



Chemical Intelligence Unleashed

NOVEL MID-IR SPECTROMETER

Miniaturized Spectroscopy

Robust and easy-to-use infrared spectrometer that fits in the palm of your hands for all your real-time, chemical composition measurements.



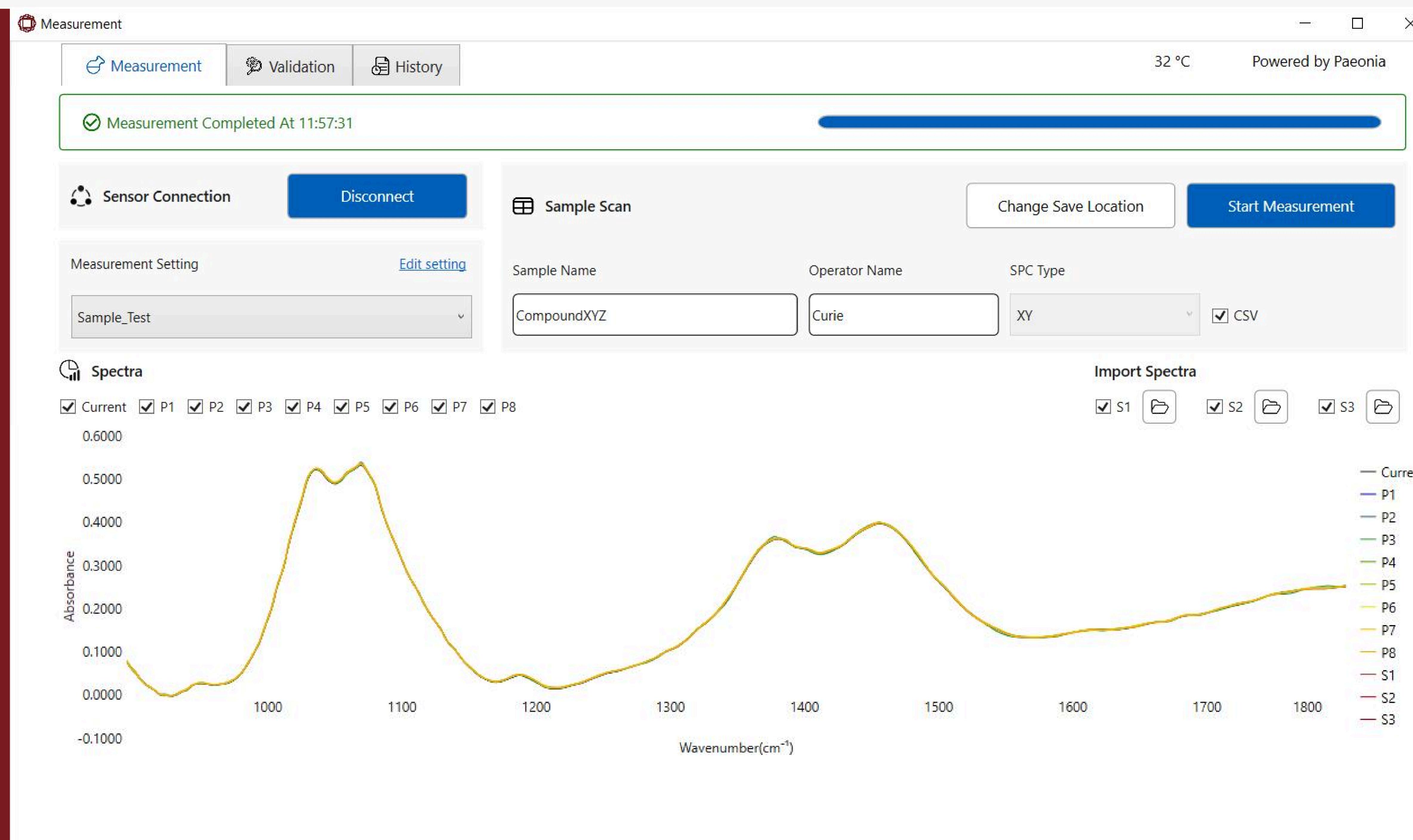
ROBUST AND COMPACT

At a size of $5 \times 5.5 \times 6$ cm, the Novel Mid-IR Spectrometer is a fraction of the size of all traditional spectrometers. It does not use any moving components or fragile optical fibers, allowing you the freedom to decide where and how you want to use the spectrometer.



SIMPLE

Just plug in the module via USB to a computer with the software installed and you are good to go even in the field.

