SOP: Zetasizer Ultra

Purpose: Determine size and zeta potential of nanoparticles using dynamic light scattering

Location: BHE B8 (main area)

Required PPE: Nitrile gloves; safety goggles; long pants; closed toe shoes

Protocol for Use:

1. [Info about turning on computer]

2. Once the computer is at the main desktop, turn on the Zetasizer Ultra instrument by pressing the button located in the back right-hand side. The indicator bar below the large green-colored button will fluoresce orange for a short period and then green. (**Figure 1**).

Figure 1. *Left*: The Zetasizer Ultra turned off with the on/off button located in the back right-hand side of the instrument. *Right*: The indicator bar illuminating orange once the system is turned on.

3. After turning on the Zetasizer Ultra, double-click on the "ZS Xplorer" software in the main desktop.
4. Once the software is opened, click on the "Measure" tab and set the various parameters (**Figure 2**):
    a. "Name": name of the experiment; "Cell": select DTS1070, which is the disposable zeta cuvette that will be used; "Material": select the material used (e.g. micelles); "Dispersant": select the solvent that the material is in (e.g. water). Please refer to the lab protocol for details.
    b. For "Project", click the "+" button to name the project associated with the experiment ([Date] [Name]) (or for an instructional setting, type [Date] [Name of Course]).

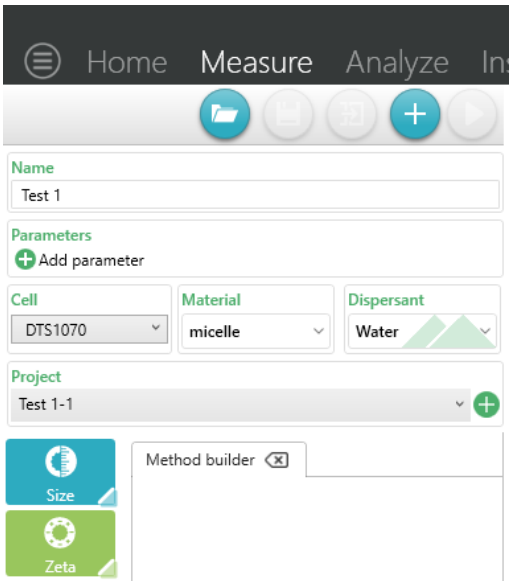

Figure 2. The parameters that need to be set in the "Measure" tab.

5. After setting the various parameters, add the appropriate read-outs to the method builder (e.g. size, zeta) (**Figure 3**).
    a. For "Size", ensure that the measurements are as follows: "Temperature": 25.0; "Return to default temperature": Yes; "Equilibration time": 5. There is no need to change the advanced settings.
    b. For "Zeta", keep the same three measurements, but change these advanced settings: "Maximum runs": 20 and "Pause between repeats": 5.
    c. Select the number of repeats by clicking on the circular arrow icon. There is an option for 1, 3, or 5 repeats. Choose the number of repeats based on the protocol of the module.
6. Once the read-outs are set up, fill a DTS 1070 cuvette with about 700uL of solution using a 1mL syringe. This volume will ensure that the solution in the internal channel is above the gold plates. Add a plastic plug to each side.

7. Press the large green-colored button on the Zetasizer Ultra to open the cover and place the cuvette in the slot with the Malvern logo facing forward. Close the cover afterwards.

8. Once the cuvette is placed into the instrument, click the "play" button icon to run the series of read-outs.

9. After the measurement process is complete, view the results in the "Analyze" tab. A table displaying various values, such as PDI (polydispersity index) and mean intensity, will appear. The type of values displayed can be changed by clicking the green-colored gear icon on the top-right corner.
    a. For size, ensure that the displayed graph has "% number" instead of "% intensity".
    b. NOTE: the data should be transferred to a USB drive or uploaded onto Google Drive. Please follow the protocol of the module for the best back-up method.

10. Remove the cuvette from the Zetasizer Ultra and take out the sample using the 1mL syringe from before. Discard the solution as directed by the instructor and/or TA.

11. Using a squeeze bottle of MilliQ water, rinse the cuvette a few times with MilliQ water before discarding.

12. Close the “ZS Xplorer” software FIRST and then turn off the Zetasizer Ultra.

13. Shut down the computer.

Maintenance Schedule:
With each use: clean any spilled liquid with a Kimwipe sprayed with 70% ethanol.

Contact Information:

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https://www.malvernpanalytical.com/en/support/contact-support/support.html