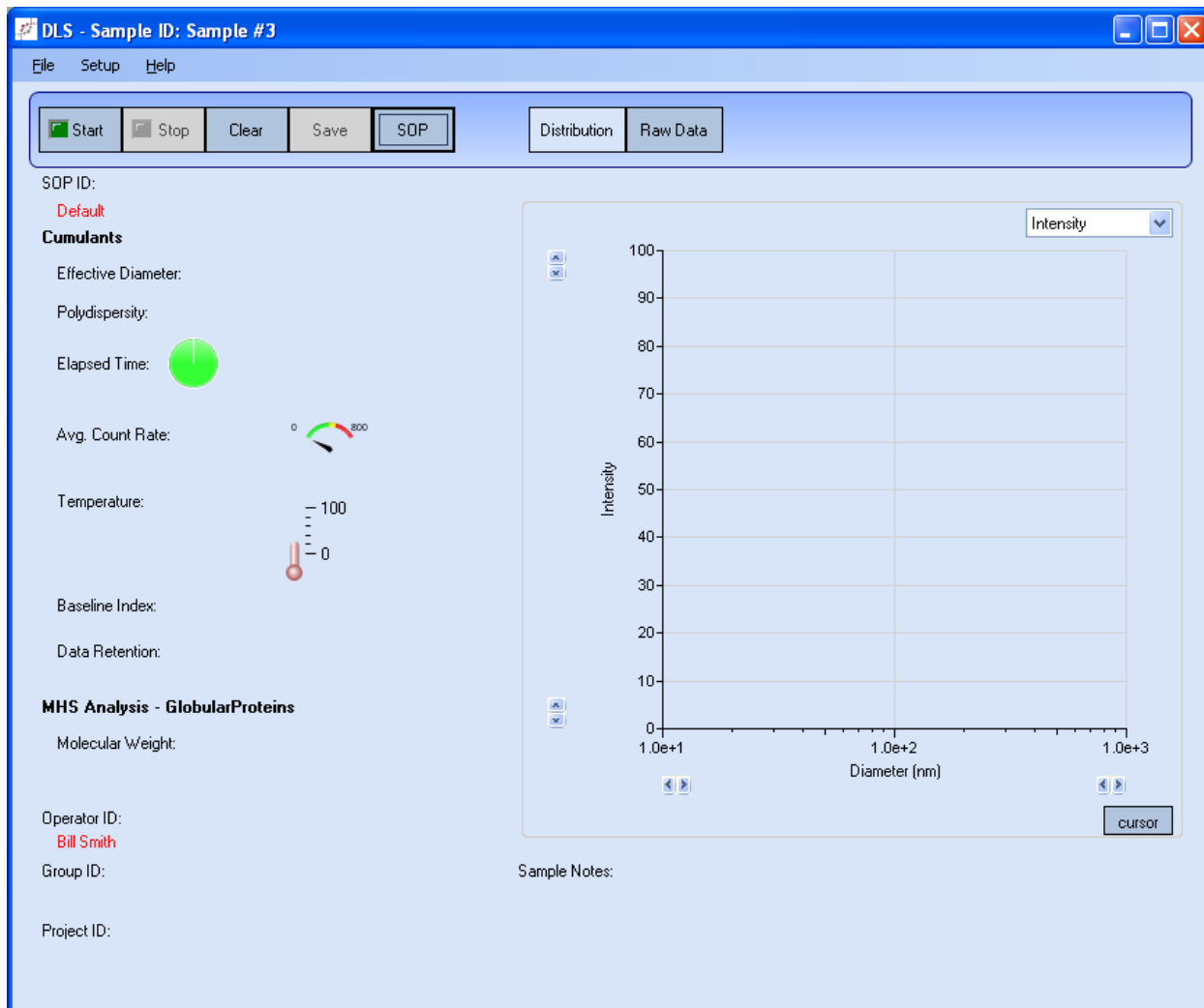


DLS Measurement Quick Start Guide

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DLS New Measurement Window



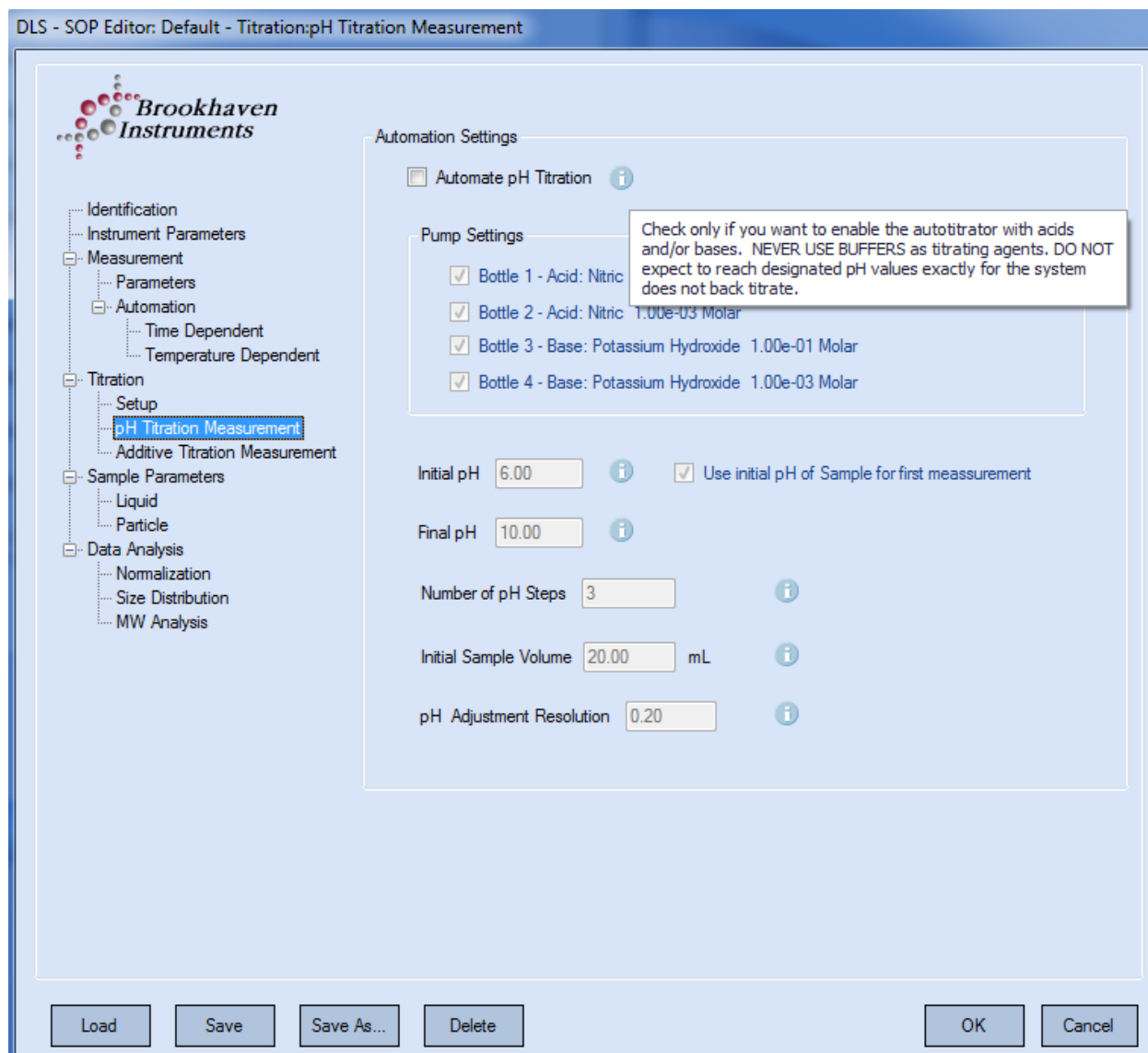
The DLS measurement window is used to collect new measurements.

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.

DLS SOP Help



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

DLS SOP Identification Window

SOP ID: Default - Identification

 SOP ID:

Sample ID:

Group ID:

Project ID:

Batch #:

Notes:

Tree View:

- Identification (selected)
- Instrument Parameters
- Measurement
 - Parameters
 - Automation
 - Time Dependent
 - Temperature Dependent
- Sample Parameters
 - Liquid
 - Particle
- Data Analysis
 - Normalization
 - Size Distribution
 - MW Analysis

Buttons: Load, Save, Save As..., 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.

DLS SOP Instrument Parameters

DLS - SOP Editor: Default - Instrument Parameters



Angle ☐ Forward Scattering ☒ 90 Degree

Wavelength nm

Cell Type

Identification
Instrument Parameters
Measurement
Parameters
Automation
Time Dependent
Temperature Dependent
Titration
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pH Titration Measurement
Additive Titration Measurement
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MW Analysis

Load Save Save As... Delete OK Cancel

Instrument parameters are indicated in this window.

DLS SOP Measurement : Parameters Window

SOP ID: Default - Measurement:Parameters

Brookhaven

SOP ID: Default

Temperature: 25.0 deg C

Set Duration: 1200 seconds

Equilibration Time: 0 seconds

Dust Cutoff: 30.00

☒ Apply dust filter

Load Save Save As... 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.

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.

DLS SOP Measurement : Automation : Time Dependent Window

SOP ID: Default - Measurement:Automation:Time Dependent

Brookhaven

SOP ID: Default

Total Measurements: 7

Time interval between measurements: 0 seconds

☒ Append Measurement number to Sample ID