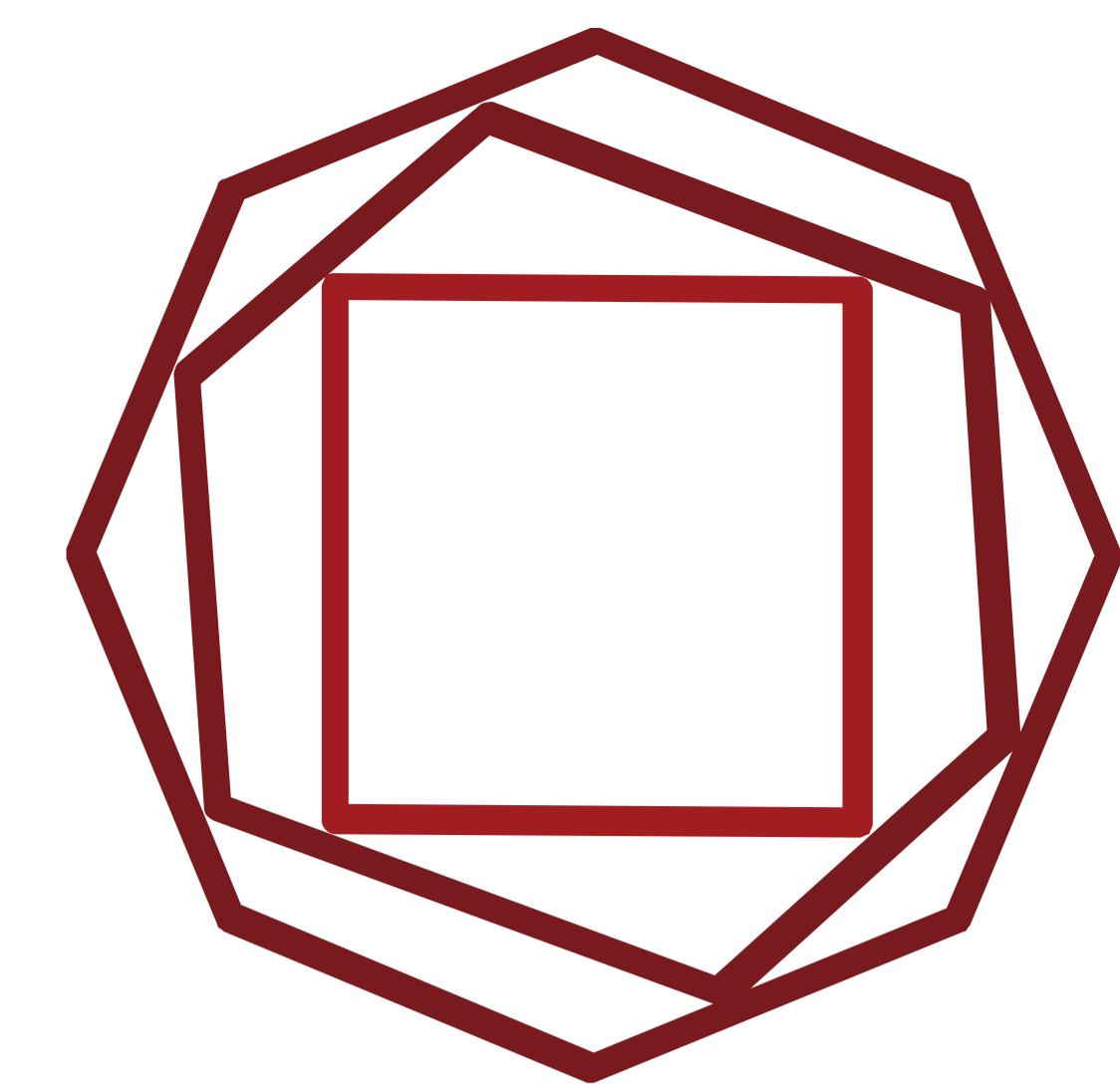


OTHER FEATURES AT A GLANCE

- Real-time results
- Minimal maintenance
- Long-term measurement
- Intuitive and simple user interface
- Power and communicate with a single USB
- Use a spectrometer even in tight corners
- Customizable to meet your needs
- Globally tested in the field in multiple countries in North America, Europe and Asia
- Modular and mountable in different settings
- Hand-tight, tool-less fittings for quick setup
- Use multiple units in a flow chemistry setup
- Light and small size enabled by our proprietary chips and optical design

MID-IR SPECTROSCOPY

Dipole moments in molecular bonds can vibrate with energies that correspond to the mid-infrared region of light such that light passing through can be absorbed by the bonds that match in energy. As the dipole moments are affected by the bond and the surroundings, Mid-IR spectroscopy can be used to identify molecules and combined with measurement of the intensity to also quantify the concentration.

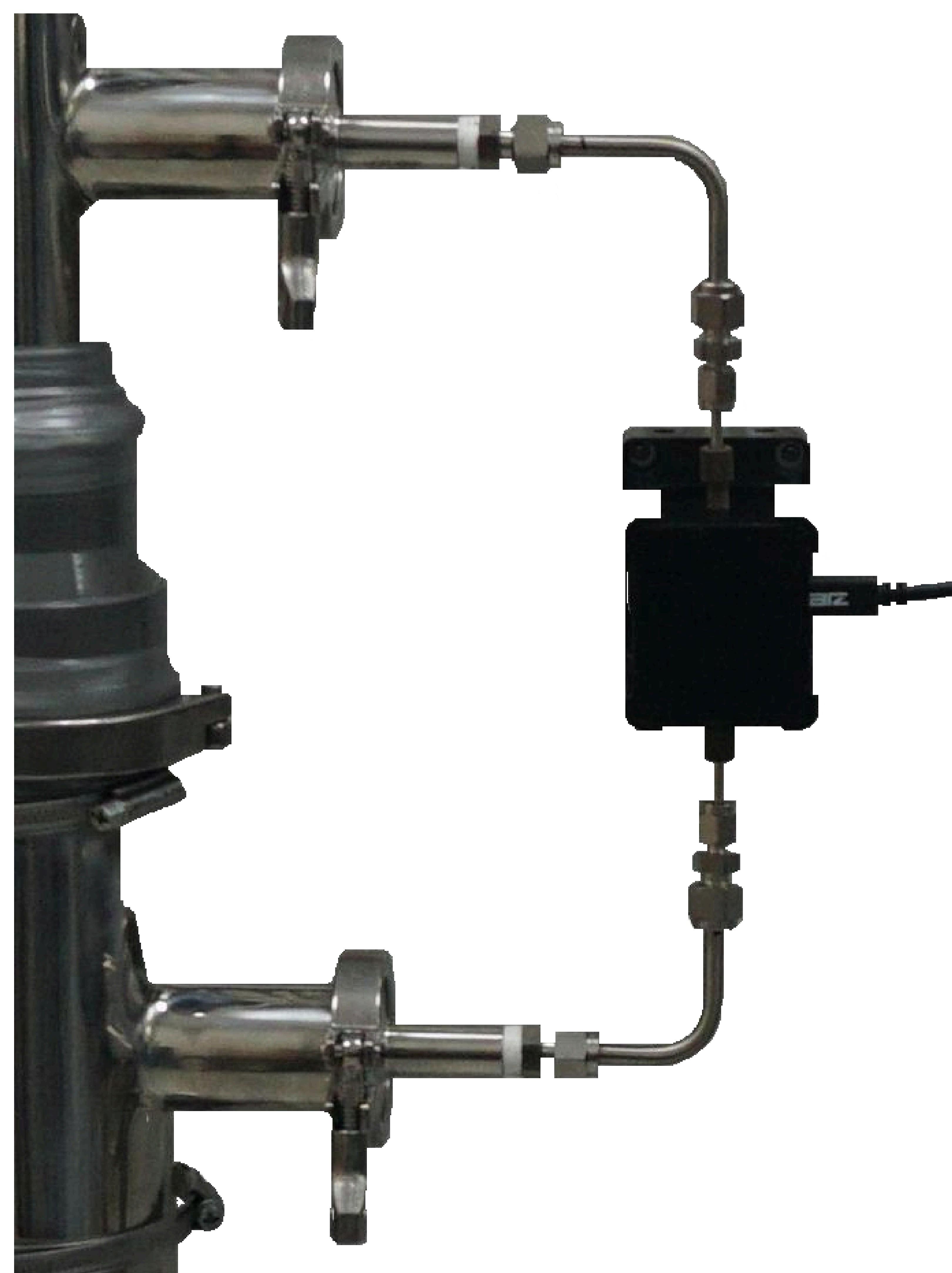


KINETICS, MOLECULAR STRUCTURE AND THERMODYNAMIC STUDIES

Researchers may use our spectrometer to expound the different molecular structures of the reaction species with potential kinetic and thermodynamic pathways, enabling green synthesis, new catalysts, molecules and reactions.

INLINE PROCESS MONITORING

Process industries such as (pharmaceutical, specialty chemicals, petrochemicals, chemicals, food and beverage) using liquid chemicals in their processes, can use our spectrometer to monitor reactions, reduce cycle times, maximize yield, reduce wastes, improve sustainability, control quality and scale up reactions.



