UV Professional

Analysis software

Operating Manual

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1. Main functions

1.1. Photometric measurement

- The display methods include: absorbance, transmittance and energy.

1.2. Quantitative analysis

- Two methods are available for establishing the standard curve: the coefficient method and the standard sample calibration method.
- The number of standard samples can be set arbitrarily to calibrate the standard curve, or the coefficients of the curve equation can be directly input to establish the standard curve.
- The standard curve can be fitted in six ways (first-order linear zero-crossing fitting, first-order fitting, second-order fitting and third-order fitting, exponential fitting, and logarithmic fitting).

1.3. Time scan

- The sampling time interval can be set arbitrarily
- The display mode of the scanning curve can be freely switched (time-transmittance or time-absorbance)

1.4. Wavelength scanning

- Scan intervals are optional (0.1, 0.2, 0.5, 1.0, 2.0 and 5.0nm)
- The display mode of the scanning curve can be freely switched (wavelength - transmittance, wavelength - absorbance and wavelength - energy)
- The baseline of the wavelength scanning system can be stored and invoked.

1.5. Multi-wavelength analysis

- The number of wavelengths can be set arbitrarily for sample testing

1.6. Spectral analysis

- Spectral operations, spectral comparisons and three-dimensional spectra

1.7. DNA/ Protein analysis

- Built-in 2 analysis methods
- Test parameters can be customized

2. Installation

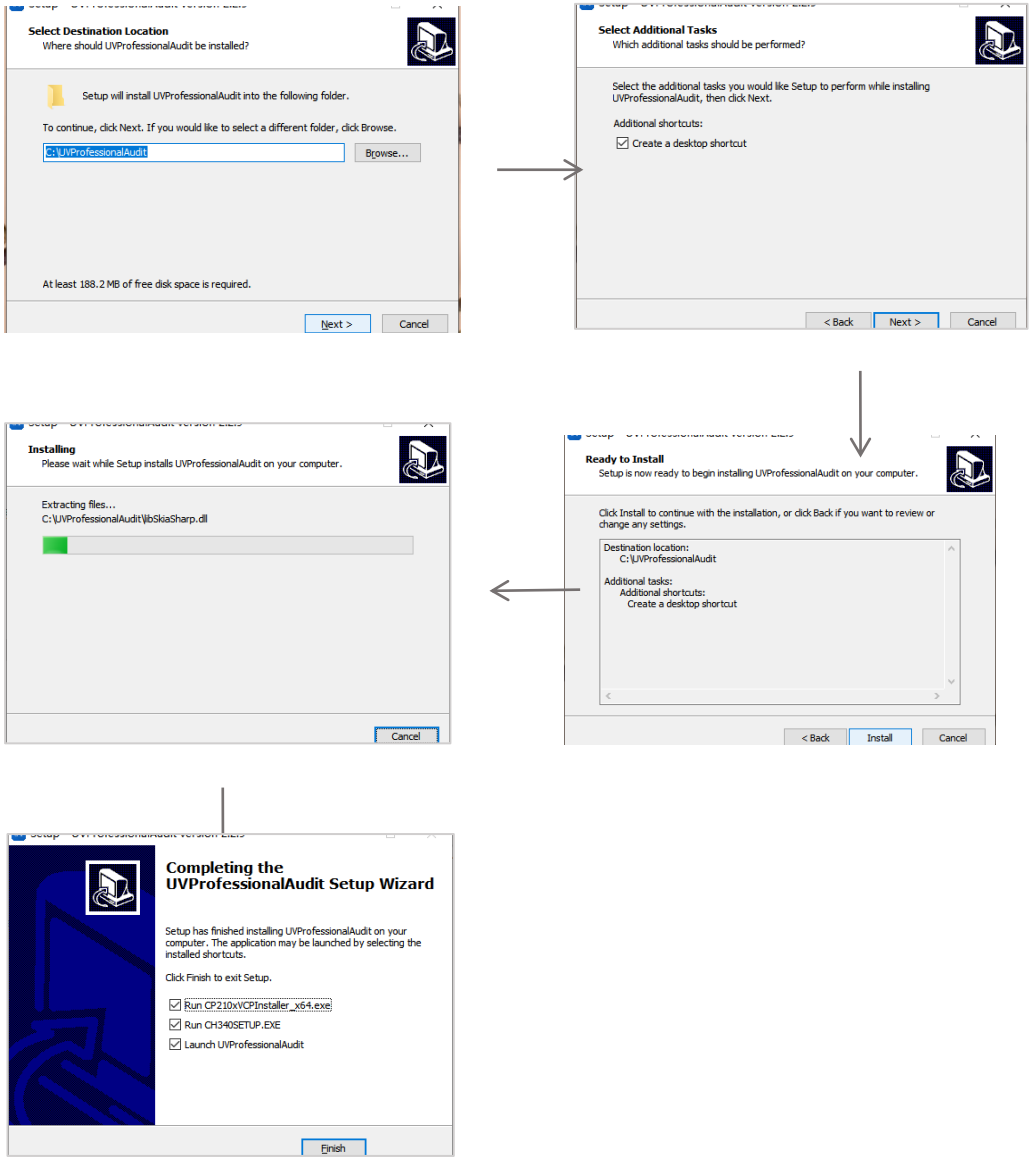
This chapter details how to install UV Professional on your PC.

2.1. Install the system configuration

- Two or more USB interfaces
- UV-Professional software is compatible with the vast majority of computer systems available on the market.

2.2. Install UV Professional

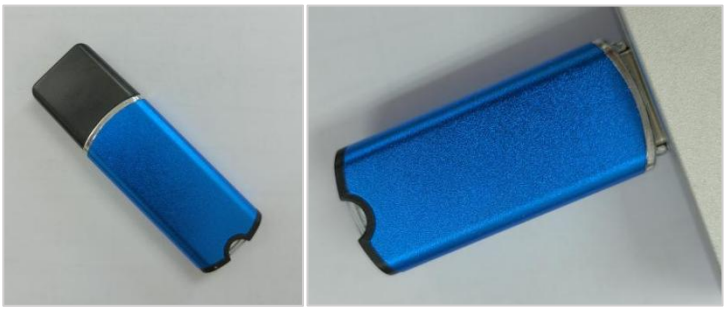
1) Insert the USB flash drive with UV Professional software into the USB interface of the computer host.
2) Open the installation package and install the appropriate software based on whether the Windows system is 32-bit or 64-bit. Double-click the uv setup.exe installer to start the installation.



3) The installation process is complete.

2.3. Run UV Professional

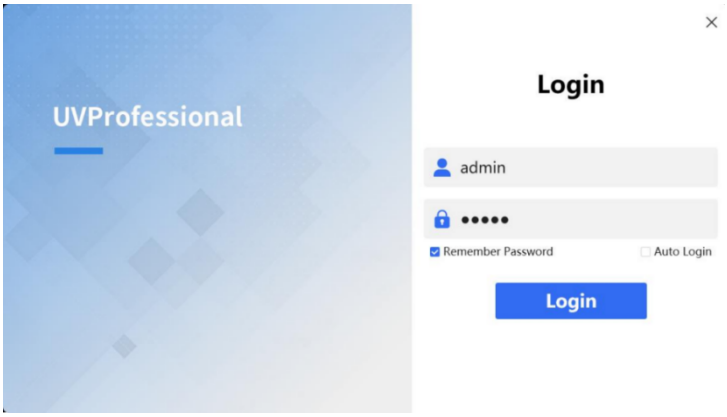
1) Turn on the instrument and ensure that the instrument preheats successfully when the software is connected, then enter the test interface.
2) First plug the “dongle” into the USB port on your PC.



3) Use USB communication cable to connect the instrument to the PC.
4) Double-click the [UV Professional] icon on your desktop to run UV Professional.
5) After starting UV Professional, click the Settings [ ] key in the upper left corner of the interface, select the serial port connection in [Instrument Settings], and after setting it correctly, click [Connect]. The instrument will be automatically connected successfully.