Identification

Instrument Parameters

Measurement

Parameters

Automation

Time Dependent

Temperature Dependent

Sample Parameters

Liquid

Particle

Data Analysis

Normalization

Size Distribution

MW Analysis

Load Save Save As... OK Cancel

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.

DLS SOP Measurement : Automation : Temperature Dependent Window

SOP ID: Default - Measurement:Automation:Temperature Dependent

Brookhaven

SOP ID: Default

☒ Use temperature automation

Starting temperature: 25.0 deg C

Final temperature: 27.0 deg C

Temperature increment: 2.0 deg C

☒ Append Temperature to Sample ID

Automation completed temperature: 25.0 deg C

Load Save Save As... 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.

DLS SOP Titration : Setup

DLS - SOP Editor: t1 - Titration: Setup



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Bottle Contents

	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.

DLS SOP Titration : pH Titration Measurement

DLS - SOP Editor: t1 - Titration:pH Titration Measurement

Brookhaven Instruments

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MW Analysis

Automation Settings

☐ Automate pH Titration

Pump Settings

☒ 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

Initial pH ☐ Use initial pH of Sample for first measurement

Final pH

Number of pH Steps

Initial Sample Volume mL

pH Adjustment Resolution

Load Save Save As... Delete OK 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.

DLS SOP Titration : Additive Titration Measurement

DLS - SOP Editor: t1 - Titration:Additive Titration Measurement

Brookhaven Instruments

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

Automation Settings

☐ 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 - Mol	Step Volume Dispensed - μ L	Total Volume Dispensed - μ L	Total Sample Volume mL
1	3.00e+000	0	0	20.00
2	2.83e+000	1176	1176	21.18
3	2.67e+000	1320	2496	22.50
4	2.50e+000	1496	3992	23.99

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.

