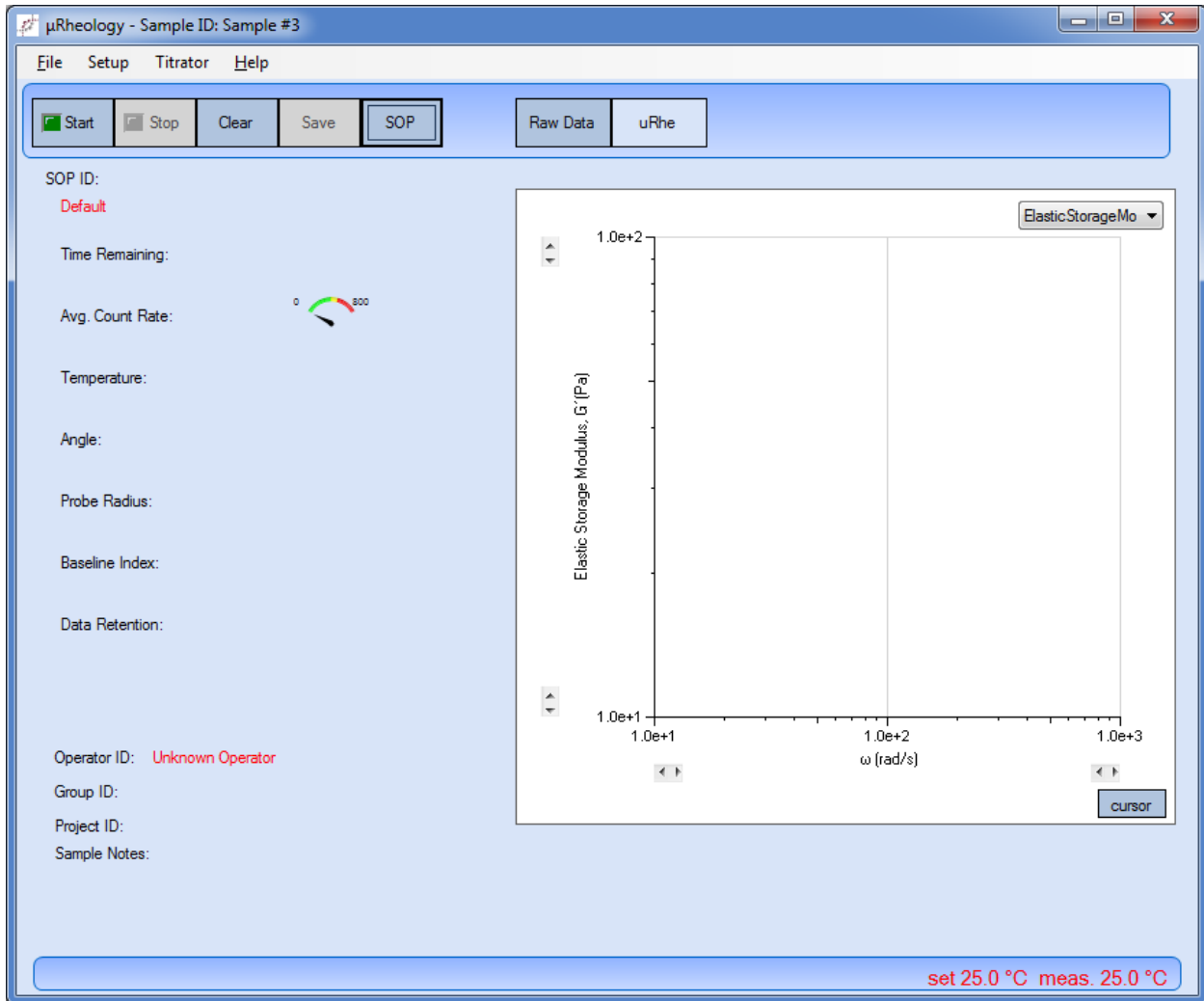


μRheology Measurement Quick Start Guide

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μRheology New Measurement Window



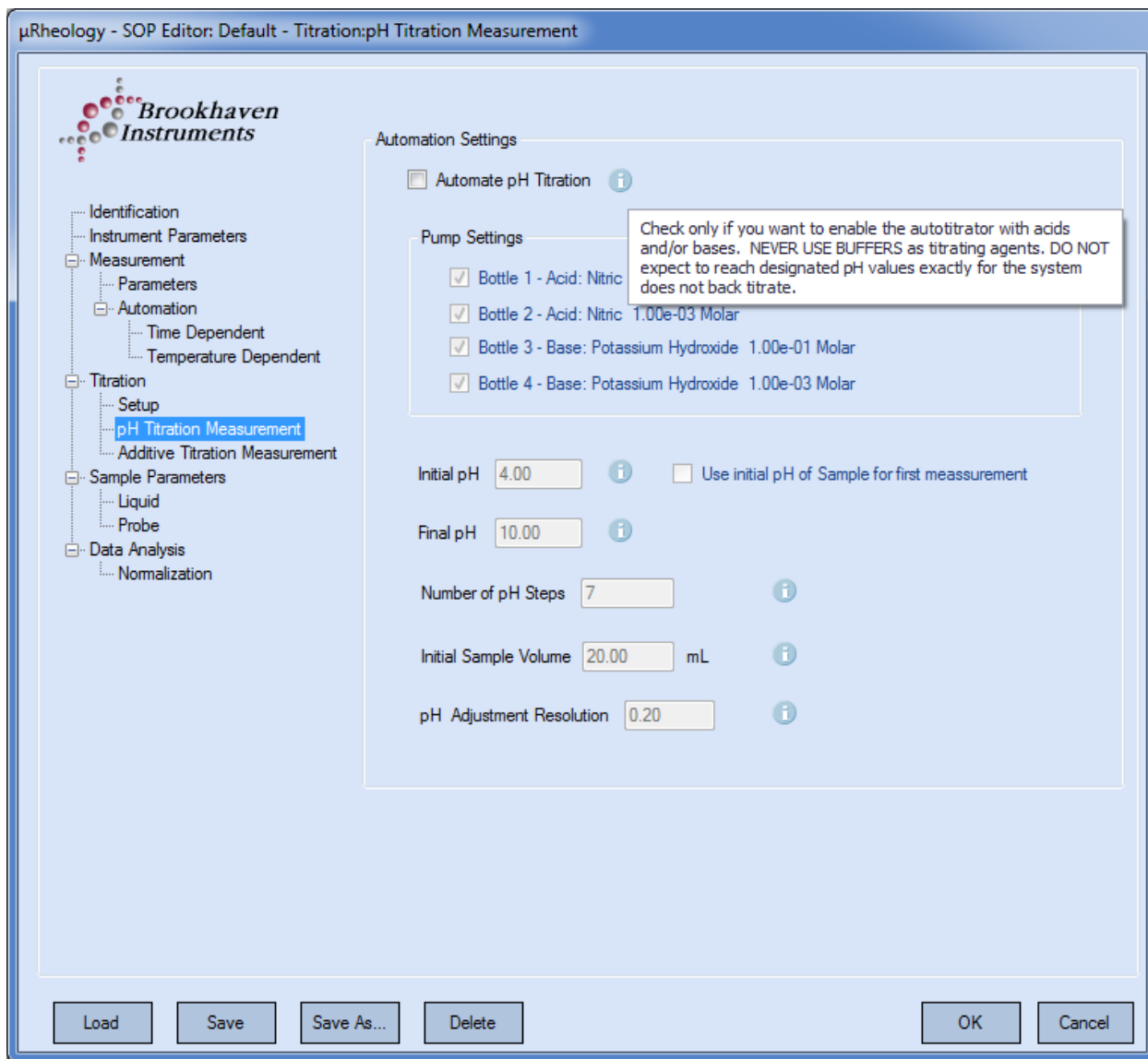
The μRheology measurement window is used to collect new measurements.