3. Software introduction

3.1. Login



Double-click the ‘UVProfessional’ icon on the desktop to log in to the operating software. The initial account of the system administrator is admin. The initial password is admin. You are advised to change the password after the first login. You can create a new user as required later.

3.2. Online/Offline

1) Turn on the instrument. The self-check work is completed normally. After the preheating is finished, enter the main test interface.

2) Click the "Online" -[ ] key in the interface toolbar. A "Di" sound from the instrument indicates that the automatic connection is successful. The main unit of the instrument shows that the instrument is in the online state at this time, and the software will prompt "Online successful". Click [ ] to release the host.

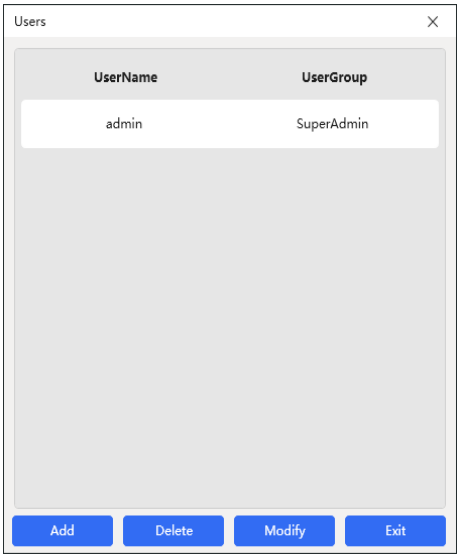
3.3. User center

To enhance the compliance and security of test data, improve internal management efficiency, facilitate auditing and supervision work, and at the same time facilitate problem identification and traceability, high-end software has specially launched the audit trail function, while low-end software only has partial functions.

Click on [Audit Trail]-[User Management] at the top of the interface to modify user information or add a new user role. User roles can be divided into three types: super administrator, administrator, and operator. Different roles can set different operation permissions for the instrument, which is convenient for users to manage the instrument on a daily basis and ensures the security of data.

3.3.1. User Information

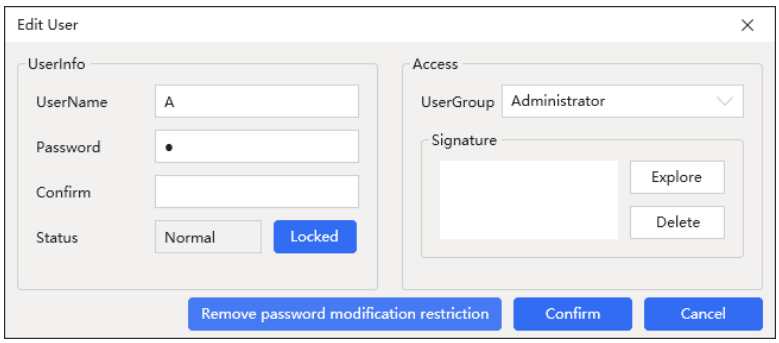
The default super administrator account of the software is: **admin**. After logging into the software, users can add or modify user information as needed for testing. New users can be added to the corresponding user group, and permissions that are not open in the user group will not be used. Super administrator permissions are all unchangeable by default.



3.3.2. Changing the password

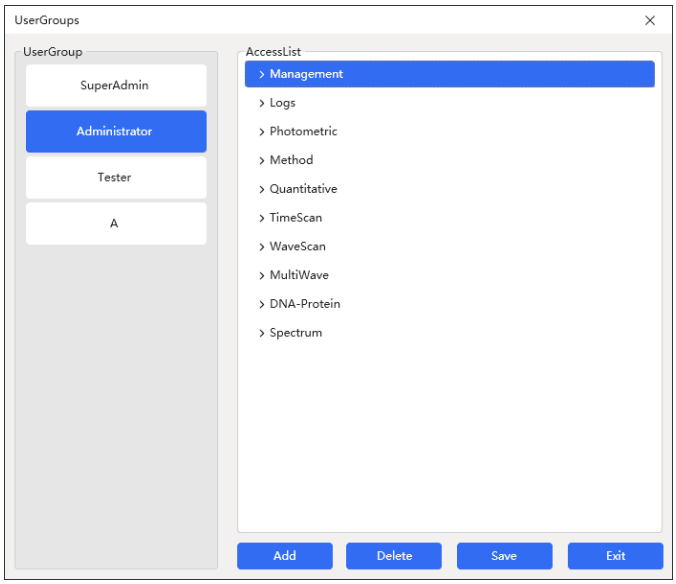
Users can change the initial password on this interface (the initial password for system administrators is: **admin**). Select the user whose information needs to be modified, click "Modify", and the user information will be modified.

Note! If the password is forgotten, the APP needs to be re-installed and all data will be lost.



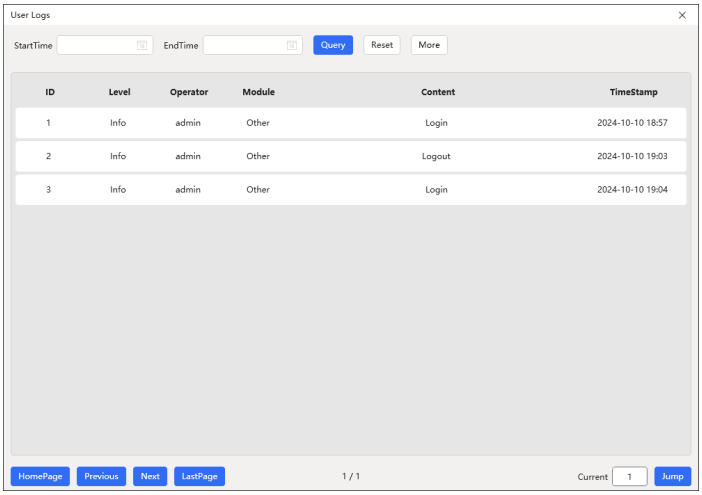
3.3.3. User group management

Users can be added to the user group with default permissions, and at the same time, new user groups can be created according to the requirements of test permissions.



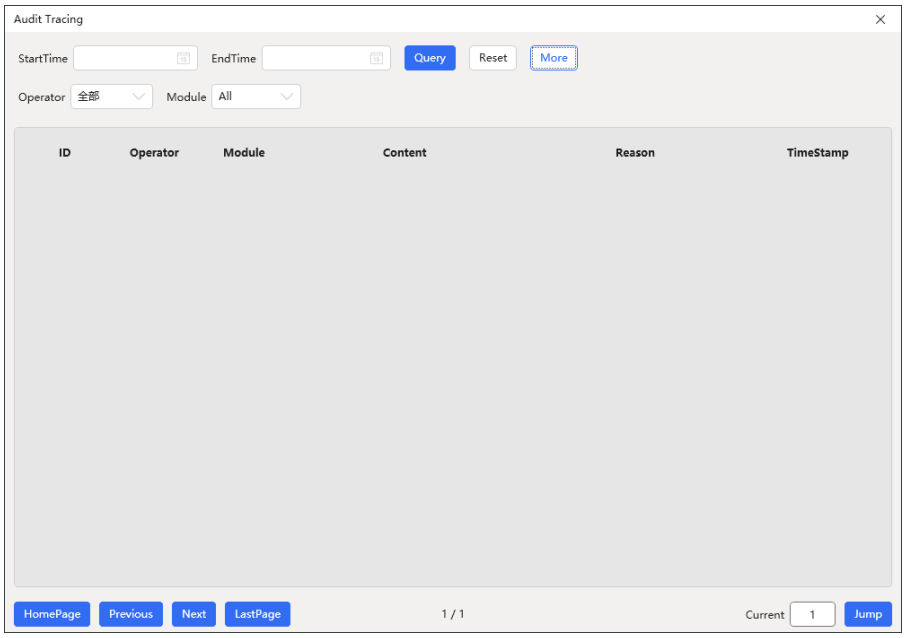
3.3.4. Viewing logs

Click to view the user log, which helps users understand the operation of the system, troubleshoot problems and conduct performance analysis.



3.3.5. Audit trail

Audit trail mainly involves functions such as recording and monitoring software operation and user behavior to meet compliance requirements.



