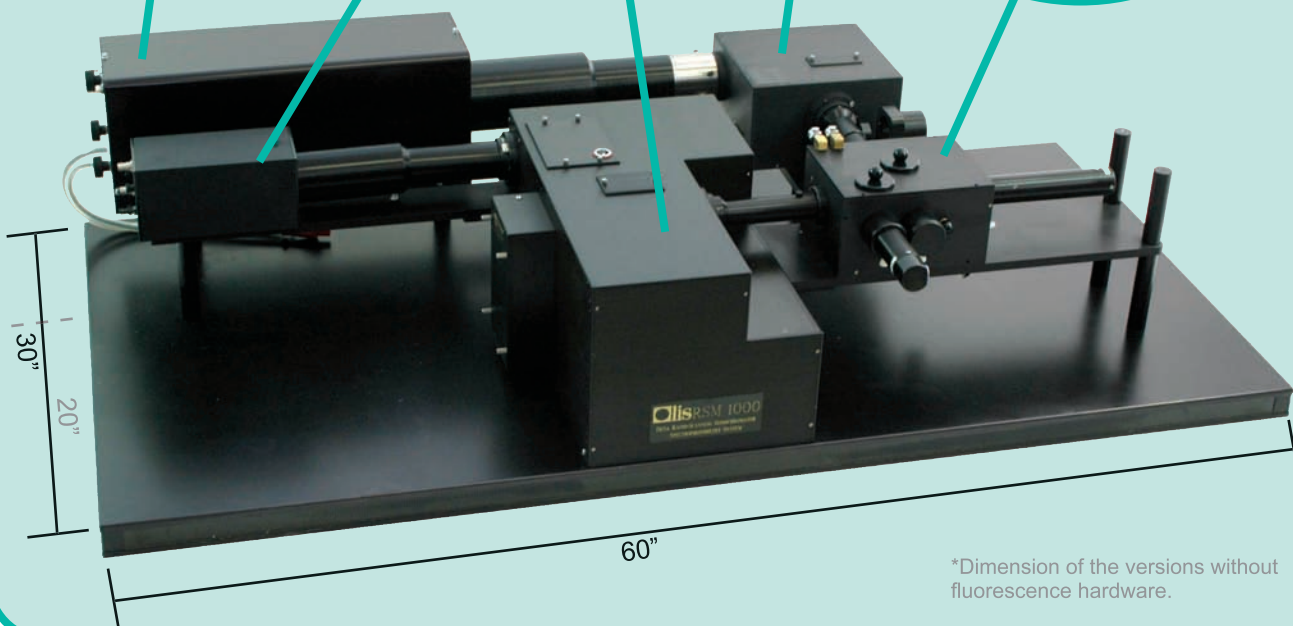
DeSa F/4.4 subtractive double grating monochromator with moving (or fixed) intermediate slit.
(US Patent 5,285,254)
Can be used as a single grating monochromator, too. Choose gratings and slit widths for one or many experimental cases.

Double or (shown) single grating excitation monochromator

Fluorescence Lamp: 150 or (shown) 450 watt xenon arc

Absorbance Lamp: 75 (abs) or 150 watt (CD) xenon arc

Sample compartment containing two 1 cm² cuvette holders (shown), or CD module (see page 4), or stopped-flow, or nearly any other sample holder for steady-state or variable sample condition studies.



*Dimension of the versions without fluorescence hardware.

All Olis RSM 1000 configurations feature exceedingly low stray light, high photometric accuracy, photometric precision, and other superb optical characteristics.

Millisecond scanning is not done by moving the gratings, as it done with traditional scanning instruments. Instead, to achieve 230,000 nm per second, the Olis RSM 1000 utilizes a moving intermediate slit wheel. This simple 'spinning intermediate slit disk' technology was awarded a US Patent and an R&D 100 award in 1994.

The RSM utilizes photomultiplier tubes (PMTs) for the UV/Visible range and InGaAs detectors in the NIR. PMTs are the most sensitive and fast detectors available and are usable over wide wavelength ranges and over wide dynamic ranges.

The Olis RSM 1000 does not include a diode array detector or CCD.