DLS SOP Sample Parameters : Liquid Window

SOP ID: Default - Sample Parameters:Liquid



SOP ID:

Liquid:

Viscosity: cP

Refractive Index:

Navigation tree:

- Identification
- Instrument Parameters
- Measurement
 - Parameters
 - Automation
 - Time Dependent
 - Temperature Dependent
- Sample Parameters
 - Liquid**
 - Particle
- Data Analysis
 - Normalization
 - Size Distribution
 - MW Analysis

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

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

DLS SOP Sample Parameters : Particle Window

SOP ID: Default - Sample Parameters:Particle

 SOP ID: Default

Refractive Index of Particles

Real: 1.590

Imaginary: 0.000

☒ Uniform Spheres ☐ Thin Shells

Identification

Instrument Parameters

Measurement

Parameters

Automation

Time Dependent

Temperature Dependent

Sample Parameters

Liquid

Particle

Data Analysis

Normalization

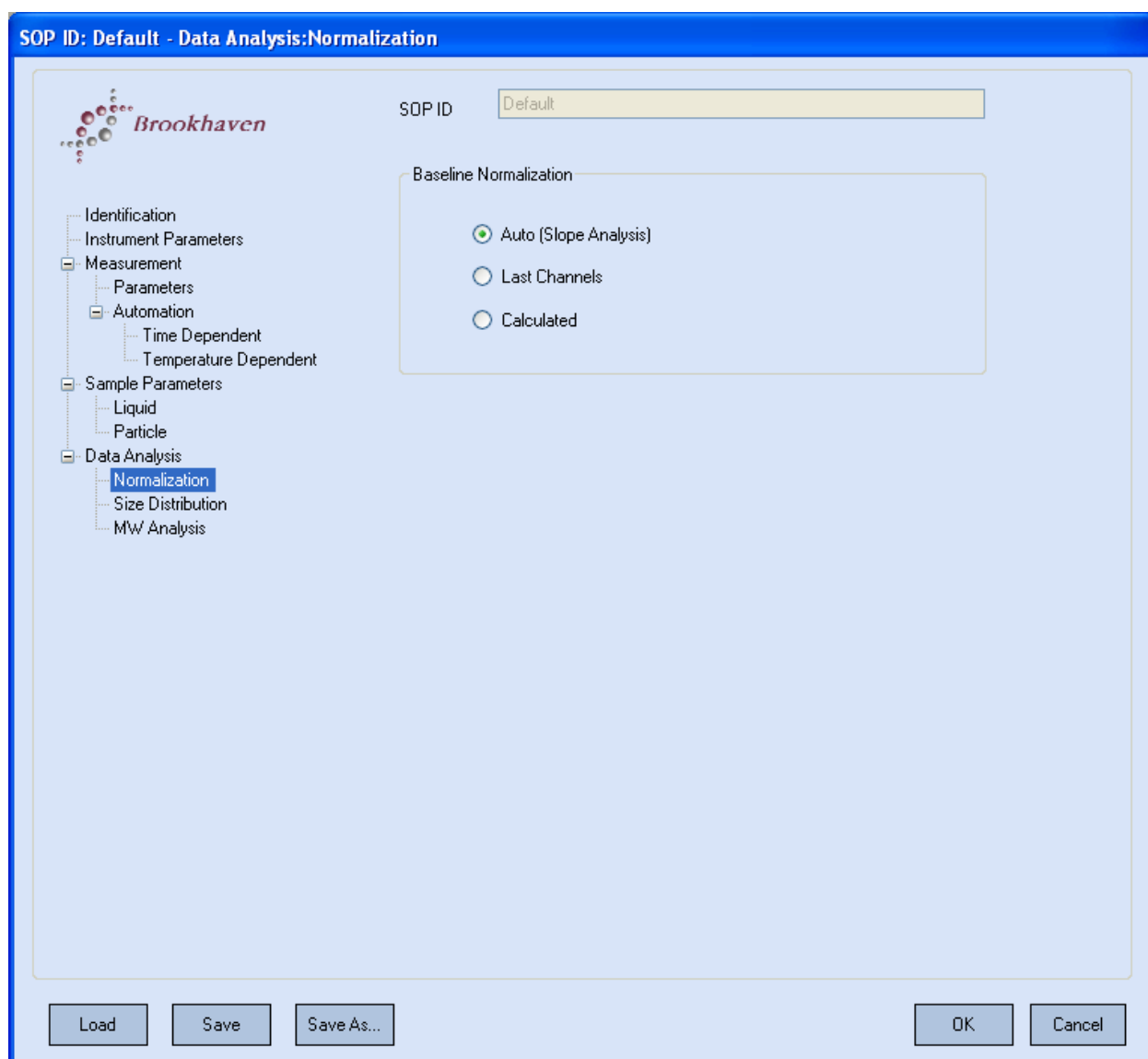
Size Distribution

MW Analysis

Load Save Save As... OK Cancel

In this window, particle characteristics are defined.

DLS SOP Data Analysis : Normalization



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

DLS SOP Data Analysis : Size Distribution

SOP ID: Default - Data Analysis:Size Distribution

Brookhaven

SOP ID: Default

Size Distribution

☐ NNLS ☒ CONTIN

Range Selection

Threshold: 5.0

☒ Automatically Calculated

☒ Particle Sizing

☐ Manually, Diameter

Min: 5.0 nm

Max: 5000.0

Load Save Save As... OK Cancel

In this window the size distribution settings are indicated. You may choose between NNLS or Contin algorithms.

The threshold can be used to indicate the minimum acceptable peak height, expressed as percentage of the maximum peak.

Automatic range selection can be used to invoke multiple calls to the distribution algorithm until an appropriate size range for the sample distribution is determined. Alternatively, a manual range for the distribution calculations may be used.

