

DynaPro NanoStar Start up/ Shut down Protocol Simplified

STOP

This protocol is for qualified users operating DynaPro NanoStar in IBC 402 only. Dr. Jao accepts no responsibility for actions taken as a result of using this protocol. Reading the manufacturer's software user guide is highly recommended.

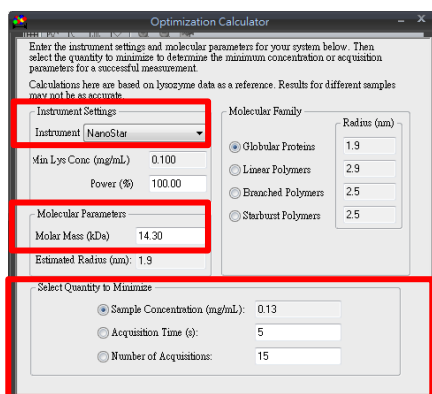
Start up procedure

1. Turn on instrument and control PC. Give the laser at least 30 minutes to warm up.
2. Create a new folder in D:\UserData\Institute\yymmdd to keep the results.
3. Start DYNAMIC 7.10.0.23 software.

Advise for sample preparation


1. Choose **Tool: Calculations: Optimizations**, choose **NanoStar** in Instrument Settings, enter the molecular weight of your sample in Molecular Parameters, enter **5 seconds** for **Acquisition Time**, and enter **15 times** for **Number of Acquisitions**, the Calculator will display the minimum concentration of your sample for measurement.

Advise: For better results, use five times suggested minimum concentration of the sample for DLS and SLS measurements





2. Centrifuging sample and buffer with 0.22 μm filter at 12,000 g for 3 minutes can decrease particle contamination.


Dynamic light scattering experiment

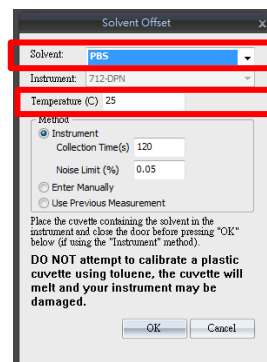
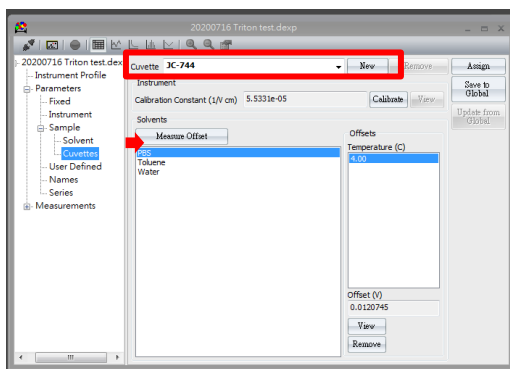
1. Choose **File: Open Preset: Presets: UserPreset** (or click the preset icon  in the main toolbar) and click **DLS_Disp_162960**.
2. Click the left side Experiment tree to set on the experimental **parameters**.
3. Choose **Parameters: Instrument** and set on the temperature for DLS measurement.

Property	Value
DLS Acq Time (s)	5
Read Interval (s)	1
DLS Number Acq	15
DLS Only	No
Auto-attenuation	Yes
Attenuation Level (%)	Auto
Auto-attenuation Time Limit(s)	60
Laser Power (%)	0
Set Temp On Connection	Yes
Set Temp (C)	25
Temp Ramp Enabled	No
Temp Ramp Rate (C/min)	15

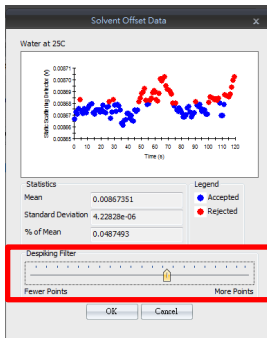
4. Choose **Measurements** and then click the connection icon. 
5. Choose **Parameters: Sample: Solvent**, click **New** to build up a new solvent and enter the parameters of your buffer.
6. Choose **Parameters: Sample**, click **New** to build up a new sample and enter parameters of the sample.
7. Choose your sample at **Next measurement**.
Notice: If you forget to follow step 7 and step 8, you may use **Assign** afterward.
8. Load cuvette with 5 μ l of sample into the DynaPro NanoStar carefully with the trade mark facing the front till you hear a click sound.
9. After the temperature locked, click the green icon  and start to measure.
10. Save data in your folder.
11. Follow **Clean the Quartz Cuvette Steps** below to clean cuvette thoroughly.