The Start and Stop buttons are used to initiate and pause a measurement's progress. When Start is pressed, a sequence of one or more measurements will be collected as defined in the measurement SOP.

The Clear button can be used to clear the current measurement. Once a measurement sequence is completed, the final measurement from the sequence will be visible. It must be cleared before an operator can begin a new measurement sequence.

You may choose to view either size distribution results or raw correlation function data using the buttons on the right side of the window.

μRheology SOP Help



Click on the information icon to see the description of the setting in pop out dialog.

μRheology SOP Identification Window

μRheology - SOP Editor: Default - Identification

Brookhaven Instruments

- Identification
- Instrument Parameters
- Measurement
 - Parameters
 - Automation
 - Time Dependent
 - Temperature Dependent
- Titration
 - Setup
 - pH Titration Measurement
 - Additive Titration Measurement
- Sample Parameters
 - Liquid
 - Probe
- Data Analysis
 - Normalization

Sample ID:

Group ID:

Project ID:

Batch #:

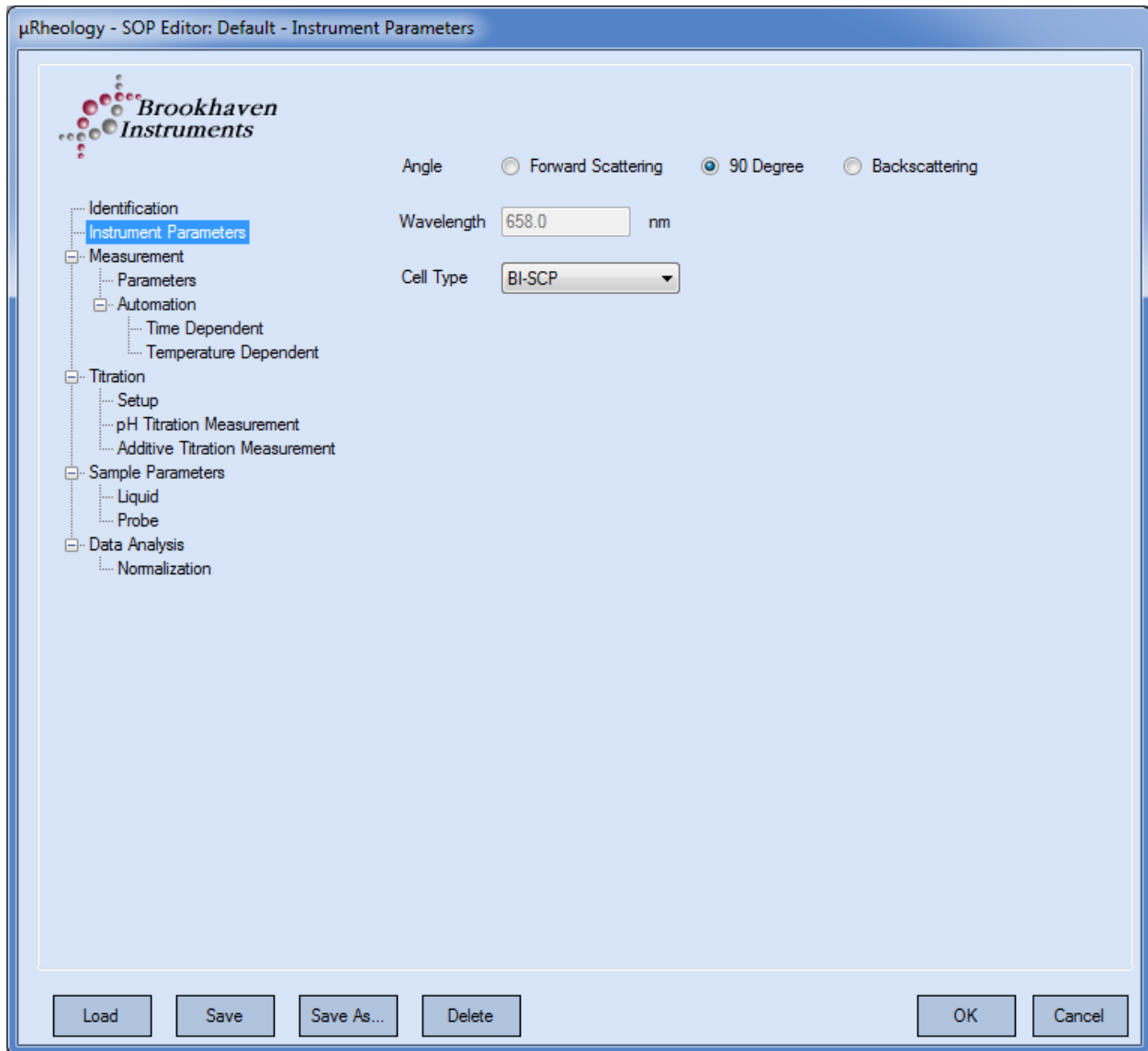
Notes:

Buttons: Load, Save, Save As..., Delete, OK, Cancel

Measurement Identification parameters are indicated the identification window.