DLS SOP Data Analysis : Mw Analysis

SOP ID: Default - Data Analysis:MW Analysis

 SOP ID:

☒ Display Molecular Weight Calculation Results

Polymer:

Solvent:

Temp. °C: K: a:

Mark-Houwink-Sakurada (MHS) Configuration

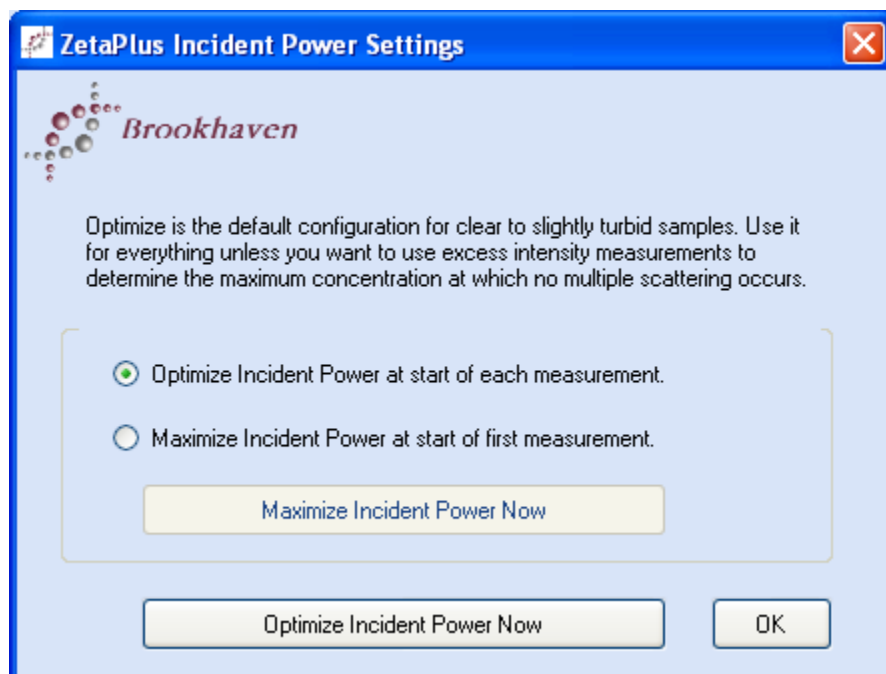
Polymer	Solvent	Temp. °C	K	a
Globular Proteins	water	25.0	7.89e-05	-0.43
Starburst Dendrimer	water	25.0	2.86e-05	-0.30
Branched Polysaccha...	water	25.0	6.71e-05	-0.44
Linear Polysaccharide	water	25.0	1.63e-04	-0.55
Polyisoprene	hexane	20.0	3.98e-02	-0.55
Polyisobutene	heptane	25.0	5.01e-04	-0.56
Polyacrylamide	0.2M KCl	25.0	8.46e-04	-0.69
Polybutylmethacrylate	2-propanol	21.5	6.30e-05	-0.50
Polytertbutylmethacr...	butylacetate	21.0	2.51e-04	-0.55

Load

Load Save Save As... OK Cancel

In this window you may request the display of a calculated molecular weight.

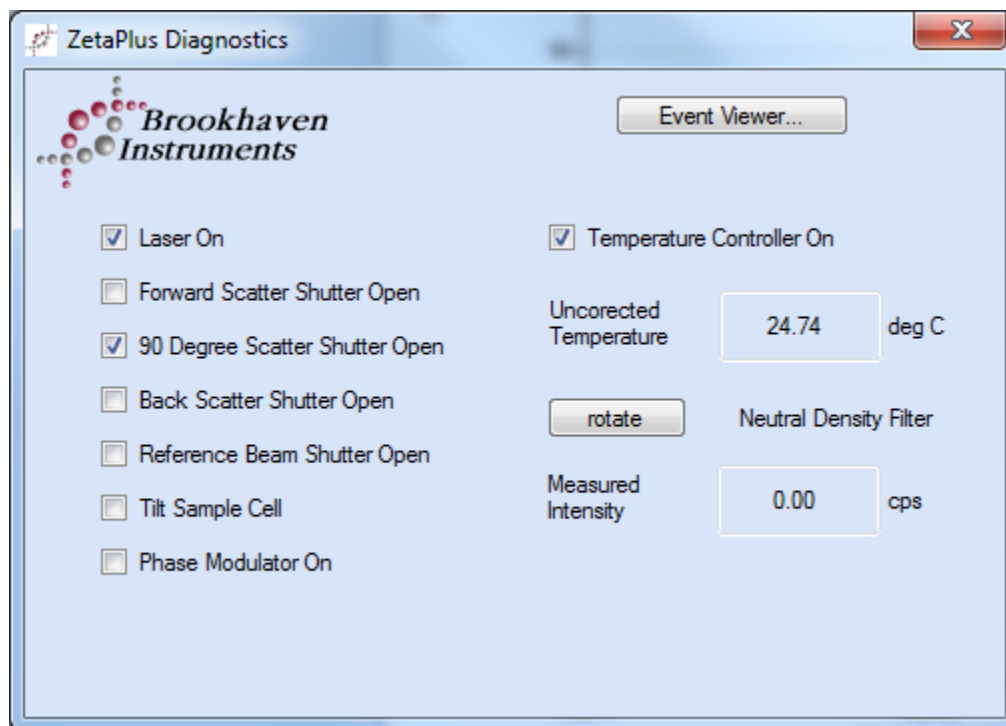
DLS New Measurement Window : Setup : Incident Power Settings



When using a ZetaPlus, ZetaPALS or 90Plus for DLS 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 DLS measurement window's main menu.