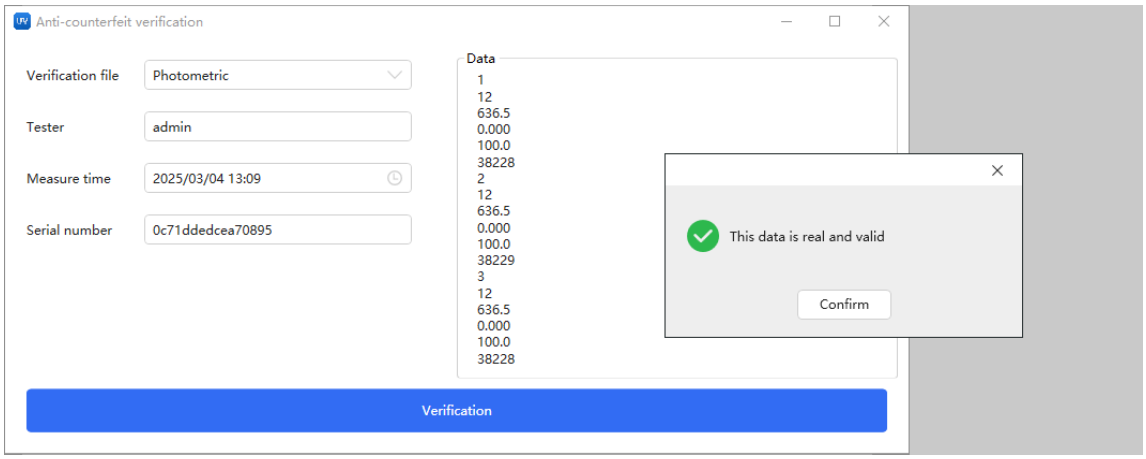
3.3.6. Export/Import logs

Back up and restore operation logs, and support audit review, statistical analysis and other work.

3.3.7. Data anti-counterfeiting verification

To ensure the authenticity of the data and enhance its credibility, and to facilitate the traceability and auditing of the data in the later stage, this software can conduct historical data verification.

Strictly copy the tester, measurement time and number in the test file into the software, and then paste all the data in. If there is any change in the data, the software will automatically identify that the data has been forged.



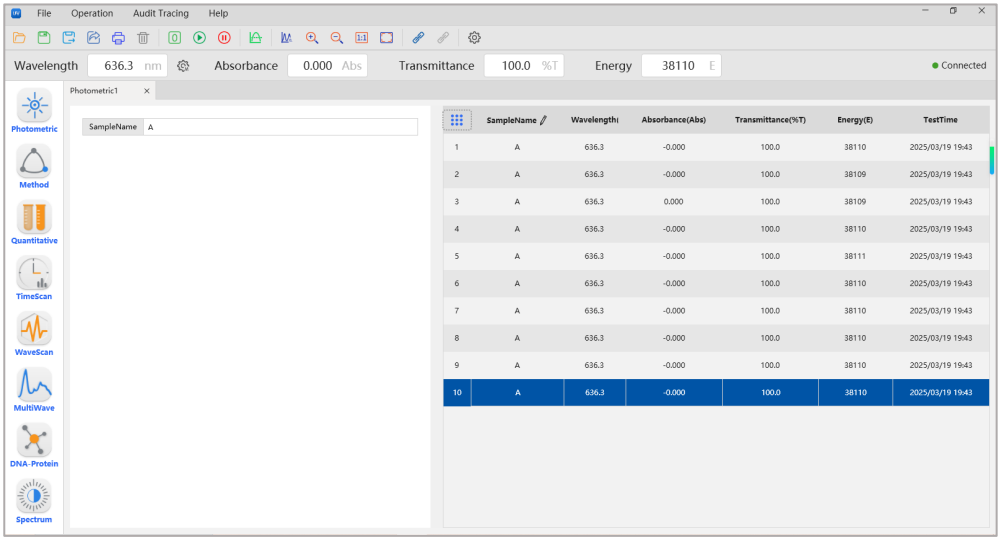
4. Applications

Click the corresponding icon on the toolbar on the left side of the software to enter the corresponding application module.

Photometric	Photometry is the measurement of the absorbance (Abs) or transmittance (T%) of a sample at a fixed wavelength.
Quantitative	Under this function, you can establish a working curve by yourself using standard samples and use this curve to measure unknown samples. If you know the slope and intercept of the curve, you can also use the coefficient method for testing.
TimeScan	The extent of the reaction can be judged by recording the changes in the absorbance or transmittance of the sample over time.
WaveScan	Measure the absorbance or transmittance curve of the sample within a certain spectral range.
Method	Create measurement methods and standard curves, and optimize the testing process.
MultiWave	It is used to measure the photometric value of the sample. The photometric value can be calculated by a custom method and can meet the requirements of multiple wavelengths participating in the test simultaneously

Spectrum	Perform operations such as addition, subtraction, multiplication and division on the test spectrum, and view the derivative spectrum or three-dimensional spectrum
DNA-Protein	Measure the concentration value of biological samples. It has two commonly used nucleic acid/protein measurement methods built-in and supports custom measurement methods

4.1. Photometric measurement



Click on [Photometric Measurement] to display three measurement modes: energy, transmittance, and absorbance.

Working wavelength setting: Click on the wavelength display position, enter the test wavelength, and click []. The wavelength setting is successful. Enter the required wavelength range of the instrument correctly. Input incorrectly or beyond the set range will be regarded as invalid data and the instrument will not respond.

Sample test:

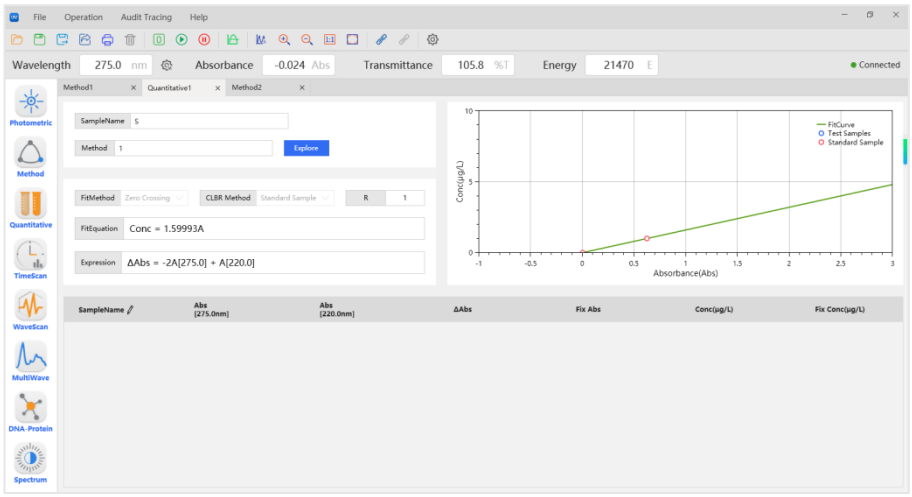
- Place the cuvette containing the "reference solution" into the measurement channel, close the sample chamber, and click the [ ] key after the data stabilizes.
- After the blank correction of the sample is completed, place the cuvette containing the "sample solution" into the measurement channel, close the sample chamber, and after the data stabilizes, click the [ ] key to read the test result. Then click [ ] to save the test result in Excel format. Click to save test results, and then click to open and analyze the previous test data in the software (the subsequent data processing method is the same and will not be elaborated here).