The SOP ID is the name of the SOP file that is currently in effect. You may load and save SOP files as needed before a measurement sequence is started. Once started, you may not change the SOP to a different file.

μRheology SOP Instrument Parameters



Instrument parameters are indicated in this window.

μRheology SOP Measurement : Parameters Window

μRheology - SOP Editor: Default - Measurement:Parameters

Brookhaven Instruments

- Identification
- Instrument Parameters
- Measurement
 - Parameters
 - Automation
 - Time Dependent
 - Temperature Dependent
 - Titration
 - Setup
 - pH Titration Measurement
 - Additive Titration Measurement
 - Sample Parameters
 - Liquid
 - Probe
 - Data Analysis
 - Normalization

Temperature 25.0 deg C

Set Duration 30 seconds

Equilibration Time 0 seconds

Dust Cutoff 30.00

Apply Dust Filter

Probe Radius 410 nm

Load Save Save As... Delete OK Cancel

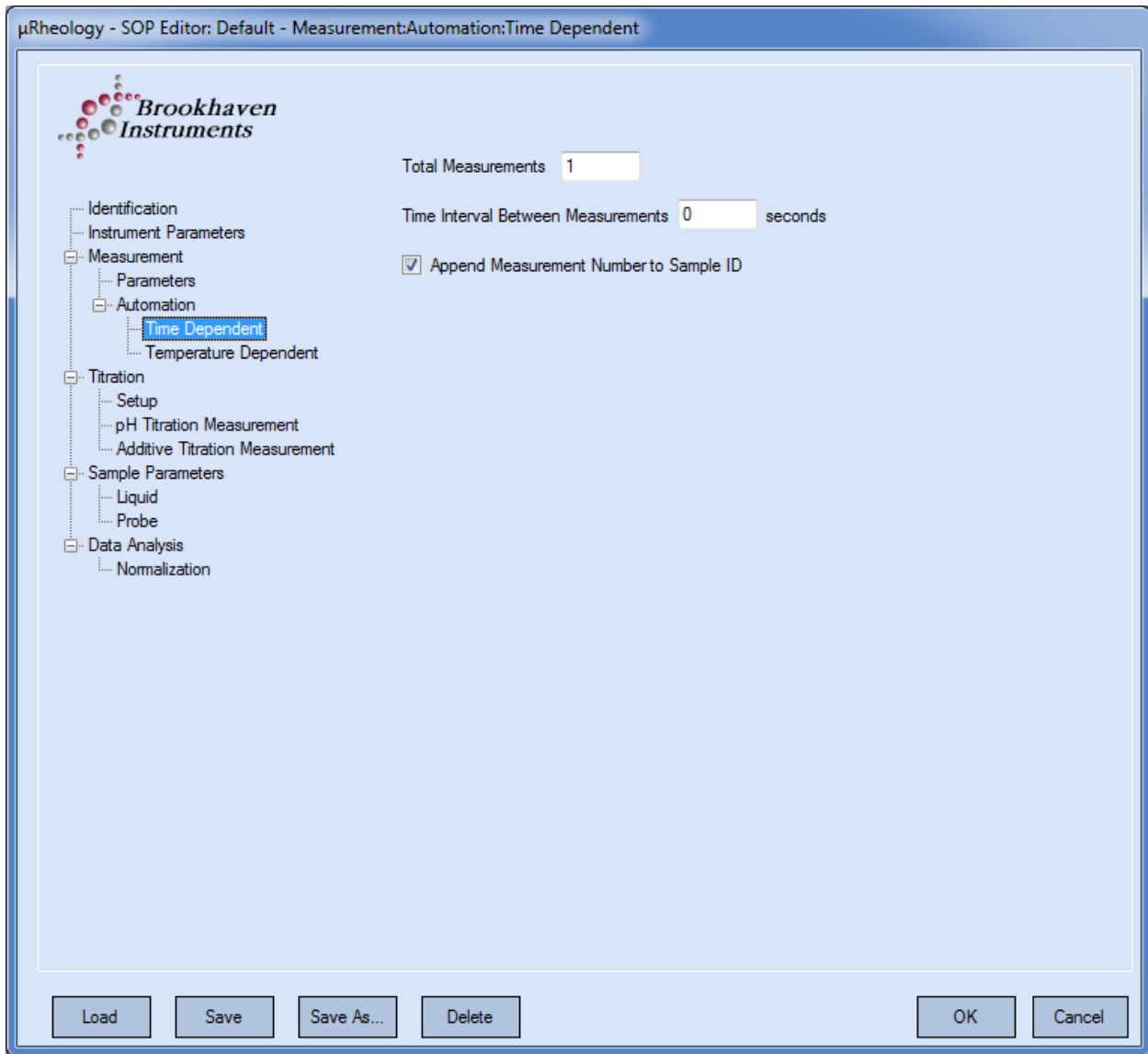
Use Set Duration to indicate the measurement duration.

The Equilibration Time may be used to invoke a delay after the temperature has been stabilized, before the actual measurement data acquisition begins.

Enter the probe radius in nanometers. The probe must be monodisperse (check using DLS) and large to dominate the scattering. It must be larger than the microstructure of the complex fluid. For Newtonian liquids, you could use a radius as small as 30 nm, but for visco-elastic liquids, start with a radius of 200 nm and larger. If the results change with a larger size, try a third even larger size.

Once a measurement sequence is started, many of the SOP parameters, such as measurement duration, cannot be changed and are used for the entire measurement sequence.

μRheology SOP Measurement : Automation : Time Dependent Window



In this window, you may indicate the number of measurements to make using Total Measurements.

You may also indicate a time interval between measurements. The interval is the number of seconds between the end of one measurement and the start of a new measurement.