DLS Setup : Diagnostics : Instrument Hardware Test

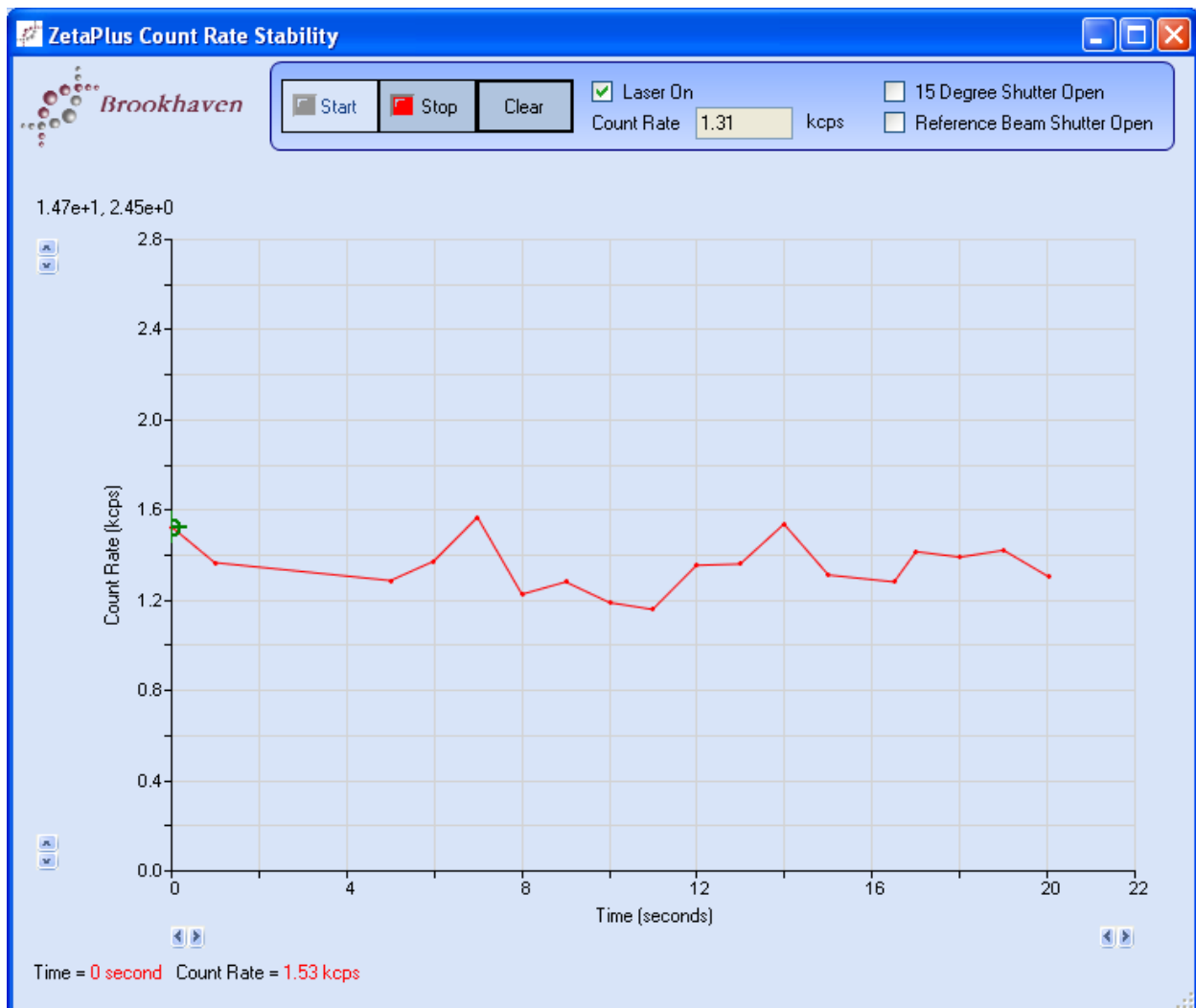


Each measurement application that uses a ZetaPlus, ZetaPALS or 90Plus has a diagnostic window that can be accessed from the application's main window by selecting Setup\Diagnostics\Instrument Hardware Test from the window's main menu.

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.