If you need to modify the sample name, just click on the [Sample Name] column to

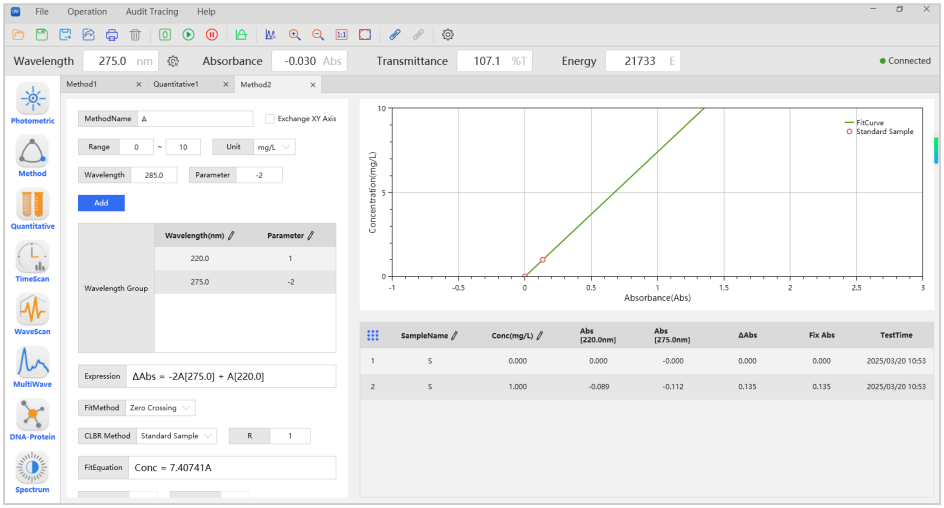
make the modification directly. Select the target data column and right-click to delete or modify the data. Clicking the left mouse button and dragging the mouse can select multiple data for processing. If the user accidentally deletes the data, they can undo the deleted data.

If you need to remeasure a certain data, select the data, right-click the mouse, and click [Measure] to remeasure the data.

4.2. Quantitative analysis



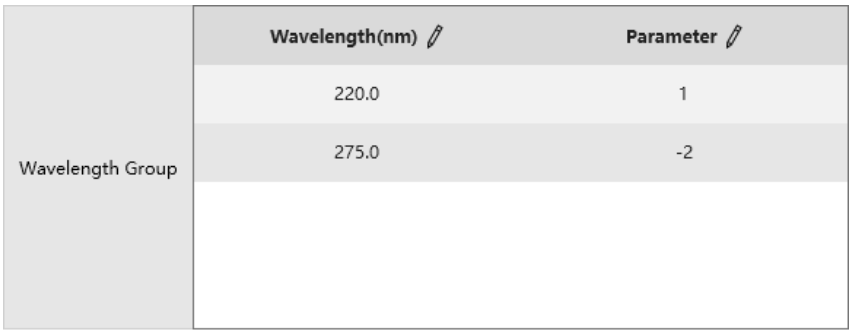
4.2.1. Set quantitative method



Method name	Set the name of the saved curve (to be used in subsequent calls to the curve)
Concentration range	Set the test range
Concentration unit	Built-in nine commonly used concentration units, while you can customize the unit
Operating wavelength	Multiple wavelengths can be set to participate in photometric calculation at the same time

Fitting mode	There are six fitting methods: zero-crossing fitting, first-order fitting, second-order fitting, third-order fitting, exponential fitting and logarithmic fitting
Measurement method	Standard sample method, coefficient method
Labeled sample	The number of standard samples is optional
Sample name	Enter sample name
Sample concentration	Input sample concentration values successively

4.2.2. Set the working wavelength



Set the wavelength values and calculation coefficients in sequence and save them in the formula library for direct invocation next time (in quantitative measurement and multi-wavelength analysis, the wavelength formula and related standard curves can be directly invoked).

4.2.3. Establish the standard curve (Standard sample method)

Set the relevant test conditions in sequence and establish the standard curve.
Click [Operation]-[Cuvette Calibration] to enter the calibration operation between cuvettes:



The cuvette calibration method is as follows: Put the standard colorimetric dish with pure water into the 1# sample tank, click on correction, as the reference colorimetric dish; Put the sample cuvette with pure water into the 2# sample tank, the 3# sample

tank and the 4# sample tank successively, pull the pull rod successively to move the corresponding cuvette into the light path, and click the "correction" button successively, the instrument will automatically compare the cuvette for correction. (In the process of sample testing, you can use the corresponding cuvettes set for testing, and the software will deduct the error between the cuvets.)

Users can choose whether to perform cupola correction according to the test needs, otherwise [pop-up prompt] set "off".

(Minus blank space) Pure water zero: In the process of standard curve establishment, users want to use pure water to zero, test sample blank and other data. The specific steps are as follows:

● Put the cuvete with 'pure water' into the measurement channel, close the sample room, and click [] when the data is stable.

After the correction of pure water is completed, put the colorimetric dish with "reference solution" into the measurement channel, close the sample room, click [] when the data is stable, read the test results, and read the luminosity value of a series of standard solutions in turn.

Reagent blank zero adjustment:

● Input the concentration value of each standard liquid to be measured in turn at the standard sample, put the colorimetric dish with "reference solution" into the measurement channel, close the sample room, click [] when the solution is stable, select the corresponding standard sample bar and click [] to read the test result.

● After the standard sample blank calibration is completed, put the colorimetric dish with "standard solution" into the measurement channel and close the sample room. When the data is stable, select the corresponding standard sample bar, click the right mouse button and click [Measure] button to read the test results. Put the colorimetric dish with series of "standard solution" into the measurement channel in turn, and read the absorbance value of series standard solution in turn.

After the curve is established, if the value of correlation coefficient R meets the experimental requirements, click [], and the new curve will be saved in the instrument, and the user can call the standard curve at any time. If the R value does not meet the experimental requirements, the user will re-prepare the standard solution after determining that the concentration of a standard solution is wrong, select the standard point, click the right mouse button, choose [Measure], read the corresponding absorbance value, and continue to complete the curve establishment, or select the standard sample bar, click the right button [delete] the concentration point data. At the same time, the user can click the liquid concentration value in the concentration bar to change its data.

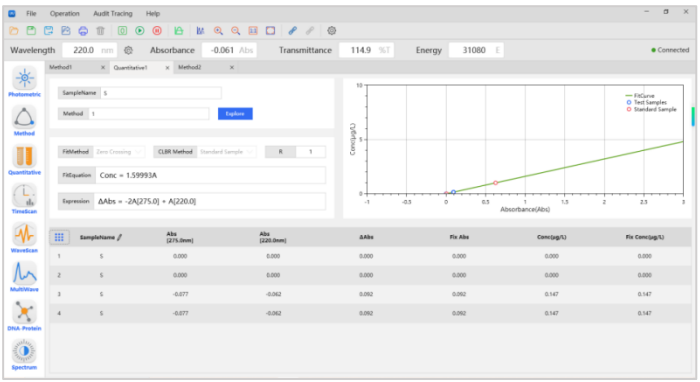
The horizontal axis represents mass: Select 'Volume' as the input type, set the standard concentration and concentration unit, and enter the volume of the sample transferred

in sequence. The software will automatically calculate the mass.

4.2.4. Establishing standard curve (coefficient method)

Set the corresponding parameters and input the known coefficient values to establish the calibration curve.

4.2.5. Sample test



On the main interface of the quantitative analysis sample test, click the [Browse] key to view and use the established curve. Select the curve file you need to call, click [Open], and enter the test interface. The test interface will display the curve information. Just carry out the test normally.

Sample test:

● Place the cuvette containing the "reference solution" into the measurement channel, close the sample chamber, and click the [0] key after the data stabilizes.

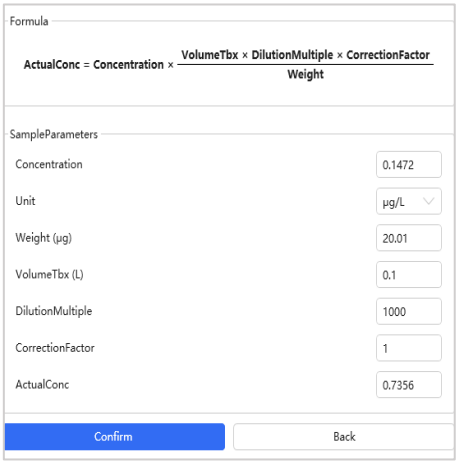
● After the blank correction of the sample is completed, place the cuvette containing the "sample solution" into the measurement channel, close the sample chamber, and wait for the data to stabilize before clicking the [▶] key to read the test result.

If the test data is marked with '*', it indicates that the data points of the sample exceed the concentration range established by the standard sample. To ensure the high-precision requirements of the test results, it is recommended that all test data be within the concentration range of the marked line. Otherwise, dilution or enrichment treatment should be carried out.