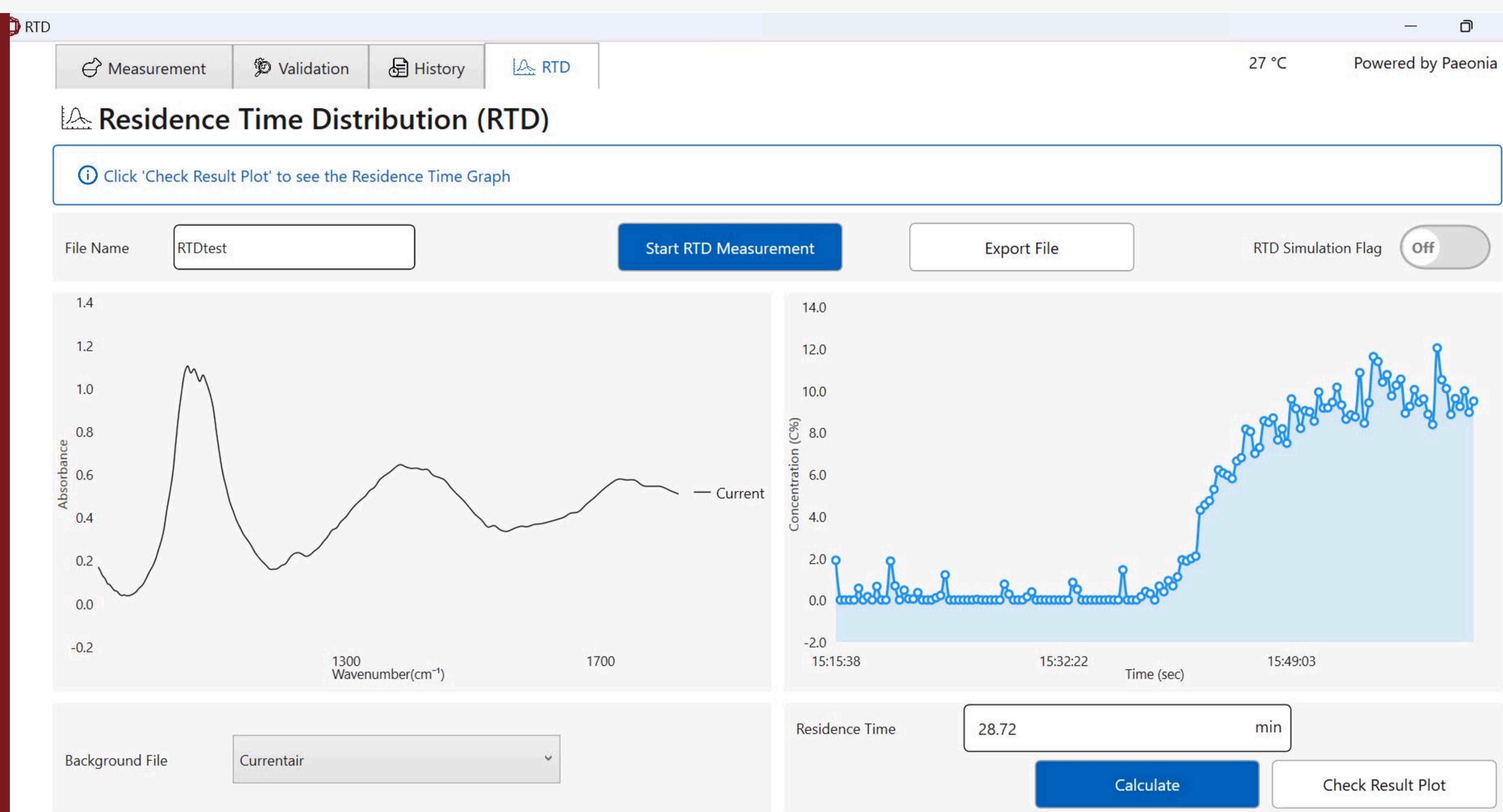
CALCULATING RESIDENCE TIME DISTRIBUTION (RTD)

Unlock the full potential of your chemical processes with Residence Time Distribution (RTD) analysis. RTD reveals how long fluid elements spend inside your reactor—providing powerful insights into flow patterns, reaction efficiency, and system performance.



By measuring RTD, you can:

- Streamline continuous reactor design and scale-up
- Maximize yield and conversion
- Minimize unwanted side reactions
- Enhance product quality