Static light scattering + Dynamic light scattering experiment



1. Choose **File: Open Preset: Presets: UserPreset** (or click the preset icon  in the main toolbar) and click **SLS+DLS_Quartz_JC744**
2. Choose **Parameters: Instrument** and set on the temperature for DLS+SLS measurement.
3. Choose **Parameters: Sample: Solvent** to give information of the solvent. You can click **New** to build up a new solvent and enter parameters of buffer.
4. Choose **Parameters: Sample: Cuvette** to set your solvent measure offset as a buffer baseline.
5. Load cuvette with 5 μ l of buffer into the DynaPro NanoStar, till you hear a click sound and wait for temperature equilibrium.
6. Confirm the cuvette is **JC-744**, and click **Measure Offset**. Choose your solvent, set up the **Temperature**, click **OK** and start to measure your buffer baseline.



When the calibration finished, the **Solvent Offset Data** shows the collected data and statics for the data. If you collect data over the noise limit, it will show up the notice window. You can click retry to measure again or click use the data as your buffer baseline.





Use the slider to select 50% points to control the **Despiking Filter**. Data points that have been removed by the filter are **red** on the graph while the points that the filter is keeping are **blue**.

7. Choose **Measurements** and then click the connection icon. 
8. Choose **Parameters: Sample**, click **New** to build up a new sample and enter parameters of the sample.
9. Choose your sample at **Next measurement**.
10. Load cuvette with 5 μ l of the sample into the DynaPro NanoStar.
11. After the temperature locked, click the green icon  and start to measure.
12. Save data in your folder.
13. Follow **Clean the Quartz Cuvette Steps** below to clean cuvette thoroughly.

Thermal ramping procedure

1. Choose **File: Open PreSet: PreSets: UserPreset** and click **Temp Ramping_Quartz_744**.
2. Choose **Event Schedule** to set up the parameters of acquisition time, the number of acquisitions, and ramping temperature from start to end.

Command	Value
Auto-attenuation enable	
Set DLS acquisition time (s)	5
Set number of DLS acquisitions	15
Temperature ramping disable	
Set temperature(C)	25
Temperature ramping enable	
Set temperature ramp rate(C/min)	0.25
Set temperature(C), don't wait	95
Do until temperature lock	
Collect data	
Label meas as current sample temperature	
Wait (min)	1
Loop	
Temperature ramping disable	
Set temperature(C)	25
Wait (min)	30
Collect data	
Label meas as current sample temperature	
Disable laser	

3. Choose **Measurements** and then click the connection icon. 
4. Load cuvette with 5 μ l of the sample into the DynaPro NanoStar.
5. Click the green icon  and start to measure.
6. Save your data in your folder.
7. Assign your sample information.
8. After “thermal ramping” experiment, be sure to clean **Quartz Cuvette** thoroughly.
9. Clean and rinse cuvette with adding 100 μ l EtOH by pipetting and rinse with ddH₂O several times.

10. Dispense about 100 μ l 1% Hellmanex II into the chamber.
11. Choose **Parameters: Instrument** and set on 50°C.
12. When the temperature locked, load the cuvette into the DynaPro NanoStar at 50°C for 10 minutes.
13. Follow **Clean the Quartz Cuvette Steps** below to clean cuvette thoroughly.

Prepare and Fill the Quartz Cuvette or Disposable Cuvette

1. Hold the cuvette so that you can view the sample clearly.
2. Insert the pipette tip until it reaches the bottom of the sample chamber.
3. Dispense about 5 μ l sample into the chamber carefully. If you operate at high temperature, cover 20 μ l paraffin oil (**only for Quartz cuvette**) or silicone oil on top of the sample. The oil will prevent evaporation.
4. Close the cuvette to prevent dust from getting in.
5. Load the cuvette into the DynaPro NanoStar carefully. There is trade mark at the front of cuvette.

Clean the Quartz Cuvette Steps.

1. Remove sample in the Quartz cuvette by pipetting.
2. Transfer Quartz cuvette in cuvette washer system and add 5 mL sample buffer in the solvent reservoir and click **clean** on degassing station to start to wash.
3. Add 100 μ L 1% Hellmanex II in the bottom of the solvent reservoir **twice**.
4. Add 10 mL deionized water in the solvent reservoir **twice**.
5. Add 5 mL EtOH in the solvent reservoir **twice**.
6. Dry and remove dust with filtered dry compressed air. Once the cuvette is dried keep it closed.
7. Check the exterior surface of the cuvette windows, and if there is any smudges or fingerprints, clean softly with the Lens cleaning paper.
8. Choose **File: Open: D:\UserData\ History_Data_ddH2O check_Quartz_JC744** and measure the intensity of ddH2O. If the intensity of 0.22 μ m filtered ddH2O is higher than $42376 \pm 5\%$, clean the cuvette and measure ddH2O again.

Shut down procedure

1. Clean and rinse Quartz Cuvette, dry with filtered dry compressed air and put the cuvette in its box.
2. Close the software.
3. Discard used disposable cuvette and the wastes.
4. Please confirm that you save your data in your folder.
5. Turn off control PC and DynaPro NanoStar instrument.
6. File the log book.

