

# Sample Submission Guideline for ZetaSizer Nano ZS Dynamic light scattering for size and zeta-potential measurements

## I. Sample Submission

1. Register an account on the Biophysics Core Facility (BCF) reservation system.
2. File sample submission form on-line under the instrument, "ZetaSizer Nano ZS".
3. Submit your samples to IBC 402 after making an appointment with Mr. Kun-Hung Chen or Miss Jin-Hsuan Yu. Tel: 27855696 x4024; e-mail: [bcf@gate.sinica.edu.tw](mailto:bcf@gate.sinica.edu.tw)
4. Samples submitted to BCF should be non-hazardous, non-toxic and nonpathogenic. No radioactive or microbial samples are allowed.
5. BCF will not compensate for your sample loss or data loss under any circumstances (hardware or software failure, operator error, or others). All experimental results are for research only. Without written permission from Academia Sinica, the user shall not claim, announce, or mislead the public into interpreting that the results of this testing is in any way related to the commercial development of the user. In addition, the user shall not in any form (including but not restricted to commercial marketing, for example advertisements, either online or offline, product packaging, catalogs, investment information etc,) use the title, logo, name, trademark or symbols that are that of Academia Sinica or similar to that of the facility, that gives the false impression of a commercial collaboration.

## II. Sample preparation

### (1) Size distribution measurement

1. Unless you want to know particle distribution for a given solution, please spin your samples at 12,000 Xg for 5 minutes or filter samples through a 0.22  $\mu\text{m}$  filter to remove bubbles and dusts before submitting to BCF.
2. 100  $\mu\text{l}$  is required for one experiment if micro disposable cuvette is your choice.
3. Please follow table below for minimum concentrations for your samples:

Predicted particle size	Minimum recommend concentration
< 10 nm	0.5 mg/mL
10 nm to 100 nm	0.1 mg/mL
100 nm to 1 $\mu\text{m}$	0.01 mg/mL
> 1 $\mu\text{m}$	0.1 mg/mL

For example, BSA is  $\sim 9$  nm. We need at least 0.5 mg/mL to get good-quality data.

4. Viscosity is very important for accurate size measurements. Please provide viscosity in the sample submission form. You may calculate your buffer viscosity using Sednterp program, written by Dr. John Philo. The program may be downloaded at <http://www.iphilo.mailway.com/download.htm#SEDNTERP>

### (2) Zeta-potential measurement

1. Your sample should be transparent.
2. 2 mL of sample is required for one experiment. Please provide at least 10 mL of buffer for cleaning purpose.
3. Please provide accurate values of dielectric constant, viscosity and conductivity for your buffer.

## III. During Experiments

### (1) Size distribution measurement

1. Samples are loaded to UV-Cuvette micro (7592 00, BRAND) disposable cell.

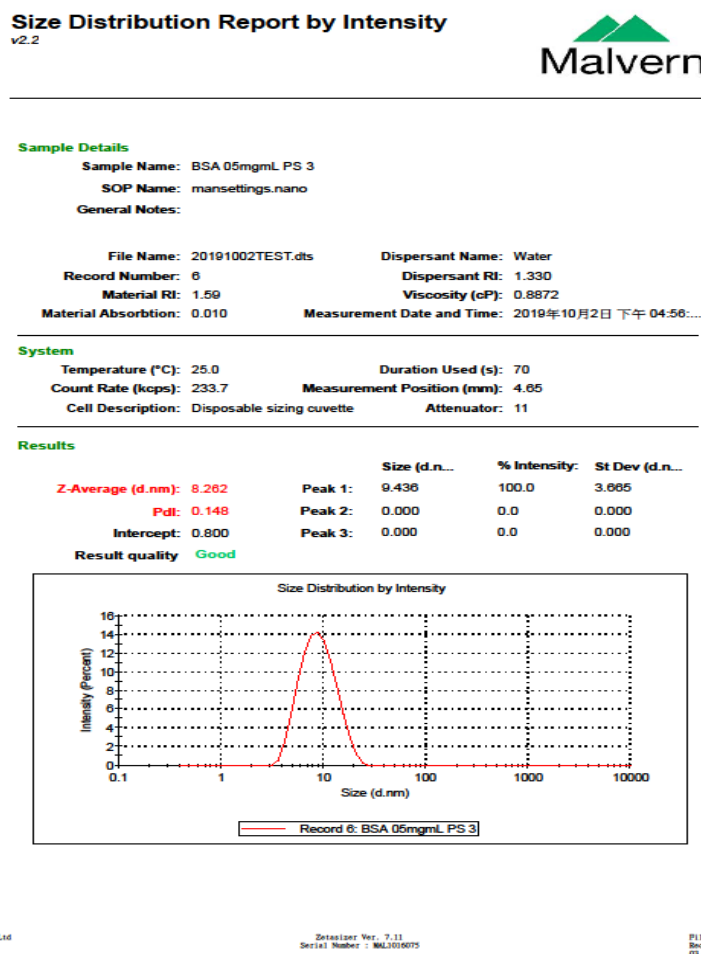
2. Experimental conditions will be automatically optimized, including duration, position, measure runs, and attenuator. We provide triplicates for every sample.
3. All size distribution is analyzed using general purpose model.
4. The detector angle is set to  $173^\circ$  and the wavelength of laser is 633 nm.
5. We will not recover your samples unless stated in the sample submission form.

## (2) Zeta-potential measurement

1. Samples are loaded to folded capillary cell (DTS1070) by syringe.
2. We cannot handle organic solvents for zeta potential measurements.  
For polar solvents, we use Smoluchowski ( $F(\kappa a) = 1.5$ ) for Henry's function calculations.
3. Experimental conditions will be automatically optimized. Instrument will apply general purpose (SFR + FFR) or monomodel (only FFR), depending on samples.
4. The detector angle is  $13^\circ$  and the wavelength of laser is 633 nm.
5. We will not recover your samples.

## IV. After Experiments

1. Raw data is saved in .dts format, which can be analyzed by zetasizer software downloaded from [www.malvernpanalytical.com/en](http://www.malvernpanalytical.com/en).
2. Although data analysis is the responsibility of users, you will receive preliminary analysis and the raw data through reservation system.
3. Figures attached below show exported PDF sample profile of BSA in size distribution analysis.



## V. Acknowledgement

Please acknowledge us if research supported and/or data generated by this instrument results in publications. For example, “We acknowledge ZetaSizer Nano ZS DLS data collected by [operator] in the Biophysics Core Facility, funded by Academia Sinica Core Facility and Innovative Instrument Project (AS-CFII-108-111).”