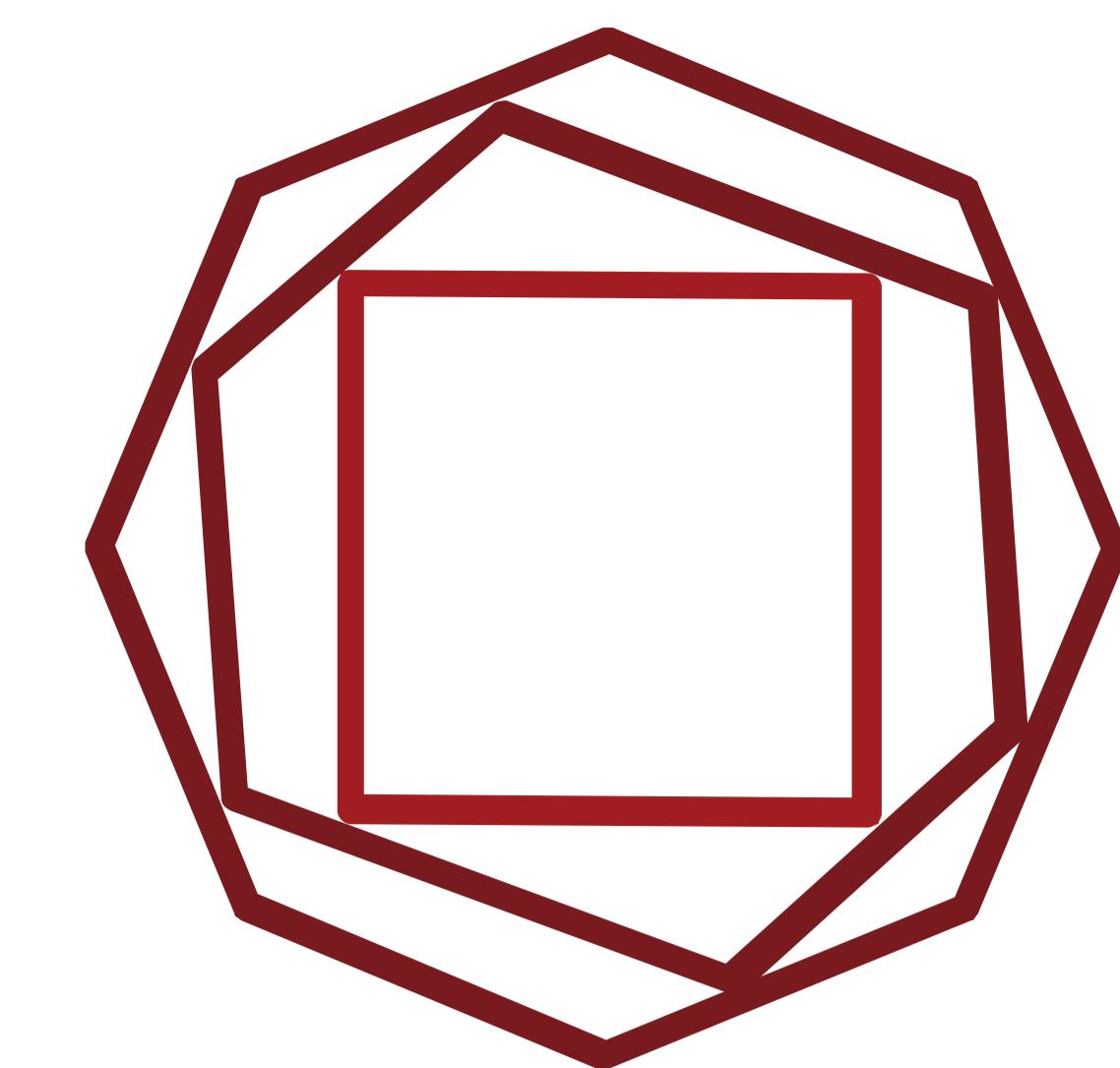
ONE-CLICK RTD ANALYSIS MADE SIMPLE

Our built-in RTD analysis function makes measuring residence time distribution effortless—just one click to start.

- Live tracer concentration monitoring with an integrated calibration model
- Automated RTD plotting at the end of each measurement
- Fast, accurate flow characterization for better reactor insights

No complex setup. No manual calculations. Just precise, real-time data to help you optimize your continuous reactor design with confidence.