μRheology SOP Measurement : Automation : Temperature Dependent Window

μRheology - SOP Editor: Default - Measurement:Automation:Temperature Dependent

Brookhaven Instruments

Use Temperature Automation

Starting Temperature deg C

Final Temperature deg C

Temperature Increment deg C

Append Temperature to Sample ID

Automation Completed Temperature deg C

Load Save Save As... Delete OK Cancel

In this window, you may indicate a temperature automation sequence. You must indicate a start, and final temperature, and a temperature increment.

The Use temperature automation checkbox must also be checked in order to use the temperature automation settings in the measurement sequence.

Note that the number of measurements requested in the Measurement Automation : Time Dependent Window will be made for each temperature in the temperature automation sequence.

The final temperature that the instrument should return to at the end of the measurement sequence is also indicated on this page.

μRheology SOP Titration : Setup

μRheology - SOP Editor: Default - Titration: Setup

Brookhaven Instruments

Identification
Instrument Parameters
Measurement
 Parameters
 Automation
 Time Dependent
 Temperature Dependent
Titration
 Setup
 pH Titration Measurement
 Additive Titration Measurement
Sample Parameters
 Liquid
 Probe
Data Analysis
 Normalization

	Type	Description	Concentration	Units
Bottle 1	Acid	Nitric	1.00e-01	Molar
Bottle 2	Acid	Nitric	1.00e-03	Molar
Bottle 3	Base	Potassium Hydroxide	1.00e-01	Molar
Bottle 4	Base	Potassium Hydroxide	1.00e-03	Molar

Load Save Save As... Delete OK Cancel

In this window, you may setup the type, description, concentration and units of the acid and base solutions used for the titration.

Up to four bottles of reagents are available corresponding to the four pumps. A reagent is either an acid, base, or additive. Select which one under Type. Under Description, use the pull down box for choices. For acids, select the recommended HNO₃ or type in the name under Unspecified. For bases, select NaOH, KOH, or type in the name under Unspecified. For additives, there is a long list of salts, surfactants, wetting, and dispersing agents, or type in a more specific name under Unspecified. Enter the concentration in either decimal or scientific notation. Finally, select the units. For acids and bases, choose either Molar or Millimolar. For additives, there is a long list including % w/w, v/v, w/v, mg/mL, mg/L, Molar, or Millimolar.

μRheology SOP Titration : pH Titration Measurement

The screenshot shows the 'μRheology - SOP Editor: Default - Titration:pH Titration Measurement' window. On the left is a tree view with categories: Identification, Instrument Parameters, Measurement (Parameters, Automation, Time Dependent, Temperature Dependent), Titration (Setup, pH Titration Measurement, Additive Titration Measurement), Sample Parameters (Liquid, Probe), and Data Analysis (Normalization). The 'pH Titration Measurement' item is selected. The main area contains 'Automation Settings' with a checkbox for 'Automate pH Titration'. Below it is a 'Pump Settings' box with four checked items: 'Bottle 1 - Acid: Nitric 1.00e-01 Molar', 'Bottle 2 - Acid: Nitric 1.00e-03 Molar', 'Bottle 3 - Base: Potassium Hydroxide 1.00e-01 Molar', and 'Bottle 4 - Base: Potassium Hydroxide 1.00e-03 Molar'. Below the pump settings are input fields for 'Initial pH' (4.00), 'Final pH' (10.00), 'Number of pH Steps' (7), 'Initial Sample Volume' (20.00 mL), and 'pH Adjustment Resolution' (0.20). A checkbox 'Use initial pH of Sample for first measurement' is also present. At the bottom are buttons for 'Load', 'Save', 'Save As...', 'Delete', 'OK', and 'Cancel'.

Check Automate pH Titration to enable this feature. Check any of the pumps with the bottles you want to use in the titration. The description and concentrations are shown as you filled them in under Titration/Setup. Enter the Initial pH or check the box labeled “Use the initial pH of Sample for the first measurement”. Enter the Final pH. Enter the Number of pH Steps. The larger the number, the longer the measurement. Unit or half unit pH steps is sufficient for most purposes. Enter the Initial Sample Volume in mL. WARNING: An accurate value is required to calculate the amount of each additive to dispense. Enter “pH Adjustment Resolution”. A value of 0.2 is recommended. A smaller value increases significantly the time to make the measurement.

μRheology SOP Titration : Additive Titration Measurement

The screenshot shows the 'μRheology - SOP Editor: Default - Titration:Additive Titration Measurement' window. On the left is a tree view with 'Additive Titration Measurement' selected. The main area is titled 'Automation Settings' and contains the following controls:

- Automate Additive Titration
- Pump Selection**
 - Bottle 1 - Acid: Nitric 1.00e-01 Molar
 - Bottle 2 - Acid: Nitric 1.00e-03 Molar
 - Bottle 3 - Base: Potassium Hydroxide 1.00e-01 Molar
 - Bottle 4 - Base: Potassium Hydroxide 1.00e-03 Molar
- Linear (difference between two successive concentrations is constant) Geometric (ratio of any two successive concentrations is constant)
- Initial Sample Volume: mL
- First Concentration: Molar
- Initial Concentration of Additive in Sample: Molar
- Last Concentration: Molar
- Number of Steps:

Step	Concentration - Molar	Step Volume Dispensed - μL	Total Volume Dispensed - μL	Total Sample Volume mL
------	-----------------------	----------------------------	-----------------------------	------------------------

Buttons at the bottom: Load, Save, Save As..., Delete, OK, Cancel.

Check Automate Additive Titration Titration to enable this feature. Check only one of the pumps, the one with the additive you wish to titrate with. The description, concentration, and units are shown as you filled them in under Titration/Setup. These same units are used later.

Enter the Initial Sample Volume in mL. Enter the Initial Concentration of Additive in Sample. Enter the First Concentration using the same units used in the pump selection section. Enter the Last Concentration in the same units. Enter the Number of Steps in the titration. A large number requires a long run and may add too much volume to the sample cup.