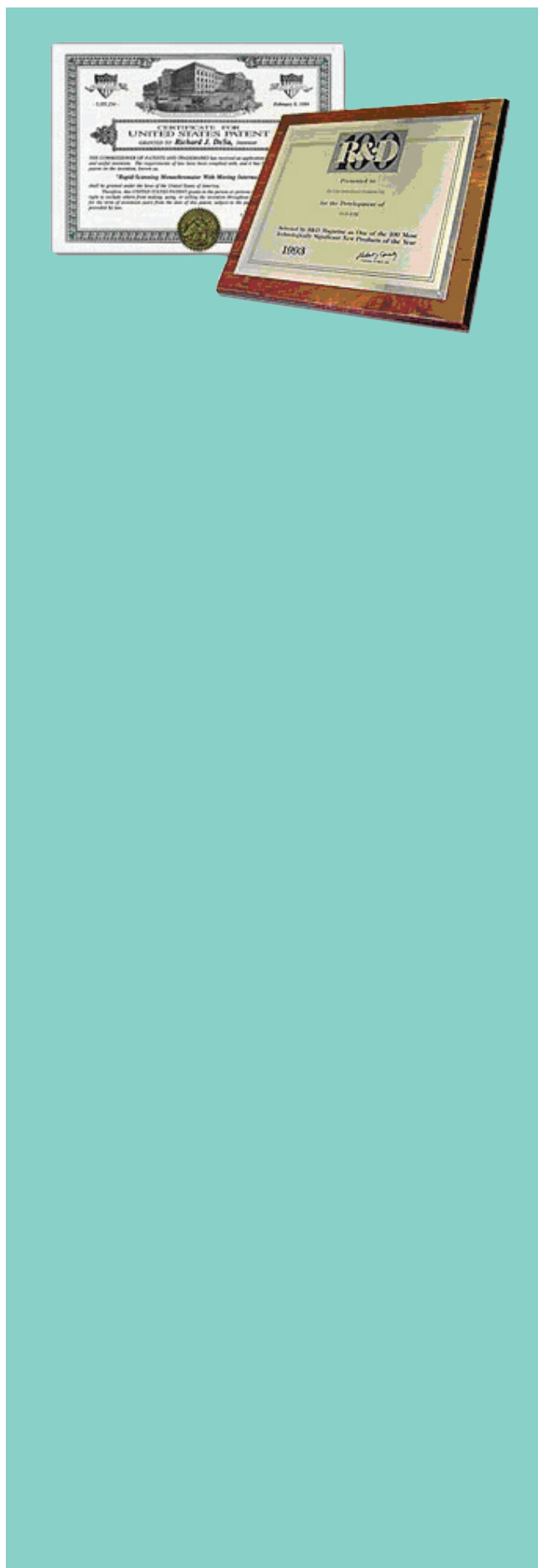
The rapid-scanning monochromator is a double grating system for stray light rejection (< 0.0001%) and true spectra acquisition (not difference spectra). As a subtractive double grating design, it provides a homogeneous output beam. And, the ScanDisk is designed to produce a dark reading after every scan.

The Olis RSM is designed for maximum flexibility and modularity; the hardware and software can be optimized for each experiment, all with obvious and easy hardware changes.

Fixed wavelength fluorescence or luminescence measurements can be made with the 'standard' absorbance model. And, after the addition of a brighter excitation source and a sister (excitation) monochromator, 1,000 emission scans per second can be captured.

The mathematics for 2D and 3D analysis provide you with instantaneous fitting of spectra and kinetics. Our use of robust fitting rather than least squares fitting is correct. Our use of factor analysis is correct and 1300 fold faster than the published algorithm. (Fits on 1,000 spectral scans take one or two seconds to complete.)

Of course, what really matters are results. Three weeks after receiving his Olis RSM 1000 plus U.S.A. Stopped Flow, Prof Grant Mauk of the UBC wrote "We have one experiment produced by the RSM that will be included in a poster to be shown at [the 7th International Congress of Bioinorganic Chemistry]." That's results. Fast!



The OLIS RSM 1000 is a unique kinetics spectrometer that is capable of obtaining spectra over the visible range with millisecond time resolution using sensitive photomultipliers that permits the intensity of sample illumination to be minimal. Furthermore, extraction of meaningful kinetic data from the spectral noise through singular value decomposition is built into data collection and analysis and will allow us to monitor the very small optical absorption changes associated with the oxidation and reduction of the monolayers of synthetic redox proteins that are a principal object of study of the MRSEC grant. There is no other commercial instrument that comes close to this combination of capabilities.

Christopher Moser, Ph.D.
Associate Director, Johnson Research Foundation
January 22, 2003

Your instrument, although designed for absorption spectra, was quickly modified to measure the rapid flash produced. In our first experiments we took a few micrograms of the modified aequorin and triggered it. The individual 1 msec spectra looked awful, but the cumulative data showed the two emission peaks very clearly, with the correct positions for both aequorin and fluorescein emission. Our subsequent rapid scanned stopped flow emission spectra of this transient signal showed how good the detection capabilities of the instrument are. We were looking at very small amounts of the protein and obtained individual 1 msec emission spectra with excellent S/N. In a few hours we obtained quality data and spectra that are publication quality. To anyone looking at low light level chemiluminescent or bioluminescent reactions, or wishing to obtain spectral and kinetic data on transient or precious biological samples the rapid scanner is a must. A wonderful instrument!!

Russell Hart, D. Phil.
Director of Clinical Assays
March 31, 1993



For more information on this and other Olis products:

- Visit **www.olisweb.com**
- Write **sales@olisweb.com**
- Call **1-800-852-3504** in the US & Canada
1-706-353-6547 worldwide
- Tour **On-Line Instrument Systems, Inc.**
130 Conway Drive, Suites A, B & C
Bogart, GA 30622