

Circular Dichroism Spectrometer

model 420

-  **Wavelength**
-  **Temperature**
-  **Titration**
-  **pH**
-  **Fluorescence**



Introduction

Aviv Circular Dichroism Spectrometer, Model 420, records CD as a function of wavelength, time, temperature, pH and concentration using a double monochromator containing two UV grade prisms as dispersing elements. Right and left circularly polarized light is produced by a 50 KHz photoelastic modulator.

The instrument includes software by Aviv for instrument control, data acquisition, processing and publication quality presentations in a Windows environment. All experiment parameters are accessed through pull down menus. Control panels allow easy entry of all data acquisition parameters.

Smaller Size: Our smallest size ever, without compromising the performance. Fits on a table top or optional customized table.

Baseline Stability: Perform long-term experiments and be able to resolve small signal changes.

**NEW
Feature**

Specifications

Wavelength Range:

Range: 160 nm to 850 nm. Optional to 1200 nm

Stray Light: Intensity Ratio less than 0.00005 at 200 nm

Slit Program: Constant bandwidth from 0.01 to 15 nm. Automatic slit closure option to protect sample and optics from UV light.

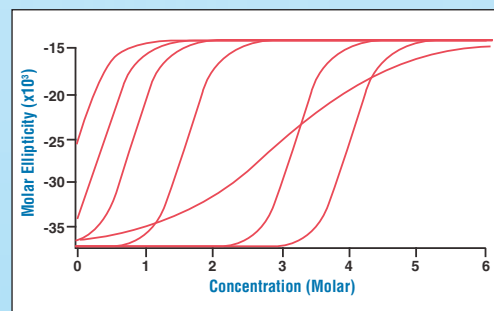
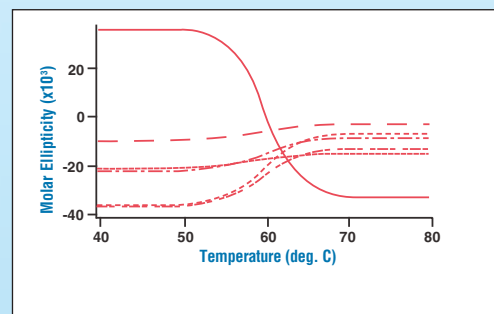
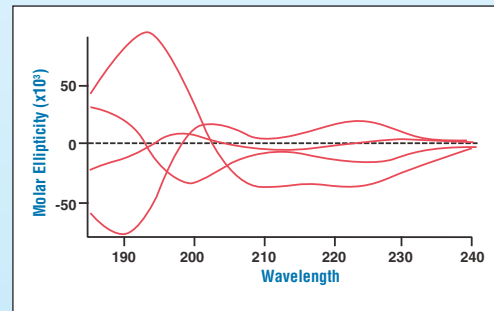
Baseline Drift: Less than +/- 0.015 mdeg per hour after warm-up, providing environment is held at 24°C +/- 2°C.

Light Source: Air cooled 150 Watt Suprasil Xenon lamp controlled by a high stability, constant current, DC power supply. Provides protections from loss of Nitrogen, lamp overheating, and EMF damage.

Automatic Proportionate Flow Control. Each compartment receives the appropriate nitrogen depending on its needs.

RMS Noise:

	"Noise Less Than" with 1 nm Bandwidth:	
	4 sec. TC	16 sec. TC
185 nm	0.08 mdeg	0.05 mdeg
200 nm	0.06 mdeg	0.04 mdeg
500 nm	0.05 mdeg	0.035 mdeg



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Experimental Modes

Wavelength: Records CD versus Wavelength at user selected bandwidth and averaging time. Data cannot be skewed by selecting improper scan speed.

Wavelength Schedule: User is allowed to enter a list of arbitrary wavelengths at which CD measurements will be made. Monitor critical wavelengths without the time of collecting the entire spectrum.

Temperature: Software control of thermoelectric device to maintain constant sample temperature, generate rising or falling temperature steps. Records CD versus temperature at fixed wavelength.

Temperature Schedule: A list of arbitrary temperatures can be entered at which CD measurements will be made. Speed through baseline regions while collecting fine temperature steps in the transition regions.

Kinetics: Measures changes in the CD signal as a function of time. Measures signal with time constants of tenths of seconds and longer.

Titration: The automated titration system option allows repeated injections of titrant under computer control. Possible experiments are ligand titration and solute induced denaturation. Handles large volume exchanges. Approach to Equilibrium option to monitor sample stability via CD or Fluorescence signal and automatically delay optical measurements until after chemical equilibrium is reached.

pH Titration: CD is measured as a function of pH. Syringe pump injects acid or base and pH meter measures changes in pH. A feedback loop automatically adjusts injection volumes to match changes in buffering capacity.