μRheology SOP Sample Parameters : Liquid Window

μRheology - SOP Editor: Default - Sample Parameters:Liquid

Brookhaven Instruments

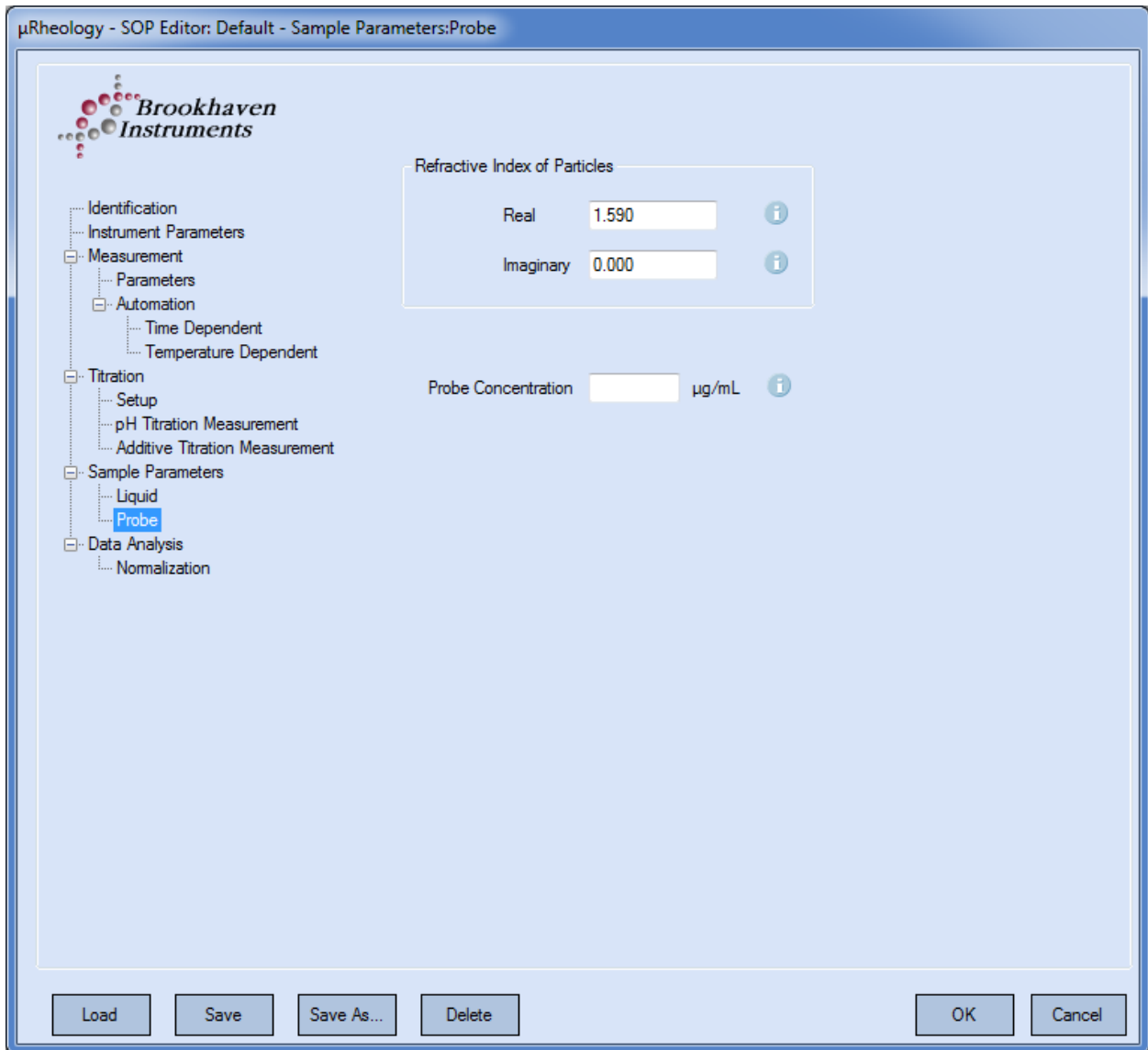
Identification
Instrument Parameters
Measurement
 Parameters
 Automation
 Time Dependent
 Temperature Dependent
Titration
 Setup
 pH Titration Measurement
 Additive Titration Measurement
Sample Parameters
 Liquid
 Probe
Data Analysis
 Normalization

Liquid: Water
Refractive Index: 1.330
pH:

Load Save Save As... Delete OK Cancel

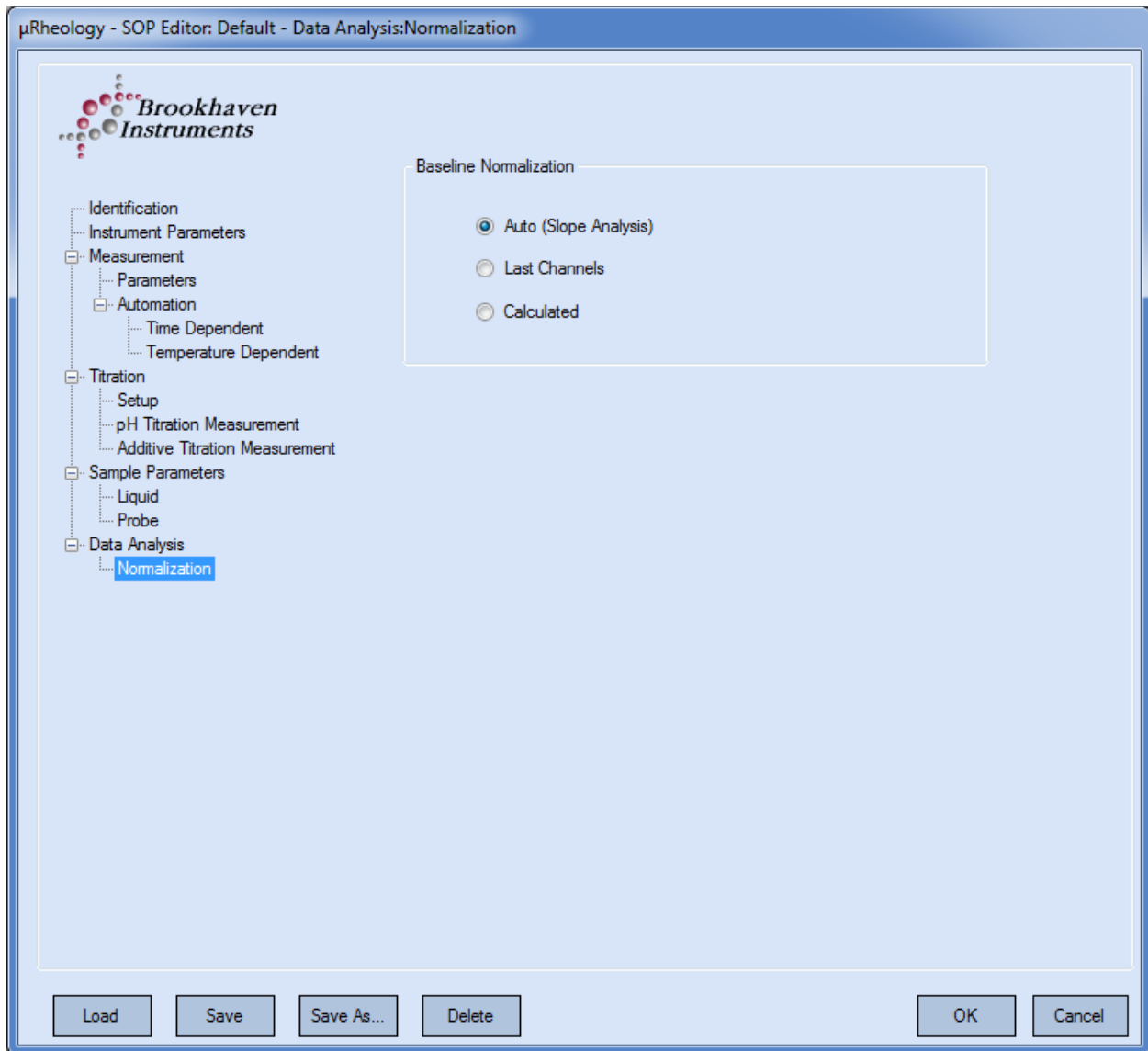
In this window the sample liquid, viscosity and refractive index are indicated.