If you need to modify the sample name, just click on the [Sample Name] column to make the modification directly. Select the target data column and right-click to delete the data.

If you need to remeasure a certain data, select the data, right-click the mouse, and click [Measure] to remeasure the data.

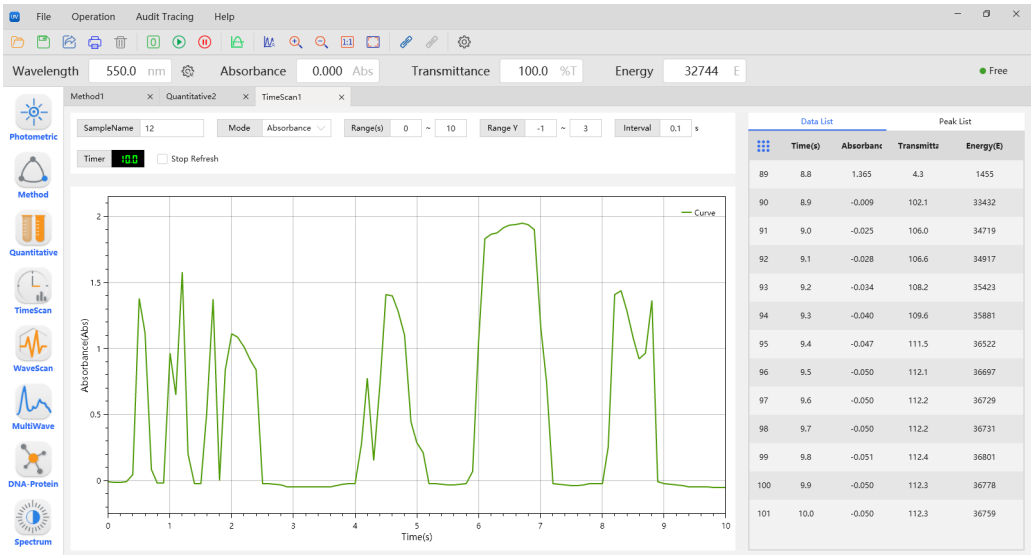
Data processing:



Select a single data point or right-click and drag the mouse to choose multiple data points. Right-click the mouse and select [Calculate Actual Concentration] to process the data. You can input the corresponding coefficient according to the specific situation of the sample to calculate the actual concentration.

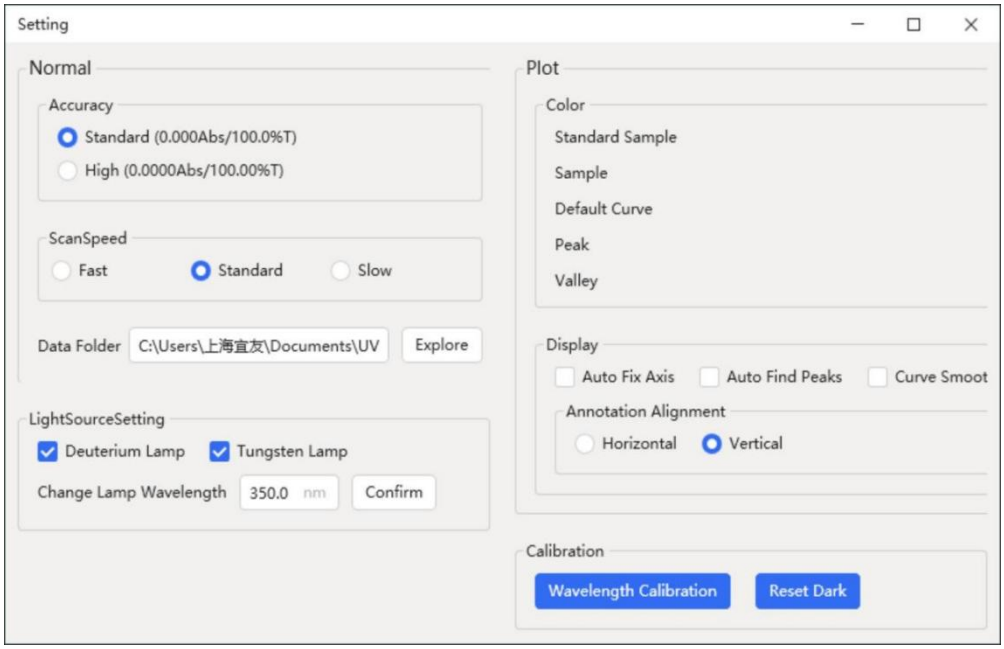
Calculation formula: Actual concentration = Concentration × (Volume × Dilution Multiple× Correction Factor)/Weight.

4.3. Time scan



4.3.1. Set the analysis method

Click  the setting key above the instrument to set the scanning curve display effect.



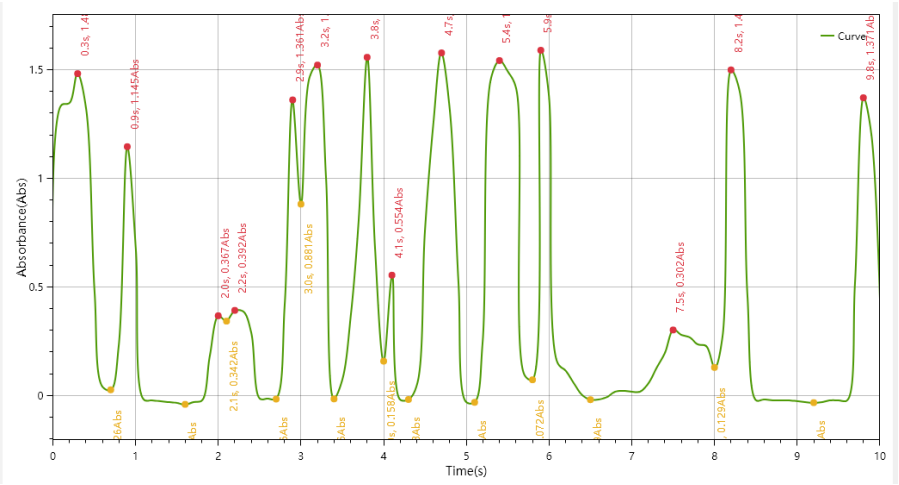
Display accuracy	Data display accuracy
Light source setting	The light source can be switched on and off according to the test needs, effectively saving the life of the light source
Changing wavelength	Switch the wavelength of the light source. You are advised to use the default setting
Color setting	Easy to clearly distinguish between different data series
Indicate	**Automatic adjustment of axes：** According to the changes of the test data, dynamically adjust and optimize the display range, so that the data display is more clear, accurate and intuitive. **Automatic peak search：** Quickly and accurately locate peak locations in your data. **curve smoothing：** Reduce data noise interference, make the curve more continuous, smooth, and more clearly show the trend and characteristics of the data.
Marking direction	The peak value indicates the data direction
Calibration	If the test data is abnormal or biased, the wavelength and dark current are calibrated to ensure the accuracy and reliability of the measurement results

Set test parameters:



Sample name		Enter the test sample name- used as the save curve name
Operating wavelength		Test wavelength value
Measuring mode		3 measurement modes: absorbance, transmittance, energy
X-axis setup	Scanned area	Sampling time
	Sweep spacing	Sampling interval
Measuring range (Y-axis)		Maximum/minimum value of the ordinate (valid only with fixed coordinates)

4.3.2. Sample test



● Place the cuvette containing the "reference solution" into the measurement channel, close the sample chamber, and after the data stabilizes, click the [ ] key to start the zero-point calibration work.

● After the blank correction of the sample is completed, place the cuvette containing the "sample solution" into the measurement channel, close the sample chamber, and after the data stabilizes, click the [ ] key to start reading the test results. The test results can be saved after the test is completed.

After the test is completed, lock the mouse pointer to the scanning spectrum, mix the mouse wheel, and you can zoom in or out of the scanning spectrum or locate the target spectrum at will. Double-click the mouse wheel to reset the spectrum. Right-click and drag the mouse to move the graph. Right-click to find peaks/troughs or perform other operations.