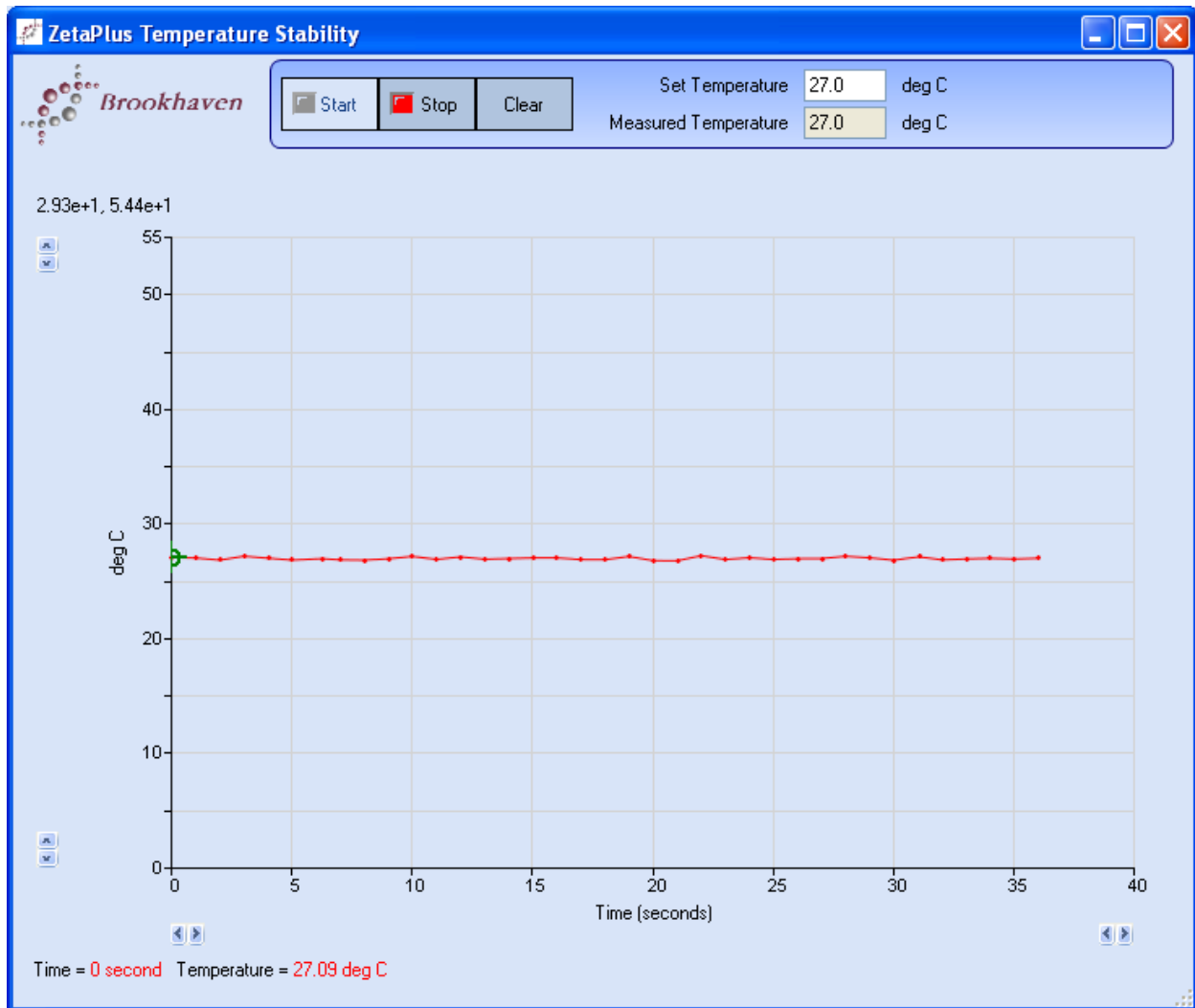
DLS Setup : Diagnostics : Count Rate Stability



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.

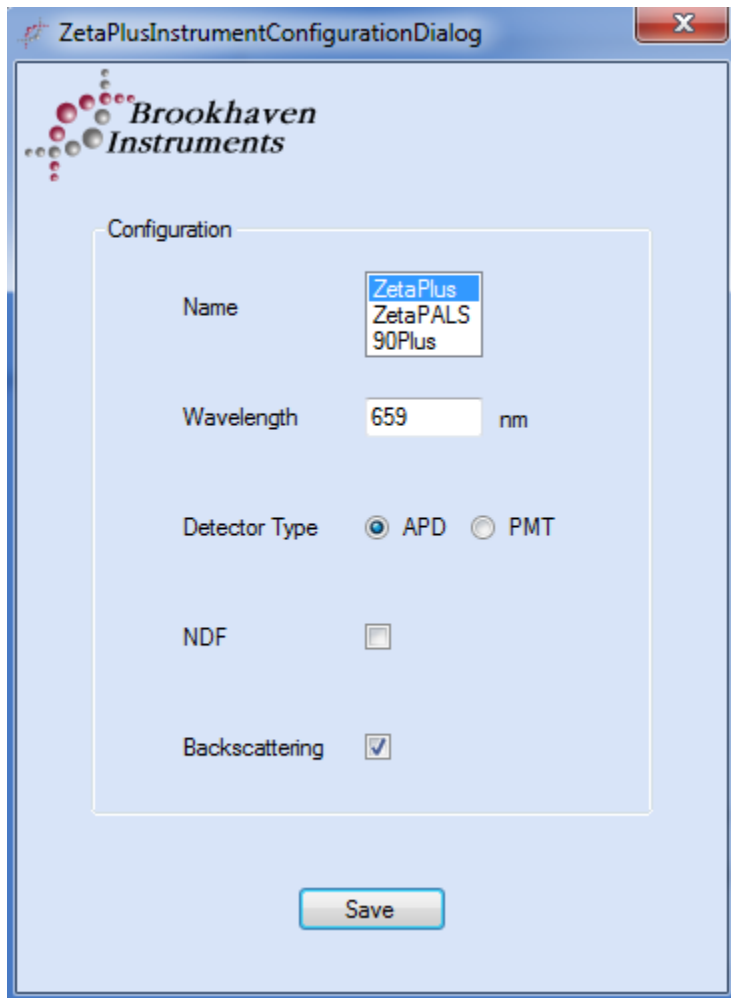
DLS Setup : Diagnostics : Temperature Stability



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.