μRheology SOP Sample Parameters : Probe Window



In this window, particle characteristics are defined.

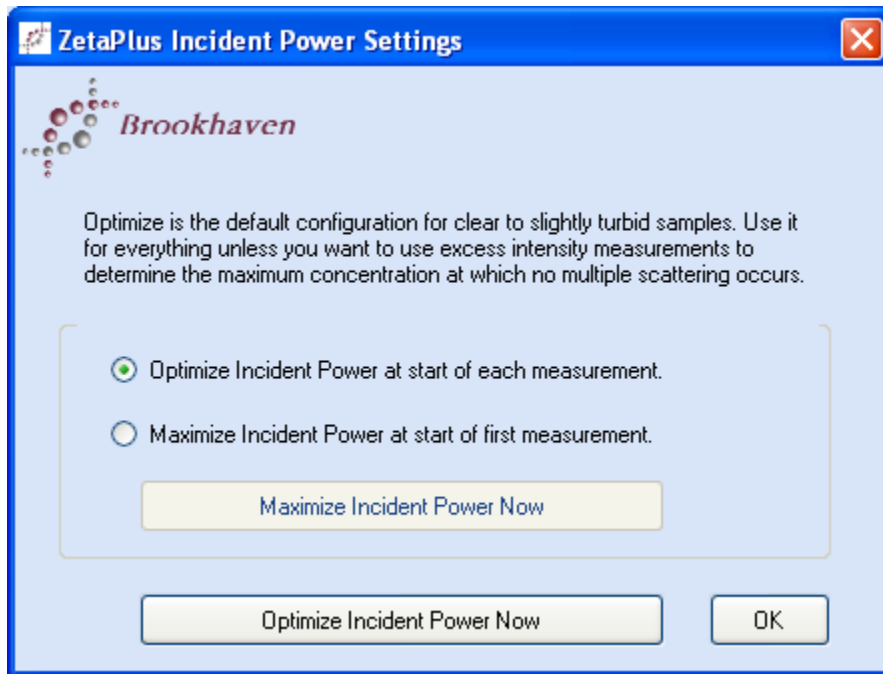
μ Rheology SOP Data Analysis : Normalization



Enter the concentration of the probe particle in $\mu\text{g}/\text{mL}$ from 9.99 to 0.01. The concentration should be large enough to enable a smooth autocorrelation function measurement within a few minutes duration dominated by the probe particle. But low enough not to cause either multiple scattering or interact strongly with the network-like structure formed in the complex fluid. In principle, you might want to make measurements with a new system at three concentrations and choose the ones that do not show any variation in the slopes of G'' , G' , or η^* . A good place to start is at 2 $\mu\text{g}/\text{mL}$, then consider 4 and 8 $\mu\text{g}/\text{mL}$.

In this window the correlation function baseline normalization selection is indicated.

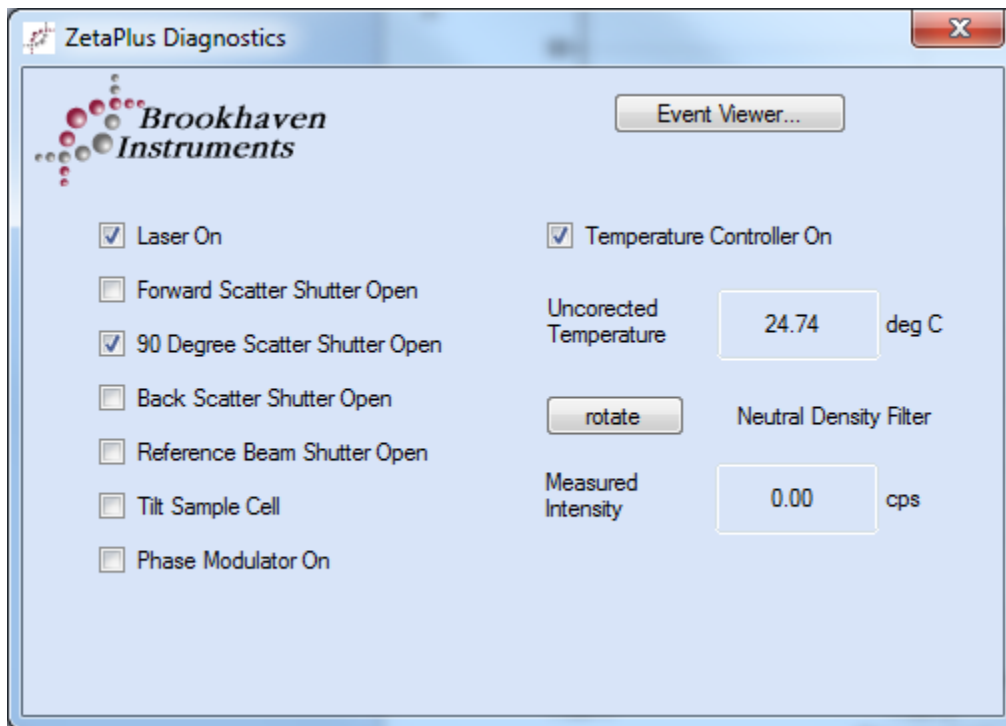
μ Rheology New Measurement Window : Setup : Incident Power Settings