4.3.3. Viewing Data

Data List | Peak List

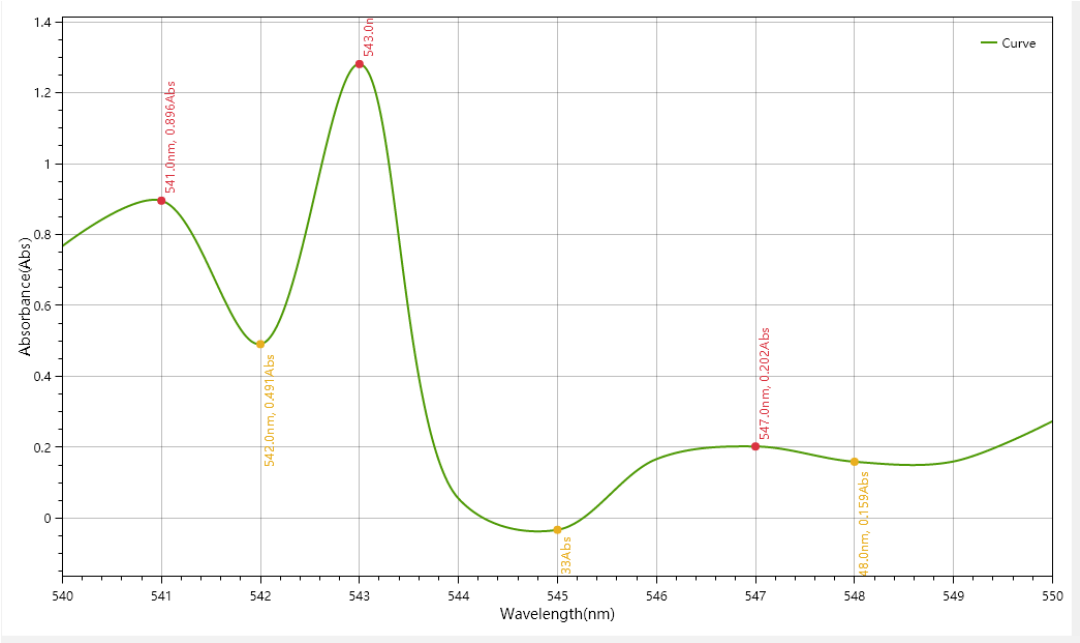
	Time(s)	Absorbanc	Transmitta	Energy(E)
89	8.8	-0.017	103.9	41012
90	8.9	0.454	35.1	14786
91	9.0	-0.025	105.9	41782
92	9.1	-0.025	105.9	41782
93	9.2	0.217	60.7	24544
94	9.3	-0.024	105.6	41646
95	9.4	-0.029	106.8	42101
96	9.5	-0.020	104.8	41357
97	9.6	0.295	50.7	20718
98	9.7	-0.023	105.5	41626
99	9.8	0.096	80.2	31974
100	9.9	0.115	76.7	30642
101	10.0	-0.020	104.8	41353

Data List | Peak List

	Time(s)	Absorbance	Transmittan	Type
16	8.4	0.800	15.9	Peak
17	8.9	0.454	35.1	Peak
18	9.2	0.217	60.7	Peak
19	9.6	0.295	50.7	Peak
20	9.9	0.115	76.7	Peak
21	0.9	1.123	7.5	Valley
22	1.6	-0.017	103.9	Valley
23	1.9	-0.020	104.8	Valley
24	2.3	-0.037	108.9	Valley
25	3.4	-0.037	109.0	Valley
26	4.2	-0.022	105.2	Valley
27	4.7	-0.031	107.5	Valley
28	5.3	-0.030	107.2	Valley
29	6.0	-0.027	106.5	Valley

After the test is complete, you can view the test result on the right of the screen. Drag the scroll bar to the right of the data to view all test data. peak: Red display; trough: Yellow display (color can be changed as needed later).

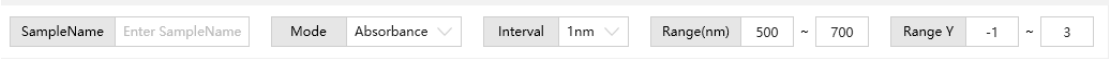
4.4. Wavelength scanning



4.4.1. Set the analysis method

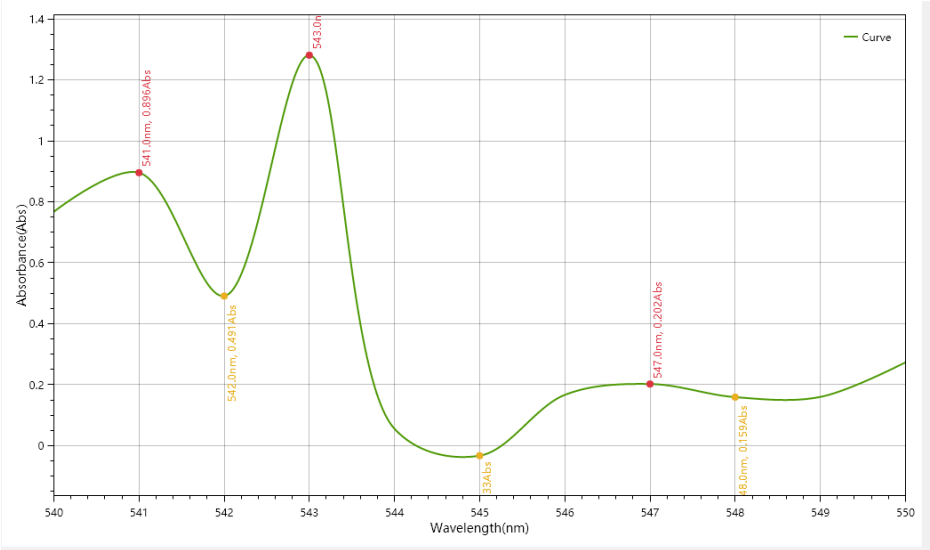
Click the set key above the instrument to set the scanning curve display effect (see Time scanning for details).

Set the test parameters:



Sample name		Enter the test sample name- used as the save curve name
Measuring mode		3 measurement modes: absorbance, transmittance, energy
X-axis setup	Scanned area	Scan the start/end point
	Sweep spacing	The 6-stop wavelength interval is available at 0.1, 0.2, 0.5, 1.0, 2.0, 5.0 nm
Y-axis setup		Maximum/minimum value of the ordinate (valid only with fixed coordinates)

4.4.2. Sample test



● Establish a system baseline: The system baseline is the energy collected by the instrument at each wavelength in a blank state. According to the requirements of the internal calculation of the instrument, an appropriate amplification factor is assigned to it to ensure that the instrument operates in the best condition. Before the wavelength scanning measurement begins, a system baseline must be established. If the system baseline has been established before, it can be skipped. The system has not been updated for a long time. Please re-establish the system baseline.

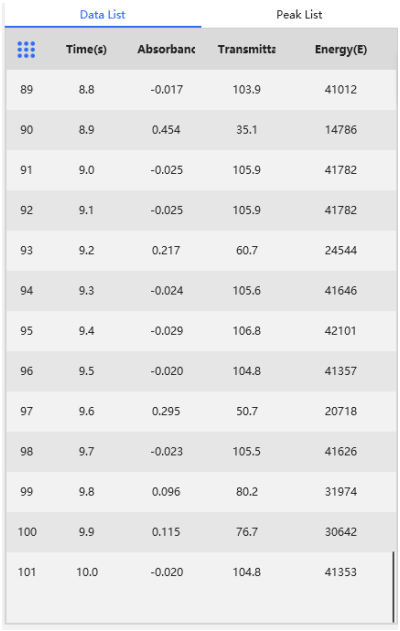
Place the cuvette containing the "reference solution" into the measurement channel, close the sample chamber, and after the data stabilizes, click [Baseline] to start establishing the system baseline.

● After the baseline is established, without removing the "reference solution", directly click the [ ] key to perform blank correction work.