REAL-WORLD APPLICATION: RTD ANALYSIS IN ACTION



Tracer: 10 % Acetone in Ethanol

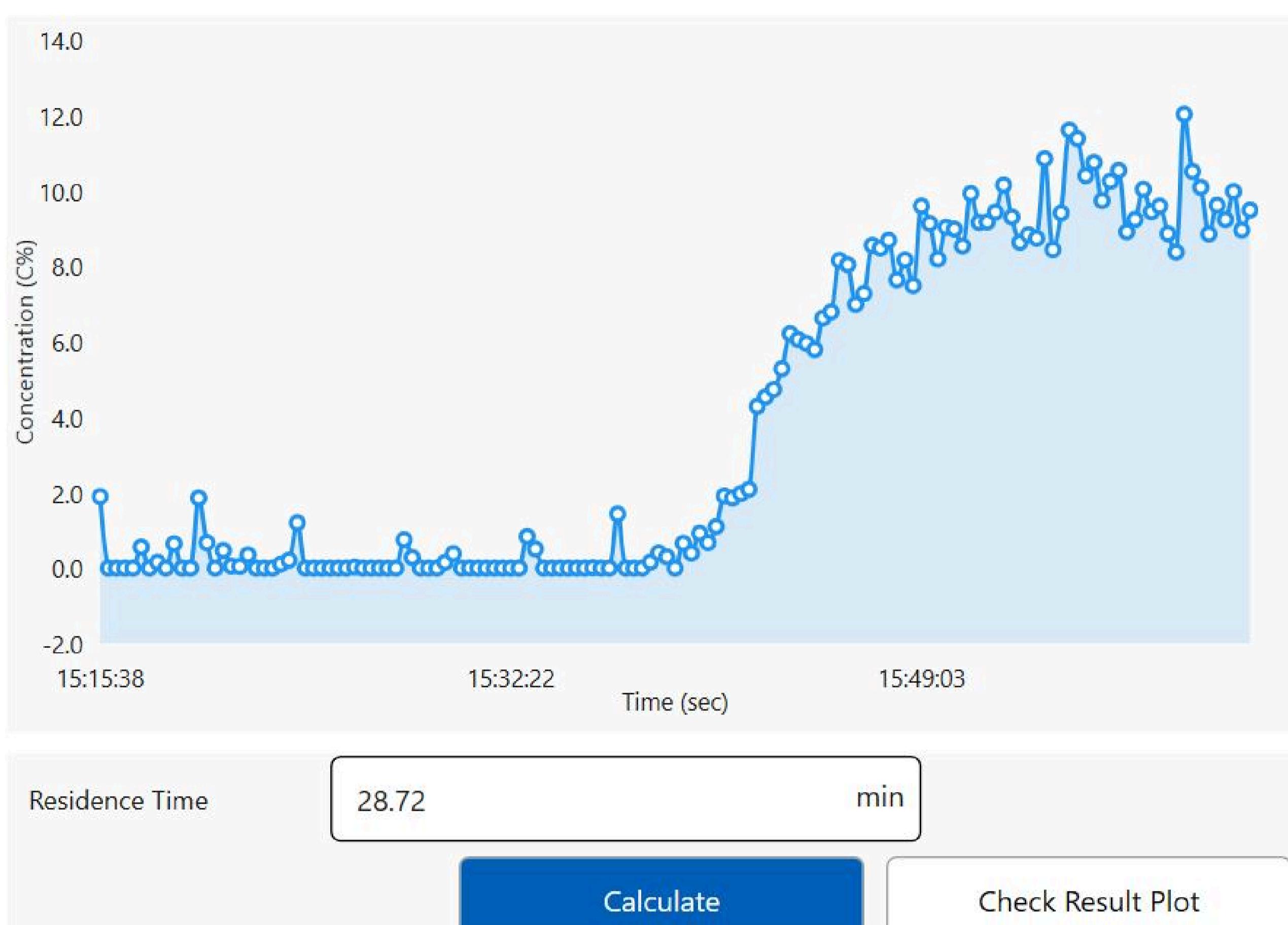
Solvent: Ethanol

Reactor Type: Coiled tubular reactor

Dimensions: 1/4" OD, 4.35 mm ID, 1 meter length

Method: Step Input experiment

Flow rate: 0.4, 0.8, and 1.0 mL/min



KEY EXPERIMENT FINDING

1. Accurate Residence Time Prediction

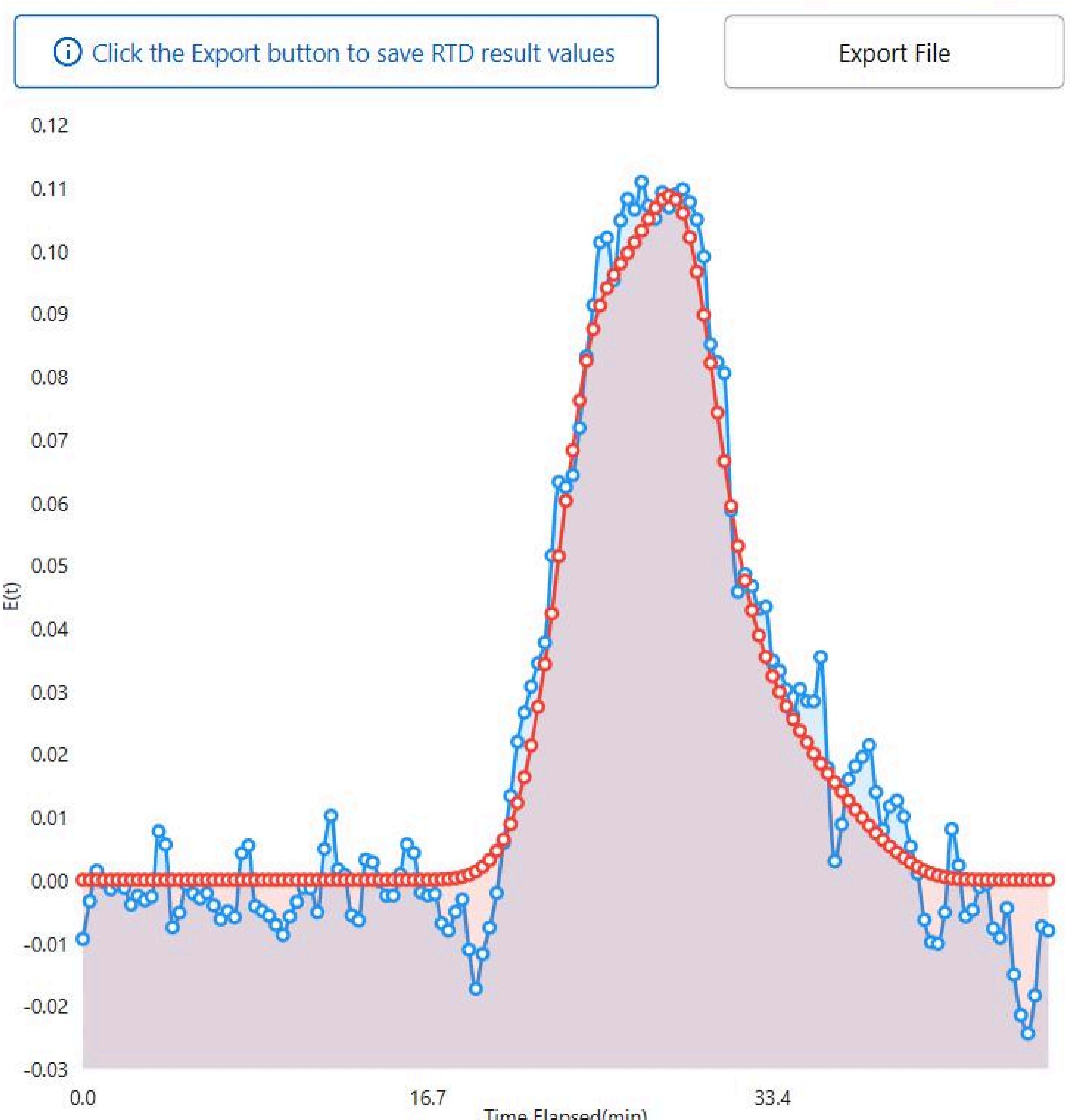
The measured peak residence times closely aligned with theoretical expectations, validating the reliability of the system's flow characterization capabilities.

2. Highly Reproducible RTD Profiles

RTD curves consistently captured both primary flow behavior and subtle secondary features.

3. Compact & Accessible Setup

All measurements were performed using a single, USB-powered device, demonstrating the simplicity, portability, and accessibility of the RTD system—no complex instrumentation or setup required.



SIMPLIFYING PRECISION: THE FUTURE OF RTD ANALYSIS

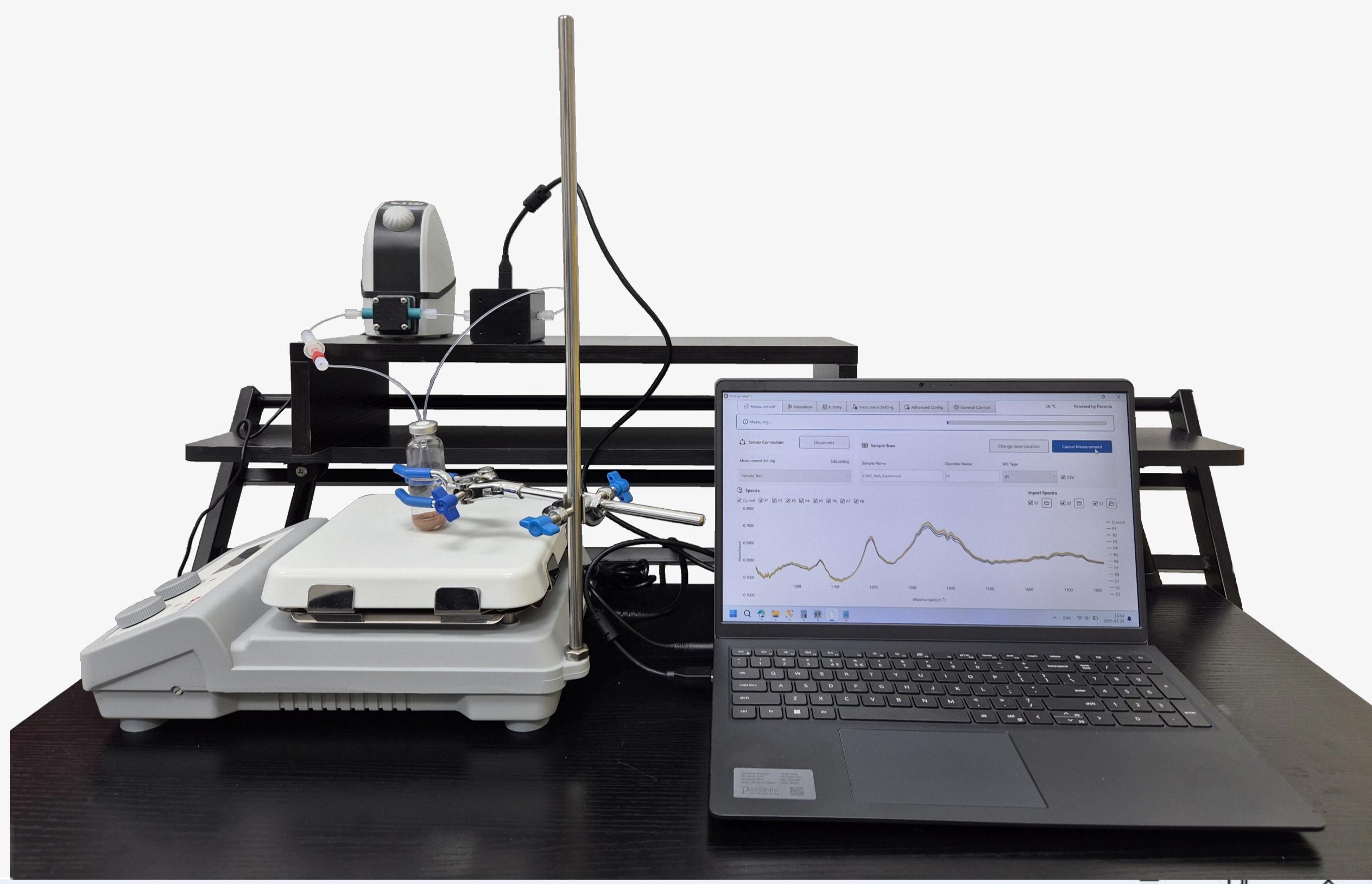
Experience next-level flow analysis with our plug-and-play RTD solution—designed for precision, simplicity, and real-time insights. Accurately measure residence time distribution using a compact, USB-powered device, complete with live tracer monitoring and automated RTD plot generation. Whether you're optimizing reactors, validating flow behavior, or scaling up processes, our system delivers:

- Reproducible results aligned with theory
- High-resolution RTD profiles, even in complex geometries
- Effortless setup with no specialized training required

Streamline your research. Accelerate your development. Simplify your RTD.

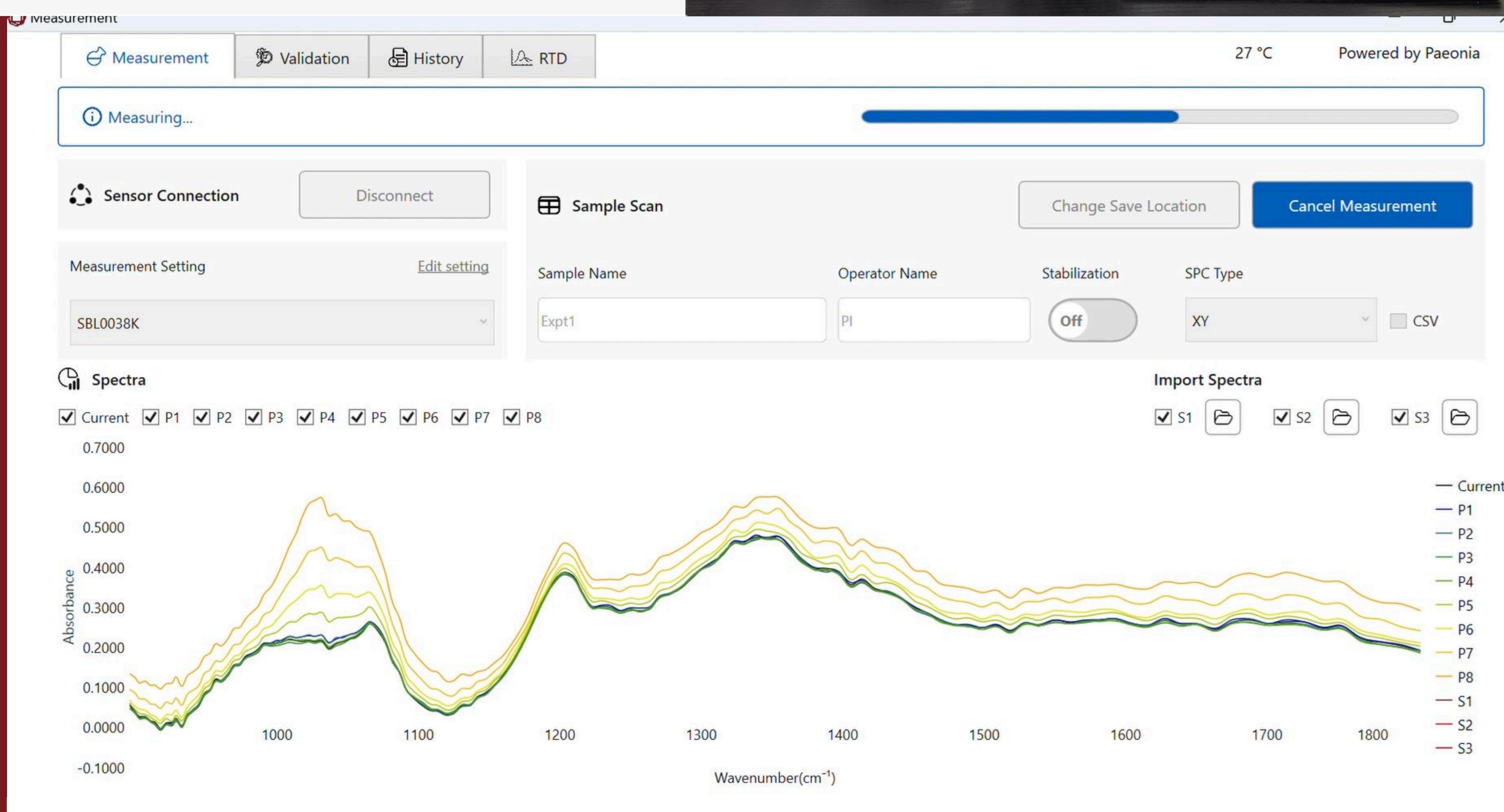
REACTION MONITORING

Real-time reaction monitoring empowers you to observe your chemical processes as they unfold—offering immediate feedback on concentration changes, reaction rates, and conversion levels. With live data at your fingertips, you can make smarter, faster decisions at every stage of development and production.



By implementing real-time reaction monitoring, you can:

- Optimize reaction conditions with precision
- Detect deviations and side reactions early
- Accelerate development and troubleshooting
- Ensure consistent product quality and performance