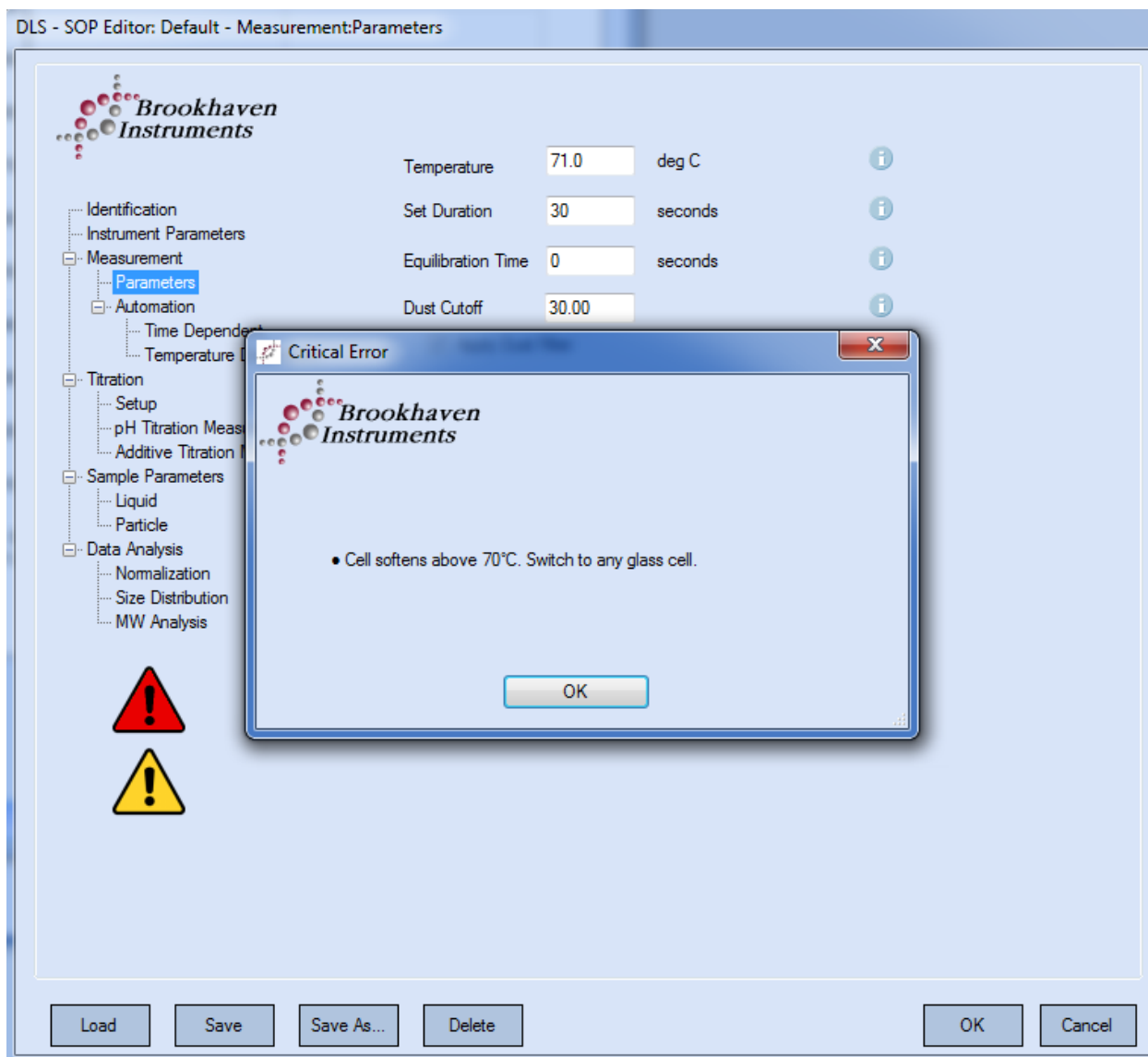
This window provides direct access to the instrument hardware for diagnostic purposes.

DLS Setup : Instrument Configuration



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

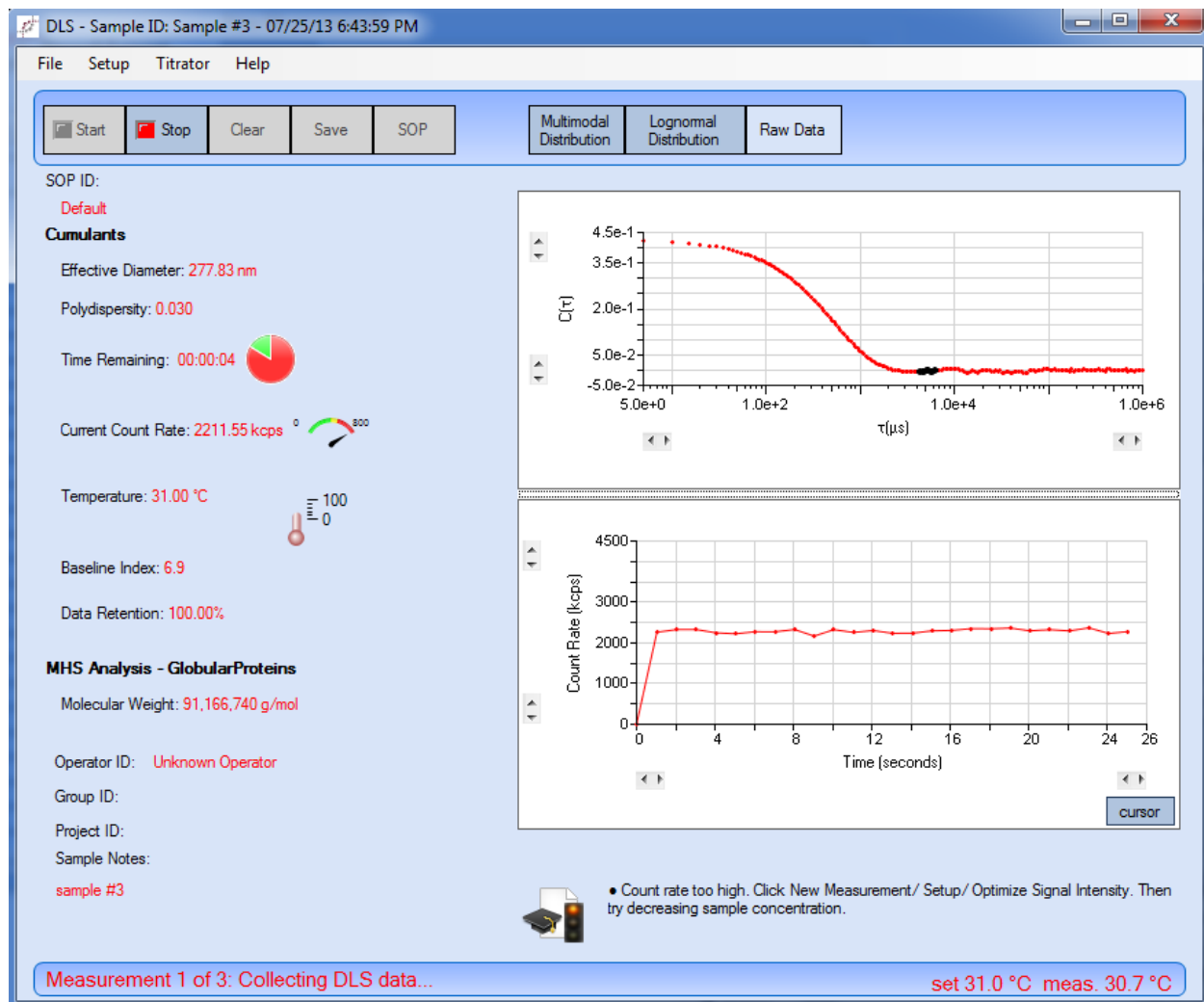
DLS Professional Recommendation Pre Measurement