When using a ZetaPlus, ZetaPALS or 90Plus for μ Rheology measurements, the Incident Power Settings for new measurements are indicated in this window.

This window can be accessed from the applications main window by selecting Setup\Incident Power Settings from the μ Rheology measurement window's main menu.

μ Rheology Setup : Diagnostics : Instrument Hardware Test

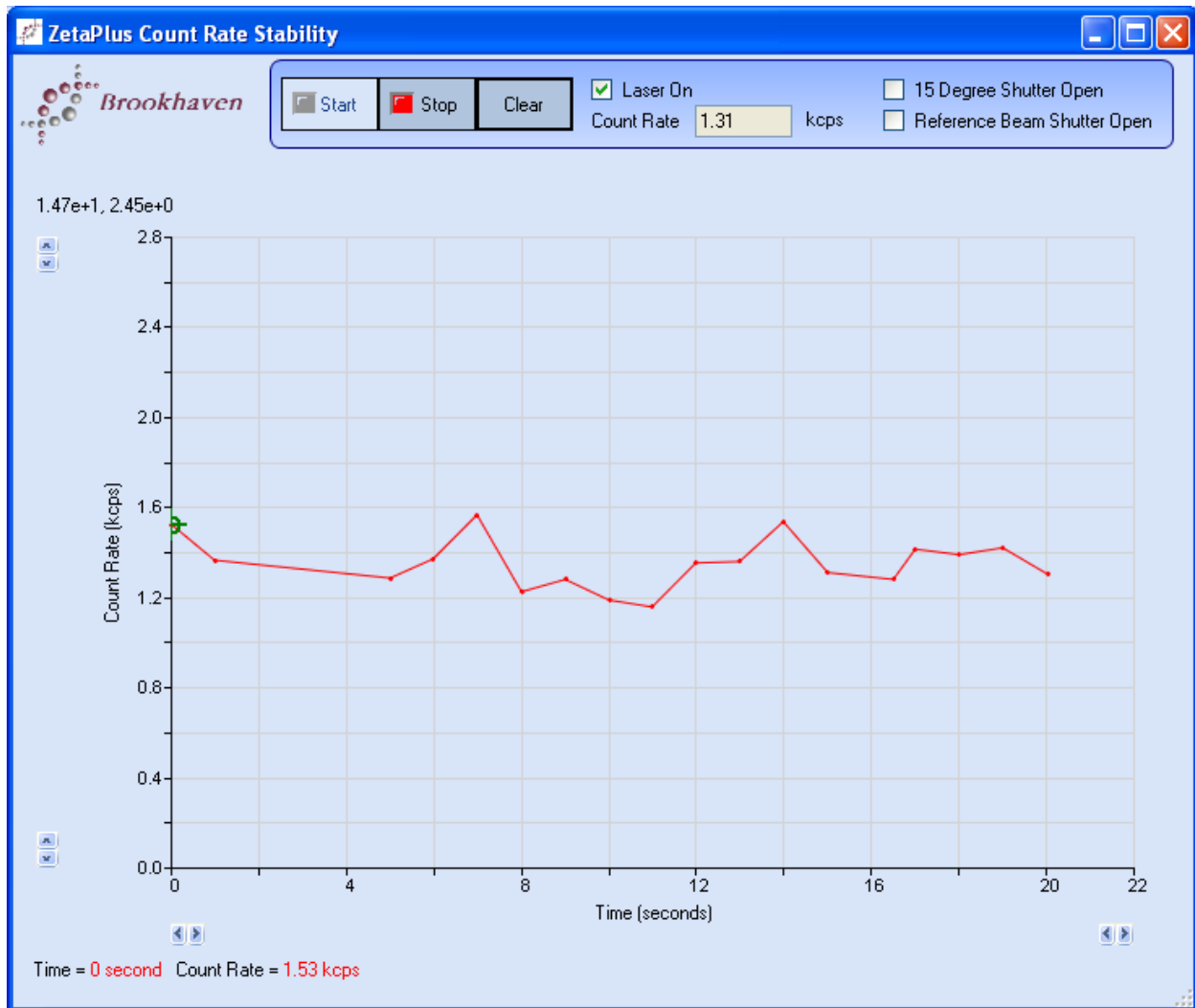


Each measurement application that uses a ZetaPlus, ZetaPALS or 90Plus has a diagnostic window that can be accessed from the application's main window by selecting Setup\Diagnostics\Instrument Hardware Test from the window's main menu.

This window provides direct access to the instrument hardware for diagnostic purposes.

The Event Viewer button brings up the Windows Event Viewer which can be used to display serial communication error messages.