ADD-ON SERVICE: CUSTOM CALIBRATION MODEL INTEGRATION

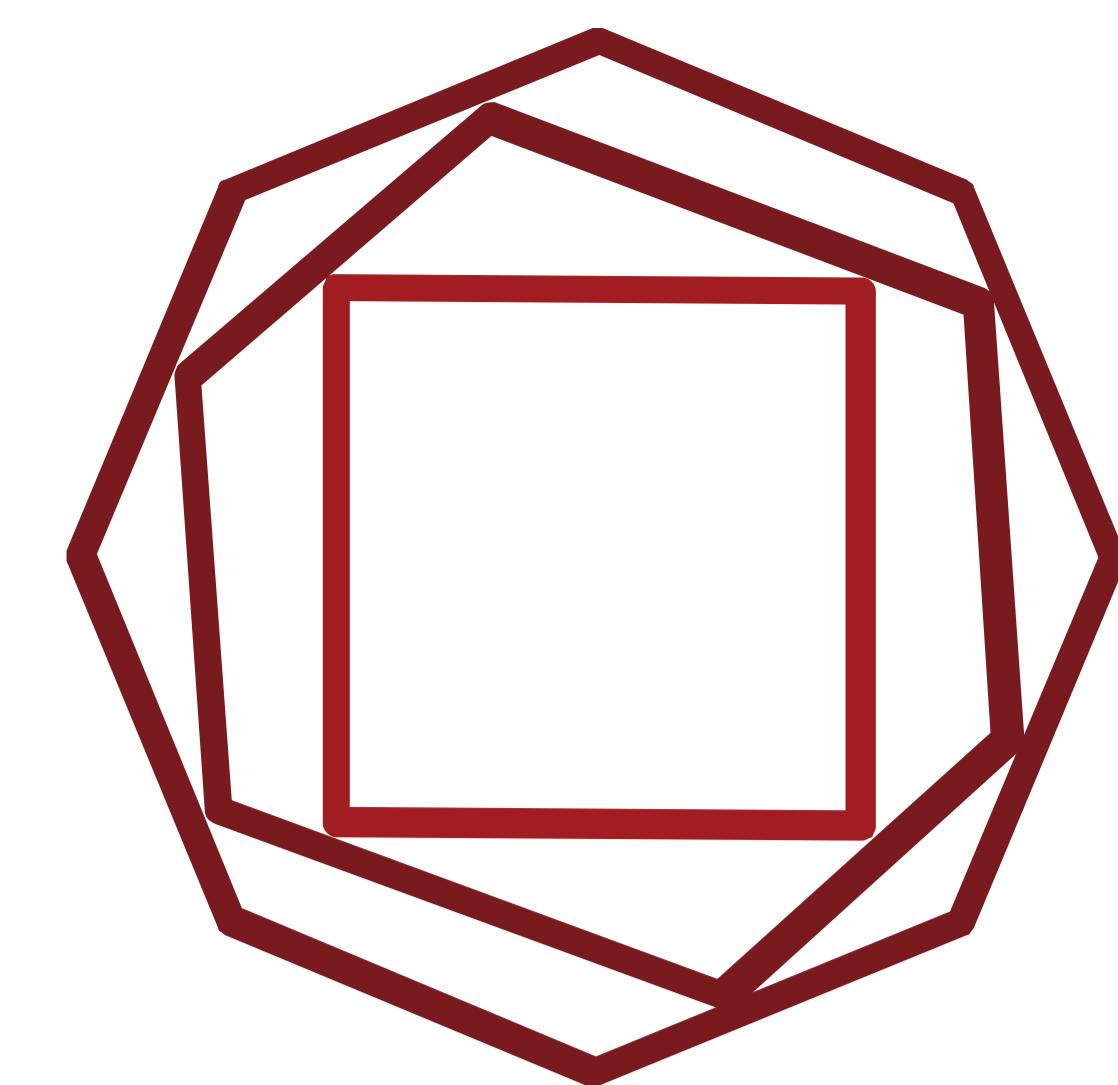
To further enhance your workflow, we offer a personalized service to help you build and integrate calibration models directly into our software platform. This allows you to effortlessly monitor reactant and product concentrations in real time—tailored to your specific chemistry.

With this service, you can:

- Track key species with confidence and accuracy
- Eliminate manual calibration steps
- Streamline data collection and interpretation
- Enable real-time decision-making in complex reactions

Our team works closely with you to ensure seamless integration—so you can focus on the chemistry, not the setup.

REAL-WORLD APPLICATION: REACTION MONITORING IN ACTION



Reaction: Aldol reaction of acetone

Reactant: Acetone

Catalyst: Amberlyst® A26(OH)