Macro Programs: Common instrument functions and experiment modes are available as commands that will automatically control the instrument. The Aviv Macro Command editor is graphically driven, intuitive and requires no programming experience. Every instrument is delivered with a library of programs, which include Multidimensional Experiments, special fluid handling and other automated functions.

Additional Signals: A multitude of additional signals can be recorded and saved in data files. These include dynode voltage, absorbance, fluorescence, fluorescence detected CD, photomultiplier current, raw CD signal, pH, injection volume, sample and titrant concentrations, jacket and probe temperatures, and fluorescence dynode.

Data Analysis

Direct transformation: All common math operations.

Fitting: Linear regression.

Statistics: Residuals, standard deviation, mean, median, smoothing and baseline correction. Molar Ellipticity and Absorbance calculations.

Protein Secondary Structure Analysis: Share-ware programs available from the Internet.

Data System

Pentium PC, current model, Network Ready • Windows 7™ Operating System, Hard disk, DVD RW, parallel port, 19" monitor, keyboard, mouse, multiple USB ports.

Multiple analog data acquisition channels and USB communications.

USB based instrument control.

Options

Thermoelectric Peltier Sample Holders

- Single Position – 10 mm X 10 mm.
- Single Position with total fluorescence capability.
- Five Position rotary cell changer.
- Single Position with emission scanning monochromator,

- Built-in, software controlled motor for a magnetic stir bar.
- Water Circulation to remove waste heat from Peltier Elements.
- Nitrogen purge for condensation and oxygen removal.
- Accepts 0.005 to 10 mm rectangular cuvettes.
- 0.01°C Resolution.

Thermoelectric Cell Holder: Single 1 cm cuvette. Range -10 to +110°C.

Thermoelectric Cell Changer: Rotary, 5 cuvettes. Range -5 to +110°C.

Thermoelectric Cuvette Holder (with fluorescence capability): Includes total fluorescence measurement and fluorescence detected circular dichroism (FD CD). Collects total fluorescence signal and/or CD signal. Software selectable. Includes single position thermoelectric temperature controlled cell holder.

Fluorescence Emission Scanning Monochromator:

Wavelength range: 200 nm – 800 nm. Allows simultaneous collection of CD and fluorescence.

Table: Customized table for mounting CD spectrometer and provisions for power supplies and Data System.

Automated Syringe Pump System: For titrations. Includes two 500 µl syringes, 10 mm cell, special titration adapter and stir bar. Highly repeatable programmable syringes for automated ligand titrations and solute induced denaturations. Can be used with single position thermoelectric cuvette holder or total fluorescence accessory. Accommodates the large volume exchanges.

Syringes for pump: 50 µl, 100 µl, 250 µl, 500 µl, 1 ml and 2.5 ml capacity available.

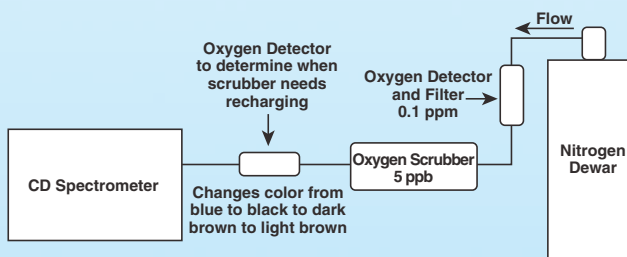
pH Measurement System: Includes pH meter and micro-probe electrode. Modified cuvette cap and electrode mount for 10 mm cell. Cables are included for complete system integration. pH range: 0 to 14 pH. Requires Automated Syringe Pump System.

Cell Holder: For water jacketed 22 mm cylindrical cells. Includes water lines mounted on its own door assembly with quick disconnects.

Short Pathlength Cylindrical Cell Holder: Thermoelectrically controlled. From -5°C to +105°C for cells having pathlengths of 0.01 mm, 0.05 mm, 0.1 mm, 0.2 mm, 0.5 mm and 1 mm.

Oxygen Analyzer: Pressure regulator and oxygen alarm. Allows monitoring of the purity of nitrogen gas to be less than 5 ppm. Xenon lamp cannot be ignited if oxygen levels are above 7 ppm.

Nitrogen Purification System: Consists of rechargeable gas scrubber and two gas detection and filter assemblies. (Replacement cartridges available).



Nitrogen Dewar: 230 liter capacity.

Nitrogen Regulator: Oil free, 2 stage, nitrogen purge gas pressure regulator and adjustable flow meter. Fits standard gas cylinders and nitrogen dewars.

Holmium Oxide Solution: For wavelength calibration. NIST Certified.

Spare Xenon Lamp: XBO 150W/4 Suprasil, for 160-1200 nm.

Solid Sample Holder: Single V-Block for solid samples/thin film holder. (Holds up to six samples).

Fused Silica Cells, Strain-free Large selection of cells with different optical path-lengths, and cell volumes. Contact Aviv for details.



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Note: All specifications subject to change without notice.