● After the blank correction of the sample is completed, place the cuvette containing the "sample solution" into the measurement channel, close the sample chamber, and once the data stabilizes, click the [ ] key to start reading the test results. After the

test is completed, the test results can be saved.
After the test is completed, lock the mouse pointer to the scanning spectrum, mix the mouse wheel, and you can zoom in or out of the scanning spectrum or locate the target spectrum at will. Double-click the mouse wheel to reset the spectrum. Right-click and drag the mouse to move the graph. Right-click to find peaks/troughs or perform other operations.

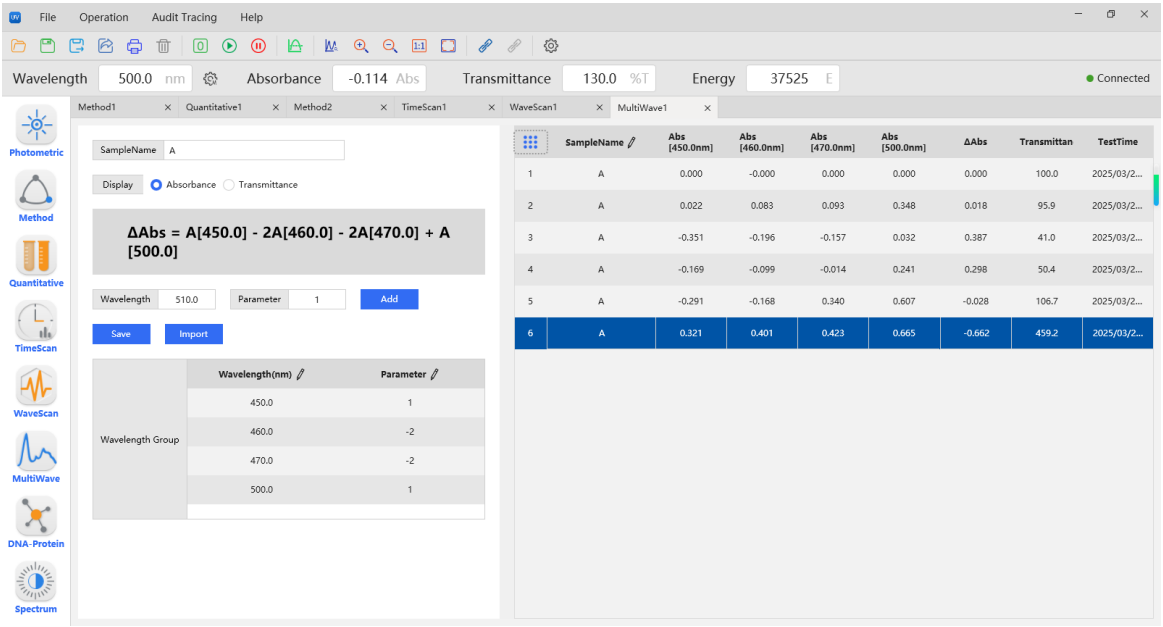
4.4.3. Viewing Data





After the test is complete, you can view the test result on the right of the screen. Drag the scroll bar to the right of the data to view all test data. Peak： Red display； Trough： Yellow display (color can be changed as needed later).

4.5. Multi-wavelength analysis



Click [View] and select to load the wavelength operation formula or create a new formula.

Sample test:

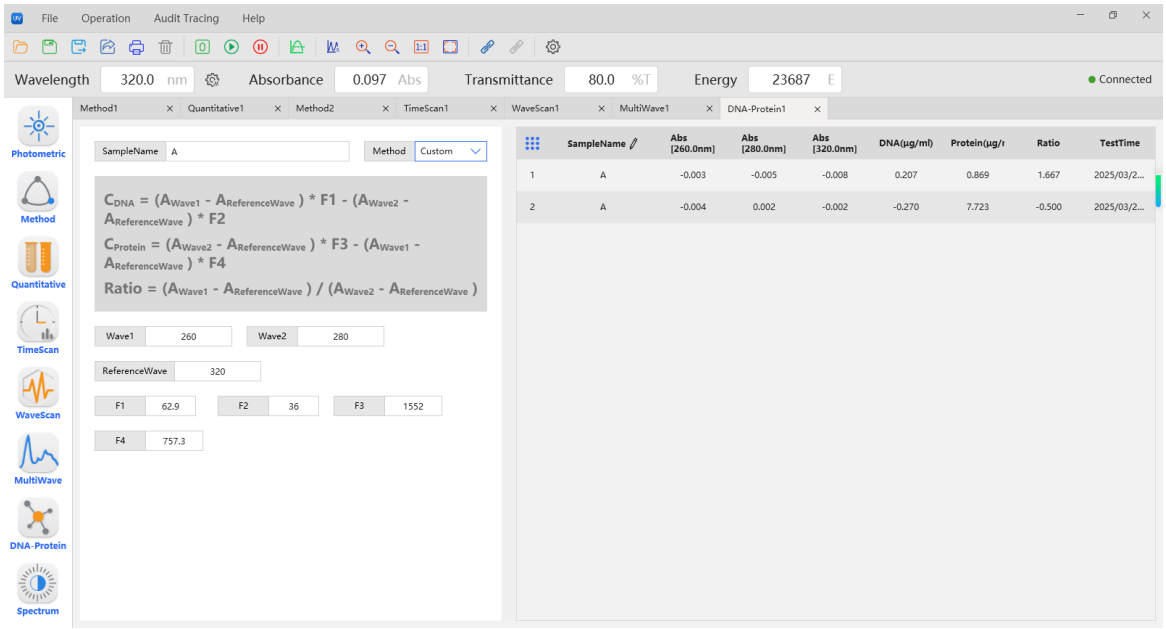
● Place the colorimetric solution containing the "reference solution" into the reference channel, close the sample chamber, and click the [ ] key after the data stabilizes.

● After the blank correction of the sample is completed, place the cuvette containing the "sample solution" into the measurement channel, close the sample chamber, and after the data stabilizes, click the [ ] key to read the test result. Then click [Save] to save the test result.

If you need to modify the sample name, just click on the [Sample Name] column to make the modification directly. Select the target data column and right-click to delete the data.

If you need to remeasure a certain data, select the data, right-click the mouse, and click [Measure] to remeasure the data.

4.6. DNA- Protein



4.6.1. Set up the analysis method

It contains two commonly used testing methods, and users can customize the detection methods. It has 12 built-in concentration units, and users can choose according to their testing needs.

Sample test:

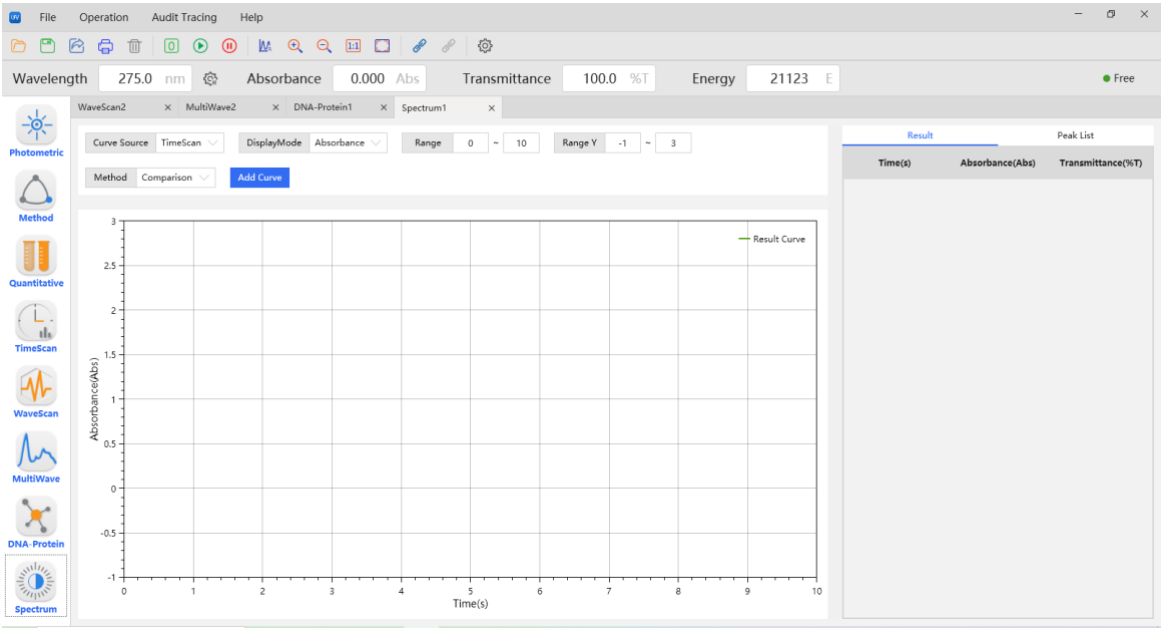
● Place the cuvette containing the "reference solution" into the measurement channel, close the sample chamber, and click the [0] key after the data stabilizes.

