Standard Operating Procedure

Malvern Instruments Zetasizer Nano series Nano S

Turning on the instrument:

Turn on the instrument (back, RHS, behind red label) and boot up laptop.

Login to the laptop (username and password are on the lid). (Dismiss any pop-ups related to IT support.)

Start software using red shortcut icon on the Desktop: "Zetasizer Software".

Log in to the software using the 'DLS' username.

The ring around the silver open button on the top of the instrument should turn from red and green stripes to just green.

You will see the "Records View" window; any open files from the previous user should be closed at this point. Either open your existing measurement file, or create a new file (and folder) if necessary, using File -> New -> Measurement File.

Please use a clearly named group folder and named subfolder for your data records.

Preparing and loading the sample:

The cuvettes provided by Biophysics require approx. 70 µL sample volume.

Material must be highly monodisperse and stable. It is advisable to filter or spin down samples before loading to remove any highly-scattering large aggregates or dust particles (NB: scattering is proportional to $(diameter)^6$, therefore large particles will dominate the data, even at very low relative concentrations).

ALWAYS replace the lid on the box of cuvettes immediately to avoid dust contamination.

Open the instrument lid by pressing the large silver button on the top of the instrument. Remove the thermal cap with the yellow sticker. Insert the cuvette with the arrow/triangle facing forwards. Replace the thermal cap and close the lid.

Experiment set-up:

File -> Open -> SOP to select an existing SOP file, preferably from your group, (easier than starting from scratch, although File -> New -> SOP is also an option).

A new window opens. "Save as" a name that describes your experiment adequately, in your group folder.

Fill in the options under "Sample". The dispersant viscosity is an important parameter, for which the instrument has an inbuilt calculator: for "Dispersant" select your buffer (new buffers can be created

using the "Add…" key). If using the standard cuvettes provided by the Biophysics Facility (kept in the drawer below the instrument), set cell type to "ZEN0040 - Disposable micro cuvette (40 µL)".

Set the number of runs (scans) per measurement, delays etc. under "Measurement". Typical settings are "Automatic", and Number of measurements "3", delay "0". See manual (kept next to the instrument) for other settings.

For Data Processing, either "Protein analysis" or "General purpose (normal resolution)" is typical, "Protein analysis" giving higher resolution but is less robust.

Save any changes before closing.

Running the experiment:

Click Measure -> Start SOP. A window opens titled "Documentation", in which you can change the sample name. Click OK.

(The ring around the silver open button must be green before the experiment will start. Exit the software and repeat the procedure from the beginning if this is not the case.)

A new window opens. Click on "Start" (large green triangle), at which point the green light will start flashing.

The black bar at the bottom of the SOP window contains information on the progress of the experiment.

Data can be viewed in real time using the tabs in the SOP window.

(Insufficient sample concentrations may result in a low-count or low-quality warning, in which case, raising the concentration may be appropriate.)

If you wish to record multiple samples using the same SOP, you can change the measurement filename by clicking 'Settings' in the SOP window.

Viewing and exporting the data:

At the end of the experiment, the instrument beeps three times. The data are displayed in the SOP window, and new reports are created in the "Records View" window. Intensity PSD is the primary result and gives the most reliable size measurements. However, Volume/Number modes can be used to assess relative contributions and to avoid over-emphasis of large particles which scatter proportionately more strongly.

Records may be overlaid by selecting multiple records using the Ctrl key.

To create PDF files of the reports, Print setup and select "CutePDF writer" under printer name menu, followed by OK. Print, click OK, save as an appropriately-named file in your user group directory.

Data transfer is *via* **clean** USB stick (see below) using the USB port on the LHS of the laptop or *via* the network (e.g. WinSCP). The Zetasizer Software for processing on your own computer can be downloaded from the Malvern website for free, after registration.

When you have finished your experiments:

Exit the software and shut down the laptop. Switch off the instrument (switch at rear). Clean up the bench area. Please inform Simon Quick (sq204@cam.ac.uk) when stocks of the cuvettes are < 1 box.

Cautionary notes:
1) Do not disconnect the instrument from the laptop (USB, rear left port) to avoid having to re-install the driver
2) Use a clean or pre-screened USB stick for data transfer to avoid viruses.

Simon Quick and Katherine Stott, 7th September 2016
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