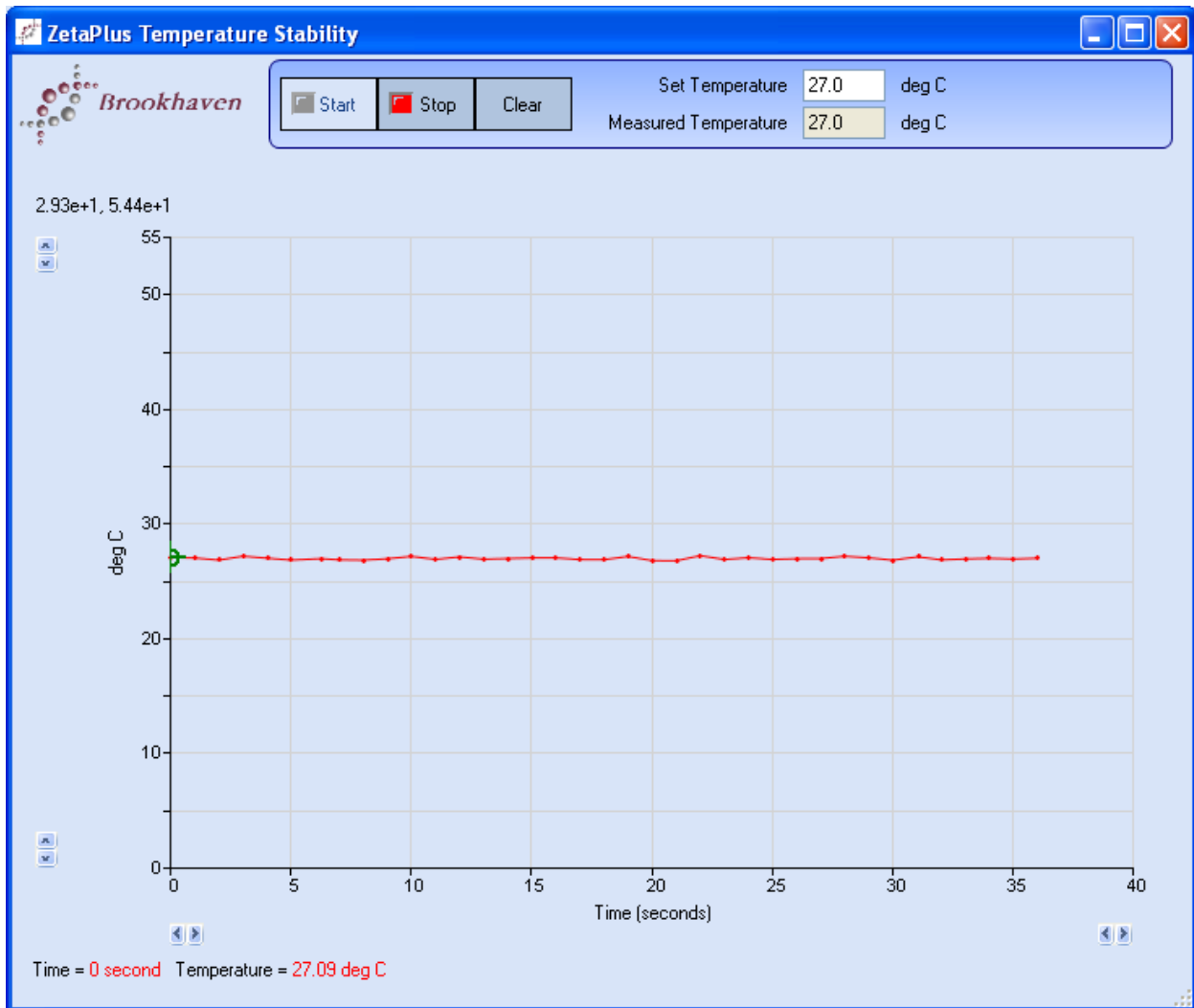
μ Rheology Setup : Diagnostics : Count Rate Stability



Each measurement application that uses a ZetaPlus, ZetaPALS or 90Plus has a count rate stability window that can be accessed from the application's main window by selecting Setup\Diagnostics\Count Rate Stability Graph from the window's main menu.

This window provides direct access to the instrument hardware for diagnostic purposes.

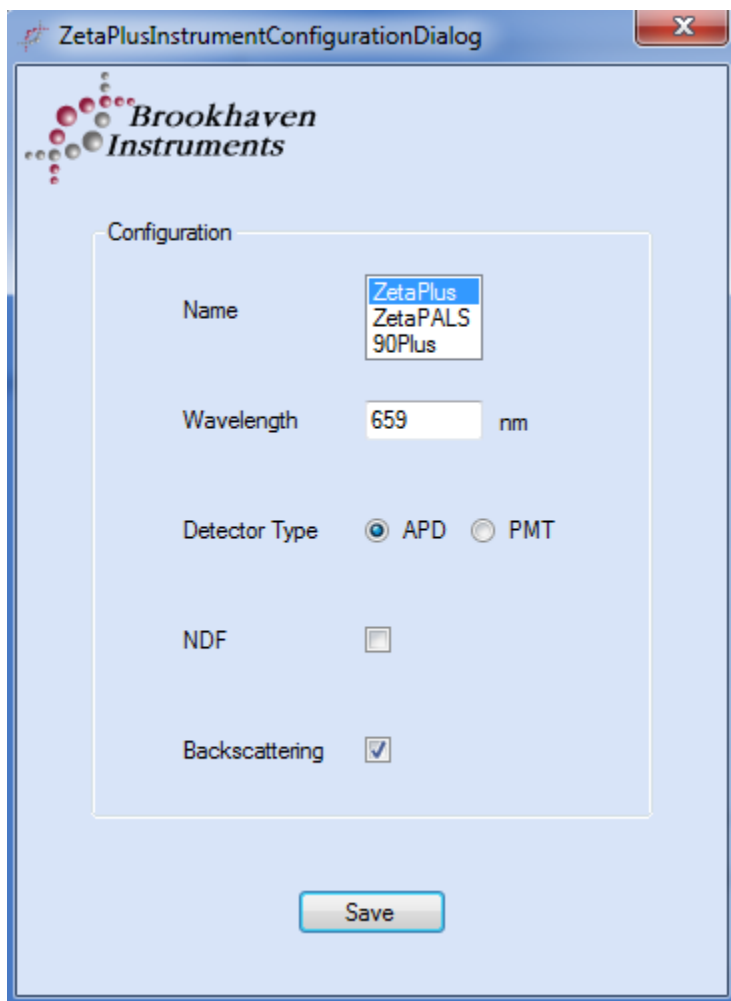
μRheology Setup : Diagnostics : Temperature Stability



Each measurement application that uses a ZetaPlus, ZetaPALS or 90Plus has a temperature stability window that can be accessed from the applications main window by selecting Setup\Diagnostics\Temperature Stability Graph from the window's main menu.

This window provides direct access to the instrument hardware for diagnostic purposes.

μ Rheology Setup : Instrument Configuration



This window lets you set up some basic settings instead of manually editing the ini file.