● After the blank correction of the sample is completed, place the cuvette containing the "sample solution" into the measurement channel, close the sample chamber, and after the data stabilizes, click the [▶] key to read the test result. Then click [Save] to save the test result.

If you need to modify the sample name, just click on the [Sample Name] column to make the modification directly. Select the target data column and right-click to delete the data.

If you need to remeasure a certain data, select the data, right-click the mouse, and click [Measure] to remeasure the data.

4.7. Spectral analysis



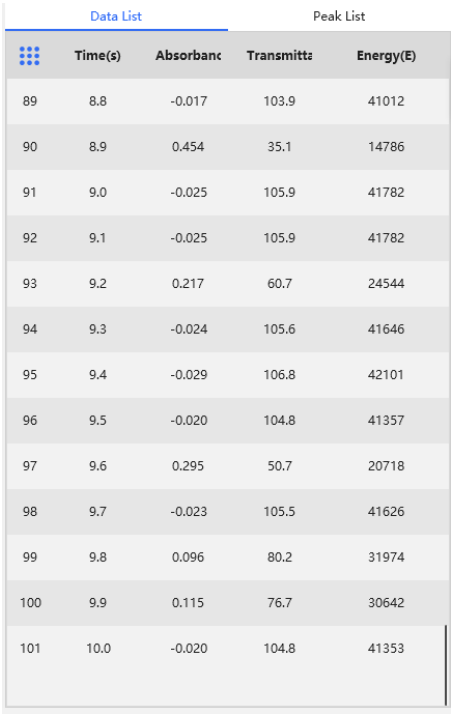
Analysis target	Time sweep	Select the spectrum you want to process
	Wavelength scanning	
Display mode		Two display modes: absorbance, transmittance
Curve range	Time range	Scan time range- automatically brought in when curves are added
	Wavelength Range	Scan wavelength range- automatically brought in when curves are added
Analytical model	Spectral comparison	Comparison between multiple scan curves
	Spectral addition	Basic data calculations can be performed between different spectra
	Spectral subtraction	
	Spectral multiplication	
	Spectral division	
	Spectral derivative	The derivative of the scan curve is calculated
	Three-dimensional map	Qualitative analysis of different atlas

Settlement of condition：

● In the spectral analysis interface, select the curve source, set the display mode, Y-axis range, and click [Add Curve] to add the target spectrum.

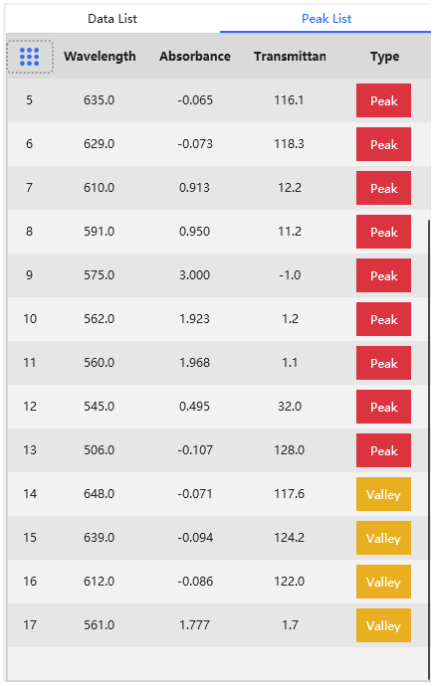
● The analysis methods can be switched at will to perform spectral operations. Click on the graph list on the right to hide or show the corresponding graph. Lock the mouse pointer to the scanning spectrum, mix the mouse wheel, and you can zoom in or out of the scanning spectrum or locate the target spectrum at will. Double-click the mouse wheel to reset the spectrum. Right-click and drag the mouse to move the graph. Right-click to find peaks/troughs or perform other operations.

4.7.1. Viewing data



Data List | Peak List

	Time(s)	Absorbanc	Transmitta	Energy(E)
89	8.8	-0.017	103.9	41012
90	8.9	0.454	35.1	14786
91	9.0	-0.025	105.9	41782
92	9.1	-0.025	105.9	41782
93	9.2	0.217	60.7	24544
94	9.3	-0.024	105.6	41646
95	9.4	-0.029	106.8	42101
96	9.5	-0.020	104.8	41357
97	9.6	0.295	50.7	20718
98	9.7	-0.023	105.5	41626
99	9.8	0.096	80.2	31974
100	9.9	0.115	76.7	30642
101	10.0	-0.020	104.8	41353

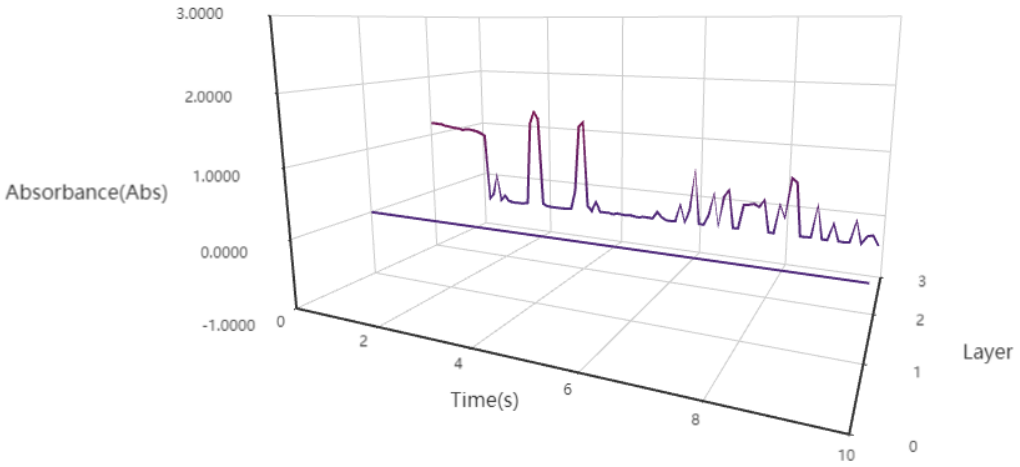


Data List | Peak List

	Wavelength	Absorbance	Transmittan	Type
5	635.0	-0.065	116.1	Peak
6	629.0	-0.073	118.3	Peak
7	610.0	0.913	12.2	Peak
8	591.0	0.950	11.2	Peak
9	575.0	3.000	-1.0	Peak
10	562.0	1.923	1.2	Peak
11	560.0	1.968	1.1	Peak
12	545.0	0.495	32.0	Peak
13	506.0	-0.107	128.0	Peak
14	648.0	-0.071	117.6	Valley
15	639.0	-0.094	124.2	Valley
16	612.0	-0.086	122.0	Valley
17	561.0	1.777	1.7	Valley

After the test is complete, you can view the test result on the right of the screen. Drag the scroll bar to the right of the data to view all test data. Peak： Red display； Trough： Yellow display (color can be changed as needed later).

Three-dimensional map： Multiple scan curves are combined and displayed in 3D, so that the sample can be analyzed using the observation of the graph.



5. Expand functionality

Set bandwidth (only valid for adjustable slit instruments) : Click [Operation]-[Set Bandwidth], and you can select the corresponding bandwidth according to your specific test requirements to improve the accuracy and adaptability of the measurement.

Check the slit bandwidth: Click [Operation]-[Check the slit Bandwidth], and the instrument will automatically perform a bandwidth check.

Set up the automatic sample rack (valid only for automatic sample rack instruments)