The exclamation icon will show up when setting conflicts are detected. Click on the exclamation icon to see the error or warning messages. For example, liquid Toluene and cell type BI-SCP (plastic cell) will generate a conflict.

The Red exclamation icon indicates critical error. Conflicts which cause critical errors must be resolved before proceeding to the measurement.

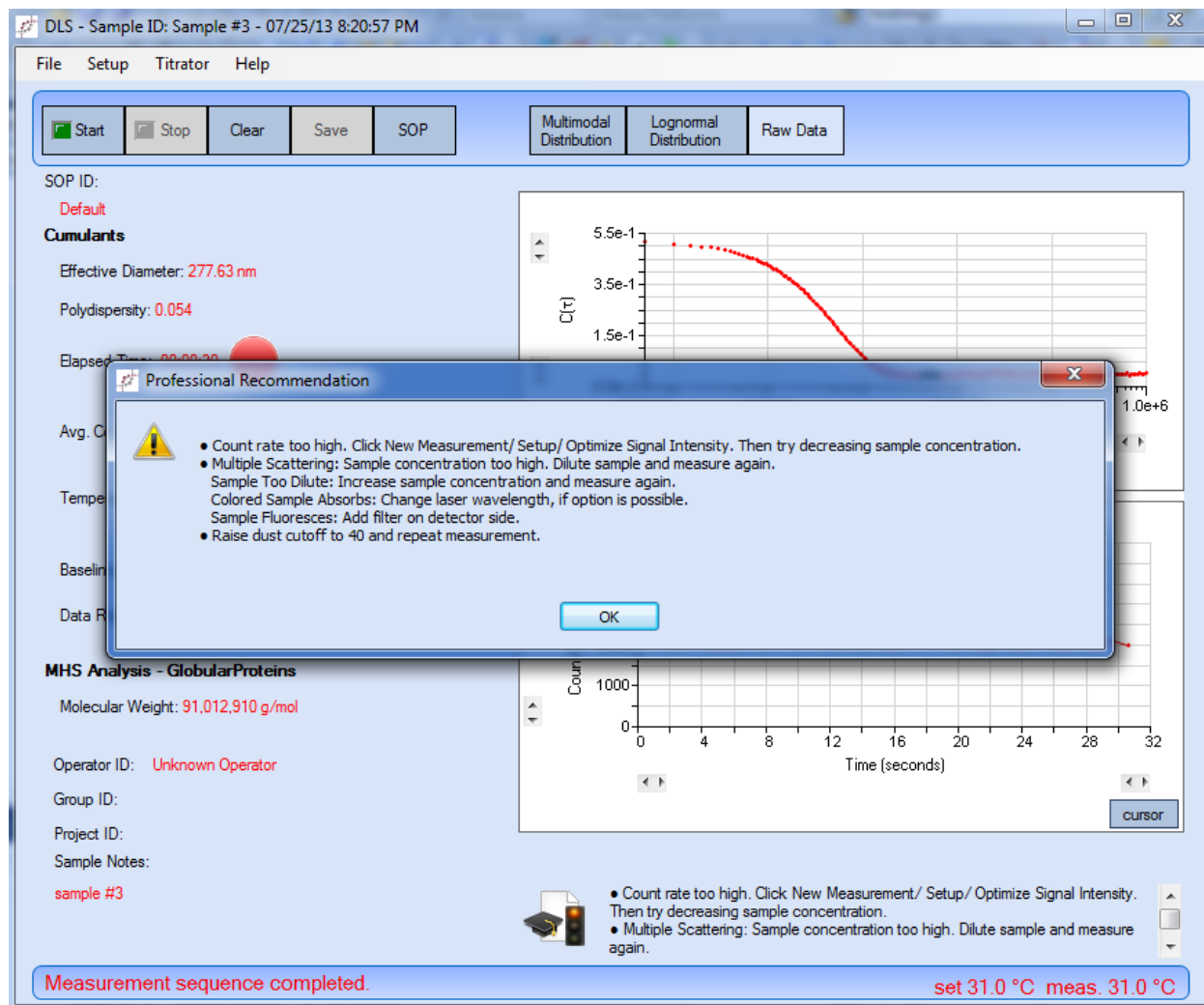
DLS Professional Recommendation During Measurement



Warning messages may be shown during measurement, showing potential conflicts with SOP selections or possible reasons causing measurement results out of range.

Consider warning message, stop measurement if necessary and start a new measurement after making adjustments.

DLS Professional Recommendation After Measurement



After the measurement is completed, warning icon may show up based on the measured results. Click on the icon to see Professional Recommendation, which will suggest solutions for getting better results in the future.