Temperature: Room temperature

Duration: 2.5 hours

KEY EXPERIMENT FINDING

1. Real-Time Insights

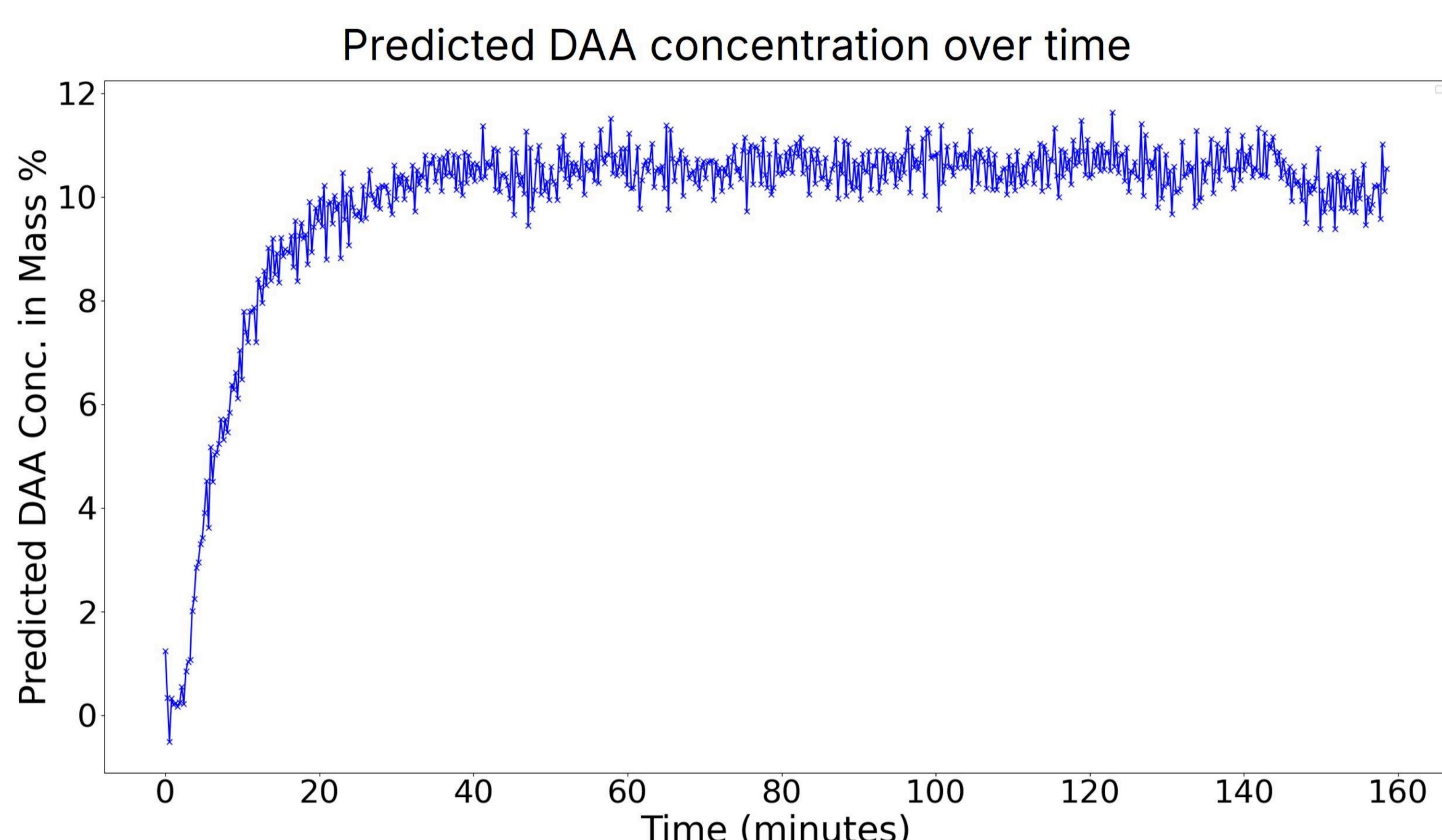
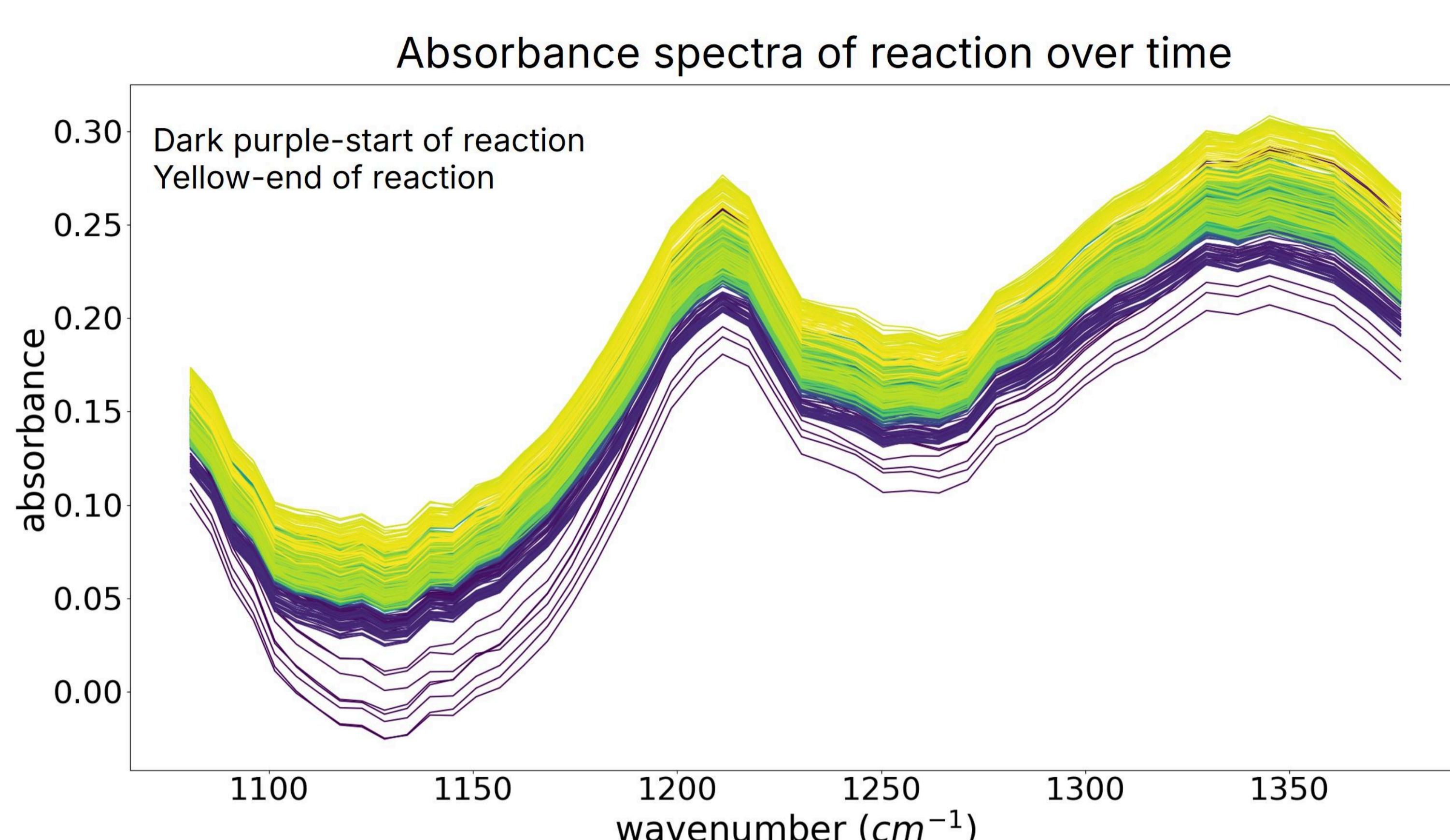
Integrated IR sensors deliver continuous, live data—enabling instant adjustments to reaction conditions for better control and faster optimization.

2. Non-Destructive Analysis

IR spectroscopy is completely non-invasive, allowing for sample integrity to be maintained for further testing or downstream analysis.

3. High Sensitivity

Detects even low concentrations of reactants and products, ensuring accurate, reliable tracking of reaction progress.



REFINING CONTROL: THE FUTURE OF REACTION MONITORING

Experience real-time chemical insight with our plug-and-play reaction monitoring solution—engineered for accuracy, simplicity, and immediate decision-making. Track reactant and product concentrations live using a compact, USB-powered device with integrated IR sensor technology and customizable calibration models.

Whether you're optimizing reaction conditions, troubleshooting, or scaling up your process, our system offers:

- Continuous, real-time data for immediate feedback
- Non-invasive monitoring that preserves sample integrity
- Simple setup—no specialized training or complex instrumentation

Improve consistency. Enhance efficiency. Simplify your reaction monitoring.

PRODUCT SPECIFICATIONS

Wavenumber Range	900 cm ⁻¹ to 3500 cm ⁻¹
Size	5 cm x 5.5 cm x 6 cm
Weight	450 g
Response Time	0.3 s
Power Consumption	600 mW (5V)
Electrical Connection	Single USB-C to power device and transmit data Can be controlled by OPC UA
Void Volume	0.1 mL
Back Pressure	<0.3 bar at 250 mL.min ⁻¹ water flow
Pressure Rating	0 to 50 bar absolute
Tube Fitting	1/4"-28 flat-bottom
Tube Size	OD of 1/8" or 1/16"
Chemicals Temperature	-15 °C to 60 °C
Ambient Temperature and Humidity	0 °C to 60 °C; 0 % RH to 90 % RH
Wetted Materials	SS316L, FFKM, Si, Ge, Au
Pathlength Options	12 µm, 20 µm, 25 µm, 100 µm or 200 µm
Residence Time Distribution	Built-in function to do residence time distribution and live concentration measurement
Historical Information	Immutable records of past measurements and data
Self Test Function	Auto test instrument signal-to-noise ratio
Data Format	SPC or CSV files
Software Operating System	Microsoft Windows 10 & 11



Reach out to us to try a demo and experience a new way of measuring chemicals that suits your needs. If the current product does not meet your requirements, we can discuss on the customization to solve your problem.

As innovators, we continually improve our products for our customers, hence specifications may change.

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INNOVATIONS

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